FRANCHISE AESTHETICS: LOOKING AT HYBRID LIVE-ACTION/ANIMATED IMAGES

THOMAS GEOFFREY LIVINGSTONE

Submitted in fulfilment of the degree of

Doctor of Philosophy by Research in

Film Studies

School of Arts

University of Kent

March 2021

Word Count: 86,851

Acknowledgements

Thanks to everyone in the School of Arts at the University of Kent, for your time and attention. In particular my supervisors, Aylish Wood and Maurizio Cinquegrani: thanks for your early support and for seeing past the typos in my application form!

My research was funded by the Consortium for Humanities and the Arts, South-east England (CHASE) and was kept going thanks to generous extensions through difficult times.

Many thanks to all my friends and family who have been very supportive throughout this process and bravely undertook the task of reading my work, or worse, hearing me talk about it.

Finally, I owe a huge debt of gratitude to Eily and Reuben. Roo, for pestering me to finish. And Eily for everything else. FAAF.

TABLE OF CONTENTS

ABSTRACT

Franchise Aesthetics: Looking at Hybrid Live-Action/Animated Images explores the connections between hybrid imagery – defined as combinations of live-action imagery and animation techniques, recorded images and process of digital manipulation - and the media-epistemological formations that inform everyday life amidst the ever-intensifying use of hybrid techniques throughout visual culture. I examine a range of hybrid procedures from the perspective of their impact on our mediated engagement with the past, our spatial and temporal experience, and the ways we envision the future. This perspective significantly extends existing ways of thinking about hybrid imagery and addresses the urgent problem of how to account for hybrid processes as they become increasingly ubiquitous, yet increasingly invisible.

Chapter one argues that digital colourisation can be implicated in the re-shaping of our access to the past, as exemplified by Peter Jackson's *They Shall Not Grow Old* (2018). Investigating hologram effects in science-fiction texts such as *Pacific Rim: Uprising* (2018), chapter two positions digital compositing as inculcating a new logic of onscreen space which impacts our psychophysiological experience of space. Chapter three examines the ways in which digitally manipulated durations – such as the impossibly extended takes of recent action cinema - have a temporalising effect that informs our experience of passing time. Chapter four investigates computer-animation's incorporation of the epistemological routines of analogue media and puts texts like the *LEGO Movie* franchise (2014-) in a quasi-causal chain with the material culture of tomorrow.

Unifying these themes of time and space, past and future, my concept of franchise aesthetics highlights the instrumental qualities of hybrid images within an hyper-financialised capital-intensive visual culture. Hybrid techniques prefigure, catalyse and normalise the ongoing reconstitution of subjective experience within, and on behalf of, digital capitalism. Offering a critique of the instrumental qualities of hybridity, franchise aesthetics aims to illuminate and inhibit the degree to which hybrid images intersect with and over-determine the structures of feeling that are characteristic of contemporary experience.

[FIGURE 1: *Jurassic Park* (1993)]

INTRODUCTION

"IT'S A DINOSAUR!"

"Let's be honest," says Claire (Bryce Dallas Howard) as she leads some corporate sponsors through the development labs in *Jurassic World* (2015) "…no one is impressed by dinosaurs anymore. Twenty years ago, de-extinction was right up there with magic. These days, kids look at a Stegosaurus like an elephant from the city zoo." The task of my thesis is to name, explain and reframe the ways in which hybrid images - defined as combinations of live-action imagery and animation techniques, recorded images and processes of digital manipulation - have emerged into ubiquity to such a degree that they not only dominate what we see, but have come to shape how we see.

The dinosaurs Claire's talking about were indeed a product of magic - Industrial Light and Magic - and their first appearance in the original *Jurassic Park* (1993) was framed in reverence. In 1993 the journey towards the protagonists' first glimpse of a dinosaur was very protracted. Ambushed by John Hammond (Richard Attenborough) at their dig in New Mexico, Dr Satler (Laura Dern) and Dr Grant (Sam Neill) travel to a mysterious island. Each stage of the journey is marked by

theatrical transitions: their helicopter lands near an enormous waterfall, their jeeps pass through a network of electrified fences. When the journey ends, a sequence of reaction close-ups begins: sunglasses are wrenched from astounded eyes, Dr Grant twists Dr Satler's head to make her see. Finally, a swell of John Williams' theme and… the reveal.

From today's perspective, the sequence is a fairly simple example of the hybridisation of live-action cinematography and computer-animated elements, the recorded performances of the actors are positioned in the foreground, with a CGI dinosaur behind them. Nevertheless, the viewer is in no doubt that the image is an impressive technical achievement, right up there with magic. The scale and movement of the dinosaur and the detail on its skin outstrips the illusory qualities achievable with other forms of special effects, such as the use of stop motion models. The effect has a pronounced wow-factor… by the standards of 1993, that is. Several films, some decades, and innumerable technical iterations later, the first glimpse of dinosaurs in *Jurassic World: Fallen Kingdom* (2018) forgoes any prelude and cuts straight to a pre-credits T-Rex attack. As effects-heavy cold-opens go, there's little that makes it stand out from all the other effects-heavy cold-opens in a crowded field. We've gone from magic to the mundane.

Confirming our generalised familiarity with dinosaurs on screen, the 2018 film follows the credits with some fake news. A BBC World News report recaps the events of *Jurassic World* and establishes the premise of the film's first act: that a volcano is threatening to re-extinct the dinosaurs. There are no pre-emptive reaction shots and the news-reader's impassiveness stands as the polar opposite of Dr Grant's bewildered stare. Beyond just an efficient piece of world building, this integration of dinosaur effects into banal visual formats is a tacit acknowledgement that visual-effects-shots seamlessly integrating recorded live-action and animated elements are a routine part of our visual experience.

When placed side-by-side, the vaunted jouissance of the first film's big reveal and the quotidian nature of 2018's opening speaks to an evolution of several things. First, VFX production itself, and second, the way in which hybrid imagery is perceived: where the illusion has improved, the magic has disappeared. I contend that the ubiquity of hybrid imagery in today's media landscape suggests that hybrid images are more than just a dominant mode, they are approaching what Siegfried Zielinski calls a "vanishing point" (1999, 183). As Evan Calder Williams explains, "this vanishing point marks the way that something becomes unseen not because it has been replaced or faded in importance, but because it has become naturalized, a structure and a given, as we forget how it was to have been otherwise" (17). With hybrid images on the brink of vanishing, this thesis offers as an object of study the fact that no-one is impressed by dinosaurs anymore; the fact that we

are forgetting what it was to see without live-action/animation hybridity pervading the visual landscape.

Before proceeding, I'll briefly introduce my case studies in order to illustrate what I see as being at stake in hybrid imagery becoming a structure and a given of our visual experience. In each of my four chapters, I connect a technical procedure involved in the creation of hybrid images to a media-epistemological outcome that impacts our every-day experience. Specifically, chapter one looks at digital colourisation and examines how this hybrid form mediates our access to, and engagement with history. The second chapter, on holograms and digital compositing, analyses how a new language of hybridised onscreen space can be implicated in the ongoing reconstitution of spatial experience. Chapter three explores how temporal experience is impacted by hybrid forms, such as time-ramping and the impossibly extended takes known as digital "oners." And the final chapter on computer-animation pursues the argument that computer-animation's simulation of photographic media contributes to a pre-determination of how we imagine material cultures in the near future. So, not without ambition, my thesis offers thoughts about the how we relate to time, space, the past and the future, in the context of the intensification of hybrid images evident from the first film in the Jurassic Park franchise to the most recent.

Focussing the argument across the thesis is my notion of franchise aesthetics, which observes that the intensification of hybrid imagery is most prevalent in franchise film-making and other hyper-financialised production modes. The hyper-financialisation of contemporary visual culture means that the image, hybrid or otherwise, is very often operative within a chain of financial transactions, and the production and effect of capital-intensive imagery is contingent upon a constellation of inter-related financial interests. Marvel's breakout success, *Iron Man* (2008) was, for example, financed in part by Merrill Lynch with a loan secured by the collateralization of intellectual property rights to ten superhero characters in the Marvel stable (Konda, 2016; Armitage, 2019). Contemporary mainstream cinema is underpinned by a range of financial instruments and interests such as this, not least in the realm of hybrid imagery where the use of proprietary VFX software and specific content licenses inform the production of a vast swathe of the images we see on a day-to-day basis. My thesis will develop the idea that the financialised conditions of hybrid image production inform the way in which they are received, and suggest that hybrid imagery's reconstitution of recorded, cinematographic spatial and temporal forms is related to the profitability imperative that underlies capital-intensive film-making.

The first task of this introduction is to contextualise my work in the literature surrounding hybrid live-action/animated imagery and delineate an approach to hybrid images that accounts for

their ubiquity. This involves compensating for what I perceive to be an absence in two bodies of critical literature, specifically that dealing with hybrid live-action/animation imagery and that dealing with contemporary mainstream digital cinema. In the first instance, the literature that deals explicitly with live-action/animation hybridity doesn't do so from a perspective that illuminates the instrumentality of hybrid images in creating the "structures of feeling" (Williams, 1977) within which we live. They do not consider the possibility of hybrid techniques passing Zeilinski's "vanishing point" and becoming not just a given of mainstream film culture but a structural element in how we understand the world around us. Broadly put, a focus within the literature on the specific features of hybrid images and the inter-relation of their constituent elements results in examinations of *what* qualifies as a hybrid image as well as studies of *how* hybrid imagery is produced. This helps justify my choice of hybrid sub-categories for analysis. But, in contrast to this body of literature, my project is less concerned with how a hybrid effect is produced and more concerned with what effect the hybrid image might have on our habitual perception of visual media. As hybrid images become an increasingly routine part of visual culture, a media-epistemological summation of the deeper ramifications of hybridity on our lifeworld remains to be written.

The challenge that will emerge from this overview has to do with establishing a consistent approach to hybrid imagery, despite the variance internal to the category. This approach is urgently required because, from the point of view of my thesis, the category of hybrid images is expanding and its effects upon our routine perception of visual media intensifying. I will use the writing of Vilém Flusser in order to work towards a methodology that can engage consistently with the heterogenous forms of hybridity as they occur not just on large-scale cinema screens, but as an affordance of every smartphone screen and camera app. My reading of Flusser offers a way of looking at hybrid images that remains consistent despite the internal variance of hybridity as a category and the fact that some hybrid techniques are legible whereas others have disappeared into ubiquity. Most importantly, however, my use of Flusser will establish a model for an instrumentalist critique of hybrid images - connecting specific effects to specific aspects within our structures of feeling - that is lacking from other approaches to the topic.

In the second half of this introduction, I will build on this novel media-epistemological framework by looking at some of the literature dealing with visual culture's digital turn and beyond. This scholarship has, as a prominent theme, how twenty-first century image culture is implicated in the formation not only of structures of feeling, but of our basic sense of being-in-the-world. As the editors of a representative volume, *Post-Cinema: Theorizing 21st Century Film* put it, digital image culture is involved in "actively re-shaping our inherited cultural forms, our established forms of subjectivity, and our embodied sensibilities" (Denson and Leyda, 2016, 2). Whilst outlining my

sympathies with this way of thinking, I will suggest that missing from this theorisation of contemporary image culture is a direct engagement with the aesthetics of hybrid images. Supplementing work dealing with what Denson and Leyda characterise as the "post-cinematic media regime" (2016, 4) with my particular perspective of hybrid live-action/animated imagery will help establish the premise of my project: looking closely at hybrid images can deepen our understanding of how we live. I will then close this introduction by putting forward the concept of franchise aesthetics as a way of identifying the intensification of hybrid imagery within mainstream film culture and examining the possible ramifications that this intensification might have upon cultural forms, subjectivity and sensibility. This articulation of the concept of franchise aesthetics will also open a space wherein the moment of spectatorship is reframed as an opportunity for pleasure and resistance.

SECTION ONE: APPROACHES TO HYBRID IMAGES

A great deal of the writing that deals directly with images that hybridise recorded live-action images with animation techniques does so with a typological energy that helps, first, to establish the continuities between pre-digital and digital forms of hybridity, and second, to facilitate the task of categorising images as hybrids as and when new forms of hybridity appear. The intertwined essays of Frederick Litten (2011) and Franziska Bruckner (2015), for example, pursue exhaustive typologies of hybrid forms in order to establish the "film analytical parameters for Live Action/Animation Hybrids" (Bruckner, 2015). For both of these scholars, hybridity is a legible phenomenon with the "interaction of animation and live action film within an image constitut[ing] the common denominator among the various… hybrid formats" (Bruckner, 23). What this focus on legibility allows is a comprehensive list of the different types of hybrid image produced - in Litten's case - up until the 1980s and - in Bruckner's case - from the 1980s through to today. Along with the work of Erwin Feyersinger (2010, 2017), the typological essays identify several modes of live-action/animation hybridity, such as "drawn and human characters interacting in a real environment" (Litten, 2011, 4), which are appropriate descriptors for a broad range of examples from both sides of the digital turn. In so doing, they demonstrate how the hybridisation of live-action cinematography and animation techniques is a long-established practice within pre-digital film-making that has both intensified and diversified with the advent of digital technologies.

However, this typological agenda, whilst aimed at firmly establishing the parameters by which one does and does not identify an image as hybrid excludes two things that are vital to my project. First, an experiential consideration of the image and second, the fact that hybridity, even the sort of flamboyant hybridity that sees actors sharing the screen with dinosaurs, is becoming more and more of a given. As to the first point, whilst the categorising tools offered are useful in highlighting the multiplicity of hybrid operations, the assumption that all hybridity is legible depends upon a spectator who is consistently attentive to the medial conditions of the image and, resultingly, resistant to the illusions that the image might be offering. For example, the image of Dr Grant and Dr Satler in front of a dinosaur can be defined in Bruckner's terms as an A4, B4, C3 hybrid (that: is a combination of live action and 3D digital animation (A4) in which the interaction between elements occurs across all planes of the image (B4) but that can only be discerned as distinct due to the impossibility of the elements on screen having been captured in live-action footage (C3)). As useful as these parameters are, they disguise the fact that Dr Grant's incredulous blurt, "it's a dinosaur" channels the experience of the viewer who perceives the content of the frame before discerning its construction. Secondly, this marginalisation of viewer experience leaves little room for the questions that are at the core of my research, namely, what impact do hybrid images have on our broader experiences? As hybrid techniques pass their "vanishing point," how can we engage with the effects they have, both in the creation of images on screen, and on the way in which we orient ourselves in the world as a result of those images?

Beyond the typological approach, a concern with how hybrid images are produced - as opposed to what effects they might have - characterises other pieces of theory that deal with hybrid images. Most prominent is the work of Lev Manovich, whose prolonged consideration of hybrid image culture consistently refers to "the hybrid revolution" (2006a). In a range of essays from the mid-2000s, Manovich frames hybrid aesthetics through the lens of "deep remixability" (2006a, 2006b, 2007). As Manovich puts it, "what gets remixed today is not only the content from different media but also their fundamental techniques, working methods, and ways of representation and expression" (2007, 9). The concept of deep remixability explains *how* the "hybrid revolution" occurred without opening up the consequences of such a revolution. In Manovich's words: "United within the common software environment, cinematography, animation, computer-animation, special effects, graphic design, and typography have come to form a new *metamedium*" (2006b, para 2). For my purposes, the idea of deep remixability places too much importance on the context that affords the hybridity (i.e. the "common software environment") and doesn't pay enough attention to the way in which the re-mixed elements within the image strike the viewer. Manovich's hybrid revolution is principally a technical procedure and not a visual experience.

A teleological trajectory towards the digital metamedium informs many studies that touch upon hybridity, by merit of being written in the context of the boom in hybridity over the past few decades. As exemplified by the title of Manovich's *Software Takes Command* (2013), several works concerned with the emergence of digital media and digital culture focus on the way in which - after McLuhan (1964) - new media simulate, absorb and subsume the structures and practices of the media that precede them. This is a common thread uniting Bolter and Grusin's *Remediation* (1999), Henry Jenkins' *Convergence Culture* (2006), as well as the latter parts of Sean Cubitt's *The Cinema Effect* (2004a). What is lost in endeavouring to sketch the contours of the new media regime is an opportunity to engage with hybrid aesthetics in a granular fashion. This granularity, as my thesis will bear out, reveals the way hybrid images operate upon our habitual ways of looking at images. It will uncover the ways in which hybrid images entrench or disrupt the epistemological routines associated with their constituent media.

Taking the first sight of dinosaurs in Jurassic Park as an example, seeing the image as the result of sophisticated programming and the convergence of live-action cinematography and 3D computer-animation within a common software environment is not enough. When Dr Grant (Sam Neill) points and says "it's a dinosaur," the simple phrase sparks for me a concatenating series of negotiations with the image. The evident hybridity of the image discloses certain things about its construction and intimates further things about our habitual relationship to the live-action cinematography and computer-animation. Specifically, I know that Sam Neill is not, in fact, standing in front of a dinosaur, and that the dinosaur is an animated element that has been composited into the image. However, I can't leverage that knowledge into a real-time deconstruction of the illusion, nor would I want to. Like Dr Grant, standing in front of the dinosaur, I am less concerned with how I see what I see, and more with what it is that I am seeing. And yet, despite my absorption, I am aware that there is a way of accounting for the image, of peeling apart its elements and perceiving the array of techniques that put the dinosaur in front of me. What is more, I am aware that the procedures that account for the hybrid image govern my perception of it, the procedures that juxtapose an actor and a dinosaur are geared precisely towards soliciting my credulity, despite my prior and certain knowledge regarding dinosaurs and/or VFX. As a result, the image of the dinosaur isn't just a new thing to see, it instantiates a new way of seeing; it is a successful provocation resting on a sophisticated combination of media, one of which automatically captures images of actual objects, the other very deliberately building illusions of actuality.

One recent piece of critical literature that dedicates itself to the phenomenon of media hybridity without insisting on the visibility of hybridity or the teleological overdetermination of digital media is Kim Ji-Hoon's *Between Film, Video and the Digital: Hybrid Moving Images in the Post-*

Media Age. Kim's study of filmic, videographic and digital media takes as its starting point what he calls "the ambiguous cohabitation" of media "specificities" (2016, 46). Kim uses the work of D.N. Rodowick to pick out a "dialectic of medium specificity and hybridity" (Kim, 2016, 6) wherein hybridity is understood against the backdrop of the specificity of its constituent elements, the formal and material conditions of the media that is continually under scrutiny in the artworks that Kim investigates. As Kim puts it "the formal, technical, and aesthetic components of non-digital media are still at play in the operation of new media, even though the processes of simulation and transcoding replace their materiality" (18). Using this nuanced approach, Kim's work resolves the problems discovered in both the typological approach to hybrid imagery and the approach typified by Manovich, which I have been discussing as a form of digital teleology.

In the first instance, the dialectic of medium specificity and hybridity maintains a focus on aesthetic components that remain "at play" despite being transcoded from their original medium. This acknowledgement of the residual impact of the constituent media is vital to my project, as it emphasises the role that routine ways of looking at non-hybrid images play in our perception of hybrids. Secondly, and relatedly, this perpetuation of the operative dimension of the residual media forms within an image disempowers any overly determining reading of a hybrid image within the context of the digital regime. Kim channels W. J. T. Mitchell's aphorism that "all media are mixed media" (2005, 399) in a bold re-hierarchisation of the terms "moving image" and "hybrid moving image." Kim suggests that "it is more productive to identify different moving images grounded in the variability of a single medium of the different combinations of more than two media, rather than insisting upon the 'moving image' as a general category" (7). Echoing this, I'd suggest that viewing hybrid images as predominantly digital is unproductive in analysing how they operate. Despite the digital image's availability to what Philip Rosen calls "practically infinite manipulability" (2001, 322) when looking at an image, such as the one of Dr Grant and Dr Satler standing in front of a dinosaur, there are portions of the image that we perceive as free of manipulation, even whilst we understand the whole thing to be an elaborate and finely tuned illusion.

Considering visual media to be only digital loses sight, once again, of the multiple sedimented routines associated with analogue media that digitality has absorbed and repurposed. As a consequence, it becomes difficult to perceive the aesthetics of hybridity as having a media-epistemological impact and contributing to structures of feelings. One of the key goals of my thesis is to discern the ways in which this growing category of images is intertwined with our experience of the world. Only by paying close attention to the phenomenological qualities that the ambiguous cohabitations of medium specificities throw up can we discern the way in which hybrids create new spatial and temporal experiences, and by extension, develop new modes of relating to the world.

Not all writing that deals directly with hybridity proves inattentive to the phenomenological qualities of hybrid imagery. Stephen Prince's work, for example, is organised around the concept of "perceptual realism," which emphasises the success of digital illusions (Prince, 2014). Prince's work is concerned with how digital visual effects "enable filmmakers to extend the visual properties of cinema in ways that are consistent with photographic images and also in ways that subvert, alter, or otherwise depart from what the optical system of camera machinery dictates" (98). His emphasis is on the expressive possibilities of hybridity and the new narrative forms that can be explored within the parameters of perceptual realism. What is missing, for me, is a consideration of how hybrid imagery has a deeper epistemological effect. It is a premise of this thesis that what Prince identifies as "the extension of the aesthetics of cinema" (55) brought about by digital visual effects also amounts to an extension of the way in which aesthetic experience organises our perception of the world around us; an extension that implicates hybrid live-action/animation imagery in the augmentations of our basic experiences of, for example, time and space.

The work of J.P. Telotte, by contrast, stands as an interesting precedent for an investigation of how the phenomenological effects of hybrid live-action/animation imagery can be used to discuss more general issues. Telotte uses Paul Virilio's thesis about the cinematisation of vision, and the replacement of reality by a reality effect, to investigate how developments in hybrid images "for all their promise, also resonate with another cultural fear that many people share… that of becoming swallowed up by the digital space of the computer, animated by our own technology" (2010, 7). In his chapter on "Digital Effects Animation and the New Hybrid Cinema" Telotte argues that hybrid images contribute to a "larger negotiation… as they try to work out a relationship between the real and the animated, the live action and the digitally fashioned, which inevitably has implications for our own natures" (241). Telotte's work acknowledges its debt to Lisa Purse (2007), whose own consideration of the representation of the body within hybrid images helps frame the way in which hybrid live-action/animation images, despite their spectacular and evidently fabricated nature, nevertheless reflect a set of very real concerns. Specifically, Purse recognises "underlying anxieties about the integrity of the human body that digitally animated (and thus digitally mutable) bodies might provoke" (2007, 22). This critical engagement with digital effects as reflective of a collection of affective conditions that can be tied to the paradigm shift of the digital is extended in Purse's later work (2011, 2013) as well as that of Angela Ndalianis (2005), Andrew Darley (2000), Michele Pierson (2002) - who deals with special effects in particular - and Thomas LaMarre (2009), Kristen Whissel (2014) and Aylish Wood (2007) who look at the influence of digital imaging technologies in a wider sense.

The above examples contribute to my own perspective on hybridity in many implicit and explicit ways. My thesis seeks to build on this scholarship with a simple claim: hybrid imagery, the routine manipulation of recorded live-action footage by animation techniques, is increasingly ubiquitous and central not only to what we see on screen but our experience in general. That is, I take the specific conclusions of scholars such as Telotte and Purse and extrapolate that the intensification of the use of hybrid images over the past few decades is not just reflective of new conditions of experience, but, significantly, generative of those conditions as well. Hybrid images aren't just refractions of our own relation to digital technologies, they are productive of specific epistemological augmentations that take place in parallel with the re-constitution of daily life under the regime of the digital.

If the typological perspective gets too bogged down in the details, and the digital media perspective loses sight of the significance of individual details, what is needed is a methodology for looking at hybrid images that is sensitive to the aesthetics of hybridity whilst also attendant to the possible outcomes were those aesthetics to disappear from view and our ways of looking at hybridity become routinised. In order to sketch a loose picture of how I will be looking at the images in my case studies, it's time to introduce the work of Vilém Flusser. Specifically, I will introduce his work on technical images (images created automatically by an apparatus that hides the criteria of its functioning from the user), the connected concepts of the "reversal of the vector of signification," (2000, 37) and the "pragmatic dimension of technical images" (2011b, 49), and finally, his overall conception of the "universe of technical images" (2011b). In discussing these key concepts, I make no claim to summarising or updating Flusser's work in total, but rather aim to establish the intellectual framework and methodological background that informs my perspective on hybrid images.

The principal contention of Flusser's media-epistemology is that the formal properties of a given medium codifies the world and our experience of it. We do not live in the world, per se, but rather the world as produced by dominant media: "the photographic universe" (2000) for example, or the "the universe of technical images" (2011b). For Flusser then, every technological revolution is also a social revolution, as new media technologies impose new forms of consciousness. Within this cosmology, the invention of photography represents an enormous change. Not least because the codes – like the written alphabet - that inform processes of mediation disappear from view. When it comes to photography there is no language to be learned, no process of decodification standing between the image and our understanding of it and the world it depicts… at least that is how we habitually engage with photographs. For Flusser, this is a misperception and the importance of this

habitual misperception of photographic media cannot be overstated, it is foundational to the epistemic formations, ontological hierarchies, social configurations and lifeworld that follow.

Flusser describes what happens when we look at a technical image in the following way: "the apparently non-symbolic, objective character of technical images leads whoever looks at them to see them not as images but as windows… Consequently, they do not criticise them as images, but as ways of looking at the world" (2000, 15). This misperception of technical images as windows onto reality as opposed to coded and encoding mediations is crucial in Flusser's work: it is the means by which photography has a profound ontological effect. Flusser's view of photography and its (mis)perception overturns the relationship between reality and the image. Because we perceive photographs as windows rather than images, and attribute the image with the status of reality, there occurs what Flusser calls throughout his work a "reversal of the vector of significance" (cf. 2000, 2011a, 2011b, 2013). Key to this reversal is the way in which photographs come to function as evidence about reality that in turn organises reality. The example Flusser uses is that of the passport photograph which is more real, from the perspective of the bureaucratic institution within which the passport functions, than the person whom it signifies. As Flusser puts it: "It is not the world out there that is real… only the photograph is real… We are dealing here with a reversal of the vector of significance: It is not the significance that is real but the signifier, the information, the symbol" (2000, 37). This reversal of the vector of significance is something that has become exacerbated within digital culture, both in terms of what secures one's identity in a digital context and in terms of the quality of experience. Not only does the density of the information and images that surround us correspond to the weight of reality, but within this system, for me at least, personal experience can feel untethered and at times unreal. Smart-phones signify the people who use them, but given the reversal of the vector of significance, the information they contain is more real than the person to whom it refers. When you lose your phone, more than just feeling lost, you become disaggregated from the reality-system.

This reversal of the vector of significance, and its grand consequences, is germane to the ways in which we habitually relate to photography. Given the automatic nature of photography, and the automatic perception of the photograph as reality, it follows (for Flusser, at least) that our sense of reality is a function of the apparatus of the camera and the various programs it has baked into its hardware. Flusser's particular interest is piqued by the relationship between photography and chemistry. The chemistry of light sensitive salts is the basis of photography, however, the prominence of chemical theory within the medium disappears when the images are perceived as windows. Additionally, the more complex the chemistry, the more difficult the chemical nature of the image is to discern. A case in point for Flusser is the distinction between black and white

photography and colour photography, where surprisingly, it is the former that is "closer" to reality than the latter. Considering a colour photograph of a green field Flusser writes that "between the green of the photograph and the green of the field a whole series of complex encodings have crept in, a series that is more complex than that which connects the grey of the field photographed in black and white with the green of the field" (2000, 44). What is true of analogue photography is, perhaps, even truer of digital photography. The automatic orthography of both media disguises the presence of diverse colour systems. We see the green of the field rather than whichever chromogenic colour film process was used in the creation of a mid-century analogue photograph. Likewise, we see the green of the field rather than whichever colour space codifies individual pixel values in a digital photograph and its presence on an LCD display. And this is before one considers that what might appear to be a green field in a digital photograph is the result of myriad post-photographic manipulations of the recorded information all of which have, essentially, passed a vanishing point and become the standards for our perception of the greens of nature.

Flusser translates this correspondence between the increasing complexity of technical media and the increasing verisimilitude of their output into the following paradox: "the 'more genuine' the colours of the photograph become, the more untruthful they are, the more they conceal their theoretical origin" (2000, 44). What will be of interest to me in the following chapters, especially where I tackle hybrid images that are becoming so naturalised as to be invisible, is how to disinter the technical procedure from the hybrid image and reassess its theoretical origin. Glancing forward, again, each of the technical procedures I investigate (colourisation, compositing, time-ramping and rendering) participates in the creation of images which in Flusserian terms invite us to perceive them as windows, rather than surfaces. This is not to say that hybrid images are being misperceived as reality. Instead, as my case studies will bear our, the criteria by which hybrid techniques create new mediations of time, space, and so forth, impact the way in which we engage with the real conditions of time and space, especially when those hybrid techniques pass their vanishing point and become a given within the visual media landscape.

Flusser has a rather unforgiving set of terms for people who live uncritically within the environment produced by photographic media and the reversal of the vector of signification. The misperception of photographs as offering a window onto reality transforms the human into what Flusser describes, throughout his work, as a "functionary" (cf. 2000). A functionary is someone who behaves according to the version of reality that is encoded by media. This behaviour further optimises the feedback loop between our understanding of reality and technical media's encroachment of that understanding. Therefore, this habitual and standardised perception of photographs has extended social consequences. Flusser had the following polemic to offer:

"photographs suppress our critical awareness in order to make us forget the mindless absurdity of the process of functionality, and it is only thanks to this suppression that functionality is possible" (2000, 64). This is the kernel of his instrumentalist critique of media. Implicated in this "functionality" is, firstly, a way of perceiving the world around us through the epistemic lens of the camera. And secondly, an extrapolation of this way of seeing into a fundamental structure of thought, an epistemic relation to the world that is both ritualised, automated and incredibly hard to escape. In the wake of the functionalisation of humanity by the apparatus, history becomes post-history (2013), writing threatens to become invalidated as a form of criticism (2011a) and the social becomes a sequence of automatic responses to stimuli determined by dominant media (2000).

The camera has a lot to answer for: as an apparatus that produces seemingly non-symbolic representations of the world, it has not only obscured that world but replaced it with one that behaves according to the logics contained within its black box. Flusser even goes so far as to situate the camera as a proto-computer: "the camera will prove to be the ancestor of all those apparatuses that are in the process of robotizing all aspects of our lives, from one's most public acts to one's innermost thoughts, feeling and desires" (2000, 71). For all its stringency, this perspective is vital to my project for several reasons. Firstly, Flusser offers a systematic way of thinking through the epistemological consequences of visual media, and secondly, he does so by positing a strong genealogy between the automatic functioning of the camera and the even more obscure functioning of digital media. What this offers to an analysis of hybrid images is the opportunity to examine each image and each subset of hybridity within the context of an already well-established photographic epistemology. A Flusserian perspective reveals that hybridity is not merely a technical operation or an exercise in producing fantastical, non-veridical content. Rather, hybrid images operate on the presuppositions of a photographic view of the world. Furthermore, as they become more ubiquitous and less visible, a Flusserian framework allows us to glimpse the ways in which the hidden criteria of hybrid imagery eclipse the presuppositions that we have learned from photography, not just generating new images, but generating new relations to reality.

Methodologically speaking, the key insight I take from Flusser is that an image must be analysed not according to what it shows, but according to the perceptual mode that it reflects and extends. This is one way of glossing Flusser's concept of the "pragmatic dimension of technical images" (2011b, 49) and represents a new way of looking at hybrid imagery. In distinction from writing on hybrids that stresses either legibility or digitality, considering the pragmatic meaning of hybrid images opens up new avenues of investigation. Significantly, in this method, the legibility of the hybrid effect is not paramount in the consideration of the image. Likewise, the trajectory towards an emergent metamedium is not as important as the impact of the image itself. What is

important to my project is not what form the hybrid image takes, nor how it was produced within a digital convergence, but what impact it has on the pre-established epistemological conventions of the media undergoing hybridisation.

This is especially fruitful when considering mainstream cinema with its exponential use of hybrid images. The hybrid images that make up a great swathe of recent capital-intensive films have extended the instrumental effects of photographic media in a variety of ways. It is in the context of mainstream cinema that a critical methodology inspired by Flusser gains traction. Hybrid images have the potential to foreground what is automatic in our perception of photographic media by placing elements within the frame that exceed our pre-existing sense of reality. Viewed through a Flusserian framework, hybrid images - which combine photographic media that has reversed the vector of signification - and animated media - where that reversal has not yet taken place - have the potential to throw into relief both the established operativity of photographic media, but also (and more interestingly for my purpose) the emergent operativity of the technical procedures that produce hybrid images and instantiate new hybrid modes of engaging with the world.

Returning to the image of the dinosaur from 1993. Smuggled into our enjoyment of the image is a tacit acknowledgement of how the epistemic security of photography is being exploited and extended by the animated element of the image. Conversely, the animated element of the image exposes our routine misperception of photographs as windows onto a given and stable reality. Breaking the image into its constituent parts, the appearance of Sam Neill conforms to Flusser's concept of the reversal of the vector of signification: I credit the image of Sam Neill as being real, and in so doing confirm the centrality of photographic media to my experience of reality. By contrast, the dinosaur does not exist on the same plane of reality as Sam Neill, nor do I accord it the same automatic status of being real. The vector of signification is not reversed in this instance, I have to decode, even minimally, its appearance according to what I already know about dinosaurs, and what I expect from the narrative, etc. Here we finally hit on one of the purposes of the line "it's a dinosaur." The line establishes that the animated portion of the image is not in fact a dinosaur, it is a symbol signifying "dinosaur." Its reality is something that isn't assumed, but invested in, as one invests in the signified object of speech - "it's a dinosaur" - or in the signified object of a traditional image, such as a drawing of a dinosaur, wherein the vector of signification runs from the symbol to its referent in the world. Within the image as a whole, then, there is an unsettled reversal of the vector of signification, and by extension an unsettled epistemic framing of reality. The hybrid image not only jams together the real and the unreal, but in doing so exposes the processes by which its constituent media form reality and the contingent nature of the spectator's determination of what is real and what is not.

As I've stressed, however, hybridity is not always available to contemplation. Nor are hybrid images always swaddled in a visual language that brings to our attention *how exactly* we are expected to attend to the image. With the intensification of hybrid images over the past decades, the Flusserian mode of analysing an image according to its vectors of signification seems to be becoming increasingly difficult. The criteria lying behind the high-intensity, wildly kinetic, and seamless illusions of *Jurassic World: Fallen Kingdom* (2018) are invisible even to the most diligent Flusserian. Flusser anticipated this difficulty in analysing images, pushing instead for a criticism that doesn't decode the content of the image piece by piece, but that rather reaches towards the instrumentality of the image, via inferences about the encoding criteria hidden within the black box of image production. In Flusser's view, one of the goals of criticism is discerning how specific media create and concretize the specifics of reality. Thus, the content of a technical image does not amount to its meaning: the meaning of the image resides in how it programs reality. As Flusser puts it: "the semantic and pragmatic dimensions of technical images are identical. To try and analyse what they show is to get lost in empty questions… Technical images do not show us their meaning; they show us a way to be directed" (2011b, 49). As if further proof were needed, it is clear from this angle that Dr Grant's line: "it's a dinosaur" is redundant. The semantic functioning of the image of Sam Neill and Laura Dern standing in front of the dinosaur is only important insofar as it is persuasive. Whilst it is possible to feel the tension between the media of live-action cinematography and computer-animation, with the conflicting vectors of signification, this does not compromise our perception of the semantic content of the frame. The pragmatic meaning of the image, on the other hand, has less to do with *what* we see and more to do with *how* we see. The image encourages us to conflate our perception of the photographed actors with the animated dinosaur, despite our awareness of their medial and ontological distinctions. Again, the semantic concerns regarding the real or the unreal status of the various elements in the image, are less significant than the pragmatic outcome, which is our pleasurable agreement with the line "it's a dinosaur." Going further, the pragmatic meaning of the hybrid image is found in our incorporation of its technical sophistication into our ordinary perceptual modes. It instantiates a new way of seeing, which, in turn, following Flusser's logic, manifests a new reality.

Despite fulfilling a central role in my own research into mainstream cinema, film only makes fleeting appearances in Flusser's oeuvre. Briefly addressing Flusser's vision of cinema's role in society will offer two things. First, an object lesson in the dangers of being too Flusserian. Second, an opportunity to open up my discussion of hybrid images to the broader field of digital cinema studies, and post-cinema theory. In this field, my focus on the specific aesthetics of hybrid imagery offers a way of adding to the already extant writing about the instrumental nature of moving image media –

the way it shapes our epistemic security, our subjectivities and sensibilities - in the 21st century. Adrian Martin's contribution on Vilém Flusser to *Film, Theory and Philosophy: The Key Thinkers* (2009) dwells for a long time on a still-yet-uncollected piece by Flusser that directly addresses cinema culture. The essay, "Film Production and Consumption" (officially uncollected in its English version, but a copy of the type-script is available online (Flusser, 1979)) posits the cinema and the supermarket as two sides of the same consumer society coin, in a fashion that, even Martin is forced to concede, gives it "prime place among Flusser's most pessimistic meditations" (2009, 38). Flusser sees cinema goers as, at best, complicit with "an apparatus that they know transforms them into passive receptors" (39). What's more, in Flusser's understanding, the images on the screen are of secondary importance to the darkness of the theatre, the enveloping nature of the sound design, the act of queuing and entering the auditorium and the impossibility of looking back into the projectionist's booth (a gesture he lets stand in for a form of social revolution). Taken together, these two aspects of the essay put forward a vision of spectatorship that is both over-determining and thoroughly anachronistic.

This represents an opportunity to put forward a more nuanced concept of spectatorship and the spectator. Within a paradigm of spectatorship influenced by, but not overly beholden to Flusser, the spectator emerges as a person within whom a variety of media-epistemological formations are held in balance. In contrast to Flusser's model of the "functionary," I envision the spectator as someone who responds to both the epistemology embedded in live-action cinematography (with its reversal of the vector of signification) and the provocations against this epistemic framework generated by the use of animation techniques (which need to be decoded not as windows onto reality, but as symbolic images). This version of the spectator is not doomed, as Flusser would have it, "to function as a function of apparatuses" (2001, 24), a proscription that harmonises with the school of "apparatus theory" (c.f. Baudry, 1974). Instead, at its most simple, the spectator of hybrid imagery is given the opportunity to negotiate the inherent believability of the image and navigate the symbolic and seemingly non-symbolic elements that constitute the hybrid. More subtly, the hybrid image augments and extends the presuppositions (ideological and otherwise) of the epistemology associated with photographic media and this gives rise to an opportunity, given that the spectator is aware of the ambivalent reality status of the image as a whole, to critically engage with the hybrid operations as they operate upon and within the live-action portion of the image. This is not to say that the spectatorship of mainstream cinema must involve an active negotiation with the image and its effects, rather that capital-intensive cinema, given its proclivity towards hybrid imagery, consistently offers opportunities to the spectator to discern the discrete media at work within a given sequence, and invest the moment of spectatorship with an engaged criticality.

To my mind, Flusser's critical imperative to deduce the ways in which the formal aspects of a given medium produce specific epistemological frameworks is valid. It is just that in the case of "Film Production and Consumption" (1979) he has focussed his attention on formal aspects of cinema-going, that have become increasingly marginalised in the digital era. What is more, given that he died in 1991, the formal aspects that my case studies focus on were not as central to film production as they are today and therefore not available to scrutiny. What remains pertinent to my project, and to film studies at large, is the fact that, in sum, Flusser's media-philosophy sets itself the task of analysing the intersection between media and consciousness in order to make consciousness commensurable to the sophistications of media. As Flusser has it, "the critical reception of technical images demands a level of consciousness that corresponds to the one in which they are produced. This poses the questions whether we as a society are capable of such a change of consciousness" (2011b, 22). Hybrid imagery is one area of image culture where the technical conditions of image production have become exponentially more complex over the past few decades. This, to my mind, makes Flusser's question all the more urgent: the change of consciousness required to view contemporary image culture critically is becoming more and more radical and more and more unimaginable as the sophistication of the hybrid forms that constitute it increases.

SECTION TWO: APPROACHES TO DIGITAL MEDIA

Adopting a Flusserian method, whilst refraining from following Flusser's logic all the way to the totalitarianism of the apparatus, risks putting forward an argument about the instrumentality of hybrid images without clarifying the role between hybridised media and the broader functioning of society. As Sean Cubitt remarked in a review of Flusser's work, "an entirely understandable rejection of Marxism leaves Flusser without some strategic elements of a philosophy of the future" (2004, 405). The purpose of this next section is to complement my approach to the specificities of hybrid imagery with a theoretical strategy that better illuminates the relationship between visual culture and the broader spheres of society.

Whilst my own engagement with Marxism in the wake of Flusser doesn't amount to a "philosophy of the future," it does offer a chance to formulate strategies to inhibit the instrumental (or Flusser-speak: "functionalizing") effects of hybrid imagery. Here, my approach owes a debt to Benjamin Kunkel's idea of Marx-ish analysis (2014). Echoing my own hesitancy around overdetermining conceptions of the digital metamedium, a Marxish approach recognises that some

of the trajectories of classical Marxism can prove more of a hindrance than a help in analysing the complex relationships between contemporary culture and models of political economy. Accordingly, my critique of hybrid images stops at the point where the spectator becomes reduced to being merely a functionary within a larger assemblage that is beyond our apprehension and impervious to critical engagement. Instead, my engagement with this type of thinking is designed to illuminate the instrumental qualities of hybrid images, so that those qualities can then contribute to our enjoyment of the films that they are part of. The idea is to elevate the critical reception of the images to a level that is correspondent to their technical sophistication. For me, this correspondence must entail enjoying the images, rather than merely dismantling them.

In what follows I will look at the ways in which a focus on hybridity extends the instrumentalist view of digital media inherent to much post-cinematic writing, and encapsulated already in Shane Denson and Julia Leyda's formulation of digital imagery as "actively re-shaping our inherited cultural forms, our established forms of subjectivity, and our embodied sensibilities" (2016, 2). Given the exposure of cultural forms, subjectivities and sensibilities to the influence of digital media, a focus on a specific set of hybrid techniques seems to be a necessary step towards fully demonstrating how the re-shaping has taken and continues to take place. I will then be in a position to put forward my concept of franchise aesthetics. In brief, it does what the writing regarding digital cinema fails to do: namely, identify the intensification of hybrid imagery within mainstream film culture and simultaneously offer a critique that places moving images – particularly hybrid ones - at the heart of capitalist dynamics that are more often than not correlated to the concept of the digital as a monolithic metamedium. My concept of franchise aesthetics argues for an understanding of visual media as implicated in the broader operations of capitalism in order to reframe spectatorship not as a site of complicity and boredom, but as an opportunity for pleasure and resistance.

Steven Shaviro's 2010 book *Post-Cinematic Affect* inaugurated a stream of critical thinking that focussed on the relationship between digital moving images and larger social structures, and in many respects remains the characteristic articulation of post-cinema theory. Shaviro considers digital visual media as "affective maps, which do not just passively trace or represent, but actively construct and perform, the social relations, flows and feelings that they are ostensibly 'about'" (2010, 6). This conception of visual images as productive of affects as opposed to reflections or refractions of affective structures (as, for example, Telotte and Whissel might have it) is a common theme across much of the writing that falls under the rubric of post-cinema. The 2016 volume *Post-Cinema: Theorizing 21st Century Film* is typical of this perspective. Carefully laying out their definition, Denson and Leyda's introduction states that the term "post-cinema" is a "synoptic notion of a special sort, one that allows for internal variety while focussing attention on the cumulative

impact of newer media" (2). Measuring the cumulative impact of the variety of new media modes, post-cinema acknowledges the perpetuation of the "cinematic regime of the twentieth century," within an "emerging media regime" (2). The stakes of this sort of analysis are exemplified in Roger F. Cook's recent monograph *Post-Cinematic Vision: The Coevolution of Moving-Image Media and the Spectator* (2020). As its subtitle makes clear, Cook's work is based on the premise that "pervasive moving-image media such as cinema… and digital media change how our bodies process not only technically produced external images but also our interaction with real environments as well" (12). Cook synthesizes the insights of writers such as Shaviro, Sobchack, Denson and Leyda, with the cognitivist view point of Katherine N. Hayles to argue that "through the engagement of neural networks that produce subperceptual signals, the moving image in all its formats has continuously altered the existing relation between the various senses and reorganized the human sensorium" (19). Whilst this line of thinking strongly confirms that visual media can be directly implicated in forming our epistemological frameworks, and - with Flusser - governing our experience of the world, the point that I would like to pick up on here is the emphasis that Cook places on the sub-perceptual impact of moving-image media on the spectator.

In grappling with the technical aspect of digital cinema, much writing in the "post-cinematic" camp makes arguments about the instrumental effects of digital images – the way it alters the human sensorium - that take place below the levels of human apprehension. Here, in parallel to my earlier discussion of the limited applicability of concepts such as the digital metamedium to an analysis of hybrid images, I draw back from this emphasis on those aspects of digital media that aren't available to perception. My emphasis on the aesthetic outcomes of the technical operations of hybridisation demands that I find a way of counteracting this marginalisation of spectatorship. I acknowledge that digital media don't operate exclusively (or even principally) within the realm of the visible. It is therefore vital that I keep this body of critical literature close at hand, especially when thinking about hybrid forms that have passed their vanishing point. Nevertheless, I insist that engaging with the aesthetics of hybridity is a productive first step to inhibiting (and appreciating) their instrumental qualities, analysing what is visible on screen, and the routines and habits of perception that are provoked, as opposed to analysing what is, by definition, not visible at all.

It is the work of Mark B.N. Hansen and his theorisation of "non-experiential media" and "post-phenomenology" that best exemplifies this tendency in writing about digital media. Hansen stakes a lot on the fact that digital media formations evade direct apprehension, putting forward a concept of "twenty-first century media" defined as operating at a temporal and affective level below higher-order consciousness. As Hansen puts it, "for the first time in history, media now typically

affect the sensible confound independently of and prior to any more delimited impact they may come to have on human cognitive and perceptual experience" (2015, 37). Hansen's work prioritises "the microtemporal processes that, despite evading the grasp of our conscious reflection and sense perception, nonetheless impact our sensory lives in significant ways" (38). As a whole, Hansen's project is geared towards bringing to light these sub-perceptual dynamics of digital media so that human beings can reduce the autonomy of technical media and regain control over the modulation of sensibility by increasingly invisible assemblages. However, in order to do this, he rarely looks at the images directly.

My project is mindful of this intellectual framing of digital media but applies this instrumentalist interpretation of media to the aesthetic outcomes of live-action/animated hybridisation. The benefits of a consistent focus on hybrids are multiple. It opens up a whole set of sub-categories within the digital image correspondent to different types of hybridity that can be approached from the perspective of how they actively construct and mould subjectivities, sensibilities and dominant cultural forms. It recuperates the aesthetics of hybrid effects from invisibility and allows us to see how hybrid images have become normalised and intensified over time. This process of normalisation and intensification – the transformation of hybrid images from an emergent category to a dominant one - can be tied to changes in our structures of feeling. This gives specific focus to the consequences of individual hybrid techniques within digital media over time (such as colourisation, compositing, time-ramping, and sophisticated rendering all of which have become vastly more technically sophisticated over the last decade). This diachronic perspective on the relative instrumentality of hybrid effects underlines the stakes of my investigation. That is to say, having established that the relatively basic compositing on display in the first *Jurassic Park* films is part of a process wherein digital compositing impacts our experience of real, as well as screen-, spaces, one can then speculate on the amplification of that impact by more recent and all-pervasive compositing procedures. Likewise, having built a case about the way digital colourisation, at its most clumsy, can over-write the evidentiary content of the moving image archive, one can then speculate about the ramifications of a colourisation process that is not only automatic, but so effective as to be nearly imperceptible.

A second significant strand of thought that I take from post-cinematic theory that helps to establish the background for my analysis of the instrumental qualities of hybrid imagery is the connections that are consistently drawn between digital image cultures and the larger dynamics of contemporary capitalism. Whilst the hegemonic impact of Hollywood over global media practice has been effectively measured and critiqued by scholars such as Oliver Boyd-Barret and Tanner Mirrlees (2020), the transactional thresholds I am interested in are the ones where the images on screen

shape our predispositions and subtly sculpt our desires, as opposed to exerting a top-down pressure on society by merit of the financial pre-eminence of a select group of companies. Returning to Shaviro's concept of digital visual media producing the affects that they purportedly represent, Shaviro sees this production and management of affect as delivered into the "society of cognitive capitalism and immaterial labour [which] continually transforms affect into currency – and vice versa" (62). This back and forth between affect and currency is predicated on the idea that digital media are directly operative on the spectator's subjectivity and orientation within the social field. Elsewhere theorists like Hansen (2015) and with him Maurizio Lazarrato (2014), Sean Cubitt (2014) and Patricia Pisters (2012) situate moving image media technology at the heart of a model of capitalist political economy precisely because, bypassing higher-order aesthetic apprehension, these media are capable of sculpting subjectivities and collectives for the benefit of – depending on the inclinations of the theorist - neoliberalism, cognitive capitalism, or the attention economy.

Having lined up this array of intellectual affiliations, there are two caveats to be made about the way in which this school of thought conceives of moving imagery as rarely more than a function within capitalism. The first concerns the way in which the connections between mainstream cinema and capitalism can be reduced to an unilluminating short-hand. Given the capital-intensive nature of the majority of films I'll be examining, it is often easy to identify the ways in which they aim to resolve an underlying profit-imperative. This can be through product placement, the tired aping of already successful films, the sheer fact of being a sequel, or the simple perpetuation of Hollywood's dominance within visual culture (the hallmarks of franchise film-making). Whilst these are symptoms of the way in which mainstream cinema operates within and on behalf of capitalism, they are not illustrative of the ways in which media aesthetics can be seen to precede and produce the subjectivities, sensibilities and cultural forms that are amenable to capitalism. The flip-side of this is that visual media and capitalism are often seen as co-extensive and indistinguishable. However, this way of thinking can result in an analytical malaise, insofar as the dynamics of capitalism are assumed to be inescapable. The benefit of a granular approach to hybrid images is that it throws wide open the question of *how* visual media operate within and on behalf of capitalism, but without assuming the foundational and inviable overlap between the two. Whilst critics such as Jonathan Crary (1990) have persuasively argued that visual culture and modern capitalism are, in many respects, the same thing, adhering too tightly to this equation doesn't leave room for exploring precisely how specific hybrid effects impact the specific qualia of life navigating our contemporary iteration of global-digital-neoliberal capitalism. The burden of proving and illustrating these connections falls to my case studies, but by staking a wary perspective on any automatic equations of visual media with capitalism, or indeed, by not claiming an intellectual affiliation with a specific manifestation of

capitalism, I will attempt to ward off reductive reasoning. Furthermore, by not repeating the easy equation between mainstream cinemas and naked commercialism, I leave open the possibility of an anti-instrumentalist critique, which is key to my second caveat.

Analyses of digital media that tend towards the post-perceptual and stress the inseparability of visual media and capitalism negate the possibility of resistance by the spectator. Worse, in my view, these perspectives make a mode of spectatorship that enjoys the film almost automatically complicit with its smooth functioning within the wider institutions of capitalism. Even when a theorist like Pisters argues for the "need to develop multiple forms of resistance from within the system, while always running the risk of being even more fully captured or overwhelmed by its logic," (2012, 5) there is a gap between the analysis of a specific film or effect and its role in the broader social dynamics. Discovering the overwhelming logic of the system more often than not draws our attention away from the particularities of individual instances, and the particular options they offer for resistance (and enjoyment). To counteract this, my analysis of hybrid images is always engaged with the perceptual phenomenon that hybridity produces, extrapolating outwards from the effects on screen towards the epistemological effects that those techniques bring about. As I hope my case studies will demonstrate, this hermeneutical vector, whilst leading at times to conclusions that border on the techno-deterministic, never assumes that paying attention to the instrumental qualities of onscreen aesthetics in any way makes that aesthetics less enjoyable. Occasionally, I hope, the opposite is true. Understanding the role that hybrid images play in manifesting and supporting the social and cultural assumptions prevalent under contemporary capitalism can amplify our critical engagement with a given film and turn a sour experience of a middling blockbuster into an enthusiastic one.

A text that bridges the gap between the particularities of aesthetic analysis and the post-cinematic emphasis on instrumental media - thereby supplementing my way of analysing hybrid imagery with a few strategic elements that harmonise with the overall project of post-cinema - is Jonathan Beller's *The Cinematic Mode of Production* (2006). As with my use of Flusser, my use of Beller benefits from the fact that the text in many ways precedes the explosion of hybrid imagery in all its heterogenous forms. Published in 2006, at the same time that Manovich was writing about the "hybrid revolution" (Manovich, 2006b), Beller's text is primarily concerned with positioning cinema as a mechanism and engine of capitalism across the twentieth century. Unlike post-cinema, therefore, Beller's analysis has a historical focus that has strong implications for the emergent digital regime, rather than a focus on digital media in all its vanishing complexity. This suits my focus on hybridity and my insistence on the importance of the residual impact of the individual media being

hybridised, as his work can serve as a platform and, with Flusser, a partial model for my analyses of individual hybrid effects.

For Beller, the inter-operativity of cinema and capitalism begins with the transformation of visual experience into a form of labour. As Beller puts it, "looking first was posited as productive by capital early in the twentieth century and currently is being presupposed as such" (2). In chorus with Jonathan Crary (and, although less explicitly, Vilém Flusser), Beller argues that the invention of photography gave rise to a political-economy of visuality. Beller builds on Jonathon Crary's insight that "photography and money become homologous forms of social power in the nineteenth century," as "equally totalizing systems for binding and unifying all subjects within a single global network of valuation and desire" (Crary, 1990, 13). Beller doubles down on the rigidity of this schema and places film and the social institution of cinema as a means, not just of systematising the world under the banner of the photographable, but of actively articulating what we experience as the social. Cinema is "not only a scene of representation but of production. The cinema is in dialectical relation to the social; in learning the codes of commercial cinema, spectators also learn the rules of the dominant social structure" (2). This could be argued for any ubiquitous medium and indeed someone like Friedrich Kittler might advance a version of the same dialectics for other nineteenth century media, such as the phonograph or the typewriter (Kittler, 1999). But it is the technical characteristics of cinema (the fact that, after Flusser, the seemingly non-symbolic nature of photographic media requires no process of decodification) that initiates and accelerates its effectiveness as a form of social power.

Without regurgitating Beller's emphatic assertion of the co-extension of cinema and capitalism, what is particularly interesting for me is the way that Beller manages to implicate the phenomenological affordances of cinema – from the late-nineteenth century onwards - within a relation to capital in a process he terms the "industrialization of the visual" (2006, 3). Commenting on Noel Burch's typologies in *Theory of Film Practice* (1981), in particular the fifteen different "Spatial and Temporal Articulations" produced through shot transitions, Beller notes that "cinema renders and depends upon a new plasticity of space and time" and, as a consequence, the spectators must "confront and process new orders of spatiality and temporality that are technologically enabled and were previously impossible" (3). For Beller, the processing of cinematic temporality and spatiality by spectators is implicated in the "re-organization of desire itself," (3) and it is this reorganisation that makes the act of looking a threshold of value production for capital. A refrain that I take from Beller and that will recur across my thesis is that "'Cinema' means a fully mediated mise-en-scène that provides humans with the contexts and options for response that are productive

for capital" (27). This sets the benchmark and is the context within which I will investigate specific onscreen effects from the perspective of the wider mise-en-scène of capitalism.

Carrying Beller's assertion forward to a study of hybrid images is fruitful insofar as it prompts and organises an investigation of the new orders of time and space produced by hybrid effects, and demands an assessment of the degree to which they inter-relate with the dynamics of capital. A joke that Beller makes on more than one occasion is that the quintessential social-realist film of late-capitalism is *The Matrix*. No doubt, the joke needs updating, but nevertheless, the implication is that the new orders of space and time articulated within the effects-heavy action sequences of *The Matrix* can be connected to the new experiences of reality within late-twentieth-century capitalism. As the multiple investigations into the bullet-time-effect attest, the specificity of a special effect can be used to illuminate a general tendency in experiences of time beyond the cinema (cf. Andreas Sudmann's "Bullet Time and the Mediation of Post-Cinematic Temporality" (2016) for an exemplary synthesis of these concerns). This stands as a precedent for my own investigations. Whilst I won't suggest that hybrid images amount to a new form of realism, I will argue that the aesthetic features of hybridisation have an effect on our experience of reality. Furthermore, Beller's joke suggests that a pointed acknowledgement of the potential relationship between digital images and the broader dynamics of capitalism is a productive starting point for discerning precisely what effects hybrid images have and how they are intensifying with the ubiquity of hybrid images in mainstream cinema.

SECTION THREE: FRANCHISE AESTHETICS

Having laid out the theoretical territory I'd now like to articulate the concept of franchise aesthetics that I use to unify the discrete contentions that inform my individual chapters. As has been suggested already, my concept of franchise aesthetics sits beneath the overarching trajectories of two theoretical teleologies, specifically that of the digital and that of classical Marxism. The concept stems instead from the evident intensification of hybrid techniques that have taken place over the past three decades. In the simplest of terms, franchise aesthetics names the growing category of hybrid images most frequently found within large multi-film series. There are several film franchises that extend from the late twentieth century, into the second and third decades of the twenty first century, that exhibit an intensification in the use of hybrid images. Comparing the beginnings and endings of franchises such as Men In Black (1997-2019), Mission Impossible (1996-2018), Pirates of the Caribbean (2003-2017), X-Men (2000-2020), Resident Evil (2002-2016),

Transformers (2007-2018), Final Destination (2000-2011), Bad Boys (1995-2020), Fast and Furious (2001-2021), Bourne (2002-2016), or the films in the Potter (2001-) or Marvel (2008-) Universes reveals an escalating tendency towards the use of hybrid images, with corresponding escalation in costs per minute of runtime, average number of VFX shots and "below-the-line" labour[1]. This tendency is not exclusively found in fantasy and action films, although these genres are strongly over-represented in the list above. Films of all sorts have intensified their use of hybrid imagery, a trend easily indexed across the life-span of individual film series or franchises. *Bridget Jones' Baby* (2016), for instance, features at least 167 VFX shots delivered by Union FX, in contrast to the original *Bridget Jones' Diary* (2001), where the final snow scene had a few extra flakes added by Double Negative. The first film in *The Hangover* franchise (2009-2013) features a star-turn from a CGI tiger; five minutes into the third film a CGI giraffe is beheaded in a car-accident and causes a huge pile up.

My use of the term franchise embraces the colloquial idea of interconnected film texts whilst acknowledging Daniel Herbert's definition, in which, "franchises are generative, as franchise logic dictates that a copyright holder exploits that copyright in myriad ways, spreading a single property as far and wide as is profitable" (2017, 13-4). Franchise aesthetics, then, names first the category of images that characterizes mainstream cinema, second, alludes to its emergence over the past three decades, and third, stresses the capital-intensive, hyper-financialised context of the production of these images, wherein the profitability of the franchise is paramount. Thus, by default, franchise aesthetics, by referring to a category of images that has come to typify blockbuster film-making, names images that are profitable. For this reason, franchise aesthetics is found not just in extended film series but wherever visual culture disguises or highlights, produces or overlaps with, some sort of transactional threshold. By this, I don't mean that franchise aesthetics consistently facilitate transactions (although they often do), rather, these transactional thresholds become apparent when the epistemological formations generated by the hybrid image contribute to the spectator's immersion in a lifeworld beyond the screen, governed by capitalism. This can be as specific as the use of hybrid imagery within advertisements or other promotional material, or as abstract as the cumulative impact of digital manipulation of recorded live-action cinematography to produce the conditions wherein eye-witness photography can be dismissed as "fake news." As mundane as the first example is, and as extreme as the second might seem, my thesis operates on the spectrum that falls between them. Hybrid images participate in a wider social and economic

[1] See for example the reported cost per minute of *Pirates of the Caribbean: On Stranger Tides,* at $2,762,774; the VFX shot list for *Avengers: Infinity War* reaching upwards of 2680 shots, and the production pipelines and industry hubs for post-production and VFX production spanning multiple continents with companies such as DNEG headquartered in London, Vancouver and Mumbai, enabling, amongst other things, around the clock productivity.

field. They have, as Flusser would have it, a pragmatic meaning as well as a semantic one. My concept of franchise aesthetics consistently foregrounds the possibility of this pragmatic functionality of hybrid images and techniques.

Not only that, but in identifying franchise aesthetics as an evolving category, my analysis can take a view of the use of hybrid techniques across time to further confirm the inter-relation between hybrid images and the contours and qualities of everyday experience. Extending Beller's argument, hybrid images are now a large part of what we know as cinema, therefore they are key to the shaping of our mise-en-scène for the benefit of capital. What is more, the intensification of hybrid imagery over the past few decades would suggest that the techniques involved in producing hybrid images are becoming central components in the logic of capitalism as it is construed in and as visuality. Gathering together terms inherited from post-cinema, Flusser and Beller, hybrids can be viewed as crystallisations of a particular intersection between the technical and the social, where the capacity of media to determine the epistemic relation to reality is in the process of advancing from one media formation (the cinematographic, the analogue) to another (the digital). Franchise aesthetics is positioned to pick apart this transition iteration by iteration. The focus on hybrid techniques as they come to dominate a prominent aspect of visual culture across the span of the last few decades can trace the way in which individual trends in hybrid image production contribute to and correspond with changing framings of the world. The impact of digital capitalism on the content of mainstream film-making is seen, most narrowly and superficially, in the presence of more smartphones being incorporated into film narratives (and film production processes). The aim of franchise aesthetics is to point to a connected correlation, unrelated to generic or narrative content. If the smartphone brings about new forms of living and working, communicating and thinking (in short, an evolution in our epistemic relation to the world), the wager of franchise aesthetics is that these new ways-of-being have been partially generated, anticipated, normalised or otherwise mediated within hybrid imagery and the ongoing and intensifying reconstitution of the way in which the world is experienced through images.

Returning again to the moment of the archaeologists' first encounter with the creatures in Jurassic Park. Whilst the involutions of the semantic meaning of the image delight and confound ("it's a dinosaur") the pragmatic meaning of the image is found in *how* the semantic content is secured over and above the evident hybridity of the image. Multiple operations on the tonal, spatial, temporal and textural dimensions of the image inter-lock in order to defy real-time deconstruction and produce the pleasure of the illusion. The pragmatic content of the image has more to do with the extension of our perceptual habits to encompass and secure the semantic presentation of a dinosaur as present on the same plane of reality as the actors. More than just an exercise in

perceptual realism, I suggest that the pragmatic content of the image exceeds the simple conforming of the hybrid image to the parameters of photographic representation. Instead, the pragmatic meaning of the image is found in the repositioning of the way in which the parameters of photographic representation govern our knowledge of the world, unbalancing the secure ways of seeing and knowing that photographic media had hitherto supported.

This augmentation of the pre-established media-epistemology of analogue media can be seen to co-evolve with the forms of capitalism that the *Jurassic Park* franchise intersects with, by merit of its spanning several decades. Glancing forward five films to *Jurassic World: Fallen Kingdom* (2018) gives an opportunity to glimpse the way in which hybrid imagery has established a new set of media-epistemological parameters for the routine perception of visual media. Further, a comparison of the first film and the most recent, allows us to see how the new routines of visuality brought about by hybridity are expressed and thematised in the films themselves, through its presentation of the quintessential capitalist endeavour: the theme park. At its base, the comparison runs as follows: *Jurassic Park* (1993) represents and manifests one iteration of capitalism and its visual components from almost thirty years ago. *Jurassic World: Fallen Kingdom* (2018) represents and manifests another iteration of capitalism and its visual components. This comparison can be expanded in a number of ways: the former film has a prominent place for the gift shop, and the means by which it constructs "a fully mediated mise-en-scène that provides humans with the contexts and options for response that are productive to capital" (Beller, 2006, 27) is enabled by infrequent yet spectacular deployments of hybrid imagery. By contrast, in *Jurassic World* the whole narrative universe functions as a gift shop. Characters talk about the value of attention and the need for new hybrid attractions. Images of all sorts – advertisements, holograms, animation, live-action - are everywhere and the boundaries between the real and the illusory are largely indiscernible. In this sense, the world of Jurassic World feels more familiar than that of the first film, given that so many years have passed and so many changes have occurred in our relation to hybrid images, and our relation to the world. From a more strictly formal point of view, the representation and enactment of capitalism (and all its myriad complex visual components) taking place in *Jurassic World* is enabled, even driven, by the ubiquitous use of hybrid images. Whereas the first film had a VFX shot count of 63 with a small number of key sequences leaning heavily on live-action/animation hybridity, (Crow, 2019) the last film has a VFX shot count of around 1200, and only a few rare sequences are free of live-action/animation hybridity (Frei, 2018). This simple comparison supports the backbone of my thesis: hybrid images are critical to perceiving and understanding the step-change in the dynamics of capitalism that have occurred in the past thirty years and which are ongoing with the intensification of hybrid image practices in all forms of visual media. Franchise aesthetics, then, becomes a way of

naming how hybrid imagery is implicated in augmenting visual experience to complement, correspond with and, possibly in some cases, construct the capitalist mise-en-scène within which we live.

In this regard, my thesis represents an aesthetic answer to a political and sociological problem commonly posed within the broader field of the humanities: specifically, how are human beings inculcated within a network of consumer practices, sutured into an affective and social regime, beneficial to the workings of capitalism? Beyond the discipline of film studies, there are several investigations of the means by which human beings become embedded within and/or produced by the broader operations of political economy. Studies such as Randy Martin's *The Financialisation of Daily Life* (2002), or Sebastian Franklin's *Control: Digitality as Cultural Logic* (2015) as well as the concept of "semiocapitalism" developed by Franco 'Bifo' Berardi (2009a, 2009b) elaborate on the ways in which capitalist logics are fundamentally intrinsic to contemporary subjectivity. Likewise, work such as Shoshana Zuboff's *The Age of Surveillance Capitalism* (2018) examines the ways in which contemporary capitalism thrives on the datafication of subjective experience, as it is played out and archived on social media. As glossed by Jonathan Beller, in his most recent work, *The World Computer: Derivative Conditions of Racial Capitalism* (2021), our atmosphere of "ambient computation" (52) has given rise to a "world computer" wherein "any and all instantiations of form can be taken as positions on the generalized volatility of the market – because they are, unavoidably" (36)

Within this wider field, my concept of franchise aesthetics offers a means of engaging with the ways in which the aesthetic qualities of mainstream cinema are wrapped within a wider capitalist logic. These will be unfolded across various axes in the chapters to come, but gesturing forwards, the ways in which hybrid images reframe our experience can often be connected to the degree to which digital media exerts a tighter and tighter grip over cultural experience, be it in the cinema, online, or in physical environments of commerce. This, in turn, is connected with Beller's general diagnosis of the relentless quantification of all aesthetic qualities and responses as sensual and affective data. However, whereas many of the above studies assume the total subsumption of subjective experience within digital media culture and its connected networks of consumer practices, my project maintains a granular focus on hybrid aesthetics in the hope that it might inhibit the degree to which those capitalist logics encroach, unseen, within visual experience and impact, unheeded, the subjective experience that follows in its wake.

SECTION FOUR: CHAPTER SUMMARIES

This theorisation of the potential effect that hybrid images might have on the way in which visual culture organises subjectivities and sensibilities within, and on behalf of, capitalism informs each of my four case studies. However, given the range of techniques and the heterogeneity of hybrid images, the opportunities for directly applying the intellectual paradigms that inform my work vary. For example, my chapter on temporal experience and the technique of time-ramping, posits a more or less straightforward equation between the temporal experience afforded by hybrid images and the micromanaged experiences of time within digital capitalism. This is, in part, because there is such persuasive writing on the relationship between the inscriptions of time in visual media and the structuring of time within capitalism (e.g. Doane's *The Emergence of Cinematic Time: Modernity, Contingency, The Archive* (2002)), but also because time-ramping essentially is a form of attention management. Therefore, the opportunity arises to make a clear connection between the hybrid effect and our increasingly normalised understanding of the value of micro- and milli-seconds in other areas of life and other arenas of capitalism (if that distinction remains possible). By contrast, my chapter on colourisation, takes a slightly different tack and, in exploring the way colourised archive footage manages our access to the material conditions of the past, avoids any acute dissection of the relationship between colourisation and a specific manifestation of capitalism. Instead, the chapter offers a way of critiquing the potential racialising impact of colourisation; a dynamic that is haunted by the racist aspects of actually existing capitalism and that only promises to develop as the technique continues to evolve.

Choosing to pursue such a broad range of techniques and such a broad range of themes, it is my intention to demonstrate how pervasive the dynamics of franchise aesthetics are, as both a feature of visual culture and as an influence over experience. Furthermore, the structure of my thesis is designed to suggest that the influence of franchise aesthetics over our experience is not only pervasive, but very pressing. Hence, I begin with a chapter about how hybrid imagery determines our relation to the past and end with one about how hybrid imagery exerts a pressure on how we imagine the future. In between these two chapters are two chapters concerned with how hybrid imagery has impacted our spatial and temporal experience. As a whole, the thesis argues that hybrid imagery has a tangible effect on our embodied orientation in the here and now and our cognitive orientation with the past and the future. In so far as this is an ambitious argument, it also tacitly acknowledges the incompleteness of the thesis. After all, there are several hybrid techniques that this thesis does not explore, and I do not make any claim that the arguments I make account for

the full range of epistemic effects that can be tallied to a given hybrid procedure. Here, the bagginess of the term franchise aesthetics is intended to leave room for any further media-epistemological investigations of hybrid effects, either yet to be developed, or yet to be pulled back from passing a vanishing point.

Chapter One looks at digital colourisation as it is applied to the black and white archive, most recently and notably in Peter Jackson's World War One documentary *They Shall Not Grow Old* (2018). I position digital colourisation of monochrome film as a legible hybridisation of analogue cinematography and the digital practice of the micromanipulation of colour information at the level of the pixel. I analyse the ways in which the applied colour over-rides the content of the original image in a way that, whilst purporting to offer more direct access to the past, actually augments our perception of the moving-image archive. Instead of sharpening our perception of history, I argue that the application of digital colour narrows the parameters by which we encounter images as historical materials. Colourisation, in short, doesn't update the accessibility of the archive as a whole, rather it conforms certain narrow portions of it to the standards of a historical consciousness shaped by digital media. Pointing to the way in which colour manipulation can impose meaning on the spatial information of an image, I implicate colourisation in the creation of a manifestly false perception of the evidentiary function of photography. The chapter closes with a look at the racist and racialising impact that colour gamuts have had throughout the history of photography, a racism that remains operative in certain pieces of facial recognition software, and that the emergent practice of digitally colourising the archive threatens to exacerbate.

Chapter Two looks at the use of digital compositing to generate hologram effects in all manner of science fiction films and television. The chapter identifies hologram effects as a legible form of hybridity that combines onscreen spaces captured cinematographically with those generated through the layering together of discrete elements. Looking closely at the way in which these hybrid spaces operate upon our gaze and attention, the chapter proposes that the onscreen spaces created by digital compositing, whilst being organised perspectivally, also depend on the micromanagement of our attention as it travels across the different layers in the image. I argue that digital compositing is a facet of franchise aesthetics as it augurs a new form of spatial experience, exemplified in augmented reality apps, in which spatial orientation in the world is the result of ocular-centric experience acutely determined by the direction of our attention between layers of the image as opposed to through 3-dimensional space. I close the chapter by looking at two capital-intensive, hologram-rich sci-fi films, *Blade Runner 2049* (2018) and *Ghost in the Shell* (2017). I suggest that the cyborg protagonists and the cyborg visuality that we absorb by proxy can be read as disclosing some of the conditions of our spatial experience. Specifically, our embeddedness within

environments saturated by data fields, micro-sensors, and information flows, all of which amounts to a form of extended spatial cognition wherein - like the protagonists of those films - our spatial experience is in part determined by processes beyond our direct apprehension but which, nevertheless, can be engaged with indirectly via an aesthetic critique of compositing.

Chapter Three, looks at the phenomenon of "digital oners" and time-ramping. Focussing on the impossibly long unbroken shots of recent films, incorporating as they do a variety of temporal manipulations, this chapter positions time ramping as a hybridisation of the standard registration of time in cinematography (i.e. an isomorphic capturing of duration, usually at 24 frames per second) and the registration of time in digital media. Walking a tightrope that runs between variant regimes of temporality - specifically Mary Ann Doane's formulation of "cinematic time" structured by contingency (2002), and Mark B.N. Hansen's model of digital media playing a sub-perceptual, infrastructural role in temporal experience (cf. Hansen, 2015) - this chapter argues that digital "oners" make the temporal regimes of their constituent media available to reflection. That said, the chapter also positions time-ramping as a facet of franchise aesthetics as it structurally reconfigures filmic temporality, conforming experiences of time on and off screen to the demands of digital technologies that operate at micro-temporal scales. No longer re-duplicating the flow of time as it is generally experienced, time-ramping in action cinema produces temporal experience through the manipulation of profilmic durations. Analysing time-ramping from the perspective of franchise aesthetics prompts a reflection on the felt experience of passing time as being something that is generated by operations associated with capital-intensive film-making, as opposed to being an experience discrete from mediation that is latterly endorsed and reflected within mainstream media.

Chapter Four builds on the previous chapters' reflections on the themes of time, space and history, by analysing the ways in which franchise aesthetics exert a determining influence on how we envision and engage with the future. Specifically, the material cultures of the future such as merchandising lines, car design and architecture, all of which appear first as a computer-animated image, and then as a thing. My focus in the final chapter moves away from the technical processes of hybridity that provoke augmented epistemological frameworks, and looks instead at how the medium of computer-animation deliberately invokes the epistemological frameworks associated with photographic media. This chapter develops the concept of the skeuomorphic asset, which is an object within an animated frame that, despite the cartoon context, overwhelmingly channels a photographic register (such as the hair of recent characters like Moana). I use this concept to demonstrate how the ambivalent reality status of computer-animated images allows for the medium to orient its representational and referential capacity temporally forwards, and present to the viewer things that look like they exist, before they have emerged into material culture. The

perspective of franchise aesthetics takes this argument a step further, suggesting that rather than just neutrally imaging possible merchandising lines, for example, the aesthetics of computer-animation can be directly implicated in the articulation, provocation and fulfilment of consumer behaviours. The chapter concludes by suggesting that computer-animation's absorption of the epistemological structures of photographic media gives it a strong hold over how we encounter future material cultures as digital prototypes on screen. Furthermore, given the imbrications between computer-animation and digital-prototyping and manufacturing software, I suggest that not only is computer-animation involved in determining how we envision future material culture, it's a key part of the supply chain. The aesthetics of computer-animation can be critiqued, then, as a means of literally filling the future with single-use plastic toys.

CONCLUSION

As the summary of these chapters suggests, my project of franchise aesthetics is consistently involved in uncovering the aestheticisation of already ongoing technological determinations that impact every aspect of contemporary life. As a concept, franchise aesthetics is always catching up to the operations that visual media is in the process of normalising. Indeed, in many cases, and with many iterations of hybrid techniques passing their "vanishing point," the question arises as to whether or not aesthetic analysis is an efficient, or even relevant, mode of critique. Likewise, in our advanced digital culture and in the middle of a pandemic that has marked a decisive turning point in the balance between dedicated exhibition cultures - such as cinema and appointment television - and streaming platforms, one has to wonder whether a focus on the act of watching something as outsized as a film is the best way to critically engage with the way we live now.

In answer to this, I offer the idea that whilst the moment of watching is becoming an increasingly decentred aspect of digital culture, it remains a potential site of resistance, a chance to confront the instrumentality of digital image culture. One of the key aspirations for my project of franchise aesthetics is to demonstrate the ways in which the instrumentality of hybrid images can be identified, and in doing so leave space for a critical engagement with the images that preserves the pleasure of watching, or even magnifies it under the banner of - after Miriam Hansen (1999) - a vernacular of twenty-first century media.

Paul Cronin's volume of essays by and about Amos Vogel (2014) takes its name from a quote pinned above Vogel's desk: "be sand, not oil in the gears of the world's machine." As I have outlined

it above, my thesis in its tentative elaboration - under the banner of franchise aesthetics - of the connections between hybrid image techniques and contemporary experience, is focussed on elaborating the ways in which hybrid images can be seen as gears in the world's machine. The final, and, from a personal perspective, most significant aspect of my project involves demonstrating the ways in which identifying the instrumental qualities of hybrid images can offer a way of looking at capital-intensive hyper-financialised visual culture in a way that inhibits its operativity and doesn't simply convert our attention into value. More than this, engaging with the pragmatic meanings of hybrid images can increase our enjoyment of even the most remedial of blockbusters. Being sand is a spectatorial mode that doesn't necessarily aim to pull the world down around itself any more than it aims to participate unquestioningly in the cranking of the machine. Franchise aesthetics offers a way of looking at capital-intensive film-making that doesn't invalidate enjoyment; that relishes the emerging vernacular of hybrid techniques and instead works at being sand in the gears, not oil.

[FIGURE 1: Personal Photo colourised on myheritage.com]

CHAPTER ONE: THE COLOURISED ARCHIVE

The above image has been run through the DeOldify colourisation algorithm on a website called myheritage.com, which offers users the chance to “See your heritage in colour” (myheritage.com, 2020). DeOldify is a piece of open-source software that utilises deep learning, training the algorithm on a database of millions of images, in order to automatically apply the likeliest colour information to black and white images (DeOldify, 2018). The results are striking. Looking at the colour images alongside the black and white originals, the warm tones of the colour image enhance the sense of three-dimensional space, the sitter’s bright face pushes forward from the image plane, and the dark background recedes. Likewise, the highlights in her hair: in the colour image these give an impression of the lamp being quite close to the sitter, just outside the frame, an impression that is missing from the colder, flatter black and white image. Upon first impression, I would say that the colour image is more impactful, and gives a greater sense of presence, whereas the black and white images are slightly more schematic, betraying perhaps the original function of

the photograph. The image is taken from a contact sheet, registering the sitter's face more or less impersonally and from all angles.

There are a few details, however, that warrant closer attention. Looking at the two colour images, the sitter appears dressed in a darkish purple top in the top image, in the bottom image her right shoulder has a brighter, redder hue. The pictures were taken moments apart, and it is clear that the algorithm has, given the minimal difference in posture and the slight change of the fall of the shadow, offered a different guess at the colour of her top. Looking closer, there's something off about the eyes. They're purple. My best guess as to how this happened is that the deep learning algorithm is hedging its bets. Given that the sitter is a brunette whose eyeline is directed straight at the key light in the studio, the irises have been shaded between brown and green, with a keyed-up luminance that tips the half-way colour to purple. The sitter's eyes were not purple, they were a distinctive grey-green. I know this because this is a picture of my grandmother.

What I'm trying to describe here is the emerging paradox of digital colourisation as it is becoming improved, automated and ubiquitous. The colour image has, for me, a stronger sense of my grandmother's presence, an amplified punctum, *despite* the fact that the colour information is inconsistent and misleading. The authenticity and the accuracy of the image are of secondary importance to the effect produced by the colour, which is one characterised by a comparative sense of immediacy. Purple eyes notwithstanding, my late grandmother appears livelier in colour.

It is the task of this chapter to unpack the tension discovered here. Digital colourisation can greatly improve the phenomenological impact of historical images, but at the expense of the actual details contained within them. As colourisation becomes an increasingly standard practice an urgent question emerges regarding the status of colourised images as pieces of evidence within the archive. If digital colourisation is approaching what Zeilinski describes as its "vanishing point," (1999, 183) it is necessary to account for the ways in which digital colourisation interacts with our perception of the past, before it becomes a structuring principle of our perception, as opposed to a component part of it. In the case of my purple-eyed grandmother, colourisation amplifies access whilst distorting the actuality. I know that the factual content of the photograph has *not* been improved, it is *not* more accurate for being rendered in colour. The possibility arises that my being drawn to the colourised image, despite its faults, is an illustration of a contemporary disposition with regard to the digital manipulation of old images. Specifically, I am willing to tolerate a certain quantity of inconsistent colour information, as long as the image conforms to the understanding of the world that I have received from digital visual media and its affordances to colour manipulation. Why

should colourising a black and white photograph be any different from making a selfie monochrome?

The answer is that colourisation obscures the medial conditions of the past, and as such, denies the media-epistemological formations native to non-digital media regimes. Preferring the colour image more or less unthinkingly, I am prioritising my experience of the past-in-the-present as opposed to preserving the past in all its past-ness. Conforming this old photograph to the technical-perceptual standards manifest in the DeOldify algorithm is an exemplification, I would argue, not just of an emergent hybrid image technique, but of a new epistemological framing of the past. In this instance, specifically, the girlhood of my grandmother loses a profound degree of what made it historical in the first place, that is: non-equivalent to the present, and ultimately lost to me save through obscure media artefacts that require my imagination and investment. Colourisation might make this image of her as a fourteen-year-old feel more present to me, but it is a presence grounded not in historical understanding, but contemporary aesthetics. It is the wager of this chapter that looking at digital colourisation as a component of franchise aesthetics will help illuminate why the manipulated image appeals to me as a more effective window into the past than the more supposedly "authentic" original.

Perceived through the framework of franchise aesthetics, I will suggest that digital colourisation produces hybrid images that augment our epistemological framing of the past by conforming our perception of the past to the technical standards of the present. It does this in several ways. As has already been suggested with regards to the image above, colourisation provokes a re-organisation of what might or might not be prioritised when looking at an image. Authenticity is put in balance with accessibility. Going further, however, this chapter will take a closer look at the operation of colourisation in order to examine the ways in which the evidentiary nature of black and white images is augmented and over-ridden by potential symbolic valences of digital colourisation. Purple eyes carry a sinister register, if one is not already acquainted with the reasons for their appearing that way. Pursuing the argument sketched out in my introduction, I will suggest that digital colourisation can be perceived as creating a trajectory in which the moving image archive is being organised according to its amenity to colourisation. This being the case, an analysis of colourisation as a component of franchise aesthetics will endeavour to implicate the procedure in the over-determination of our perception of the moving image archive; an over-determination that constrains images of the past within the technological and perceptual standards of the present. I will end the chapter with an extended reading of Raoul Peck's non-fiction film *I Am Not Your Negro* (2016) which probes the epistemological blind-spots at the heart of race relations in America, via a suggestive use of colourisation. This reading will demonstrate how engaging with the

hybrid technique of digital colourisation from the perspective of its instrumental and political qualities (i.e. from the perspective uncovered by franchise aesthetics) can reveal new meanings within an otherwise unremarked-upon aesthetic practice and help amplify the protest imperatives at the heart of Peck's film.

SECTION ONE: CONTEXTS AND THEORETICAL BACKGROUND

Before entering into a sustained analysis of digitally colourised films, I'd like first to offer a survey of recent colourised texts and practices, qualify my identification of digital colourisation as a hybrid technique and, lastly, lay out the theoretical framework by which I make the hefty claim that an aesthetic augmentation of archive footage is tantamount to an epistemological reconfiguration of our access to the past.

As for the growing colourised archive, a prominent example from recent cinema is Peter Jackson's *They Shall Not Grow Old* (2018) which presented archive footage of the First World War in colour and 3D, and which will serve as my main case study. Jackson plans to repeat this transformation of archive footage with his forthcoming Beatles documentary which apparently focusses on the *Let It Be* sessions (Aswad, 2020). Ron Howard's own Beatles documentary *Eight Days a Week: The Beatles – The Touring Years* (2017) contains several colourised segments. Whilst Jackson's film is rare in featuring the colourisation process across the majority of its screen time, it is not the first feature film to do so. The 2014 film *Warsaw Uprising* (Jan Komasa, 2014) makes an interesting use of colourisation. Building a fictional narrative around actual newsreel footage of the 1944 Warsaw Uprising (in which the Polish Resistance tried to prevent the razing of Warsaw during the Nazi retreat) the film often uses images from its newsreel archive twice, once in colour to represent the unmediated POV of the newsreel cameramen bravely filming the fighting, and once in black and white to represent the newsreel just captured. The conceit is plainly staked on the idea that "reality" happens in colour, and that colourisation, despite its explicit augmentation of an original image, is somehow involved in recuperating a sense of reality from black and white footage.

This sentiment is echoed across the credit sequences of various colourisation-heavy television documentaries. Colourisation has since the early 2000s made frequent appearances in television documentaries about war, beginning with the series *World War One in Colour* (2003) followed by *World War II in HD Colour* (2008-9) and more recently *The Pacific War in Colour* (2018). Outside of military programming, colourisation has featured prominently in many series of *America*

in Color (2017-) as well as its UK-centric spin-off *Britain in Colour* (2020) on the Smithsonian Channel. Channel 4's documentary *Auschwitz Untold: In Colour* (2020) also features prominent use of the process in a television format. The phrasebook for these colourised archive credit sequences is full of claims such as these: "this is the story of how the royal family survived the early twentieth century *as you've never seen it before,*" (*Britain in Colour,* Smithsonian, 2019); "The story of the First World War as it was seen by those who fought it" (*World War One in Colour*, 2003); "Auschwitz is a story that should never be allowed to fade from memory" (*Auschwitz Untold: In Colour*, 2020). When it is not explicitly articulated, this sentiment is implicit within the visual language of the credit sequence. For example, *World War 2 in HD Colour* has a credit sequence that presents the transformation from monochrome to colour with a twinkle and Tinkerbell-esque magic flourish in order to celebrate the new and improved nature of the image. Taken as a whole, this forthright and celebratory use of colourisation is indicative of a number of shared assumptions about the value of colour imagery versus black and white imagery. It suggests that these texts hold the evidentiary status of archive footage in balance with the phenomenological appeal of colour images. Ultimately, they all claim, with different levels of intensity, that the application of digital colour more effectively serves the collective memory than black and white media.

Arguably, however, it is the wealth of short-form online videos that use the technique that best exemplifies colourisation's rise to ubiquity and helps give a general sketch of how the images are perceived. A prominent YouTube channel belonging to Denis Shiryaev features upscaled and colourised videos as an advertisement for the digital restoration services that Shiryaev's company, Neural Love offers (Shiryaev, 2020). The videos, such as a colourised version of "A Trip Through New York, 1911" (2020) - a travelogue by the Swedish company Svenska Biographeatern - have garnered a notable amount of attention. *Wired* magazine used the popularity of the video as the premise for an article called "YouTubers are upscaling the past to 4K. Historians want them to stop" (Nicholson, 2020). The article falls on the side of the viewers (as represented in the comments sections on YouTube) and suggests that colourisation is responsible for reviving interest in the footage. (As an aside, it is perhaps worth noting that from a metrics point of view, colourisation is here fulfilling one of the basic conditions of franchise aesthetics: it is proving profitable, clocking up views on the platform and drawing attention to Shiryaev's business. And therefore, it is no surprise that, despite the caution of historians, as things stand, the use of colourisation as a form of automatic content creation online doesn't look like stopping).

Whilst the colourised archive can be easily delineated as a growing corpus, it remains for me to confirm their status as hybrid images. After all, the images I've glanced at so far are ones set upon a trajectory towards ever less obtrusive colourisation, where the process intensifies the qualities of

the punctum in the black and white original without leaving behind any artefacts of augmentation, such as purple eyes. In order to keep the hybridity of the colourised image in sight, I'd like to draw a clear distinction between the constituent media of analogue cinematography and digital processing by which the colour is added. In its predigital form, colourisation was a process whereby colour was applied directly to film prints, with the colouring in of specific objects in the frame being carried out by hand, frame-by-frame. This effect gives the colour an effervescence, it dances about, clearly hand-made, distinct from the smoother movements and subtle spatial information of the cinematographic images beneath. Despite the odd result of hand-colouring early films, the technique evolved in the first decades of cinema to include the production of stencils for colouring multiple prints with multiple colours (a precursor of sorts to travelling mattes).[2]

However, early applied colour was never orthographic or unobtrusive. Early applied colour techniques disrupt the movement of the eye through the spaces of the photographic image in a way that always signals the medial distinction between the indexically produced black and white image, with its isomorphic capture of 3D spaces, and the painterly 2D layer of colour on top. As a result, predigital applied colour films are always available to deconstruction along media specific lines. It is only recently, with the process passing its "vanishing point," that it has become hard to separate the cinematographic portion of the image from the supplementary colour.

Re-emerging in the 1980s, colourisation retained a great deal of its legible hybridity. The initial patents surrounding the digital colourisation process were granted in the late eighties to two separate men, Wilson Markle and Barry Sandrew. Both patents stemmed from scientific imaging processes: Markle was originally involved in colourising images for NASA, whereas Sandrew's original innovations were in neuroimaging processes (Toumarkine, 2014). The patents devised by both men clearly signal the use of the process in applying colour with a degree of automation to black and white video imagery, and deal with the problems of identifying distinct objects within a sequence, and tracking the movements of those objects between key-frames so that the colour can be applied without excessive amounts of oversight from humans. These are advanced versions of the industrialized stencil colouring process prevalent in Paris at the turn of the 20th century and germane versions of the edge-tracing algorithms that are central to contemporary colourisation processes.

[2] There is a lot of work from writers such as Joshua Yumibe that deals with early colourisation techniques from a variety of vantage points. Yumibe's book *Moving Colour: Early Film, Mass Culture, Modernism* (2012) explores the industrial practices of film-colourisation, for example. Sarah Street's *Colour Films in Britain* (2012) imports a national framework over early colour systems, including hand colourisation. A collection of stills from early hand coloured film is collected in *Fantasia of Colour in Early Film* (Gunning, et al 2015) which gives a strong impression of the way in which colour impacted the atmospherics as well as the specific details within the black and white image, taking on unique expressive qualities that disappeared with the emergence of natural colour film systems.

In essence, the principal challenge for the first iterations of digital colourisation was not altering the colour information to extrapolate a colour image from a greyscale one, but ensuring that the application did not get in the way of our perception of the image as, in Flusser's terms, a window not a surface. (Interestingly enough, although neither patent remains dominant, Barry Sandrew's technical innovations are now integral to 3D conversion processes, and participate in the reconstruction of screen based spatial experience that I shall be discussing in the following chapter). 1980s colourisation did not achieve a seamless integration of the colour with the depth cues and spatial language of the original image. Given the narrow colour gamuts of late-1980s video hardware, it isn't surprising that the acidic hues and block colours of the colourised colours sit uneasily with the rich monochrome cinematography beneath. The classic example of this early version of the process is the colourised version of *It's a Wonderful Life* (1942, colourised 1987) which Jimmy Stewart described as a "bath of Easter egg dye" (cited in Dowd, 1987). Stewart again gave a fairly good assessment of the way in which colour over-rides the monochrome image when, speaking in the mid-eighties, he complained that "when they put colour on a girl's face…. She just has a sort of light-orange face. And the background – one thing's red, the other thing's green. There's no composition to the thing" (Video Review, 1986).

The difference between these colourised films and more recent ones that, for example, use the DeOldify software, isn't one of procedure or medial integration. DeOldify is still an applied colour process reliant on differentiating between foreground, background and individual objects within a grey-scale image and applying a colour to each object. The main difference is computing power. Most colourised films are upscaled to 4K and 60fps before they are colourised, a process which generates a greater canvas for the colourisation to work upon, and assists in making the integration of colour into the greyscale information less visible (except in a few marked cases that I will explore in my analysis). In stressing the continuities between early applied colour techniques that literally involved painting over the image, and today's digital colourisation, I aim to keep in sight the hybrid nature of these images. In line with the approach put forward in my introduction, foregrounding the hybridity of the image offers a foothold for analysis that considers the instrumental qualities of the constituent media.

In this light, the most crucial distinction to be drawn - especially as it relates to my broader argument about the ways in which colourisation augments our access to the past - concerns the indexical nature of analogue cinematography and the non-indexical nature of colour, be it hand-

applied or digital. Taking another lesson from the pre-history of digital colourisation, wherein the application of colour to the film strip resembled a process like rotoscoping, I'll elaborate this distinction along lines that commonly demarcate live-action cinematography and animation. This approach is advantageous for many reasons. Characterising digital colourisation as an animation technique that hybridises the analogue cinematography of monochrome footage is designed to maintain a focus on both the residual indexical quality of the image, as well as the significatory trajectories of digital colour. After all, looking at the image of my grandmother, the incorrect presentation of her eye colour does not negate the indexical quality of the image as a whole, rather it signifies something additional to the profilmic scene where she sat in a photographer's studio. Insisting on a medial distinction between analogue cinematography and digital colour brings to light not only the instrumental qualities inherent to each media, but also the particular instrumentality of the hybrid form itself, and its adaptation of perception to emergent norms.

Analogue cinematography, then, operates by providing the spectator with an indexical link between the image and the scene that it represents, guaranteeing the profilmic reality of the scene depicted. This is as true of colour images as it is of black and white ones, despite Flusser's assertion that the "'more genuine' the colours of the photograph become… the more they conceal their theoretical origin" (2000, 44). In analogue colour systems, be they black and white (and generated by orthochromatic or panchromatic stocks) or two-colour or three-strip technicolour (splitting and filtering the light beam in order to build up a colour image by layering the red, green and blue images back together), the indexical connection between image and object is unchanging.

The same is not true of digital images, nor the digital colours applied to the monochrome images. There is a strong tradition of theorising digital cinema, given its freedom from an indexical relation to the object it represents, as a form of animation. Chief amongst these theorists is Lev Manovich who argues that digital cinema "is no longer an indexical media technology but, rather, a sub-genre of painting" (Manovich, 2017). This is particularly the case when considering colour. Confirming Manovich's post-indexical view of digital media, Richard Misek's overview of colour systems recognises that "digital colour no longer needs to be diegetically motivated because it is no longer diegetic; it exists in digital space, and so need not approximate Newtonian colour" (2010, 170). Digital colour, in Misek's view is characterised chiefly by its "partiality to transformation" (170). That is not to say that as a non-indexical medium the digital depiction of colour is perpetually disconnected from reality, just that digital colour is better understood as a language, a set of technical parameters for the assignation of different colour values to individual pixels. Sean Cubitt

takes this a step further, by thinking of digital colour purely in terms of the logistics of translating an image from one device to another, from high spec hardware to any old device, from the RGB colour space reproducing an image on a screen, to the CMYK colour space that describes how the image can be printed. For Cubitt, digital colour "does not reproduce actual hues, but shifts them to the mechanically available colour space" (2014, 148).

This medial distinction leads to the following imperative: the epistemological impact of digital media's propensity towards what Aylish Wood calls "micromanipulation" (2007a) needs to be measured alongside the indexical nature of analogue media, the dimension that gives the moving image archive its status as evidence. As is demonstrated in the picture of my grandmother, the application of digital colour can leave behind artefacts that interact in complex ways with the indexical qualities of an analogue image. My analysis will endeavour to tease out the ways in which colourisation, moving in and out of visibility, generates shifting positions vis-à-vis the indexical and evidentiary nature of documentary footage. Before embarking on that analysis however, it is important to clarify how my discussion of specific images can relate to larger institutions of remembrance and memorialisation. In order to do this, I'd like to provide a quick survey of some aspects of Documentary Studies, Digital Memory Studies and Software Studies, all of which feed into my understanding of the relationships between archive materials, procedures of digitization and contemporary memory formations.

For me, a foundational insight into how contemporary media formations such as digital colourisation shape our conception of the past, comes from Flusser. For Flusser, "historical consciousness" is the product of a dominant media technology, specifically alphanumeric writing, that, given its linearity, creates a structurally correspondent understanding of the world. Mediated via writing, the world is organised cumulatively, according to cause and effect, with history resembling a text, insofar as one thing happens after another. As Flusser put it "with the invention of writing, history begins" (2013, 93). However, the story doesn't end there. With the invention of photography, "history, and the mode of thought that produces history, is over" (2011a, 59). What replaces history, Flusser calls "post-history" (2013). In Post-History, the vector of signification has been reversed by the technical image to such a degree that events are no longer understood according to their determinants and outcomes, but rather according to their mediation via technical images. The reversal of the vector of signification means that it is the image of the event (the signifier) that is considered real, as opposed to the (signified) event itself. Today's twitter imperative "pics or it didn't happen" sums up the degree to which this ontological displacement of real events by images of events, has taken root. For Flusser, the universe of technical images becomes a "dam for linearly progressive time" (2013, 97) because events are no longer understood as moments in

time that fit within a broader understanding of history, but rather events are the "raw material" for the apparatus of photography and belief systems and social structures that photography brings into being.

Flusser's concept of post-history is not only entwined with his concepts of technical images and technical imagination, but also with his theorisation of freedom within a reality that is programmed to the point that forecloses any meaningful chance of rebellion. For Flusser, history becomes post-history, because the functionalising nature of apparatuses has made any more history (i.e. revolution) impossible. I don't intend to follow this logic, or impose his model of post-historical consciousness in any detail, but revisit it here to stress the basic media-epistemological premise that my project inherits from his work. Namely, that media structures determine epistemological frameworks and that analysing the ways in which the indexical and non-indexical media are co-operative in the colourisation of the archive should provide a view onto the popular memory formations and conceptions of history that emerge within the regime of capital-intensive hyper-financialised image culture that I call franchise aesthetics. The image of my grandmother, for example, doesn't speak to me of a post-historical condition, but it certainly does crystallise the problematic interrelation of two media regimes, and their associated epistemological formations. For example, the black and white original, despite the fact that I perceive it as a non-symbolic window onto a past reality, nevertheless exhibits a number of medial artefacts, not least of which is its being monochromatic, that encourage me to engage with the image according to its historical and material conditions. It's an "old" photograph. In a different fashion, despite being riddled with artefacts and misleading colour information, I look at the colourised image as a non-symbolic window onto a reality. However, because these artefacts are digital, I do not supplement my perception of the image with a residual sense of its place in history. It doesn't primarily appeal to me as an "old" photograph. It's neither old nor new, it is a picture of my grandmother as a girl, adapted to the technical and aesthetic parameters of her grandson's habits of perception. What is crystallised for me is that in this process of adaptation some of the residual routines associated with looking at "old" images are suppressed. The DeOldify algorithm is true to its name: the question is whether or not, in no longer perceiving the image as "old," I am also no longer engaging with it as an artefact from the distant past, and, more speculatively, whether the processes by which I remember my grandmother can be considered to be augmented by the deoldified image, and its de-materialised past-ness.

Digital Memory Studies, exemplified in the work of Andrew Hoskins (2017) is directly concerned with the imbrication between media and forms of memory. Starting from the premise that "media have long been instrumental in the settling of history," (6) Hoskins takes as a central

presupposition that “the past has long been inexorably and securely put to bed with the aid of media, offering certainty through memory” (6). Media are a form of external memory field, offering certainty because, unlike neurological memory, the archive is a secure depository of historical artefacts. It is also a shared memory field, producing, shaping and sustaining not just individual memory, but collective memory. In parallel to Flusser’s thinking, Digital Memory Studies tacitly suggests that without media there would be no history and, similarly, the settling of history through mediation gives rise to social structures and collective consciousness. Within this view of the co-evolution of media and memory, digital media represents a rupture. Hoskins writes that “media history has long been steady and benign” (6), with the clear implication being that in the contemporary media context the means of settling history is up for grabs.

Digital Memory Studies has many sub-disciplines, from the cognitive to the socio-political. Matthew Allen, for example, uses a cognitive perspective in order to describe the dynamics of contemporary memory practice. He comes to the conclusion that memory is “intermedial” with the processes of memory formation taking place in the brain and in media being inextricable. For Allen “memory vascillates between biotic systems and communication devices” (2017, 193). Whilst it is not within the remit of this chapter to think about colourisation as having a direct impact on our neurological make up, this perspective is useful in underlining what is at stake in discussions of mediation and memory. Not only does the emergence of the new digital media regime render the settling of history a process that can be, in essence, hacked, but it suggests that a horizon for this hack-ability is the interface between our “biotic systems” (i.e. our brains/wetware) and the media objects we consume. Whilst I find the idea of an intermedial relationship between media forms and memory to be very suggestive, I don’t plan to argue that looking at a colourised image of my grandmother has made an indelible impact on my brain, nor do I feel that it would be valid to speculate from this point about a generalised experience of colourisation. Instead, analysing colourisation as a component of franchise aesthetics requires that I expand my focus out, from family photos to the larger moving image archive that plays a more decisive role in the formation of collective memory.

Although Hoskins doesn’t explicitly make this connection, one of the contributing factors to the intensified dynamism by which digital media are disrupting the settling of history is that a large section of the moving image archive undergoing digitization and – increasingly – colourisation, relate to periods of history that are falling out of living memory. This is particularly relevant when thinking about collective memory, especially with regards to historical events such as World War One. Remembering World War One is inevitably an engagement with media and takes place within what digital memory scholars describe as a “new media ecology” (Hoskins, 2017, 20; also, Merlin Donald,

2002). Within this new media ecology, living memory has decisively disappeared. For Hoskins, this emergent ecology needs to be analysed in order to build a picture of "the actual consequences of the entanglements of sociotechnical life… on remembering and forgetting" (2017, 20). Hoskins' work stands as a firm precedent for the argument that new aesthetic forms within the external memory field have actual consequences not just on the discourses that surround particular historical events, such as World War One, but on the way in which those discourses are internalised as a form of collective memory. As for the question of forgetting: glancing forward to my analysis, I will suggest that given colourisation's growing popularity, the process of collective forgetting can be tied to the mediation of the archive by colourisation procedures. As I'll argue in more detail shortly, as the archive is increasingly subjected to colourisation, the archive is increasingly shaped by the amenability of its various images to colourisation. Considering the moving image archive as an external memory field, this would suggest that colourisation actively narrows this memory field. Whilst colourisation promises to help us remember the past in full colour, it simultaneously causes us to forget that part of the archive that can't be colourised.

The software studies of Wendy Chun provide a complementary perspective on what is forgotten in the process of digitization. However, where Digital Memory Studies offers insights into the pitfalls of un-settling history via the aestheticisation of the archive, Chun offers a more direct vision of the processes by which memory has been externalised and re-conceptualised through the emergence of computing and software culture after the Second World War. In her book *Programmed Visions: Software and Memory* (2011) Chun tackles the problem of a common misperception, specifically that cultural memory and the digital archive are more or less the same thing, given that cultural memory in the digital world is formed and sustained predominantly online. Chun identifies a sequence of paradoxes that spring from our intuitive over-lapping of digital media and cultural memory (the overlap identified and problematised by Digital Memory Studies). The assumption that cultural memory is enshrined within the architecture of digital media, Chun argues, "creates an enduring ephemeral that promises to last forever, even as it marches toward obscolescence/stasis. The paradox: what does not change does not endure, yet change – progress (endless upgrades) – ensures that what endures will fade" (2011, 137). The media-epistemological stakes are clarified even further in the following statement: "Another paradox: digital media's memory operates by annihilating memory" (137). This is a software specific version of the dynamic sketched above, wherein the technical standards of colourisation determines what is and isn't included in the colourised archive.

Chun goes even further in her analysis of the false equation between digital media and cultural memory. Descrying what she describes as the "blinding belief in digital media as cultural

memory," Chun argues that "this belief threatens to spread this lack of memory everywhere and plunge us negatively into a way-wayback machine: the so-called 'digital dark age'" (2011, 171). This blinding belief is a key concept for my own discussion of colourisation, because it describes the condition that colourisation seemingly aspires towards: the belief that colourisation makes archive footage *more* accessible. This belief marginalises, or forgets, the historical significance of media specificity. In turn, forgetting that contemporary media formations do not resemble those of the past allows the epistemological dynamics that are baked into contemporary standards of perception to go unquestioned. As will be clear across my thesis, franchise aesthetics are more effective in shaping our relation to the world when they are invisible and unavailable to critique. The first step towards inhibiting the instrumentality of franchise aesthetics is bringing their aesthetic criteria to light.

For my purposes, Chun's concept of the "digital dark age" characterised by a profound lack of memory as a human-cognitive function can be taken as the fatalistic horizon that a critique of colourisation is attempting to pull back from. A final touchstone for thinking about digitally colourised archive material comes from the realm of Documentary Studies, specifically that area of research that since the publication of Bella Honess Roe's book *Animated Documentaries* (2014) has been looking at the role of animation, and non-indexical media more broadly, in non-fiction storytelling. The work surrounding animated documentaries has many interesting overlaps with the ground covered by Wendy Chun and Digital Memory Studies, not least because in its most paradigmatic usage (for example in the Ari Folman's rotoscoped film *Waltz with Bashir* (2008)), animation in a documentary format deals directly with the problem of memory, as a living process susceptible to erasures and the occlusions of trauma.

More recently the foundational insights of animated documentaries have been turned on their head, with animation in documentary not reflecting the instability of individual memory processes, but rather the slipperiness of notions like memory and truth in our "new media ecology" (Hoskins, 2017, 20). For instance, Nea Erlich claims that the use of animation in documentary is apposite within what has been called the "post-truth era" (D'Ancona, 2017). Erlich claims that animated documentary aesthetics "function very much as a sign of the times," where "what matter[s] [is] not veracity, but impact… the triumph of the visceral over the rational, the deceptively simple over the honestly complex" (D'Ancona 2017, cited in Erlich, 2019; 5). Erlich, in turn, gestures towards Esther Leslie and Joel McKim's assertion that within digital culture, "animation is increasingly fundamental to processes of knowledge production" (2017, 207). The suggestion is that

documentary film-making practices require non-indexical media like animation in order to produce knowledge about processes and dynamics that cannot be directly documented through cinematography. Extending this insight, one can say that the prevalence of animation within contemporary documentary practice is an indicator of how our media-epistemological engagement with the world has advanced *beyond* the cinematic regime, anchored by the indexicality of the image, the evidentiary nature of the photograph.

However, there is a distinction to be drawn here between animation as a means of "knowledge production" and the hybrid process of digital colourisation. The distinction speaks to the nature of evidence in the "post-truth era," and ultimately helps define what my analysis will seek to demonstrate in full. Specifically, colourisation is a hybrid process wherein the animated nature of the digital colour is involved in the production of knowledge that can run counter to the indexical record of the event that the archive image provides. The question then becomes: is colourised evidence of the past *good* evidence of the past? And under what conditions do we prefer colourised images despite the fact that we know that they undermine the evidentiary quality of the archive image?

The insights from Digital Memory Studies concerning the imbrication of media and memory, and Wendy Chun's polemic with regard to the annihilation of memory within digital culture, suggest that digital media are already playing an over-determining role in the way in which we look at history via the moving image archive. However, throughout the rest of the chapter I hope to demonstrate that analysing digitally colourised imagery as iterations of hybrid media allows for a granular engagement with colourised archive footage in a fashion that suitably grapples with the epistemic impact of digitization. Going further, perceiving colourisation as an aspect of franchise aesthetics will help frame our tolerance of the micromanipulations of colourisation as a tolerance of other dynamics embedded within capital-intensive visual culture. Finally, my reading of *I Am Not Your Negro* will model a way of looking at digital colourisation that is alert not just to the semantic operations of the procedure, but what Flusser calls the pragmatic meaning of the image as well, attuned to the way in which colourised images impact our orientations towards history and the moving image archive as a means of accessing history.

SECTION TWO: ANALYSING *THEY SHALL NOT GROW OLD* (2018)

I have chosen as my principal case study for this chapter Peter Jackson's World War One documentary *They Shall Not Grow Old* (2018). On the surface, the film epitomises the mainstream culture of remembrance with regards to the First World War. It fits the mould outlined by Emma Hanna in her book *The Great War on the Small Screen* (2009). Writing in 2009, Hanna notes that, in the main,

> television documentaries about the First World War became central sites of national memory and mourning which utilised images and ideas about the conflict which resonated with the accepted story of 1914-1918. By using modes of remembrance that were established in the inter-war years, these programmes were designed to be self-generating. Many programmes sought to place the war and its aftermath beyond critical discussion, and where more recent programmes challenged accepted ideas about the war they were roundly condemned in the press (29).

Hanna's assessment of the way mainstream media complies with normative modes of remembrance is reminiscent of Hoskin's assertion that media "settle" history. Jackson's film fits this mould perfectly: thematically and narratively, it is highly orthodox and feeds into a century old tradition of national memory and mourning that wishes to do justice to a lost generation of young men. Indeed, the film was designed as a classroom tool and is available as a set of teaching resources (BBC Teach, 2018).

What makes the film stand out is its treatment of archive footage, which is colourised and – in some screenings – presented in 3D. Whilst it is not the first film to digitally colourise footage from World War One, it is the first to frankly claim the superiority of the colourised images over their originals, and, crucially, for that claim to be met with mainstream critical consensus. Whereas the aforementioned *World War One in Colour* (2003) was largely ignored for being a historically uninteresting one-trick pony, Jackson's handling of the archive is being signalled as the beginning of a new practice in non-fiction film-making. Crucially, the colourisation is not positioned as adding anything new. It is simply and (to my eyes) disingenuously positioned as a strategy of restoration. For Jackson, restoration is an ethical project "important if we want people […] to think of these men as human beings… Restoration is a humanising process" (Jackson, 2018). The critical reception of the film ratified this: Jackson's film was celebrated not so much for re-iterating the contemporary relevance of archive footage but of making the archive footage feel contemporary. Mark Kermode's

5-star review sets the tone for the general tone of adulation that champions the colourisation as "utterly breathtaking" and "a cinematic triumph" (Kermode, 2018).

Not everyone would agree with this opinion of colourisation. Indeed, many perceive the ethical dimensions of colourisation in opposite terms from Jackson. The FIAF Code of Ethics itself states that:

> When restoring material, archives will endeavour only to complete what is incomplete and to remove the accretions of time, wear, and misinformation. They will not seek to change or distort the nature of the original material or the intentions of its creators. (FIAF, 2008)

This quote is taken from the third edition of the code of ethics, produced in 2008, and so firmly within the context of colourisation's re-ascendancy as a method of "restoring" the archive. More recently, Luke McKernan, in anticipation of Jackson's film, argued that "colourising… threatens to make the WW1 film archive we have inherited meaningless" (2018b). Lawrence Napper, upon seeing the film, bemoaned that "so sacred is the cow of the Great War in its centenary moment that nobody seems to have noticed how horribly distorted and ludicrous Jackson's tarted-up images look" (2018). Elsewhere, Pamela Hutchinson argued that Jackson's treatment showed a "contempt for archive footage" (2018).

Like it or loathe it, the colourisation is never truly invisible. Instead, watching the film is an experience of getting used to the novelty of the effect. This makes the film a very useful test case for my ideas about colourisation, because the colourisation practiced here represents the most technically sophisticated version of the process. Therefore, the aesthetic characteristics we draw from this example can be considered typical of the practice more generally, but the fact that the colourisation remains visible allows us to ask further questions about the aesthetics of the process. Specifically, how does the consistent visibility of the digital manipulation impact the film's status as a "site of national memory and mourning"? Through my analysis I aim to problematise the blithe assertions that prop up the colourised archive and, to borrow a word from the FIAF code of ethics, suggest that colourisation contributes to the accretion of "misinformation" in the archival image, imposing a set of aesthetic standards that can only be perceived as an expression of contemporary priorities concerning perceptual accessibility and the false belief in the value-neutral effects of digital colour.

I will now turn to an account of the peculiar aesthetics of colourisation. The aesthetic features I'll be examining can be loosely listed as follows: the redness of red, the pinkness of (largely Caucasian) skin and the monotone of deep backgrounds. Each is particular to colourisation and is the specific result of the difficulties involved in the colourisation of images from World War One, such as overlaying convincing colour on monochrome images that were captured in extreme circumstances (the trenches), using volatile equipment (hand-cranked cameras) and developed using chemical procedures that could have several distinct effects on the finished image. As such, each of the particular aesthetics of colourisation is also an articulation of the priorities of our current techno-cultural context, effacing the heterogeneity of the archive with the standard aesthetic parameters of the colourised archive. In each of the sections that follow, I'll endeavour to describe what these aesthetic features disclose about the colourisation process, its modes of signification and symbolisation, as well as its effect on the significatory modes of photochemical media. From this standpoint, I'll decode what impact this might have on the collective perception of World War One, as it is organised by a film like *They Shall Not Grow Old*.

Luke McKernan's impassioned assault on colourisation is grounded in the fact that film stocks of the early twentieth century were orthochromatic rather than panchromatic, and do not represent an accurate capturing of real colour in the first place (2018a). Orthochromatic stocks, in general, registered reds as deep blacks and blues as lighter greys (a chemical quirk that Méliès famously accounted for by painting his sets blue in order to brighten up the final image). What this means for the colourisation process is that the orthochromatic record of the colours will be translated into a misleading grey-scale and when colour information is interpolated into the grey-scale several shading issues will present themselves: what could be perceived as something receding into darkness was, in front of the camera, a bright red object. The problems this poses for colourisation are exemplified in the Nugus/Martin television series *World War One in Colour* which included an episode on aerial warfare, and particularly the exploits of Manfred von Richtofen, known as the Red Baron thanks to the colour of his plane. In most black and white images of the Red Baron's plane, the colour is registered as a dark imposing black. In the colourised image, the darker portions of the plane are too dark to successfully register as red, and the red tint on the brighter sections of the wing or fuselage makes the plane appear a touch pink.

In Jackson's film, by contrast, obvious misregistrations of colour such as this are prevented by editorial oversight. Furthermore, the process of digitally restoring the greyscale image has improved over the past few years, minimising the problem of extreme contrasts found in the images of the Red Baron's plane. This means that the colourisation procedure itself, wherein individual

objects in the frame are identified, their edges traced and the pixels within that area assigned a specific hue, appears more accurate because it is operating on a greyscale image with very subtle gradations from pixel to pixel, allowing for more naturalistic appearing colour. That said, the problems of colourising red objects still haunts Jackson's film in two ways. Firstly, most specifically, the misregistration of red in the orthochromatic record means that red areas of the frame – those areas of uniforms, munitions, or blood, for example, are overcompensated for given that the colour information must be overlaid on a darker grey. Secondly, more abstractly, given that red objects present such problems for colourisation, their generalised absence means that the presence of red can potentially strike the viewer in an overly significant key. Indeed, the infrequency of colourisation's handling of reds means that when reds do occur they appear anomalous. Red is already a highly symbolic colour, and this dynamic can freight the red with excessive symbolic meaning. It snags the eye and tempts a meaning that over-rides the neutrality of the documentary's presentation. Jackson's film features red in its most vivid registers: as blood and as poppies. Looking at these two details and the way in which they are presented helps us glimpse the way in which colourisation both attempts to shore up its claim on authenticity even as it slips into a rhetorical register that exceeds the parameters of neutrality and veridicality.

Firstly, the redness of blood. Under the conditions of colourisation the documentation of injury must overcome the technical difficulties of blood red and its misregistration on orthochromatic film stock. A creative intervention is inevitable as is the potential for the blood to appear stylized. Jackson's display of injury and death is in line with his ethics of restoration: it is an attempt to express the human, physical cost of combat. Accordingly, the film is peppered with frequent, often visceral, images featuring dead and wounded soldiers. One image of a gangrenous foot stands out as being positively gory. Another sequence shows the walking wounded being treated in a field hospital. Here, the reds of bloodied gauzes and open wounds pull the eye in a way that verges on the over-accentuation of the presence of blood. This over-accentuation bifurcates the meaning of red in the image: it denotes blood but simultaneously the livid reds connote the process of colourisation itself and its re-signification of the contents of the black and white image. The way in which red draws the eye and accentuates the injury detail serves as a reminder of its interpolation into the monochrome image; in turn this generates an awareness of the manipulation of the images. No matter the photorealistic achievements of the colourised image, any signal of the colourisation process itself potentially alters a straightforward perception of the image as an indexical record of a past event. Blood in Jackson's film always has an edge of the lurid about it: our sense of the bloodiness of the battlefield is produced via a rhetoric of blood and gore that is familiar from digital blood effects in fiction film-making, a rhetoric that is surprising to identify in a documentary. In the

image below, for example, the red of the blood stands out from the dun-colours and dreary greys surrounding the figure. The walls and floor of the trench appear to be streaked with blood, with extra dots of red on the bag standing out as spatters thanks to a sharper contrast of the red against the textile beneath. All in all, the prominence of the colour overstates the presence of the blood (a presence which the black and white image presumably does not suppress) to such a degree that the colourised image seems to be amplifying its documentary status with a set of tropes about gore and blood drawn from contemporary visual culture, where digital blood effects are a staple of all forms of genre film-making. (For a discussion of how digital effects, such as blood effects, contribute to fictional retellings of recent events see Melanie Piper's "Blood on Boylston: Digital Memory and the Dramatisation of Recent History in *Patriots Day*" (2017))

[FIGURE 2: *They Shall Not Grow Old* (Peter Jackson, 2018) Screenshot]

The red of the poppies in the film has a similar effect on the way in which the image is interpreted. In a variety of flat green shots, dots of red stand out in a manner that organises the way in which we perceive the images. Appearing in the foreground of wider landscapes, red in and amongst the green of the grass helps segment the image and contribute to the sense of perspective. Popping up at the side of the road, bright dots of cheery red offset the uniforms of marching men. Significantly, there is never any question as to what flower this red is supposed to represent. The connotation of this use of red is overwhelmingly symbolic, so much so that it imposes upon the basic

veridicality of the colourised image. The appearance of red dots resonates symbolically before it persuades photographically.

Poppies are ubiquitous in Jackson's film and whilst there is plenty of evidence to suggest that poppies flourished on the battlefields of World War One, I'd suggest that in this instance, the rituals of remembrance supersede photographic realism. The symbolic lineage that runs from John McCrae's "In Flanders Field," via the British Legion to every lapel on television in early November consistently pushes its way into Jackson's frames, with the red of the poppies again proving a distracting element, drawing the eye to the corners of the frame and disrupting the composition of the images. Whilst nit-picking about whether or not there were actually poppies in every frame that is dotted with red is not necessarily helpful, their repeated presence contributes to a growing awareness of the retroactive processes of colourisation which has the potential to re-signify the most basic landscape. Each repeated inflection of a green landscape by a random scatter of symbolically over-loaded red opens the question of whether or not those flowers were really there. Thus, integrated into our basic perception of reds in the colourised image is an intuition that the red is motivated less by the presence of actually existing flowers, and more by the power of the colour itself.

Perhaps the polyvalence of the colourised red here can be used to illustrate the idea (drawn from Digital Memory Studies) that memory is essentially an "intermedial" process, wherein memory formations are dependent upon a variety of distinct media as well as the cognitive act of retaining certain impressions. This being the case, we can see how the existence of a pre-eminent set of cultural assumptions about red poppies could feed into the national memory of the First World War and from there, into the process of colourisation. Our association of poppies and trenches establishes a feedback loop that is perpetually reinforced by films like Jackson's, pushing to the side any querying of the colour information in images pertaining to World War One. We can begin to discern the dynamics by which this use of red, despite standing in contradiction to the evidentiary nature of the archive material and despite having a palpable symbolic flavour, does not meaningfully interfere with the apparent veridical nature of the images. The symbolic function of red is so pervasive across all mediations of the war that no amount of it can overturn the perceived neutrality of colourisation.

This is an interesting example of how franchise aesthetics can function. The post-photographic interpellation of reds throughout Jackson's film successfully retrenches a set of questionable ideas about the ubiquity of poppies on the battlefields of World War One, despite

being legible augmentations of the film image and not evidentiary in any way. The phenomenological access to the past that colourisation provides tweaks history to its phenomenological legibility. What this means is that the external memory field of the moving image archive is, in the context of colourisation (and digitization more broadly), always already construed via the perceptual standards manifest in contemporary media. The red of the poppies throughout Jackson's film is an expression not of the red that may or may not have been visible at the time, but of the imperative to remember the war according to the parameters of its symbolic heritage. This imperative has been in place since the inter-war years, but has been incorporated into the evidence, thanks to the hybrid process of colourisation. Indeed, if colourisation is to disappear from sight and become a normative process within the reconstitution and re-mediation of the moving image archive, one can imagine a scenario in which the validity of an image of the First World War is called into question because there aren't enough red poppies to prove its historical credentials.

The colourisation of skin-tone, like the presence of reds, can prove a distracting feature in the frame. However, where the reds compromised the veridicality of the colourised image by creating a tension between the overtly symbolic use of red and its actual presence in the profilmic scene, colourisation's presentation of largely Caucasian skin-tone must deal directly with issues of naturalism and the correspondence between digital colour and natural colour systems. If, as Jackson says, the task of restoration is a humanising one, it is worth taking a closer look at those humans and interrogating the degree to which the application of digital colour is successful in making the faces appear more human. Again, the process is inhibited by the nuances of colour registration in monochromatic stock and again, this problem of translation and registration accounts for the characteristic aesthetic of colourised skin tones.

[FIGURE 3: *They Shall Not Grow Old* (Peter Jackson, 2018) Screenshot]

On first glance, as in the image above, colourised faces appear strange, they have a monotonous wash and can appear either overly luminous, almost acidic, or chalky and sallow. There are various ways to explain this issue, but in essence the reason for this chromatic monotony is that colourisation deploys too few colours in its rendering of flesh tone. Painters have been including surprising hues in their representation of skin for centuries, in deference to the nuances of shade, tone and reflection. In more recent years, researchers into digital effects, most notably Barbara Fleuckiger, have outlined the challenges of digitally modelling and rendering convincing skin. The solutions that have been pioneered in the VFX industry – most notably the rendering protocols loosely described as Subsurface Scattering (SSS) – rely on multi-layered models with an abundance of sub-cutaneous architecture and enormous amounts of computing power (Fleuckiger, 2008), all of which calculates the effect of infinitesimally small variations of texture and surface density on the behaviour of light and the appearance of colour.

By contrast, colourisation is only dealing with a grey-scale image and there are no sub-visual determinants to inflect the way light bounces off faces. Likewise, colourisation is not a rendering process. The colours are determined not according to the behaviour of light, but according to a set of assumptions established and articulated externally to the photographic process. For example, a short video on the Smithsonian Channel's YouTube channel, promoting the series "America in Colour" features an interview with Samuel Francois-Steininger, Art Director at Composite Films, the company who colourised the footage. In outlining the steps for the colourisation, Francois-Steininger is at pains to demonstrate how much of the labour involved in colourisation has nothing to do with the image itself. Instead, the work is in finding colour references for people, places and things within the photograph. "We work with a team of researchers and historians," Francois-Steininger says, "colour investigators, calling collectors and […] re-enactors." As a result, "putting colour on the film is more like working with micro-history, because we are really concerned with details" (Smithsonian, 2017). The video boasts that the series required 5,800 hours of research, all of which was spent on gathering knowledge and reference colours from materials that had little to do with the image undergoing colourisation. This discorrelation between the original image and the sources used to determine the colour content of the colourised image is exacerbated with automation. The algorithm behind the DeOldify software, for example, learns what colours are appropriate for black and white images by consulting a neural network library of colour images. As a result of training the algorithm on a database of contemporary images, its creators admit that DeOldify "biases people to wearing blue jeans" (cited in Nicholson, 2020). This is an anachronism that illustrates the incomplete compatibility that marks the process by which the images are made, and the various knowledge

regimes that choose and impose the colours for colourisation. Returning to World War One footage, this is most markedly the case in the colours of uniforms, which cannot be captured spontaneously or automatically by black and white film. To compensate, the colours are imported from various other non-photographic realms of knowledge: military history and regimental portraiture being foremost.

In the example of uniforms, the use of colour isn't particularly intrusive given that the average viewer does not have direct experience of World War One livery. The same can't be said of the representation of skin, which betrays not only the politics of the process by which the reference colours are determined, but also goes some way towards uncovering a generalised bias within the architecture of digital colour towards a particular skin-tone. The faces in the image above exhibit a homogenous pink-grey wash that is so vivid and particular as to make manifest the process by which colour values are assigned in colourisation; each un-life-like pinkish face attests to the colour arriving from beyond the significatory processes of photography. This is doubly consequential. Firstly, the consistently problematic representation of skin tone in the colourised images troubles our intuitive perception of the photographic image as a transparent picture of reality and goes some way towards guaranteeing the visibility of colourisation within the frame. Secondly, this persistent visibility transforms the way in which the image is understood. That is to say, once the evidentiary status of the image has been undermined, what becomes visible is what Flusser describes as "the entire complex of apparatus and their criteria… that lie between a photograph and its meaning" (2011b, 42). In the case of Jackson's film, the skin-tone of the soldiers is so lacking in variation that it becomes relevant to investigate the criteria behind that invariance and the parameters that manifest that particular tone.

Jackson's film dedicates a significant amount of attention to the personal hygiene of the troops. It is reported that on the front-line the men are expected to shave. Likewise, on returning from a four-day spell at the front, the men are expected to be spick and span the next day. Accordingly, the film features several group portraits of pink-faced Tommies smiling at the camera. However, even justified by the images of vigorous scrubbing there is a monotony and unnaturalness in the pinkness of the faces. This non-correspondence between the flesh tones that we experience every day and those of colourisation discloses the fact that the colour information is not drawn from the scene photographically, but instead selected from a palette, wherein Caucasian skin tone can be expressed as an RGB value. These are the criteria – the description of ethnicity in mathematical parameters, R225, G224, B189 according to Colour-Hex.com (accessed 2019) – by which, Flusser

argues, the meaning of the image is set in place. What they disclose through being visible in the frame is the basic incommensurability of photographic media and digital colour. This splits the ontology of the image: the spatial information is derived from the play of light in front of the lens, the colour values quite legibly have no relation to the profilmic scene.

The monotony of the skin tones ultimately reveals the narrow parameters that express Caucasian skin tone in digital colour, and the result of designating a range of individual faces with the blanket colour value associated with their (presumed) ethnicity: R225, G224, B189. What is being brought to the fore in this particular aesthetic of colourisation is a set of representative tendencies that are potentially in conflict with the politics of remembrance. There is a paradox at work. In humanising the individuals caught on film, Jackson's process is quite legibly homogenising them. What is at stake here is not the success or failure of Jackson's film but instead the effect of a representative medium on the processes of "national memory and mourning." The aesthetics of colourised skin tone do not enable a greater realism in the image, but instead seem to conform skin tones to the available palette. As such, in the tension between representation and remembrance, digital colour's drive to more realistically represent the events of World War One instead actively distort them according to a set of descriptive standards. This fulfils the dynamic that Sean Cubitt identified, in a different context, as the "normative core" of digital media, wherein all aesthetics serve the purpose of "conforming perception to… technical standards" (2014, 148). I'll return to the racial dimensions of digital imaging technologies and the role of colourisation within those dynamics when I look at *I Am Not Your Negro* for my conclusion. It's worth noting briefly, however, that the racial politics of representations of the First World War is still a highly contested area. Sam Mendes, for instance, was compelled to defend his featuring of a Sikh soldier in his film *1917* (2020) against the spurious accusation that it was forcing diversity on the viewer. The role of Sikh soldiers has been thoroughly under-represented in considerations of the First World War. A relevant question with regards the role of colourisation as a component of franchise aesthetics is whether or not this marginalisation will be exacerbated by colourisation not just because of its persistent use of a narrow and narrowing mathematical language for the representation of skin-tone, but also because it relies precisely on the resources that exhibit the initial under-representation of the Sikh contribution for the process of finding colour references.

Adding colour to a black and white image has an effect not just on the semiotic conditions of the image and its significatory processes, but also on its expression of space. As Christine Brinkmann

points out in her essay "The Tensions of Colour in Colourized Films," (2014) which focuses on hand-painted early film but contains many points that are relevant to the digital iteration of colourisation,

> colour can alter the impression of space, as warm colours seem to lie close up and cooler ones appear to be more distant… It can override the three-dimensional modelling of shadows on objects as well as the illusion of depth resulting from central perspective and other indicators in the image (2014, 98).

This disruption of photographic space has a two-fold impact on the viewing experience of colourised films. The first occurs image by image, with warm colours effecting the depth of the image and making distant perspectives appear shallow. The second results from the concatenation of these effects, as the intensity of the impact of colour upon photographic space oscillates from shot to shot. Across the duration of a given sequence, the viewer negotiates not just the effects of montage – with its construction of spatial continuity – but the varying effects of colour on spatial perception as well.

[FIGURE 4: *They Shall Not Grow Old* (Peter Jackson, 2018) Screenshot]

To deal with the first of these interconnected effects: there are several instances throughout Jackson's film in which distant backgrounds more closely resemble matte paintings than receding space recorded photographically. This is particularly acute when the middle and foreground of the image are clearly demarcated, either through the movement of figures across the screen, or by a

clear line receding in perspective, such as a road or a trench. In these instances, it is often the case that deep spaces aren't fully integrated into the composition and the application of colour to the deep background can make the image appear planar, especially when that colour is warm and, as Brinkmann describes, pushes itself forward in the composition. In the image above, wounded soldiers returning from the front trudge past the camera, having climbed what appears to be a relatively steep hill. The middle ground of the image is taken up by the road and the detritus on the verge, scrubby trees dominating the right-hand side of the image. On the left, however, the landscape opens out. There is no movement to help discern the perspective or distances at play, instead the area of the frame appears in a pale and static green. It does not fully integrate with the perspectival information laid out in other portions of the frame; as a result, the composition appears unbalanced. The blocky shades depicting the countryside in the deep background loom over the middle-ground of the frame instead of receding behind it. A similar effect occurs in colourisation's integration into aerial shots, where the colour appears unnatural and schematic rather than isomorphic and spatially accurate.

What can be drawn from this treatment of perspectivally flattened space and deep backgrounds is that successful colourisation depends upon images that offer a clear distinction between figure and ground. This should come as no surprise, given the process by which colourisation is achieved and its similarity with the process by which 2D images are rendered in 3D. In both instances, objects within the grey scale image are isolated and differentiated from the background, usually via an edge detection algorithm (AR Show, 2018). In the 3D rendering, this differentiation is the first step in stereo conversion and is used to create the parallax effect. In colourisation the object is then assigned a colour and tracked as it moves. It follows that in images where the differences between figure and ground are unclear not only will 3D rendering be unpersuasive, but the application of colour will obfuscate what little depth information is contained within the grey scale.

This varying effectiveness of colourisation's integration within spatial compositions is felt not just in individual frames but also across the duration of a colourised sequence. For example, when spatially distinct compositions are edited together, the eye constantly re-adjusts to compensate for the effect of the colour on the expression of space in the frame. The juxtaposition of a group portrait, for example, with aerial views of the trenches, requires a re-adjustment between the unobtrusive colours applied in the former instance, and the more abstract use of colour in the latter. Jackson's film uses a number of strategies to make the flow of images as smooth as possible; nevertheless, there are enough awkward juxtapositions to disclose the fact that colourisation is not

equally effective across every type of image. In short, because colourisation is most effectively applied to images where there is a strong differentiation between figure and ground, and where objects can be easily mapped and tracked, a film that relies on colourisation for its aesthetic impact will show a formal tendency precisely towards those images where colourisation is most effective. In Jackson's case, that tendency is towards the group portrait. Whilst this is not entirely the result of the use of colourisation, the use of colourisation certainly enables and justifies this formal structuring of the film, thus impacting its representational strategy at a structural level.

As with colourisation's treatment of flesh tones, which exposes the criteria of digital colour, this bias towards compositions with a strong differentiation between figure and ground affords a glimpse at another set of criteria informing digital colourisation and its processes of construing meaning from the monochrome archive. The implementation of these criteria, through an emphasis on particular compositions, has a homogenising effect on the film as a whole and exerts a normative force on which images and which archives are eligible for colourisation. This is not the venue to denounce Jackson's film for its editorialisation – conscious and unconscious – of the archives it employs, merely an opportunity to show how Jackson's film exemplifies an automatic tendency within the processes of colourisation. This tendency places restrictions on what can be represented within colourisation and potentially excludes entire subsets of images from representability. Those images that cannot be represented in colourised form cannot enter the canon of remembrance as it is being re-shaped by digital technologies and processes such as colourisation. Subsequently, the content of those images that fall outside of the parameters of colourisation, is more likely to be forgotten.

To recap: colourisation is a technique whereby black and white archive footage is hybridised with digital colour to create an image in which the historical valence of the material conditions of the image has been suppressed, in the name of making the image more accessible to contemporary audiences. This process of medial de-historicization has a number of other effects: these include but are not limited to the specific misrepresentation of colours thanks to the discrepancy in registration of various iterations of colour stocks; the homogenising process brought about by colour look-up processes that replace the indexical registration of specific colours with generic information imported not from the image itself, but from alternative regimes of knowledge; and finally, a bias towards certain types of composition that emphasise a strong differentiation between figure and ground which pushes to the margins and beyond certain compositions and therefore whole sections of the archive that are not amenable to colourisation. These aesthetic micro-factors have a range of macro effects: on the way in which the archive is used by documentary makers employing

colourisation; on the way in which spectators engage with the meaningful portions of the frame, reading the colour content of the frame symbolically as opposed to symptomatically; and on the way in which the moving image archive resides as a stable external memory field, as a material repository of historical documents or an articulation of the affordances and functionality of contemporary software.

Taken together, what these insights into the particularities and effects of colourisation suggest is that digital colour, especially as a format for the remediation of black and white archive material is far from a neutral medium. Added to this, as has already been suggested, there is a pervasive discourse surrounding colourisation reflective of the priorities of a "post-truth" era, which in the words of Matthew D'Ancona, favours "the visceral over the rational, the deceptively simple over the honestly complex" (cited in Ehrlich, 2019, 5). As the press articles written about the recent higher-profile examples of colourisation and upscaling suggest, the perspective criticising colourisation as a distortion of the archive is a minority one, with the overwhelming consensus being that colourisation fulfils its promise. In the words of the opening credit sequence of Channel 4's *Auschwitz Untold: In Colour* (2020) "it get[s] the image closer to what it actually was." This has resulted in a presumption about the value of colourisation as a restorative process that disregards the way in which colour overturns and diverts the way in which the black and white images are encountered and, in turn, the meanings that can be drawn from them. In testament to this, colourisation leaps from the screen in a distracting fashion, even when it is supposed/assumed to be invisible.

What I'd like to suggest is that colourisation does update the archive, just not to the aesthetic standards of colour cinematography that stand as a benchmark of naturalistic appeal and phenomenological accuracy. Rather, colourisation updates the archive to the imperatives of our current techno-cultural context and the media-epistemological formations inherent to it. In order to unpack this, it is possible to flip a certain number of the presuppositions on which colourisation rests on their head. Rather than perceive colourisation through the lens of historical accuracy, i.e. as a means of making black and white archive footage *more* authentic, we can use colourisation to talk about the standards of accuracy in today's predominantly televisual mediation of history. From this perspective, the claims that colourisation makes for itself invite counter readings. Specifically, the claim made by Kenneth Branagh's narration in *World War One in Colour* (2003) that the show presents the war "as it was seen by those who fought it" is an evident mischaracterisation of the visual experience of a witness to World War One and the possibility that subjective experience from

over a century ago can be recuperated by digital media. Colourisation, whilst promising historical revelation, offers revisionism.

Secondly, rather than perceive the effects of colourisation as aspiring towards ever greater levels of authenticity and evidentiary status, colourisation demonstrates how notions such as authenticity and the evidentiary role of photography have been recalibrated in the digital context. Given that the oddities of colourisation are not just tolerable, but are successful in appealing to large audiences, it is reasonable to assume that the medial specificity of the moving image is of diminishing relevance to the role that the moving image archive plays in our collective memory. The colourisation of archive footage absorbs the archive, its material content and the events to which it bears an indexical relation into what Wendy Chun calls the "enduring ephemeral" of digital media, in which "what does not change does not endure, yet change – progress (endless upgrades) – ensures that what endures will fade." Applying Chun's insight as literally as possible to the colourised archive: the change effected by colourisation reduces the monochrome image to obsolescence whilst also guaranteeing that the colourised image will fade, that is, when the techno-epistemological context that gave rise to colourisation is superseded then the images will become as alien to the new orders of perception and new ways of thinking historically, as black and white images are, supposedly, today.

However, as stated before, I do not follow Chun's logic all the way to its conclusion, namely that what is emerging is a "digital dark age" wherein cultural memory is always only a product of digital mediation procedures. Rather, by way of conclusion, I would like to demonstrate how a critical engagement with the hybrid nature and specific aesthetics of colourisation can be mobilised to reveal not just the biases that are emergent within the practice of colourisation, but those that have been historically operative within the constituent media of analogue photography. Thus, rather than wallow in the digital dark age of colourisation, I aim to demonstrate how an engagement with the effect can enrich our perception of moving images, and in the case of *I Am Not Your Negro* add another layer to the arguments about racial misrepresentation that the film puts forward.

CONCLUSION

I Am Not Your Negro (2016) repeatedly describes "the negro" as an active conceptualisation of mainstream white American consciousness, an epistemic buttress that supports a complacent worldview and perpetuates the crisis of race relations in America. The final moments of the film features Baldwin talking on television: "What white people have to do," he says, "is try and find out

in their own hearts why it was necessary to have a n------ in the first place, because I'm not a n-----, I'm a man, but if you think I'm a n------, it means you need it." The film is replete with images of the explicit racist coding pervasive throughout all areas of mainstream culture, from minstrel shows to contemporary advertising. The film argues that the racism that marks the foundations of various mainstream modes of representation directly contributes to the racist formations of contemporary consciousness and illustrates its argument with example after example of settled mediations of "the negro" that go uncontested despite their demonstrable racism. Aided by the above analysis of colourisation, I aim to show how the film's deployment of colourisation contributes to its discussion about racial representation, and implicates the constituent media of analogue photography and digital colour in an ongoing process of racialisation. As such, this first mobilisation of the model of analysis that I am associating with franchise aesthetics will set a benchmark for analyses to come. I hope to demonstrate how an engagement with the instrumental qualities of the hybrid image can both deepen the experience of the film and enable a critical stance that counteracts the standardising processes of franchise aesthetics.

I Am Not Your Negro makes pointed use of colourisation, with several examples of exhibiting the full range of aesthetics discussed so far, including an over-emphasis of colours with a symbolic resonance, a tension between the applied colour and the sense of space within the image, and a monotonous and narrow colour palette that homogenises, amongst other things, skin tone. There are several key moments when this use of digital colour leaps from the screen in a provocative fashion, playing an interesting role in the film's deconstruction of the epistemological formations that give rise to the idea of "the negro." The first instance features images of the race riots in Birmingham in 1963. The sequence begins with CGI images of Mars, pointedly out of place in the context of the documentary. When the narration kicks in, the out of place pictures start to make sense:

> White people are astounded by Birmingham, black people aren't. White people are endlessly demanding to be reassured that Birmingham is really on Mars. They don't want to believe, still less act on the belief, that what is happening in Birmingham is happening all over the country. They don't want to believe that there is not one step morally or actually between Birmingham and Los Angeles.

The images that follow target precisely this blind-spot. There are some stills of white crowds beating black men, a brief visceral piece of footage of a fight breaking out, and some extended clips featuring images of Martin Luther King Jr being hassled by police during the Birmingham Campaign. [FIGURES 5, 6 & 7] This piece of film and the brief clip of violence breaking out have been colourised.

There is an acidic tinge to the bright colours and a pale wash in the darker hues. By contrast, the stills are in black and white. A strange assonance is established between the artificial colour of the CGI images of Mars and the colourised hues of the archive footage. Both are noticeably fake, acknowledging the digital image's propensity to fabulation, in the first instance, and manipulation in the second. In contrast with the black and white stills of lynching, there is an aestheticised quality to the CGI and colourised images that sits apart from the more straightforwardly testimonial images of violence.

[FIGURES 5, 6 & 7: *I Am Not Your Negro* (Raoul Peck, 2016) Screen Grabs

From the point of view offered by the narration, what is manifested in this distinction between digital images acknowledging their propensity to manipulation, and the black and white images communicating in an evidentiary fashion, is the difference between white and black perspectives on racial violence. I take the digitally altered images to be associated with the desire to be reassured that "Birmingham is really on Mars." By extension I see the sequence as implicating colourisation in the process of aiding and abetting the wishful thinking that would only ever half-believe in the fact of racial violence. This timely use of colourisation challenges the audience to become aware of the filters through which they perceive evidence of racist violence. Making the colourisation prominent, and associating it with a desire to "not want to believe, still less act on the belief," the sequence throws into relief the degree to which the contemporary remediation of the moving image archive by processes such as colourisation might be complicit in an epistemic framing of the past that perpetuates racist mediations.

As has been demonstrated by several writers, photography has always exhibited a racial bias. Frederick Douglass became "America's most photographed man" in a campaign to overturn the underrepresentation of Black people in nineteenth century photography (Stauffer et al, 2015). As Lorna Roth's work illustrates, a century later, the Shirley Card - Kodak's colour balance card that until the 1990s featured as its reference for skin tone a portrait of a white woman dubbed Shirley – was still being used to optimised Kodak's colour processing with a distinct bias to white skin (Roth, 2009). More recently, Sarah Lewis has demonstrated how many of the ingrained racial biases in chemical photography are carried over into digital photography, with the colour-balancing protocols in digital

formats inheriting the unchallenged parameters of quality control that preceded them. Even where the problems have been identified, Lewis describes how the solutions create more problems. Lewis points towards how image stabilization procedures in digital photography exacerbates the shortcomings of digital photography for registering dark skin in low artificial light. (Lewis, 2019) Elsewhere, Joy Buolamwini, founder of the Algorithmic Justice League, has described the racist underpinnings of facial recognition software as manifesting what she calls "the coded gaze" (Buolamwini, 2018), wherein racial bias is evident in the ways in which algorithms perceive Black faces. This is the context within which *I Am Not Your Negro* uses colourisation in an ambiguous and reflexive manner, provoking, at first, questions about *why* colourisation techniques were used, and secondly, how the distinct aesthetics of colourisation contribute to the film's critique of racist effects of contemporary media formations.

In another key moment in the film, James Baldwin is giving a speech at the Cambridge Union, discussing the conceptualization of "the negro" as inferior. The sequence begins in black and white with Baldwin stating that "it is a terrible thing for an entire people to surrender to the notion that one ninth of its population is beneath them." The speech continues with different camera angles revealing Baldwin's audience to be predominantly young white men. The speech concludes, "there is scarcely any hope for the American Dream because people who are denied participation in it, by their very presence will wreck it, and if that happens it is a very grave moment for the West." The audience breaks into applause, and the sequence changes from black and white into colour [FIGURES 8 & 9].

[FIGURES 8 & 9: *I Am Not Your Negro* (Raoul Peck, 2016) Screen Grabs

A wide angle shows Baldwin picking his way back to his seat through a sea of white faces. Baldwin sits and the applause turns into a standing ovation. Baldwin remains seated (and a little taken aback) as the applause continues above him. The transformation from black and white into colour appears completely unmotivated, but the ambivalence of the gesture is what makes it most

effective. It is even possible to miss the transformation altogether. On first watching, I barely noticed that anything had happened, but on repeat viewings the strange timing of the transformation, the specificity of the blocks of colour, the fact that the colour altered the way my eyes travelled across the frame, took on a strong resonance. The application of colour demonstrated an alternative way for the image to be read, that is according to the colour information that draws the eye towards specific figures (in a green dress), or specific faces (with different skin tones). That said, this new way of reading the images isn't strictly synthesized with the perceptual habits that go into looking at black and white images, for example the inference of colour and chromatic range from greyscale information. But this black and white mode lingers awkwardly in the moments after the transformation, when it is quite possible that the transformation has barely registered.

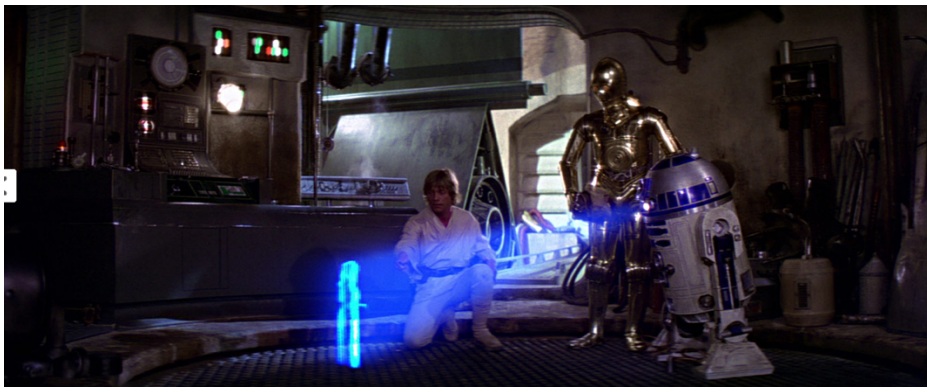
By placing the black and white and colour in problematic conjunction the sequence demonstrates a number of things. Firstly, as explored in my analysis, our eyes travel over a colour image in a noticeably different fashion and that as a consequence a different set of perceptual intuitions are at play when looking at colour and looking at black and white. By including the transformation from black and white to colour within an unbroken shot, the sequence causes an overlap between the habitual perceptual modes generated by black and white archive footage and digital colour. This overlap highlights the obvious aesthetic differences but also the subtler differences that are sedimented into our basic perceptual habits. When the image transforms from black and white to digitally applied colour, what is brought to the fore is our tolerance for the manipulation of the moving image archive for the benefit of contemporary perceptual criteria correspondent to a contemporary technical regime. When the digital colour arrives, it is a reminder that digital colour is the dominant aesthetic condition of our perception of moving images. However, when the digital colour arrives it also brings with it a sequence of subtler more troubling changes. For seemingly no reason, Baldwin's skin takes on an odd tonality. The colour fails to translate the way in which the black and white cinematography registered the specular highlights on his cheeks and forehead, and reduces his skin tone to a narrowly expressed set of parameters estimated by an automated process historically disinclined to recognise dark skin within a frame. By contrast, the audience that surrounds Baldwin flushes a relatively uniform pink that is, by comparison to the treatment of Baldwin's skin is, more or less, aesthetically unproblematic.

Although the various interviews and articles surrounding the release of the film don't mention the use of colourisation, there is a strong agreement that the film is designed to make us re-assess dominant image categories. The film's editor, Alexandra Strauss, wrote an essay about the film, which concludes "the film is there… to change the mentalities and the conception of what a

national identity is; a much more complex notion that what text books or images given by the dominant category give us" (Strauss, 2016). In conclusion I would like to suggest that the two examples of colourisation that I've looked at in *I Am Not Your Negro* can be read as demonstrations of a dominant category of image making, made out of place by the sequences that surrounds them in order to be offered up for critique. I'd also suggest that the best mode of critique to grapple with these strange uses of digital colour is to conceptualise colourisation as a facet of franchise aesthetics. As such, the micromanipulation of digital colour is reaching such a degree of ubiquity that not only do we not perceive it in the vast majority of colour photography, but it is becoming a standard condition of our access to the past via the moving image archive. Colourisation, the application of digital colour to black and white archive footage in a manner that disrupts and diverts the original image and its indexical relation to a past event, can be conceived as a component part of franchise aesthetics, because its increasingly concentrated usage across several formats of documentary film-making reflects an evolving media-epistemological framework determining how we visually access history. As my analysis has demonstrated, and as the provocative use of colourisation in *I Am Not Your Negro* attests, this media-epistemological framework is one that prioritises the phenomenological qualities of colour over the material specifics of the moving image archive, and as a consequence imposes a number of socio-politically relevant criteria on our access to the past. Put simply, the aesthetics of colourisation narrows our access to history and as such perpetuates, perhaps even promotes, the "mentalities" associated with dominant structures of representation. Only by critically engaging with colourisation can we inhibit its ongoing influence over popular forms of cultural memory and the associated constellations of racial and national identities.

Chapter Two: Hybrid Spaces, Digital Compositing and Holograms

I'd like to begin this chapter on digital compositing with a brief look at the history of holograms in science fiction. This will provide a view on the evolution of the technique of compositing from its pre-digital to digital iterations, that is, from the simple layering of discrete elements within a recorded image of a profilmic space to the construction of the screen space through the layering together of multiple recorded live-action and animated elements. Furthermore, in illustrating how the composited holograms evolve from simply appearing in profilmic space to dominating the spatial dynamics of the image, this brief synopsis will offer a glimpse of what is at stake when considering digital compositing as a hybrid procedure understood through the lens of franchise aesthetics. This chapter will explore the possibility that by re-making space on screen, the hybrid procedure of digital compositing extends the way in which cinema sets the presuppositions and mise-en-scène for spatial experience within and on behalf of capitalism.



[FIGURE 1: *Star Wars* (George Lucas, 1977)

[FIGURE 2: *Star Wars: Attack of the Clones* (George Lucas, 2002)

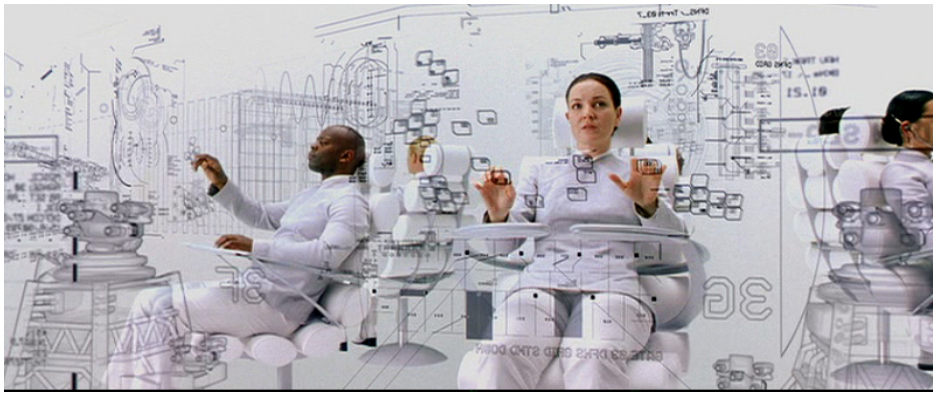
[FIGURE 3: *Star Wars: The Force Awakens* (J.J. Abrams, 2015)

The most iconic uses of the hologram effect are found in the original Star Wars films, where the holographic images are projected by R2D2 into the coherent (filmed) spaces that make up the diegesis [FIGURE 1]. This use of holographic effects to depict advanced communication technologies is iconic and, incidentally, shapes our collective misapprehension of how holograms work and what they might be used for.[3] In terms of composition, throughout the *Star Wars* franchise, the holograms can be seen moving from the middle ground of the image into the extreme foregrounds and deep backgrounds, where they dominate the space and dictate the way that the eye travels across the frame [FIGURES 2&3]. Beyond the *Star Wars* films, holograms have a rich history of depicting

[3] Although it is only passingly relevant to the argument that this chapter puts forward, it is worth noting the marginalised status of actually existing holograms. Holograms use laser beams to create a photographic plate with a distinct sense of depth, and parallax. However, in the light of not only holograms in science fiction, but what Sean F. Johnston calls "faux-holograms" (Johnston, 223), actually-existing hologram technology is rapidly disappearing from view. "Faux-holograms" include the holograms of resurrected celebrities, the performances of "virtual pop idol" Hatsune Miku (Levitt, 92) as well as a plethora of AR experiences where the holographic "tour guide" is mediated through the use of a phone screen. None are holograms as the technology is actually defined. Instead, they are tricks of projection and compositing, and evidence of our collective misapprehension of holograms as volumetric images suspended in three-dimensional space. This misapprehension, as this chapter will suggest, is better understood as a realignment of our epistemological framing of space, as a volume latent with digital information ready to appear within our visual field.

Futuristic or Fantastic User Interfaces (FUIs, for more information see Yuen, 2017). Again, as the three images from *Minority Report, The Matrix Reloaded* and *Avatar* [FIGURES 4, 5 & 6] illustrate, the effect develops from being an isolated element in the middle of the image to being the dominant component of the image's spatial effect. Furthermore, whilst the holograms from the first two images situate the live-action actor in a coherent (albeit fantastical) space, the image from *Avatar* has multiple disjunctive geometries within it, generated by the camera position, the animated content of the hologram, and the infometric overlays of yellow lines and floating digits.

[FIGURE 4: *Minority Report* (Steven Spielberg, 2002)]



[FIGURE 5: *Matrix Reloaded* (Wachowski Siblings, 2003)]

[FIGURE 6: *Avatar* (James Cameron, 2009)]

This development of the complexity of the hologram effect indicates two things. Firstly, the increasing sophistication of the process of digital compositing. Secondly, the degree to which our perception of space on screen is determined not by the perspective generated through live-action cinematography, but by the imposition of various elements within, over, and into that space. In other words, by the hybridisation of the recorded images of profilmic space. Early examples of the effect rely on the superimposition of one element over a background plate to give the impression of a hologram appearing in perspectivally arranged profilmic space. By contrast, digital compositing, whilst it may reproduce perspective, doesn't do so by relying on the perspective automatically generated through the use of a camera with a lens. Instead, I'd like to suggest that digital compositing generates screen space through the management of the relations between multiple elements, all of which can exhibit discrete scales, perspectival arrangements and textural qualities that signal that the image on screen bears no correspondence to a real space.

To invoke Vilém Flusser: perceiving photographic images as windows rather than surfaces means perceiving reality according to the criteria of the camera. By extension, does perceiving digitally composited images as windows onto 3-dimensional space, rather than flat surfaces, mean perceiving real space according to the criteria of digital compositing? To answer this, I will explore the idea that digital compositing contains a supplementary logic to that of perspective, wherein the experience of space can be generated more by the close management of attention as opposed to the faithful or "realistic" reproduction of space according to the rules of perspective. This chapter is premised on the idea that digital compositing's generation of hybrid screen spaces can be seen as inculcating a new logic of spatial representation that has ramifications for what can be termed, after Panofsky, our "psychophysiological" experience of space (1991). And as a facet of my larger

argument about franchise aesthetics, this chapter is driven by the possibility that this reconstitution of spatial experience can be implicated in the ongoing instrumentalisation of all aspects of experience within and on behalf of capitalism. In *Ready Player One* (2018) the evil monopolist Nolan Sorrento (Ben Mendelsohn) plans to take over the popular VR play-space of the Oasis in order to advertise: "we can sell up to eighty percent of an individual's visual field before inducing seizures," he says triumphantly. As *Ready Player One* ably demonstrates, with its canny placement of VR tech that is actually in development, there are a variety of technologies in which the user surrenders their visual field to total mediation. Capital investment in VR is a familiar story, with reports suggesting the industry will be worth around $180 billion dollars if rapid adoption continues over the next five years (PR Newswire, 2020). This chapter explores a related, but no less pressing possibility, that the hybrid procedure of digital compositing establishes a presupposition that un-mediated ocular experience itself is available to hybridisation. To state the case with hyperbole: has digital compositing paved the road for the colonisation of our visual field by targeted adverts?

Having surveyed the relevant theories that contribute to my conception of digital compositing as a hybrid technique that can be implicated in - what a recent study has called - "the emerging spatialities of the 21st century," (Sæther & Bull, 2020) this chapter will then offer three inter-related case studies. The first, concerned with the hologram effects in the first season of the Netflix sci-fi drama *Altered Carbon* (2018), will explore the way an often-obtrusive hologram effect becomes a normalised and routinised part of the viewing experience. The second case study will dissect this routinisation and look specifically at how digital compositing manages the attention of the spectator as it oscillates between the discrete elements constructing hybrid onscreen spaces. Looking at the hologram heavy texts of the *Iron Man* (2008-2013) and *Pacific Rim* (2013-2018) films, the section will examine how interactions between live-action performances and animated holograms determine perception of onscreen space. The final case study looks at *Ghost in the Shell* (2017) and *Blade Runner: 2046* (2018); films where the protagonist is a cyborg connected to a vast computer network that produces their subjective experience. In each film, the use of holograms allows for a reading wherein the cyborg sensorium can be made analogous to the spectator's experience of the digitally composited spaces of the film. I will offer a reading wherein this approximation of viewer experience and cyborg subjectivity inhibits the over-determination of spatial experience by digital compositing. I'll conclude with a few thoughts on how the hologram is serving as a "diegetic prototype" (Kirby, 2010), just not for the volumetric imaging technologies that are actually arriving in the marketplace (such as "The Looking Glass" - a "holographic" display that isn't actually a hologram (see Adam Savage's Tested, 2018)). Instead, through the lens of franchise aesthetics, I'll suggest that digital compositing can be seen to create a new mise-en-scène of spatial

experience, making intrusive appeals within our visual field a presupposition of our visual experience of three-dimensional spaces.

SECTION ONE: CONTEXTS AND THEORETICAL BACKGROUND

The concept of the "psychophysiological" experience of space is one that hangs over a great deal of recent scholarship concerning the production of space on screen. In my usage, the term connotes the way in which embodied experience of space absorbs the representational standards and epistemological structures manifest in technological mediations of space. The term is the outcome of Panofsky's recognition of perspective as a "symbolic form," within which ocular experience is always already inflected by the parameters of the perspectival representation of space, which dates back to the visual culture of the Renaissance (Panofsky, 1997). The redeployment of the term, in recent scholarship by Nick Jones (2015a, 2020) for example, is urgently required, given the continual remaking of ocular experience by new technologies, not least of which is Digital 3D Cinema (D3D). Thomas Elsasser provides an exemplary summary of the relationship between visual technologies and ocular experience when, in his essay on "The 'Return' of 3D" he posits a "decisive change in our perceptual and sensory default values." These changed values include "a different awareness of bodily orientation and physical location." Given that we are, in Elsaesser's summary, "embedded in layered spaces, navigating multiple temporalities and interacting with data-rich, simulated and hybrid environments," he goes so far as to argue for a redefinition of what we mean by "seeing" and "images" (Elsaesser, 2016, 287-8).

Refraining from Elsaesser's call to re-define what we mean by seeing, this chapter seeks to expand the concept of our psychophysiological experience of space. As I see it, the psychophysiological experience of space should incorporate not just the perceptual routines associated with perspective but also the habituation of digital compositing's hybridisation of perspective. This is a much-needed extension of the theoretical content of the so-called "spatial turn" in media studies, well summarised by Stephen Monteiro as the recognition that "[thinking] about space today requires thinking about *media space,"* as media "do not merely penetrate or occupy space," but also "produce and shape it" (2014, 281). The hybrid spaces I'll be looking at all contain holographic effects, which don't just reconstruct the ocular experience, but organise spatial perception through the deliberate calibration of visual cues. Looking closely at the image from *Avatar*, the space in the frame is dynamic, articulated both by the live-action recording of the three

actors in front of the camera, the keyed-up luminance of the hologram in the foreground, and the schematic lines that offer an alternative vanishing point at the convergence of the yellow lines to the left of the frame. Looking into the space of the frame is not a matter of absorbing a dominant perspective. Rather, the spatial effect of the image is produced by the management of the relationship between discrete elements and layers that takes place via digital compositing. The onscreen space has been both recorded *and* animated. After J.P. Telotte (2010), and his work with Anthony Vidler and Henry Lefebvre, I take this animation of space - one afforded by very specific technological procedures - to correspond to a more general conceptualisation of space, equally determined by emergent technologies. Correspondingly, our psychophysiological experience of space is one that is alive to the ways in which our spatial experience is generated and conditioned by the management of our attention. One example of this is found in already existing screen-based experiences of Augmented Reality. Pokemon Go (Nianitic Inc, 2016), for example, is a grim example of the way in which the navigation of real space is over-determined by the compositing of an animated figure within an augmented reality view, to such a degree that there have been several injuries and even fatalities. [4]

However, as my chapter will argue, the hologram is a "diegetic prototype" for a new form of spatial experience. As Roger Cook summarises it, citing the cognitive philosopher Andy Clark: "digital technology has inserted itself so pervasively between the body and the external physical world that we now find ourselves increasingly interacting with mixed media and everyday objects within a 'hybrid (digital/physical) space" (Cook, 2020, 204 citing Clark, 2010, 14). Cook continues, "when cinema patterns film space accordingly it helps both the individual viewer and the collective viewing public master spatial cognition outside the theatre as well and promotes adaptation to our altered interface with the environment" (204). This view of the integration of digital technologies into our experience of seemingly unmediated space is further supported in work such as that included in the volume *Image – Action – Space: Situating the Screen in Visual Practice* (Feiersinger, et al., 2018) which builds on Harun Farocki's idea of "operational images" to suggest that, with novel technologies of immersive or volumetric display, it is the space in front of the spectator/user that becomes operationalised. Acknowledging this sort of work and the technologies that it grapples with as a distant horizon, this chapter traces the degree to which the visible aesthetics of digital compositing promotes adaptation to new spatial arrangements, thus broadening our psychophysiological experience of space to accommodate new digital technologies.

[4] See for example, the Pokemon Go Death Tracker (available at: http://pokemongodeathtracker.com), established in 2016, which offers a morbid, if relatively well sourced and cited, list of such incidents.

My work intersects with a lot of writing concerned with Digital 3D Cinema. Elsaesser's essay on 3D (2016) as well as the previously mentioned work of Nick Jones, specifically his most recent book *Spaces Mapped and Monstrous: Digital 3D Cinema and Visual Culture* (2020), investigate the way spatial experience is intertwined with stereoscopic visual media and its most recent iteration of Digital 3D Cinema (D3D). This body of work also includes books by Miriam Ross (2015), Jens Schroter (2014), Yong Lui (2018) as well as essays by scholars such as Kristen Whissel (2016); all catalysed by the success of films such as *Avatar* and *Gravity* and the huge economic shift within the exhibition sector towards this new cinematic experience. Another recent volume *Screen Space Reconfigured* (Saether and Bull, 2020) summarises this trend by asserting that "screen space is seen to partake in an overall reconfiguration of production and perception of space as such" (28). Importantly however, Saether and Bull acknowledge that whilst "3D may be the paradigmatic example of emerging spatialities of the 21st century, it is not the only one" (11).

This chapter on the hybrid screen spaces produced by digital compositing takes place in the context of this scholarly (over-)emphasis on 3D, sharing the basic insight that technical mediations of space have the effect of "reshaping space, realigning vision" (Jones, 2020, 222). However, it is important to stress that despite the overlaps – and the fact that the vast majority of my case studies were given some form of D3D release – my focus is on the post-photographic process of compositing, as opposed to the integrated production process of D3D. The first difference that needs to be clarified is the technical one: although D3D films make extensive use of digital compositing, strictly speaking D3D does not require compositing for its 3D effect nor does the process necessarily include the hybridisation of two discrete media processes. Digital compositing, on the other hand, is hybrid by default, as the spaces created on screen are the product of the layering together of multiple elements, and therefore never an orthographic capturing of profilmic space, in the way D3D can be. Within the images themselves, D3D's spatial effects most markedly occur along the z-axis which seemingly protrudes from the screen and recedes behind it, creating positive and negative parallax respectively. By contrast, whilst digital compositing procedures can involve intricate calculations of perspectival depth, the spatial impact of the images is not reliant on the careful calibration of parallax values. In fact, some of the most interesting effects of digital compositing occur when, as in the Wachowski Siblings' *Speed Racer* (2008), *Sky Captain and the World of Tomorrow* (Conran, 2004) or *Sin City* (Rodriguez & Miller, 2005), the aesthetic function of the z-axis is replaced by a graphic flattening of space.

An emphasis on holograms as they are composited into the spaces viewed on flat-screens means that I will be looking at images where the phenomenological coherence of onscreen space is notionally stable, despite being obviously manipulated through the use of compositing. The

questions that I will pursue across this chapter are as follows: how is spatial coherence secured, despite our awareness of the hybrid nature of the image? And, given the routinisation of our perception of digitally composited spaces across all sorts of visual media, how might our psychophysiological experience of three-dimensional space be impacted by our habituation to the layered, quasi-perspectival spaces of digital compositing?

To re-iterate the approach outlined in my introduction, I see digital compositing as a hybrid technique that generates a hybrid media-epistemological framing of space by augmenting the presuppositions inherent to cinematography. This approach stands apart from other more technical investigations of compositing which either, after Lev Manovich, approach the technique as a form of "ontological montage" (2001, 159) or see it as an entrenchment and intensification of the representational parameters of perspective. Whilst neither of these approaches are invalid, neither of them fully account for the particularities of hologram effects and their representation of hybrid spaces. Manovich has written a number of articles about compositing, most of which were published around the late 1990s and address early 2000 examples, (cf. Manovich 1993, 1998, 2001, 2002) and all of which provide a sense of compositing's role within an emergent digital culture and its trajectory towards seamlessness. Writing in *The Language of New Media,* Manovich suggests that "digital compositing exemplifies a more general operation of computer culture," (139) specifically the assemblage of new media objects from diverse media artefacts. Manovich stations compositing as a transitional aesthetic in the broader evolution of computer culture, "from 2-D images towards 3-D computer graphics representations." Within this trajectory, Manovich writes, "digital compositing represents an intermediary history between the two" (140). Here, as I discussed in my introduction with regard to Manovich's concept of hybridity and "deep remixability,"(2006a, 2006b) Manovich's thinking celebrates the *impact* of the digital turn over and above the iterations of hybridity that give form and aesthetic interest to the turn itself. Rather than an intermediary phenomenon, digital compositing has an aesthetic function beyond presaging a visual media constituted entirely out of 3-D computer graphics. The hologram effects seen above, which make the digital compositing a legible aspect of their construction, are evidence enough that compositing has an appreciable aesthetic function in and of itself. Nor is it the case that the trajectory Manovich traces towards a coherent image produced by the computer came to pass. There are a range of smartphone apps – Holo (8i, 2017), Holo.Cam LIDAR 3D (VR Virtual Reality Inc, 2017), Hologram 3D Pet Simulator (Denis Ivanov, 2015), and of course, Pokemon Go (Niantic Inc, 2016) – that offer an AR experience in which rudimentary 3D animation appears in the space in front of you. These apps maintain a sharp aesthetic distinction between the cinematographically mediated 3D space and the animations they integrate into that space. Here, Manovich's description of compositing as a form of

"ontological montage" (2001, 159) is more apt. For Manovich this entails the "co-existence of ontologically incompatible elements within the same time and space" (2001, 150). Whilst this is an inviolably correct description of the various composited images that my phone can create, and that occur across all sorts of holo-laden science fiction, I'd argue that Manovich's emphasis on ontological incompatibility has lost its acuity over the past few decades. In today's context, the "coexistence of ontologically incompatible elements within the same time and space" has been so normalised and is such a staple feature of franchise aesthetics that, rather than deepening the specificities of Manovich's description of digital compositing, what has instead happened is that spectators have adjusted their sense of time and space.

One of the virtues of Manovich's discussion of digital compositing is that he doesn't over-capitulate the affordances of new media to the old (analogue) parameters of perspectivalism. Loosely following on from Stephen Prince's discussion of compositing as a technique of perceptual realism (1996, 2012), several scholars emphasise compositing's reduplication and simulation of the rules of perspective in order to frame it as an intensification of the epistemological criteria already baked into cinematography. D. N. Rodowick for example states that "the desire to achieve perfect photographic credibility… reproduces and reinforces deeply recalcitrant cultural norms of depiction" (2007, 100). Theorists like Sean Cubitt and Thomas LaMarre build on this, recognising that the reduplication of analogical norms of depiction within digital cinema can amplify the epistemological impact of those norms. To this end, LaMarre - in his theorisation of "closed" compositing (the technique that allows for the illusionistic movement of the camera through composited space) - sees the technique as exemplifying and accelerating a "hyper-Cartesianism" (2009, 31). In summary, if to see is to know in the Cartesian world view, to organise vision is to totally organise knowledge to the point of "a suicidal hyperinstrumentalization of the human life-world" (31). Sean Cubitt's 2010 essay "Making Space," makes a similar point about the way compositing's creation of illusionistic spaces entails a total rationalisation of vision and everything in it, suggesting that digital compositing produces a "managerialist commodification" of time and space (2010). Elsewhere, Nick Jones's elaboration of Lefebvre, in his notion of "the abstract space of virtual cinematography" unfolds with the same emphasis, arguing that virtual cinematography produces spaces that are totally quantified and therefore easily assimilable into exchange economies and capitalism (2015b). My choice of hologram effects means that my analysis is suspended between these two theorisations of compositing, the quickly aging idea of "ontological montage," and the over-determining idea of "hyper-Cartesianism." Given that the images with holograms do feature illusionistic spaces, they are involved in this extrapolation of the rationalising impact of perspective. However, as legible hybrids,

they do more than just present perceptually realistic onscreen space: it is possible that they foreground the ontological incoherence of the hybrid environments we live in.

LaMarre's study of anime also involved a discussion of "open compositing, which plays with the layering of elements within the image and with the movement between layers" (2009, 36). In contrast to "closed" or "volumetric" compositing, this creates images with depths that "are not calculable by Cartesian geometry" (38-9). LaMarre's main examples are the films of Miyazaki whose "preference for open compositing challenges the technological determinism implicit in apparatus theory and in structuralist theories of perspectivalism" (44). Whilst Miyazaki's animations, in Lamarre's phrasing, "gather nontechnological modalities in a technological ensemble," (44) they are not hybrids in the way my thesis understands hybridity. Nevertheless, prompted by LaMarre's discussion of the productive ambiguities of open compositing, I'd suggest that the hybrid nature of hologram effects often entails a break with the structures and ramifications of Cartesian geometries in a fashion that allows for an engagement with the layers of an image, even as they produce illusionistic depths.

This double perception of illusionistic spaces as simultaneously legibly constructed out of discrete layers, whilst presenting a phenomenologically compelling 3D space, is found in two pieces of recent criticism that directly contribute to my perception of holograms as hybrid and, by extension, imbricated in the ongoing re-making of our psychophysiological experience of space. Shane Denson's concept of "discorrelated images" (2016) explores the consequences for the spectator of images that do not overlap with phenomenological qualities of embodied human experience. Lisa Purse's essay on disaggregated composites (2018) identifies moments of discorrelation produced by a specific compositing strategy and explores the expressive possibilities of these disjunctive and surprising representations of space.

Denson's essay focuses on images that "deviate from the perceptual norms established by human embodiment" (196). He elaborates on this notion of embodiment referring to

> the baseline physics engine… at the root of classical continuity principles, which in order to integrate or suture psychical subjectivities into diegetic/narrative constructs had to respect above all the spatial parameters of embodied orientation and locomotion (196).

Whilst there is a lot to be queried in this straightforward equation of human vision and film language, the background idea of a "baseline physics" helps clarify the core ideas of Denson's essay. Specifically, the "crazy camera," is essentially any movement through space that breaks the rules of

physics and/or engineering and therefore betrays the fact that the camera is virtual and its movement through space reliant on digital animation as opposed to analogue recording. The key example of the "crazy camera" is the opening shot of *Fight Club* (Fincher, 1999) in which the camera travels from the synapses inside Ed Norton's brain, up the barrel of the gun in his mouth. Denson's related concept of the "discorrelated image" is slightly more ambiguous, referring both to the overlap between film language and human ocular experience and the images that exceed or lie beyond this overlap. For Denson, breaking with the perceptual norms established by human embodiment "results in… the discorrelation of post-cinematic images from human perception" (196). But in its ambiguity, Denson's concept provides an interesting counterpoint to Prince's notion of perceptual realism, and opens up a few ways of looking at hologram effects that, despite being coherent depictions of three-dimensional space, openly signal the layered nature of that illusion of space. Whilst holograms might conform to the standards of perceptual realism and ground the spectator in a perspectivally coherent position, I'd suggest that the hologram produces an experience of screen space discorrelated from the embodied experiences of space that correlate to cinematography. As will be explored shortly, this discorrelation is often exacerbated by the aesthetics of the holograms themselves, which often glitch and fuzz in order to signal their liminal presence/absence in the space of the diegesis.

Denson's work suggests that the discorrelated image impacts not just the spectating position proposed by the image, the relation between the spectator and the spaces of the diegesis, but the spectator's sense of embodiment and bodily orientation as well. Key to my understanding of digital compositing augmenting the psychophysiological experience of space is Denson's implication that discorrelation does not entail the disembodiment of the spectator, rather it implies new experiences of embodied sensation, responsive to a new category of images. Foregrounding their discorrelation from the norms of perception, hologram effects can therefore be seen as invitations to re-assess the degree to which our integration into the narrative world is dependent upon correlations between our embodied perception and that modelled on screen. Going one step further, they are also invitations to re-assess the degree to which the discorrelation exhibited in the image informs interactions with our physical environment. One could suggest that "the discorrelated images of post-cinema" is a concept with a shelf-life, insofar as the discorrelation between the aesthetics of post-cinema and embodied experience will diminish with the incremental influence of digital technologies over the human sensorium.

Building on Denson's insights, Purse's recent essay "Layered Encounters: Mainstream Cinema and the Disaggregate Digital Composite" (2018) focusses more specifically on the production of space through digital compositing, and looks at how a recently emergent sub-category of digital

composites reflects the new experiences brought about by digital culture. Purse's definition of the "disaggregated digital composite" is particularly apt to the hologram effect. It identifies a category of digital composite that "formally fragments, foregrounds and scrutinises the digital surfaces that constitute it" (149). Purse's examples are highly reflexive; moments where the diegetic space of the film is deliberately dismantled and shown to be constructed of stacked layers of digital surfaces. Unlike Purse's examples, hologram effects are more often than not lost in the flow of the narrative, but I don't think that makes Purse's argument any less applicable.

Purse suggests that exposure to the spatialised and spatialising layers of information onscreen in a sequence featuring a disaggregated composite corresponds to a number of everyday experiences:

> One is the synthesising and navigating of thickly stacked and complexly choreographed digital layers, encountered in everyday life in the multiple windows of computer display, the shopping centre's various display screens and the juxtaposition of the mobile screen with screens in the wider landscape. The other experience is the oscillation between two-dimensional and three-dimensional perspectives that navigating this digital landscape frequently implies (159).

In a manner that strikes a chord with my own over-arching argument about franchise aesthetics, Purse examines this consonance between disaggregated composites and everyday screen experience from the perspective of neoliberal capitalist structures. This draws a revealing analogy between opportunities for spectatorial agency when faced with a disaggregated composite, and the experience of freedom and agency in the multi-screen, hyper-informational environments of digital commerce. Borrowing from Sean Cubitt the hopeful thought that spectators are "connoisseurs of compositing," (cited in Purse, 2018, 165) Purse concludes that "self-conscious digital composites offer embodied encounters both inside and outside the narrative, which rehearse in different ways the spectator's agency, positioning, and creative potential inside today's digital communication flows" (165). The fragmented, foregrounded and scrutinised layers of a digital composite then, offer "possibilities for play and agency," (165) both in relation to the image and the digitally transformed environment of everyday experience.

What marks the analysis that follows apart from Purse's argument is my emphasis on digital compositing as a hybrid technique that is disappearing from view, passing the "vanishing point" identified by Siegfried Zeilinski (1999) and becoming, as Evan Calder Williams has it, "naturalized, a structure and a given" (2017, 17). Whilst holograms remain plainly visible, the technique that supports their appearance is increasingly ubiquitous and unobtrusive. This offers me the opportunity

of examining how the specific aesthetics of hologram effects reflect our experiences of environments saturated by digital media. Moreover, it leaves room for thinking through how those aesthetics might be seen to inculcate a new logic of spatial experience into our routine modes of perception: a logic that becomes increasingly instrumental to our experience of off-screen space the more naturalised it becomes on-screen. It is this dynamic that elevates digital compositing to the category of a franchise aesthetic. In reconstituting the way in which we perceive space on screen as discorrelated from embodied experience but productive of new modes of bodily orientation, digital compositing can be implicated in an ongoing process of habituating us to the new hybrid digital physical spaces of contemporary capitalism.

SECTION TWO: ACCLIMATISING TO HYBRID SPACES IN *ALTERED CARBON* (2018-)

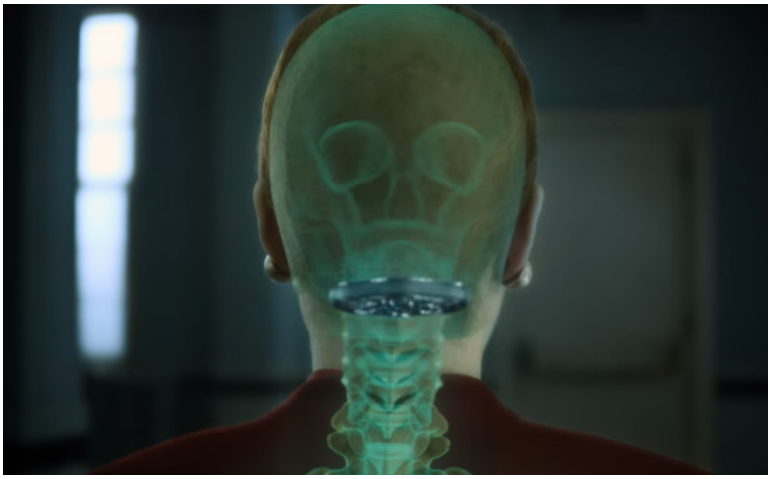
My first case study is the first season of the television show *Altered Carbon* which premiered on Netflix in 2018. In what follows, I will focus mostly on the use of the hologram effect as a decorative element within the frame, something communicating what Jens Schroter calls the "futuricity of the future" (2014, 180). My aim here is to establish how screen spaces constructed through digital compositing, and manifested in the form of ubiquitous hologram effects, strike the eye in a way that is discrete from photographic (and perspectival) renderings of space. More than that, I aim to suggest that the self-consciously layered spaces of *Altered Carbon* (and its ilk) challenge the habitual processes that lie within the perception of photographic spaces. Ultimately, the imagery of the first season models and solidifies a way of glancing at screen spaces that hybridises the epistemological formations inherent to perspectivalism through the prominence of specific digitally composited layers.

Set in 2384, in a civilization re-shaped by the technological gifts given to humanity by aliens referred to as 'The Elders,' the conceit of *Altered Carbon* – adapted from Richard K Morgan's 2002 novel – is that human consciousness has been effectively digitised. A person's entire identity – memories, personality, etc. – now resides in a small disc-shaped object at the back of the neck called a cortical stack. "Stacks" can be moved from body to body, and consciousness can be backed up. Into this world, Takeshi Kovacs (played by multiple actors, but principally Joel Kinnamon in Series 1) is re-incarnated, or rather, his stack is taken out of deep storage in prison and he is given a new "sleeve"/body in order to investigate a murder mystery. The world that Kovacs wakes up in (after 250 years) is saturated with holograms. They are everywhere: advertising hoardings, computer

interfaces, video games, company logos, news bulletins; all of these are composited into the frame as holograms. Thus, Kovacs becomes a proxy for the audience's own process of acclimatisation to this futuristic aesthetic, as well as the novelty of the screen spaces that digital compositing creates.

After coming to terms with his new "sleeve," Kovacs sits through a presentation, notionally designed to welcome the re-sleeved people to the future, but functionally telegraphing information about a great deal of the essential sci-fi tech on which the show relies. In it a friendly figure begins running through a welcome speech, before being revealed to be a hologram: her body dissolves into a translucent schematic so that the all-important "stack" can be visualised at the back of the neck. (FIGURE 7) Later, Kovacs inserts a contact lens (known in the show as an ONI, an acronym for Online Network Interface) that plugs him into the wider social network and heads to a part of town that is laden with holographic adverts. The ONI is essentially an augmented reality device, but one that is assimilated into Kovacs' eyeball and therefore one that makes the information it places in the visual field indistinguishable from physical space, certainly for Kovacs, and to a degree, for the audience immersed in the overloaded aesthetic of the first episode of the show. Initially charmed by the colourful display, Kovacs becomes increasingly disconcerted, eventually finding himself physically dodging two hulking figures in what turns out to be a holographic advert for an establishment called the "Fight Drome" promoting a bout between "Rhinoman" and "Neanderthal." (FIGURE 8)

Kovacs' giddy inability to discern between holograms and figures in real space unfurls as an analogy for our own disorientation. When confronted by the dense visual landscape of the show our eyes don't know where to rest, nor do the frames communicate any settled sense of perspective. The actual and the virtual are constantly swapping places. Kovacs moves through a space made uncertain by multiple planes and layers of information and hyper-saturated colour. Indeed, the degree to which the ocular experience of so many hologram effects exceeds the parameters of a comfortable visual experience is confirmed when Ortega (Martha Higareda), a police officer trailing Kovacs, steps in and applies an "ad-blocker" to Kovacs' ONI and his visual field, at which point the maximalism of the compositing recedes and a more legible sense of space re-establishes itself. Kovacs' plunge into the novel hybrid space of dense holography serves as a fore-taste, a visual baptism by fire, of what is to come. (FIGURE 9)



[FIGURE 7: *Altered Carbon* Episode 1: The Stack at the back of the neck]

[FIGURE 8: *Altered Carbon* Episode 1: The hologram advertising the "Fight Drome"]

[FIGURE 9: *Altered Carbon* Episode 1: The Ad-Blocker makes the hologram fade]

What *Altered Carbon* offers is not only a representative example of a visual text strongly reliant on digital compositing for its impact, but a screen experience that communicates the futurity of its narrative universe by reflexively disrupting settled modes of engaging with screen spaces

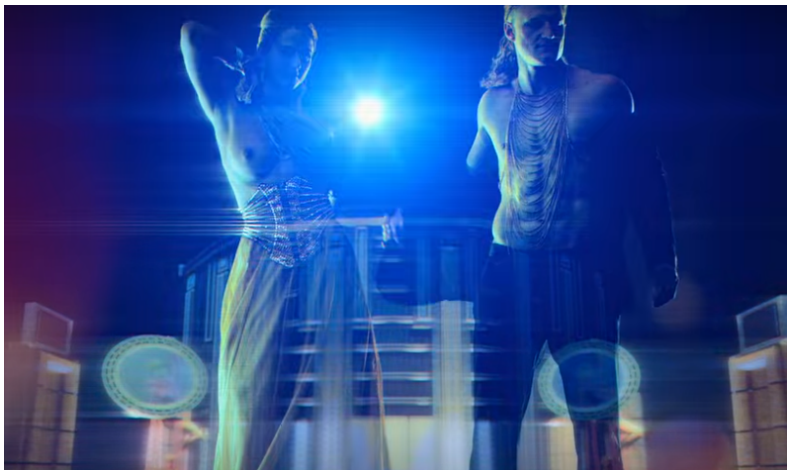
reliant on the photographic capture of space (a technology which, in the world of *Altered Carbon*, is a thoroughly antiquated medium). As such, by closely examining the hologram effects in the show, we can get a glimpse at what exactly is normalised through our extended exposure to the layered spaces of digitally composited images. Outlining the distinct aesthetic features of the hologram effect reveals the way in which they disrupt perspective and prompt acts of perceptual synthesis. These acts of synthesis are, I suggest, what make up the new routine glance at hybrid spaces.

The two aesthetic features I'll look at in this section are, firstly, the disjunction of relative scales, which interacts directly with the sedimented assumptions of perspective and its relation to scale. Secondly, the juxtaposition of photographic and "digital" textures. Again, this feature of the frame guides the way our eyes travel across the space in a manner distinct from the organising principles of perspective. Each of these features demonstrates how the disaggregated composite "fragments, foregrounds and scrutinises" its constituent layers (Purse, 2018, 149). In taking a closer look at each instance, I'll describe how this fragmentation meets our eye and results in a distribution of our attention between the perspectivally arranged portions of the image and those elements that discomfit and challenge the dominance of perspective as a means of representing space. Having shown how compositing dismantles our settled modes of perceiving spaces on screen, I'll analyse how certain hologram effects demonstrate a new way of producing spatial experience through the micromanagement of our attention across the various layers of a composited image.

From the miniature monsters of a holographic chess-set (*Solo: A Star Wars Story* (2018)) to the lurching, skyscraper-high figures dwarfing the human-scale surroundings beneath them (this is a popular trope appearing in all sorts of texts, such as *Divergent* (2014); *Thor: Ragnarok* (2017); *Ghost in the Shell* (2018); *Blade Runner 2049* (2018); the "Rachel, Jack and Ashley Too" episode of *Black Mirror* (2019)), a consistent feature of hologram effects is surprising and disorienting relations of scale. Within a perspectival regime, scale is veridical and serves as evidence of the relationship between material objects in physical space. The same is not true in images that have been built using digital compositing. In digital images, and especially those featuring holograms, scale is not tied so firmly to the production of illusion and is, instead, often used to signal the presence of a form of "ontological montage" within the frame through the disjunction of perspectival geometry. *Altered Carbon* is no exception and is replete with instances where the photographic capture of a profilmic space is supplemented by a hologram effect exhibiting a conflicting spatial geometry, either in terms of scale, or even in terms of how perspective is arranged within the holographic image. In each instance, the presence of the hologram effect puts pressure on the perspectival arrangement of space within the frame, and as a result, directly impacts the way in which our eyes travel over the surface of the image and into the spaces that are being represented.

In the first episode, Kovacs enters the "Raven Hotel" where the proprietor Poe (Chris Connor) runs through a list of hospitality options - including several salacious offerings - in the form of holographic thumbnails. After the first saturated introduction to the use of holograms, these miniature scenes are, visually speaking, positively sober. Formally, the scene has a simple shot reverse shot structure that emphasises the dialogue between Poe and Kovacs. Each character is pictured in mid close-up against a dark background, a composition that, in exclusively photographic terms, implies a clear sense of the actor performing in physical space. However, in contrast to this routine sense of photographic space - pulling the eye away from the faces of the performers and the centre of the photographic composition - are the holograms that hover above Poe's hands. These holograms feature human figures in miniature, posing for their customers. Not only do the holograms disrupt the photographic space of the frame by being radically scaled down and hovering over Poe's hand, and thus contradicting the perspectival organisation of normal scalar relations, but they themselves feature a disjunctive play with scales, as the figures stand on elaborate podiums that overturn more familiar relations of human and architectural scale. (FIGURES 10 and 11)

[FIGURE 10: *Altered Carbon* Episode 1: Poe's multi-scale holograms]



[FIGURE 11: *Altered Carbon* Episode 1: skewed perspectives in Poe's hologram]

The hologram effect multiplies the number of spaces within the frame: there is the perspectival geometry of the photographic space operating at the normal scale of the characters and the miniaturised scale of the figures in the hologram and there is the distorted space of the hologram itself with its combination of human figures and fantastic architectural detail, a space achieved through the layering together of photographic and animated elements. More than just a thumbnail version of the fantasies the Raven Hotel has to offer, the hologram is an encapsulation of the skewed spaces that digital compositing can generate. Their presence generates the hybrid space of the frame as a whole, which is the combination of both the photographic space containing the performers and the layered space featuring the holograms.

The hologram is a clear example of Purse's disaggregate digital composite, insofar as it foregrounds the digital layers of the hologram and, indeed - cutting time and again to the hologram itself - offers the holographic element itself up for scrutiny. However, this disjunction of scales, and the foregrounding of a digitally composited layer discrete from the photographic capture of a physical space, doesn't necessarily provide an opportunity for reflection and the exercise of agency, as Purse's disaggregated composites do. These images do not have any exceptional status within the diegesis, and by this point in the episode are becoming more and more mundane.

Rather, I'd suggest that the scalar disjunction doesn't compromise our ability to quickly read the hybridised spatial composition of the image; instead, it indicates the degree to which intuitive observations of screen space have already normalised effects such as these. What is routine within the perception of screen space, then, is the bifurcation of our attention between the photographic compositions of space, and the layered constructions of digitally composited space. Within this particular sequence, this bifurcation is emphasised by the cuts between close-ups of the actors (that contain no compositing) and close-ups of the holograms (that contain skewed and distorted spaces), before being resolved in the more legibly hybrid spaces of the shot (which contain both photographic space and layered space). How this resolution is achieved, and the effect that it has on the spectator's perception of the physical spaces of everyday life, as well as the screen spaces of everyday watching is a question that I'll pursue in a moment.

The second characteristic of the hologram effect that I'd like to draw attention to is the juxtaposition of contrasting textures. As with disjunctions of perspective, contrasting textures disaggregate the image at the same time as indicating how routine the perception of hybrid spaces has become. These textures stand out from the image, but not to such a degree that the image loses coherence. In fact, this particular aesthetic predates digital compositing and was a strong feature of the superimposition effects and the lab-work that went into creating the archetypal hologram of

Princess Leia in *Star Wars* (1977). Typically, the textural contrast is between rough and smooth, pixelated and solid, and invariably signals the liminal materiality of the hologram and its presence/non-presence in the space of the diegesis. What this juxtaposition of textures also invariably brings to the fore is the ontological montage of the final image. The juxtaposition of textures achieves several things. Principally it signals the technological nature of the hologram itself. Think for example of the texture of the Wakandan holograms in *Black Panther* (2018), which overturn the standard videographic textures of the hologram trope - dating back to *Star Wars* - and instead depict holographic images forming out of black sand or beads. This re-thinking of the holographic textures reconfirms the importance of establishing a sense of technological difference between the cinematographic portion of the image which contains the hologram and the hologram itself. By consistently showing holograms to be supported by a technology distinct from the cinematic apparatus of camera and projector, holographic textures underline the hybrid nature of the images in which they appear. The contrasting textures offers another means by which the attention of the spectator can become bifurcated between the holographic and photographic elements in the image and their contrasting ontological valences. The brightness of the holograms in the darkness of the Raven Hotel lobby places them very much in the foreground of the image, spatially speaking, but also in terms of what appeals most prominently to our attention and scrutiny.

Whilst our perception of hybrid spaces on screen might be complex, I'd like to stress at this point in my argument that it remains to be seen whether the spatial synthesis of the hybrid frame is brought about less by the spectator's optical probing of onscreen space, and more by the way in which the image manages our attention. In the essay "Layered Encounters," Purse leans on Aylish Wood's formulation of the "technological encounter" in order to suggest that the disaggregated nature of the images offers a playful space in which the spectator can rehearse the new forms of agency that are required to live within an immersive digital culture (2018, 165). Wood's description of the "dispersed" or "distributed attention" of the viewer watching, for example, Mike Figgis' quartered-screen film *Timecode* (2000), also fits the way in which hologram effects bifurcate our attention when we look at them. Wood builds on the experience of "distributed attention" and argues that this effect serves

> as an index of a more direct technological experience. The spatio-temporal organization of competing elements have the potential to evoke the impact of technologies on how we see the world, by creating a tension in which a viewer's illusion of omniscience is countered by having to make a decision about which element is given attention (2007b, 73)

Going further, Wood suggests that encounters with "complex spatio-temporal organizations" that feature a tension as to which element to focus on "gesture not only towards the technological changes otherwise hidden behind a seamless interface, but towards the nature of technological encounters" (162). Applied to the specific aesthetics of hologram effects, the bifurcation of our attention (provoked by the disjunctive scales or contrasting textures of the hologram and its photographic context) can be conceived of as constituting an encounter between embodied perception and the technological procedures that lie behind the spatial constructions of digital compositing. And likewise, the negotiation of complex spatio-temporal organisations on screen evokes the technological encounters than constitute our everyday psychophysiological experience of space.

This encounter with digital compositing could still be framed as an intensification of the residual determinants of perspective that guide our normal perception of onscreen space, in the manner argued by Cubitt and Prince and Rodowick. Rather than position digital compositing as a procedure that produces space principally through the reproduction of perspective, I'm arguing that hologram effects exemplify another affordance of digital compositing that does not necessarily reproduce the spatial codes of perspective. Specifically, digital compositing produces space through the management of attention across discrete layers within the image.

As the hologram effects of *Altered Carbon* demonstrate, despite presenting the viewer with disaggregated spaces and an overriding impression of ontological montage, advanced digital compositing produces an impression of a coherent 3D volume by tightly controlling the movement of attention across its constituent elements. This is where the notion of spectatorial agency and the degree to which the construction of the image controls the way in which it is experienced comes into play. In distinction to Purse, I don't see hologram effects (and digitally composited images more generally) as offering up moments of playful reflection. Motivating this distinction is Purse's emphasis on "self-conscious" (164) composites, which stand out from the narrative flow and invite special attention. By contrast, my framing of hologram effects and digital compositing through the lens of Vilém Flusser means that I am more interested in unpacking what happens when the heightened sense of encounter becomes absorbed within the banality of perceptual presuppositions.

Having used two aesthetic features of hologram effects to open up the way in which our glance at hybrid spaces amounts to a synthesis of the ontologically - and often geometrically - distinct elements, I'd now like to look at the ways in which that synthesis is achieved. Baldly put, in contrast to Purse, I see our easy perception of hologram effects manifesting a particular form of

spatial experience that is characterised by a direct and determining address on our attention. In what follows, I'll argue that our perception of coherent onscreen space does not necessarily result from the reduplication of perspective but instead is a result of digital compositing's ability to tightly control the way in which our eyes travel across an image. To demonstrate this, I'll take a close look at the points of interaction between hologram effects and profilmic performances and analyse how digital compositing choreographs the synchrony of the live-action and animated elements in a manner that makes a decisive contribution to our perception of the diegetic spaces.

Before proceeding, it should be noted that I don't think that emphasising the determining nature of these images invalidates the possibility that, as Wood has it, they evoke a form of technological encounter. It is just that the particular encounter evoked by complexly choreographed interactions between actors and holograms does not bear a straightforward resemblance to actually-existing interfaces that require haptic engagement and user agency. Instead, what is evoked through the micromanagement of our experience of onscreen space is the degree to which our psychophysiological experience of space stems from attentional cues and provocations as opposed to an ocular/perspectival absorption in physical space. To re-invoke Beller's contention that "'Cinema' means a fully mediated mise-en-scène that provides humans with the contexts and options for response that are productive for capital," (2006, 29) I'd suggest that the mise-en-scène of hologram effects produces a spatial experience characterised by passivity and responsiveness, which renders the spectator adaptable to what has already been identified - by writers like Mark Hansen (2015) - as the pervasive incursion of digital technologies into the human sensorium.

SECTION THREE: INTERACTIVE HOLOGRAMS

The holograms discussed so far have served a more or less decorative function in the frames that they populate. Whilst it is true that their presence in the frame performs many functions, it is not often the case that the actions on screen would be rendered completely meaningless in their absence. In terms of the distinction between semantic and pragmatic meanings of an image, the decorative holograms of *Altered Carbon* have a clear semantic meaning – signalling the futurity of the fictional world – as well as an implicit pragmatic meaning, found in the displacement of perspectivally regimented 3D space by a space built out of discrete digital layers. On the other hand, the sequences I'll look at next, which feature elaborate interactions between live-action actors and animated holograms, would be utterly meaningless were it not for the careful calibration of the

performance and the animation. The fact that the semantic meaning of the image is so reliant on the effectiveness of digital compositing amplifies the pragmatic meaning of the composited image greatly. In each instance, removing the hologram from the frame would do two things; firstly, render the remaining portion of the image non-sensical, and secondly, highlight how much of the image's spatial effect is the result of the microscopic synchronies between the live-action performance and the animated content of the hologram. The following analysis aims to shine a light on the degree to which the operation of this synchrony is independent from the representational parameters of perspective. I'll ask what is more important to our perception of onscreen spaces: the organisation of objects within a coherent 3D space governed by perspective, or the management of our attention as it is directed between and across the discrete layers of the digitally composited image? As a result, I will be able to get closer to the pragmatic meaning of the images of interactive holograms, which is a further displacement of perspective from its determining position within our experience of hybrid spaces, both on- and off-screen.

With regards to the effects themselves, the aesthetics of these holograms still encourage a bifurcated attention. The familiar contrast in textures and scales continue to foreground the disaggregation of the layers and the image's discorrelation from the norms of spatial perception. Even so, these effects are consistently persuasive and very difficult to deconstruct within the real time of watching. As such, these interactive holograms allow a glimpse of how hybrid onscreen spaces rely on digital compositing's management of the spectator's engagement to secure the phenomenological coherence of an evidently constructed, mixed-reality, image. Wood, discussing images and interfaces that do not synthesise the complex organisation of multiple spatio-temporal elements on a single screen, argues that that spectatorial agency is "gained through the process of making sense of the fragmented image" (2007b, 79). Reversing this, I'll show that it is the process of digital compositing that makes sense of the fragmented holographic image to the detriment of spectatorial agency. I'll argue that the manner in which compositing minimises the ambiguity inherent within disaggregated spaces is an indicator of the degree to which spectatorial agency is constrained and overdetermined in the hybrid image. It is precisely by merit of their seamlessness and effectiveness that I can argue that - within sequences displaying the complex interaction of actors and holograms - the rules of perspective, however important, are playing second fiddle to the careful arrangement of layers and their inter-relations as a means of generating a sense of onscreen space.

Glancing forward, my first point of analysis will focus on how the disaggregation of the image (the gap between the performance and the final result) is resolved, using the concept of deixis. The second point I plan to make about integrated holograms such as these is that the

management of our attention that is performed at the point of integration between hologram and performance foreshadows larger passages of CGI within the individual narratives, as well as larger swathes of CGI practice. I will suggest that holograms serve as diagrammatic versions of the tent-pole action sequences yet to come in a manner that arguably pre-determines the way those action sequences are perceived. In essence, they function as visual aids and buttresses to the larger, more fantastical and perhaps less legible pieces of action upon which a film, or even a whole franchise, is built. It is my suggestion that micromanaging the attention of the spectator via a hologram effect doesn't just secure the legibility of the sequence featuring the hologram; it sets the preconditions for how the spatial information of other hybrid spaces is read. In short, I aim to demonstrate that phenomenologically-coherent illusions of space do not depend solely on the geometries of perspective that give the spectator a sovereign position over the scene in front of them. Whilst perspective may remain latent to the sense of depth and dimension in capital-intensive CGI spectacles, the way in which digital compositing directs the gaze emerges as a prominent determinant of how the spaces on screen are experienced.

As mentioned above, a persistent feature of these interactive holograms is the visibility of the performance that accompanies them. The effects are responsive to the swipes, taps and other gestures that the characters perform. As such, they betoken the negative spaces in which the performance originally took place in front of a camera. The animation of the holograms onscreen always indicates the absence of the hologram from the scene of the performance, at the same time as compensating for it. This is important for my argument, as ultimately this sense of tension between the diegetic presence of the effect and the absence of the effect from the moment in which the performance was cinematographically captured has the potential to intensify the disaggregation of the image. Nowhere is this clearer than in Robert Downey Jr.'s turn as Tony Stark in the *Iron Man* films (2008-2013), especially in those sequences when he thinks out loud with his hologram-capable A.I assistant JARVIS. When interacting with JARVIS, Stark's body language is voluminous; he practically skips about the space of his studio, interacting with the hologram in a sequence of off-the-cuff gestures. Indeed, across the three films this performance of interaction becomes more and more complicated: from the simple swiping and 'trash bin' gestures of the first film, via the conductor's flourish of the second with its two-handed zooming in and zooming out, to the direct manipulation of holographic objects in the last film. Beyond the *Iron Man* series, the *Avengers* films inevitably feature a scene in which several characters stand around a hologram and point, prod, manipulate, meld, tinker and contemplate the composited element in turn.

What appears on screen, especially as the performances get more self-consciously haptic is the naturalism of Downey Jr.'s onscreen presence, matched millisecond-by-millisecond by an

animated hologram composited *within* the space of the performance. Every gesture has its corresponding effect; every eye-line has a corresponding object of attention. A good example of this is the sequence from *Iron Man 2* (2010) in which Stark is deducing the physical structure of a new atom, using as a clue a scale model of an Expo park made by his father. First, Stark has JARVIS map and replicate the scale model as, what Stark calls, "a digital wire frame made out of manipulable projection." The hologram effect appears as a sequence of bright diagrammatic lines tracing the model, as the camera pulls back from a medium close up to a medium shot. The hologram fills the space between Downey Jr. and the camera, and its striking circular geometry draws the eye down, away from Downey Jr. in the centre of the shot. When the "wire frame" hologram is complete, Stark lifts it up from the table. The camera angle reverses to a medium shot of Stark from behind. With his arms held out, as though he is physically lifting the hologram, Stark turns towards the camera and pivots on his motion and the large holographic plane moves with him, swooping, once again, into the empty space between the camera and the actor. Stark then issues a series of instructions, both vocal and gestural, and JARVIS responds by rotating and manipulating and highlighting various pieces of the hologram. Stark leaves the frame, leaving the hologram hovering in the extreme foreground of the image, and then returns, in extreme close-up to examine a detail at the centre of the hologram. In many ways, he is taking the place of Purse's spectator, insofar as he is scrutinising the disaggregated digital layer that is hanging in the space in front of him, taking a trial and error approach to figuring out the operative information it contains. [FIGURES 12 and 13]

[FIGURE 12: *Iron Man 2* (2010) Hologram filling the foreground]

[FIGURE 13: *Iron Man 2* (2010): Close up with Hologram in the extreme foreground]

Crucially, the same luxury of scrutiny and agency is not extended to the spectator. As Downey Jr.'s highly gestural performance continues – Stark claps his hands and stretches out his arms so that the hologram envelopes him – the choreography between performance and hologram becomes tighter and more complex. Despite the resolutely disaggregated nature of the image, we are not afforded an opportunity to scrutinise the digital layer as a discrete element. There is a high density of incidental detailing and contrasting geometries filling the perspectival space between the camera and Downey Jr.'s performance. Yet, there is no sense within the sequence that the audience has a choice about which element to give attention to. Against Wood, I'd suggest that the meaning of the sequence is not produced by the play of distributed attention across the surface of the image, but instead the precision with which digital compositing stages and draws focus on the interaction between layers.

A useful way of thinking about how the process of digital compositing dominates the meaning of the image is to consider Pepita Hesseberth's resurrection of the concept of cinematic deixis. In *Cinematic Chronotopes*, (2014) Hesselberth proposes the deictic terms "here, me, now" as ordering principals additional to those of narrative by which to come to grips with the "complexity of contemporary cinematics and the kind of viewer engagement it demands" (113). Hesselberth defines the use of the term deixis in line with C.S. Pierce's "dynamical co-existence" of sign and referent. That is, the sign is meaningless without contextual support – the words "here, me, now" point nowhere if they fail to be sufficiently contextualised. Hesselberth positions the deictic terms "here, me, now" as axes across which the viewer's affective engagement with the image is modulated, creating the "thick time" of cinematic experience.

Applying this idea to the special effect of the interactive hologram, and especially of the way in which they are integrated with Downey Jr's performance, I'd suggest that Downey Jr.'s performance is notable for its abundance of deictic gestures. However, these gestures only make sense within the hybrid spaces of the finished image. The JARVIS hologram responding to Downey

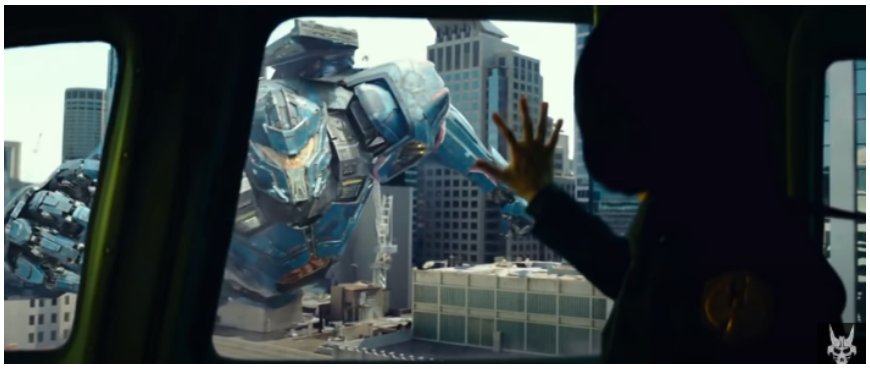
Jr.'s performance creates a deictically secure *here* - despite the fact that the space of the frame is built out of discrete layers, and a deictically grounded *now* - despite the fact that co-existence of Downey Jr and the hologram is an impossibility. Digital compositing emerges as the dominant mechanism by which the audience is secured within the deictic consistency of the diegetic space. Going further, it is the principle means by which space is represented but also by which the represented spaces (and the bodies within it) become meaningful. To put it another way, digital compositing creates meaning through the reaggregation of discrete layers, synchronising deictic signifiers with their signified elements. This removes any ambiguity from the images and also removes any chance of a playful engagement with the hybrid spaces under-construction. An obscure (but in this context relevant) part of the pleasure of watching the JARVIS sequences lies in the knowledge that the slightest asynchrony in the sequence, the slightest incompatibility in the hybridisation of live-action and animation, would render the image meaningless and leave Tony Stark looking like a fool.

Whilst I've demonstrated the way in which digital compositing tightly controls the engagement with the screen spaces in which it is visibly a constituent part, I'd like now to broaden my focus and look at the way in which digital compositing not only minimises the degree of spectatorial agency within scenes featuring interactive holograms (like those in *Iron Man 2*) but how control of gaze and attention governs spatial experience in other sequences as well. The *Pacific Rim* films (2013-18) are good examples of the way in which a highly visible effect models a specific way of absorbing onscreen information ahead of an altogether less digestible sequence of images. Consistently the films use hologram effects to foreshadow, diagram and make meaningful sequences in which skyscraper-high robots duke it out with Godzilla-type monsters from another dimension. A brief synopsis of the two films can give an impression of the degree of spectacle on display, and, by extension, hint at the degree to which the spectacle will rely on a fully engaged spectator whose attention is laser-focussed as opposed to dispersed or distributed between the discrete elements within the frame. In the first film, a crew of Jaegers – giant robots driven by a pair of pilots who share the "synaptic load" of interfacing (via hologram) with such enormous machines – save the world from invading Kaiju – huge monsters who emerge from a breach in the ocean floor. The Jaeger team close the breach by using a Kaiju corpse to smuggle a nuclear bomb into a different dimension. In the second film, after Kaiju brains are implanted in an army of Jaeger drones, the breach is re-opened and a team of young Jaeger pilots must stop a huge Kaiju from detonating Mt Fuji. Crucial to each of the major action sequences across both films is the business of piloting the Jaegers. The action expressly plays on the wildly enhanced embodiment of the Jaeger pilots, who occupy multiple spaces and operate in multiple scales by merit of their immersion in a highly advanced computing

environment, and the interconnection between their gestures and the movements of the Jaeger. However, there is little room within the films to speculate on the psychophysiological experience of space induced by Jaeger piloting; not least because the digital compositing that helps to represent the multiple spaces of the action does so through a fast-paced sequence of deictic signifiers that establish the cause-and-effect connections between the live-action performances and the fantastical imagery of enormous robots battling in the street.

The live-action performances have a correspondence to two distinct pieces of computer-animated action that are not native to the space in which the gestures are performed: firstly, they are matched millisecond by millisecond to the composited holograms that furnish the Comm-pod (where the pilots are) and secondly, as noted, the performances animate the gestures of the giant robot as it fights with the Kaiju. This double correspondence offers a good opportunity for analysing how digital compositing secures and completes not only the deictic gestures that make up the live-action performance, but influences how we perceive adjacent sequences. For example, the compositing that is reflexively on display within the hologram effects foreshadows the spatial relationships that make up the larger action of the giant robots fighting giant lizards, in human-scale environments. More than that, we can use the way in which the hologram effect explicitly manages our attention, and foregrounds the interactions between the animated and the live-action spaces, to help understand how - in the larger sequences - perceptually realistic spaces are produced by the management of attention across layers and not necessarily by the organisation of those layers in a convincing perspective. After all, when the figures that are being deployed in action are as large as the figures in the *Pacific Rim* films, the functionality of perspective as a means of making sense of these scales is pushed to breaking point. Digital compositing, and its micromanagement of our attention, compensates for the shortcomings of ocular perspectivalism and, throughout the franchise, successfully stages absurd confrontations between monster and machine in a variety of equally absurd spaces, such as at the bottom of the ocean and in the sky above Mt Fuji.

The sequence I turn to now comes from relatively early in *Pacific Rim: Uprising* (2018). The film's hero Jake Pentecost (John Boyega) is taking his first tentative steps back into Jaeger driving when he and his co-pilot, Nate (Scott Eastwood) have to stop a rogue Jaeger from destroying Sydney. During the climax of the battle the rogue Jaeger shoots a helicopter carrying Jake's adoptive sister Mako Mori (Rinko Kikuchi). Jake, in the Comm-pod tries to catch the holographic representation of the helicopter; the Jaeger, above the streets of Sydney, tries to catch the actual helicopter. Jake misses, the helicopter crashes, the Jaeger smashes into the street. [FIGURES 14-18]



[FIGURES 14-18 *Pacific Rim Uprising* (2018) The missed helicopter catch, with a range of scales and spatial compositions]

The action takes place across a range of scales. The view of the bystander looking up at the giant robots takes in the scale and chaos of the battle as it impacts on various Sydney landmarks; the view of Mako from the helicopter provides a more comprehensive overview of the robots in the urban layout, a view complemented by another aerial shot not situated within the helicopter. Finally, inside the Comm-Pod, there are several angles that relate what the pilots see and what they do and how they control the Jaeger through a holographic interface. Each of these individual elements manifests a degree of hybridity in its construction of screen space: the Comm-pod is full of holographic effects and therefore bears all the hallmarks of a disaggregated hybrid space, Mako's scenes are staged in front of a camera, with compositing used to fill in background details (such as in the windows of the helicopter), whilst other wide angles simulate a street-level photographic space and a bystander's POV.

As they contain a great number of CGI elements, however (including the giant robots), these simulations of photographic space still openly disclose their composited construction. Ultimately these multiple viewpoints, disparate locations, and divergent modes of building/representing screen space aren't easily amalgamated. Rather than compose a total picture of the space in which the action is taking place, each edit wrenches the viewer from one environment, and mode of spatial organisation, to another. But to suggest that the sequence conforms to the dynamics of intensified continuity (wherein spatio-temporal consistency in the editing is discarded in favour of the affective impact of rapid, disorienting cuts) is to underestimate the ways in which the spatial compositions inter-relate, successfully cohering the action of the sequence as a whole.

Despite the chaos and disorientation, the blocking of the sequence and the relationship between the pilots, the robots, Sydney landmarks and the unfortunate bystanders remains legible throughout. This is exemplified in the piece of action that involves Jake attempting to catch his sister's helicopter. Here, the use of the hologram effect very explicitly pre-stages the action of the

larger CGI effect despite the fact that they are taking place simultaneously. The diagrammatic representation of the larger action, deployed in the hybrid space of the Comm-Pod with all its holograms, predetermines the way in which our eyes *will* travel over the spaces of the adjacent images. The way in which the compositing grounds and completes the deictic performance of Boyega in the Comm-Pod location extends into the perspectival spaces of the larger sequences, even though compositing is no longer visible as a hologram effect.

What is significant here is that the mode of perceiving hybrid screen spaces that is explicitly generated by the hologram effect extends into and is re-duplicated in the perception of notionally perspectival screen spaces. Watching the hologram of the falling helicopter, our eyes slide between the interacting layers of the hologram and Boyega's eyeline and his outstretched fingers. This movement is repeated when the shot changes to the one featuring the real helicopter and the enormous Jaeger: our eyes slide back and forth between the fingers of the robot and the body of the helicopter. The meaningful interaction between the discrete layers of the image (helicopter and robot hand) is guaranteed by the shot that has come before. This guarantee is generated not just in the holographic representation of the larger action within the Comm-Pod, but, more significantly, in the way in which the digital compositing of the hologram effect models our perception of screen space. Essentially, the hologram effect trains the viewer how to perceive the radically scaled up action of Jaegers vs. Jaeger, and later in the film of Jaeger vs. Kaiju, etc. Throughout, the business of the hologram effects staged in the Comm-Pod serves to secure and govern the perception of sequences dealing in radical disjunctions of scale and intense action.

In doing so, they also typify how hybrid spaces manage the attention of the audience. By finely tuning the interactions between the layers of the image, digital compositing creates screen spaces that predetermine how they are perceived; everything that is not contributing to the meaningful interaction of layers within the image is, to borrow a term from lens media, out of focus. The hybrid spaces of digital compositing manage the gaze of the spectator through the interaction of layers, offering very specific avenues for perception and absorption. Distilling my argument right down to its core: these sequences demonstrate how digital compositing does not produce space through perspective, it produces space through the management of attention and the appearance of perspective.

To my mind, the hologram effect as it frequently occurs in all sorts of visual media is a clear consolation for this emergent paradigm of screen space being brought about by digital compositing. As perspective plays an increasingly diminished role in our perception of screen space, so too does the ability of the spectator to contemplate, explore, or scrutinise those spaces. In the face of this

lack of ambiguity in screen space, hologram effects offer up the spectacle of things that are usually impossible to see. But given the frequency of hologram effects across all sorts of media, it is clear that this spectacle is easy to produce. The disambiguation of screen space and the management of audience attention can be cheaply and easily achieved. The question for the final section of this chapter is whether or not spectatorial agency is a redundant concept in the face of digital compositing; if the contemplation of hybrid spaces is at all possible; and whether or not our psychophysiological experience of material space is undergoing a similar process of hybridisation, wherein our ability to simply let our eyes wander over what is in front of us is disappearing.

SECTION FOUR: COUNTER READINGS OF HYBRID SPACES

As I outlined in my introduction, one of my ambitions for the working concept of franchise aesthetics is, after Flusser, to model a critical engagement that is correlated to the technical sophistication of hybrid images, alert to their pragmatic meanings and instrumental qualities. And, in so doing, position the act of watching as an opportunity to take pleasure from hybrid images at the same time as inhibiting their instrumentality. This critical function becomes more acute and urgent the more ubiquitous and invisible the hybrid effect in question is. Digital compositing is both ubiquitous, and often utterly invisible. It is for this reason that I have chosen as my point of analysis a science fiction trope that is fantastical in nature and consistently visible as a disaggregated composite. A study, say, of digital compositing as manifested through digital set extensions - the shots in period dramas that take a live-action location and composite a wealth of historically appropriate details into the background - or window-fills - where a moving landscape is composited in the window of live-action footage shot in a car, parked inside a studio - would have presented myriad methodological problems. The tendency towards naturalism means that these forms of digital compositing don't present as disaggregated space, even though they perform the same function of carefully managing how the viewer's eye travels over the frame and which elements within the image the eye rests on.

As a result, and in order to claw back digital compositing from its vanishing point, it is necessary to critically engage with the most visible manifestations of the effect; then extrapolate the dynamics found there outward, beyond the horizon at which digital compositing stops having a foregrounded aesthetic quality and becomes a structuring principle of our perception of space on screen. For this reason, the final section of this chapter will consider three films which make

ostentatious use of the trope of holograms in order to thematise the spatial impact of digital compositing and the way that the management of attention in digital compositing supersedes ocular perspectival perception in spatial experience. I will offer readings of the films and their representations of space that, in the spirit of franchise aesthetics, stop short of simply accepting the illusions of space that the films create and instead dig down into how those aesthetics can be read as instrumental to our own psychophysiological experiences of space. The three films are *Ghost in the Shell* (2017), *Blade Runner 2046* (2018) and *Spiderman: Far From Home* (2019). The first two offer narratives about cyborgs undergoing identity crises, and use holograms to construct their futuristic milieu. This makes possible a reading in which the ubiquitous use of digital compositing can be read as a thematisation of the diminished agency and post-human make-up of cyborg subjectivity. Thus, the two films enact the management of attention discussed so far as central to the spatial impact of digital compositing at the same time as narrativizing the subjective fallout of this over-determination of perception by media processes beyond embodied, ocular-centric experience. *Spiderman: Far From Home* whilst enjoying a lighter touch, nevertheless offers a vision of a weaponised holography, enabled by extensive use of digital compositing which, in the manner of *Pacific Rim*, trains the eye in how to absorb composited spaces at the same time as it constructs those spaces. This version of holography can be considered a "diegetic prototype" (Kirby, 2010) for a logic of immersive media; not because it demonstrates the advantages of having thousands of drones equipped with guns and smart projectors, but because it manifests a spatial experience which can be extrapolated and extended in a variety of real-world iterations, such as AR apps for smartphones.

Beginning with *Ghost in the Shell* (2017) and *Blade Runner 2049* (2018), the central narrative of both films concerns a sentient computer grappling with its own sense of agency. This negotiation of agency; this grappling with the overdetermination of bodily orientation by supra-perceptual networks of computers, has its aesthetic signature in the heavy use of digital compositing. As prominent examples of capital-intensive science fiction film-making, these films feature hologram effects in great quantities and use digital compositing to create fantastical hybrid spaces, all whilst telling a story from/about the perspective of a robot or cyborg. Neither of the protagonists of *Blade Runner 2049* or *Ghost in the Shell* are human. Yet both are invested with a desire to believe that they are – in some measure – human. In *Blade Runner 2049,* K (Ryan Gosling), a replicant who hunts and 'retires' other replicants, goes in search of a child miraculously conceived by a replicant. As he does so, he begins to suspect that he might be the child he is looking for. In *Ghost in the Shell*, Major Mira Killian (Scarlet Johanssen), whose human brain has been implanted into a robotic shell, goes in search of an entity called Kuze, who wishes to destroy Hanka Robotics, the corporation that made her. On

her journey, she learns that her memories are implants and that her real (human) identity is Motoko Kusanagi, an anti-augmentation activist who was kidnapped and turned into a weapon by Hanka Robotics.

In both instances their desire to be human expresses itself in a profound mistrust in the projections of their own consciousness: a distrust centring around the problem that their subjectivity is a product of mediation. K discovers how his memories were created (and that they belong to someone else, not him). Major suffers glitches in the form of objects appearing in her vision that aren't actually there. This inability to believe in what is visible greatly informs the visual scheme of both films. Indeed, it is this express thematising of the protagonist's complex relationship with what they see that I'd like to focus on. In dramatising the epistemological crisis of the protagonists, the films represent what they also enact via digital compositing: specifically, the tight control of the spectator's spatial sensorium by media processes that appeal directly to the attention of the spectator and don't have perspective as their bedrock geometry.

Sean Cubitt touched on this form of vision, wherein ocular and perspectival vision is supplemented by diagrammatic and informational fields, when discussing Tony Stark's Iron Man HUD. Cubitt argued that this placed Stark in an odd post-human limbo, insofar as the results of all of his actions were pre-calculated before he carries them out (2016). Going further, Cubitt equates Stark's condition to that of the "contemporary cyborg… not a human with bionic implants but a massive array of networked computing power with implanted humans" (7). This is a useful definition of cyborg, offering a counterpoint to Donna Haraway's canonical "Cyborg Manifesto" and its emphasis on the cyborg as resistant to illusions of wholeness (1985). Cubitt's cyborg is always-already integrated into a totalising system beyond its ken, and thus the cyborg condition is one characterised by diminished agency and the over-determination of the sensorium by the network in which it is implanted.

It is also a convincing description of Major's and K's individual situations: Major has a human brain implanted in her computer body, and K is a replicant with a human memory. However, more than using Cubitt's analysis to help label the situation of the films' protagonists, I'd like to suggest that this form of the "contemporary cyborg" also accounts for the perceptual modes that these two films - and their stories about robots - model for the audience. The perceptual schemas and spaces of the films are so discorrelated from the baseline physics engine of embodied orientation and motion that the viewer can be said to be practising a form of contemporary cyborg vision. Take, for example, the image of K meeting his old love-interest now in the form of a gigantic hologram (FIGURE 19). A residual sense of perspective informs our sense of how dwarfed K is by the hologram,

and also anchors our perception of Ryan Gosling's gloomy performance. But the principal means by which the space in the sequence is produced is the layering together of the radically disjunctive and diverse elements. The image below takes all the hallmarks of the hologram effect and amplifies them, almost to the limits of coherence. The scalar disjunction is disorienting, not least because the holographic textures of the pink figure are over-illuminated and pierce the foggy atmospherics of the image in a way that makes the figure of K recede, not only spatially, but in terms of significance. The sequence features several close-ups of Gosling's rain-splattered performance, but in the two-shot below, it is the nebulous textures of the hologram that draw the eye. Moreover, in terms of narrative impact, the self-conscious demonstration of ontological montage underlines K's emotional disconnection from this new iteration of his former companion. Digital compositing accounts for the vast majority of the spatial features within the image (not least, the simulation of the impossible co-presence of the two figures) and in its self-conscious disaggregation is key to how those spatial relations become meaningful. I'm not suggesting that the scene isn't staged in some form of perspective, rather that the knowledge that this perspective is construed via the over-determination of our attention participates in the meaningfulness of the image in several ways. We are put in K's shoes in more ways than one; the intrusion of his ex-lover into his visual field reflects the way in which her figure dominates the scene. This lack of ambiguity as to how the scene is constructed (rather than naturalistically staged) underlines his tragic sense that her performance is not addressed for his attention alone, but indifferently and for any audience whatsoever. What felt real and intimate in their relationship has vanished, not least because the two-shot that supposedly re-unites them is so wildly disaggregated as to make their ontological incompatibility key to its effect.

[FIGURE 19: *Blade Runner 2049*]

More than just a point of identification within the narratives, both *Ghost in the Shell* and *Blade Runner 2049* foreground the subjective experience of their protagonists to serve as a proxy for the spectator's own navigation of screen space and the experience of being a node within a larger

apparatus; that is, a human implant within a larger cyborg construction. In *Ghost in the Shell* Major is haunted by odd images that appear as glitches in her vision. These glitches appear as coherent images which then disaggregate and disclose their composited construction before our very eyes. In one instant, a cat, pawing through Major's line of sight, disintegrates into a flurry of pixels. In another, Major observes a busy city intersection from a moving car: a pagoda-style construction is seen as part of the street, with pedestrians flowing around it. However, in the next instance, the pagoda glitches out of visibility. In each instance, the spectator is encouraged to perceive the image as a spatially coherent composition, organised according to the straightforward arrangement of objects in front of a camera. In this initial moment, the audience experiences the untroubled correlation between our own perception and that of the protagonist, securely situated in the narrative world and in spaces organised and perceived perspectivally. When the objects in the image glitch and disappear, the film represents the discorrelation of Major's vision from her surroundings, but it also demonstrates the possibility that every seemingly perspectival image is in fact a layered construction. Undercutting our straightforward perception of space, the glitch reminds us that the experience of the hybrid spaces on screen is always already a product of compositing's management of attention across layers. This rendering of spaces as ambivalent and troubling, containing imperceptible forces, or only merely simulating the presence or absence of an object in the visual field, becomes a trope throughout the film. Major can make herself invisible and one sequence features her arresting a suspect in a vast empty watery space, her presence only given away by the splash of footprints in water and the telling distortion of the quality of emptiness right in front of the suspect. Likewise, room-sized holograms play a major role in the world-building, with characters interacting with each other either with or without the knowledge that the figure that stands in front of them isn't, in fact, physically co-present.

K's embodied experience in *Blade Runner 2049* is less explicitly technologically mediated, but nevertheless, the way in which the perspective of the audience is intermittently aligned with K's own vision produces the same effect as in *Ghost in the Shell*. It encourages an acknowledgement of the ambiguity inherent within the screen spaces, even as the film pursues a gritty and haptic aesthetic encouraging an immersive engagement with the environments on screen. As mentioned, K suffers from the delusion that he might be the natural born child of a runaway replicant, a belief that is supported by a dream that he has and a talismanic miniature of a horse that he owns. The audience is encouraged to align with K's self-delusions, as the dream is relayed for us to watch, without any telling signs of external mediation. In it, a young boy runs through an industrial space, one that is rigorously organised by a network of metal runways and staircases. The lines and dimensions of this space are striking not least because of the way the highly complex environment

interacts with perspective, receding into the deep background in a symmetrical array of metalwork. Later, K visits this same location and the audience is encouraged to think that he is re-visiting the scene of his dream and the place where he was as a boy. But this is not the case: K is a replicant, he was never a boy, he was never born. The spaces of his dreams have been incepted (as it were) into his consciousness by a massive array of networked computing power. In sharing both his illusion and his disillusion, the spectator is encouraged to share K's epistemological reconciliation with his cyborg condition. This condition is offered for the spectator's experience, in an analogous form, in the hybrid spaces of the film, which exert a tight grip over how we attend to the screen. In a climactic scene, K and Deckard (Harrison Ford) - the replicant/man K thought might be his father - fight in a Las Vegas theatre in which holograms flicker on and off on various stages in the arena. Every time they do, the dark recesses of the deep background rush forward, flattening the space of the action and crowding our ability to attend to the figures moving through the scene. The space becomes super-saturated with the holograms; the possibility that they might suddenly intrude in the foreground inflecting our sense of the space even when it is dark and empty.

Late in the film, K learns that his all-important dream has been implanted and is a fake. He goes to visit Dr Ana Stelline (Carla Juri) who constructed his dream and watches as she conjures extraordinarily persuasive environments and scenarios out of thin air. In parallel with K experiencing his entire sense of himself disintegrate, the audience is treated to an object lesson in digital compositing. This scene celebrates the operations of layering together discrete elements as the principal means of constructing space and renders the perspectival perception of those spaces as a secondary effect of their layered construction. As with the glitches suffered by Major, it also acts as an embedded demonstration of the constructed nature of the film text as a whole; a retroactive reminder of the illusionism of onscreen space in general. For instance, a stand out moment comes when Stelline, enclosed in a large glass bubble, uses a hand-held device to build, tweak and scrutinise a 3-D image of a birthday party, combining various elements around the cake – girls in party dresses, the style and colour of the cake and candles – to complete the scene. In a reversal of the dynamic in *Ghost in the Shell* where a verisimilar image is shown to be a construction, here, despite the construction of the scene taking place in front of our eyes, the end result is thoroughly persuasive and, perhaps like K's dream of being a real boy, more touching for being fake. [FIGURE 21]

[FIGURE 21: *Blade Runner 2049*]

Roger Deakins gives an extensive break-down of this scene in an interview in *American Cinematographer*, and what is striking is the fact that very few of the discrete elements featured in the scene were generated digitally (Bosley, 2018). In fact, the real labour involved in the making of the shot was in calibrating the lighting on each object so that it could be recorded photographically before being composited into the final scene. This is a clear articulation of the altered relation between photographic elements and digital compositing in the creation of space. In the creation of hologram effects in *Star Wars,* for example, the process involved the layering of the holographic element over the background plate containing the live-action scene, with the perspectival arrangement of the latter being dominant in the spatial effect of the image. By contrast, in the construction of the images in *Blade Runner 2046*, photography and cinematography is only a method for ingesting the content of the image (and one amongst many, after taking into account other methods of representing actual objects and spaces, such as 3D and LIDAR scanning) whereas the spaces in which those elements appear are articulated predominantly through digital compositing. The photographically captured elements within the image appear only as remnants of a no-longer dominant visual schema; residual details of a residual mode correlated to embodied ocular experience, itself a residual factor of a spatial experience principally mediated from beyond or below immediate apprehension. Drawing out the analogy between hybrid techniques and cyborg subjectivity: not only is K a cyborg insofar as his subjectivity revolves around a single, human implant within his networked and manufactured brain, but the memory itself, as created by Stelline, is hybrid in nature, consisting of photographic elements embedded in a layered construction. The mode of vision that it engenders then is principally governed by the micro-management of the interacting layers (that is by the massive array of networked computing power that produced it), but residually responsive to isolated pockets of perspective and moments of correlation between onscreen space and embodied experience. In summary, cyborg.

Returning to Denson's formulation of the "discorrelated image," he observes that discorrelation is the result of the image's deviation from the "perceptual norms established by human embodiment," all of which, in line with Vivian Sobchack's film-phenomenology, "integrate or suture psychical subjectivities into diegetic/narrative constructs" (Denson, 2016, 196). As I've implied in my argument above, both of these films successfully integrate the audience into diegetic/narrative constructs. However, those constructs are organised around cyborg subjectivities that demonstrably exceed the norms of human embodiment, without alienating the spectator from the diegesis. K can read raw data; Major performs a "deep dive" into the disintegrating operating system of a robot. Consistently the films invite us to share their points of view, and by extension their sense of embodied orientation: insofar as we see what they see, it follows that we see *how* they see as well. A key character – Batou (Pilou Asbæk) - in *Ghost in the Shell* gets augmented vision that allows him to see in infrared, and peer through walls. "I see like you now," he says, speaking for the audience as well, when Major comes to visit him in the hospital.

Batou wants to become more augmented, and doesn't necessarily see this as becoming less human. However, ultimately, in both films it is the protagonists' desire to be more human that allows a reading concerning the emergent forms of spatial experience to get its strongest foothold. The disenchantment of K and Major with their cyborg condition is trackable in their quests through increasingly complex and hybrid spaces, in which perspectival arrangements of space are continually supplemented by elements like holographic objects, which manipulate the gaze and reframe the space. Concomitantly, the impossibility of the protagonists' desire for an embodied humanity – aka, a simple, ocular world-view free of the manipulations and introjections of the massive networked array of computing power they're plugged into - is instantiated with every overt display of how digital technologies control their perception of space, and instil a sense of ambiguity in the protagonists' spatial orientation. In building the cyborg's crisis of subjectivity into the visual procedures of the text, and encouraging an overlap between the protagonists' ambivalent and networked experience of space and the spectator's own experience of the spaces of the film, *Ghost in the Shell* and *Blade Runner 2046* encourage us to reflect on the degree to which our own spatial experience is determined by technologies that, like compositing, proceed through the management of attention as opposed to the reproduction of material space.

Moving towards a conclusion, I'd like to gesture outwards from onscreen spaces, to an expanded concept of the psychophysiological experience of space that incorporates digital compositing's direct management of attention. To do this I will look at a term seeded throughout this chapter so far: "the diegetic prototype." The term comes from David Kirby's 2010 essay "The

Future is Now: Diegetic Prototypes and the Role of Popular Entertainment in Generating Real-World Technological Development" and as a concept dovetails with my own notion of franchise aesthetics. Kirby's essay endeavours to make direct links between the process of normalising new technological artefacts (such as artificial hearts) in a film context, and the social, political and financial processes behind translating the fictionalised technology into real-world business. As Kirby has it, films whet the public's appetite for the technologies they depict which encourages capital investment in companies that are developing similar technologies. His examples include the VR of *Lawnmower Man* (1992), made by Brett Leonard with the hope of gaining support to "create a company to extrapolate on those things [the VR in the film] both from an entrepreneurial level and on a creative level" (Leonard, quoted in Kirby, 2010, 49). He also dwells on the gestural interface used by Tom Cruise in *Minority Report* (2002), specifically the role played in the design by computer-engineer John Underkoffler: "*Minority Report* was a golden opportunity for… Underkoffler to demonstrate to the public, and potential funders, that not only would his gestural interface technology work, but also that the technology would appear as if it were 'natural' and intuitive for users." The fate of Underkoffler's gestural interface is well known: whilst the one that Cruise uses is self-evidently too physically demanding for popular use, raising heart-rates well above safe-for-work levels, smaller versions of the haptic interface – aka touchscreens - are now absolutely everywhere.

Seen through the lens of franchise aesthetics, this dynamic of diegetic prototyping of emergent technologies is active in a more abstract, but no less pertinent level. In the representation of holograms of all sorts, the hybrid technique of compositing prototypes a form of spatial experience, deictically performed by Cruise/Boyega/Downey Jr., and experienced, by proxy, in the spectator's own engagement with the screen. Digital compositing models and represents an experience of the spaces near-at-hand being fully operationalised and saturated with information, but, crucially, not full of the physical supports of that information. This is precisely the technological situation that Cook is describing when he points to the way in which "digital technology has inserted itself so pervasively between the body and the external physical world that we now find ourselves increasingly interacting with mixed media and everyday material objects within a "hybrid 'digital/physical' space" (2020, 204). If the actual interfaces of *Minority Report* don't accurately predict the real-world technologies that are just around the corner through their depiction, they act as harbingers of spatial technologies yet to come. To conclude this chapter, I'll focus on just one technology (and emergent industry) that can be thought to piggy-back on the reconstruction of on-screen space and the augmentation of the psychophysiological experience of space brought about by digital compositing: augmented reality.

Summarising the trajectories of AR technologies, Nick Jones assesses the way in which "AR embeds the kind of digital material previously associated with the screen within the real world, even if the screen still mediates this material" (102). Jones stresses that, within the logic of AR, the screen is becoming increasingly vestigial, merely a device to "reveal the "true" data-based underpinnings of our surroundings" (102). AR, in the words of Olivier Asselin and Louis Auger Gosselin, offers immersion in "a screenless, surfaceless and frameless image" (2013, 140). But what does a screenless image look like, and more importantly, what kind of space contains - or is constituted as - a screenless, surfaceless, and frameless image? And, how might that space be experienced?

CONCLUSION

In order to unpack this final question, I'll turn to *Spider-Man: Far From Home* (2019) which is a film that pivots around a form of weaponised holographic technology. This acts as a sort of "diegetic prototype" for a screenless experience of hybrid digital/physical space promised by AR. This is brought about by its ubiquitous use of digital compositing, and its creation of action sequences in which the hero's sense of bodily orientation is manipulated by holograms, such that he runs into brick walls thinking that they are open spaces. I take the film to be a more or less explicit dramatisation of the way in which the layered spaces of digital compositing are superseding perspectival spaces correlated to human embodiment. Furthermore, as an operative piece of a larger franchise, the film also directs its spectators to AR and VR experiences that elaborate and extend the spatial effects of the film (as well as establishing more sites for the capture of attention, and extraction of value). I'll offer a brief look at the way in which the film dials up the intersections between digital compositing and the management of attention as a form of spatial experience, and close the chapter by sketching a simple equation between this expression of franchise aesthetics and one of the transactional thresholds towards which the franchise ushers its viewers.

The narrative revolves around Quintin Beck (Jake Gyllenhal) and his advanced "illusion tech," a flock of drones mounted with projectors capable of simulating Avengers-scale disasters through the use of holographic technology. Beck's fake disasters are so compelling that he persuades the film's protagonist, Peter Parker/Spiderman (Tom Holland) to hand over control of an all-powerful computer system called "Edith," itself a treasure trove of holographic capabilities, all foregrounding digital compositing as a means of articulating space. In possession of "Edith," Beck's holograms

become bigger and nastier and cause more physical damage, not least because the holograms make it next to impossible for Spiderman to navigate physical space.

Across several key scenes, the film stages the reconstitution of physical space by an invisible infrastructure of cinematic technologies and produces a sustained liminality between "illusory" spaces and the "physical spaces" of the diegesis. Beck uses his flock of hologram projecting drones to erode any clear distinction between material and illusory space: solid walls appear to be possible escape routes, what looks like firm footing becomes thin air, Beck traps Spiderman in a hall of mirrors whilst actually placing him on a high-speed train track. The illusion only dissipates for long enough for the hero and audience to cotton on to the "real" situation of the train about to strike. The diegetic space of the film is so distorted and uncertain that in the climactic sequence Spiderman is forced to resort to a "spider sense," (trailed throughout the film in comic references to the "Peter tingle") in order to break through the holographic illusion and damage the drone hardware beneath it. The implication is that embodied perception (as modelled in the figure of the hero) has been so overdetermined by holographic effects that only an *additional* super-sense can discern the real from the virtual, physical space from projected illusion.

Spiderman's supremacy over Beck's holographic illusions might form the climax of the film, but it is also where our identification with the hero and his movements through space falls down. By contrast, the film is at its most interesting when representing Spiderman's experience of what is, essentially, an over-augmented reality: a "screenless image." In one key sequence, Beck uses his flock of drones to turn the legible environment of a building site into a hall of mirrors. Here, the supposed physical "location" of the sequence is completely obscured leaving Spiderman totally vulnerable to the images that not only surround him but are directed at him. His bodily disorientation is underwritten by the fact that throughout the sequence he is constantly changing costume, suggesting that he is embedded in the screenless image to such a degree that even his body has become part of what is projected. The spaces he navigates are skewed and unreliable, constantly morphing until becoming a snow-globe model of New York, with Spidey trapped inside. Phenomenologically speaking, these morphs are so discorrelated from the normative parameters of human embodiment that our orientation within the sequence is entirely given over to the procedures of digital compositing and its graphic and collage-esque arrangement of layers on screen, as opposed to its reproduction of perspective. As can be seen in the image below, [FIGURE 22] the figure of Spiderman clambering back up a snowy slope is framed within a haphazard version of the New York skyline. Inside this model the scalar relations between the Statue of Liberty, the Flatiron building and the Empire State building are muddled, with the scaled down buildings poking up in the foreground and the scaled-up ones crowding in the background. Along with the dark backgrounds

beyond the globe the arrangement of the individual landmarks/layers creates a sort of vortex within the composition, drawing the eyes around the circle of the snow globe and returning our attention to the panicked figure in the middle. There are no consistent vanishing points (in the next few seconds of the sequence the snow globe reveals itself to be Beck's helmet); any sense of perspectival regimentation of space is residual to digital compositing's dominant address of our attention and the resulting experience of the space on screen.

[FIGURE 22 *Spider-Man: Far From Home* (Jon Watts, 2019) Screen Grab: Spidey in a snowglobe]

It is this occlusion of perspectival space by layered space that can be seen to be "prototyping" the experience of a screenless image promised by Augmented Reality technologies. This chapter has argued that digital compositing can be seen to prioritise the management of attention over the reduplication of perspective; in so doing, it has expanded our psychophysiological experience of space to incorporate the possibility that perspectival space is not empty but dense with digital material, and furthermore, that ocular experiences of space can be over-ridden by the appearance of perspectivally discontinuous elements in the visual field. It remains to offer an example that can clarify this dynamic within the terms of franchise aesthetics and suggest that by producing a new form of spatial experience, digital compositing contributes to the mise-en-scène in which human beings make choices that are productive for capital. As mentioned above, the Spiderman franchise has a strong cross-platform relationship with a variety of VR and AR experiences, all of which operate within the ecosystem of Marvel/Spiderman IP to maximise profits through a variety of means, from ticket sales to data-scraping. One such spin off is the *Spiderman: Far From Home* app (Sony Pictures, 2019) which, amongst its limited offerings, allows the user to take a selfie with Spiderman. This selfie is produced through the use of digital compositing, with the figure of Spiderman appearing in the field of view mediated by the phone screen and users encouraged to stand in empty space in order to pose with the composited figure. Essentially, the user is encouraged to deictically confirm the presence of a figure who is absent from physical space,

thereby supplementing ocular and embodied experience of space with a sense of the space organised by the app's AR functionality and its rudimentary compositing. This gesture of taking a selfie with Spiderman crystallises, for me, the way in which digital compositing can be seen to have expanded our psychophysiological experience of space, such that, when proximate to digital technologies, we understand our environments to be more than just the 3D spaces we look and move around. Instead, we treat our physical environments as volumes latent with layers of information ready and waiting to crowd our visual field. How and why this new mise-en-scène might prove to be valuable to capital is found in the free-to-use nature of the Spiderman app. In offering a playful way to engage with the new spatial dynamics exemplified within the film, the app captures behavioural data and wastes no time vying for more and more of the user's attention.

CHAPTER 3: THE HYBRID TEMPORAL OBJECT

More so than any other feature of moving imagery, the digital turn caused a crisis in thinking about the relationship between film and time and temporality. As attested by Philip Rosen's concept of change mummified (2001), Babette Mangolte's query, "why is it difficult for a digital image to communicate duration?" (2003, 263) and D. N. Rodowick's elegy for the analogue durée (2007), the emergence of digital cinema heralded the end of a key formal property of moving image media and its relationship to time; specifically, analogue cinematography's creation of "a spatial record of duration" (Rodowick, 2007, 170). As Rodowick has it, "films capture blocks of duration in a uniform and continuous causality effecting physical transformations in the recording medium" (116). Or, more simply, that the flow of time can be isomorphically reproduced in 24 frames a second. Whereas analogue film "transcribed" duration, digital film "converts" duration into code (117). In digital cinema, recorded time does not imprint itself on a given length of film stock, it is registered as variations within the algorithmic computation of pixel colour values. Lev Manovich offers the following formula: "digital film = f(x,y,t)… since the computer breaks down every frame into pixels, a complete film can be defined as a function which, given the horizontal, vertical, and time location of each pixel, returns its colour" (2016, 47). This recognition of the different modes of temporal inscription in visual media contributed to the weightier announcements of the death of cinema, as well as some of the more dogmatic theorisations of the actual content of our experience of digital cinema. Axiomatic of the former is D.N. Rodowick, who culminates one line of argument with the thought that digital film will only ever be a "homologon, and not an analogon, for the time of analogical transcription and the expression of duration is broken. But perhaps that is good enough for most" (124). Manovich's reformulation of digital film has been refracted by many critics. Amongst them, Sean Cubitt's analysis of compression algorithms and codecs is built on the claim that "hidden in the myth of immediacy lies the reality of distribution… the aesthetics of time are intimately bound up to the political economy of distribution" (2014, 236).

Taken together, Rodowick's condescension (the appearance of an analogical reproduction of duration is good enough for me, thanks) and Cubitt's vertigo-inducing dilation to political economy mark out the two poles of critical thinking about moving imagery and temporality after the digital turn and in the era of an intensifying use of hybrid techniques across all forms of moving image media. Without refuting either critic - and taking Cubitt's concept of the "myth of immediacy" (2014) as broadly synonymous with Flusser's identification of the vast amount of hidden criteria (chemical, optical, industrial, etc) that lie between a photograph and its meaning - this chapter seeks to operate in the middle ground between the two. Whilst there is a range of work that falls between these two poles and deals intensively with the formal relationships between analogue cinema and time as well as digital cinema and time, a sustained focus on the hybridisation of these structures is, for the most part, missing. Matilda Mroz's book *Temporality and Film Analysis* (2013) successfully resituates thinking about time at the centre of Film Studies, but does so by looking exclusively at pre-digital films. Work such as Laura Mulvey's *Death 24x a Second* (2006) has a split focus, looking backward at the lost formal property of analogue cinema's capture of duration, and forwards at the new forms of cinephilia unleashed by new media's altered relationship to time. Pepita Hesselberth's *Cinematic Chronotopes: Here, Me, Now* (2014) elucidates the ways in which cinema's relocation to ubiquitous mobile screens as well as digital media's mode of inscribing time has resulted in a "changing spatio-temporal configuration of the cinematic" (18). This "thickening of time" (17) within digital cinema has wider cultural and theoretical implications which Hesselberth explores. All of the above theorists are mindful of the impact of our digital context on our relationship to analogue temporal objects. However, none directly address films or film sequences that both appear to reproduce time analogously, and also bear the hallmarks of digital mediation and manipulation. Hesselberth's concept of the "thickening of time" speaks eloquently to the general trajectory of digital cinema's specific spatio-temporality but in many ways loses sight of the residual forms of analogue temporality that strongly inform how onscreen durations are experienced. My specific focus on hybridity will add to this body of work concerned with cinema and temporality, as it allows me to keep residual media forms, and residual media-epistemologies, in sight whilst exploring the emergent forms of temporality vying for dominance within digital media and visual culture.

The following chapter addresses the need for a critical appraisal of moving image sequences containing residual elements of analogue cinema's capture of time, as well as the hallmarks of time's thickening, within a digital context. I am calling this category of moving image sequence 'hybrid temporal objects.' Hybrid temporal objects appear to fall between the analogic and the algorithmic, insofar as they both reproduce captured durations and manipulate those durations. In hybrid temporal objects the isomorphic capturing of time (i.e. the live-action recording and replaying of a

duration as it is experienced by human subjects) is hybridised by processes of digital manipulation (i.e. fast- or slow-motion, or the seamless editing together of discontinuous takes into a single duration) in a manner that augments/disrupts/de-stabilises the flow of time as it is generally experienced.

Today, these hybrid temporal objects are easy to find. They are especially prevalent in advertising, where, given that time is often posited as its own commodity, new rhetorics and experiences of time are constantly being articulated. A typical example is "A Bit of Me-Time," (2019, Fuze Tea: IMAGE 1) the UK commercial for Coca-Cola's low-calorie drink. The tagline is: "When life around you gets hectic, pause for a moment… with Fuze Tea." The advert takes the form of a frozen moment: a man takes a sip of Fuze Tea and the hectic hustle and bustle of the street around him slows almost to a halt. The man notices this sudden dilation in time and moves – at an unslowed pace, correspondent to the flow of time as it is normally experienced – through the altered time-scape. Water bursts from a fire hydrant, the man drinking Fuze Tea ducks beneath the slo-mo arc of water, glancing over his shoulder to appreciate the spectacle. The narration concludes: "Enjoy a minute of calm with the unique taste of Fuze Tea, and serve yourself a little me-time."

[FIGURE 1: "A Bit of Me Time" (2019) Fuze Tea, Coca Cola]

Breaking the advert down, there are three scales of temporality at play: the first is the flow of time captured through the standards of live-action cinematography and its isomorphic relationship to time as it is ordinarily experienced. The second is the privileged perspective brought about by a sip of Fuze Tea, and enabled by a variety of special digital effects. Time in this advert is both transcribed (the man moves at a pace that does not appear to have been sped up or slowed down) and manipulated. Hence, it is what I would describe as a hybrid temporal object.

The third temporal scale belongs to the experience of watching the hybrid temporal object itself. The importance of this dimension of temporality cannot be underestimated. As the advert runs, the moving image is both the generator and measure of time-consciousness, the flow of time as it is represented onscreen intimately overlaps with the flow of time as we experience it whilst watching. Within media philosophy, the notion that moving images condition time-consciousness

has a venerable history, beginning with Bergson's drawing of an analogy between cinematography and consciousness in *Creative Evolution* (1911 [1975]) all the way through to Bernard Stiegler's exhaustively argued contention that moving images effect a direct "grammatization" of the way in which we experience time (2011). This intellectual trajectory - from positioning moving images as analogous to time-consciousness to productive of time-consciousness - is encapsulated in the work of Maurizio Lazzarato and his Bergsonian analysis of video technologies (2019). Lazzarato argues that the temporal operations of what he calls "machines that crystallize time" don't just produce temporal objects for aesthetic contemplation, but set the conditions for processes of subjectivisation within capitalism (2014, 2019). This intimate bundling together of media and subjective formations within a given socio-political context drains the joy (and relevance) from any analytic project before it can get going. For my purposes, it is enough to identify that as the advert runs, the moving image is both the generator and measure of time-consciousness; the flow of time as it is represented onscreen intimately overlaps with the flow of time as we experience it whilst watching. The temporal object is conceived of as an instigator of temporal experience. Thus, the process of experiencing a temporal object is deeply bound up with the conditions by which the temporal object was produced. A key premise for this chapter is that the temporal object becomes something that can be said to impose its own analogue, digital or hybrid structures of temporality on the spectator.

The Fuze Tea advert is what I'm calling a hybrid temporal object, and thus the temporal experience it provokes is chiefly characterised by hybridity: the interweaving of the two discrete temporal scales, and the production of a third. For example, as the advert's protagonist quickly ducks beneath the spray of water that is moving in slow-motion, the presence on screen of two distinct temporal scales challenges us to synthesize the disjointed tempos within our own experience of time passing, in conjunction with the playing of the advert. The protagonist of the advert is capable of perceiving the micro-temporal increments contained within the flow of time and navigates this layered temporality with ease. By extension, as a hybrid temporal object, the advert generates a temporality that synthesizes distinct temporal scales, thus positing (and to a degree producing) a spectator equally embedded in a multi-scaled temporal flow.

Here the harmony between the narration's rhetoric of time and the experience of time offered in the visuals breaks down. This brings some of the stakes of my analysis into view. In synthesizing a coherent temporal experience out of the desynchronised temporal modes on display, the last thing the spectator is getting is "me-time." Rather, "me-time" seems to be characterised by

the recognition of the micro-temporal content of the ordinary flow of time, the hustle and bustle *within* the hustle and bustle. “Me-time” is not a freedom from the pressures of ordinary time, but an intensification of the pressures and complexities intrinsic to temporal experience. Across the course of this chapter, I will suggest that hybrid temporal objects should be seen through the lens of franchise aesthetics, as instrumental in shaping our structures of feeling within the digital cultures of contemporary capitalism. Under this rubric, the “me-time” depicted in the Fuze Tea advert is not an experience of being extrinsic to the flow of time, but its opposite. It is an intensification of our experience of time as super-saturated and over-exposed to the cues and lures of digital commerce.

In what follows I will argue that hybrid temporal objects manifest and reflect an emergent experience of time that - through the ubiquity of hybrid temporal objects within visual media - is becoming more and more generalised. Within hybrid temporal objects, the residual structures of the cinematographic inscription of time are augmented and over-written by the temporal effects of digital mediation. Within the experience of time that they manifest and reflect, this same jostling between structures and registrations of time is palpable. I will suggest that the experience of phasing in and out of “real time,” exemplified in the Fuze Tea advert, correlates to an ongoing re-constitution of temporal experience. Broadly stated, the diaphanous flow of time has escaped the boundaries of its previous standards and is splintered and distributed across a variety of technical media and new digital practices. The temporal standards of clock-time and twenty-four-frames a second are now supplemented by the new scales of temporal inscription made available by digital media, such as the micro-temporalities of compression algorithms or the macro-temporalities of data-intensive geological forecasting.

Hybrid temporal objects put this palimpsest of temporal scales on screen. This chapter will explore the possibility that hybrid temporal objects themselves have a temporalising and instrumental effect, in so far as they produce and normalise a temporal experience that oscillates between an isomorphic reproduction of duration and the manipulation of time afforded by digital media. In pursuing how this hybrid temporality works at the level of the screen, we can discern some of the technical processes and embedded assumptions that characterise the experience of the passing of time. Furthermore, by bringing to light the instrumental qualities of these aesthetics, this chapter aims to critique the way in which hybrid temporal objects generate temporal experience within and on behalf of capitalism.

In order to fully grapple with the structural features of hybrid temporal objects, it is first necessary to define the salient characteristics of the media undergoing hybridisation. The first section of this chapter is dedicated to exploring the relationship between analogue cinematography and time, as well as articulating a similar model of digital media to serve as a counter-point. In both cases, I'm seeking to define precisely how the respective media create the sense of passing time on screen. It is from this platform that I'll be able to ask the following key questions: how do these distinct media, and distinct modes of temporal mediation, interact in a hybrid temporal object? And how do these processes of hybridity relate to our experience of time today?

Whilst there are several philosophers, from Husserl to Bergson to Deleuze whose thinking illuminates the relationship between moving image media and temporality, I am opting to proceed through a close engagement with the work of Mary Ann Doane. Specifically, her argument that early cinema helped produce a standardised model of time that operated in concert with the larger dynamics of modernity (Doane, 2002). I put Doane's writing front and centre because it takes the form of a direct engagement with the medium of film, and argues that the formal properties of "cinematic time" are foundational to what she terms a "generalised experience of time" in the 20th century (7, 2002). Obversely, I will examine Mark B. N. Hansen's post-phenomenological theorisation of the temporalities of digital media (2004, 2014, 2016) as a counterpoint to Doane's model of "cinematic time." In brief, whereas Doane places great emphasis on the visibility of the passing of time on film, stressing its representability and openness to wider processes of rationalisation, Hansen insists that digital media's inscription of time is invisible, occurring below the thresholds not only of human perception but of representability in moving image media. This invisibility gives digital media what Hansen describes as an "infrastructural" effect on temporal experience (Hansen, 2014, 82). With these two models of how media influence temporal experience in place, I will then be able to begin my in-depth analysis of hybrid temporal objects, wherein isomorphic recorded time is legibly manipulated by digital processes.

SECTION ONE: BACKGROUND AND THEORETICAL CONTEXTS

Hybrid temporal objects come in many forms, one of which is the frozen moment trope, common to advertising. Another is the instant replay of sports broad-casting that flows backwards and forwards over a specific piece of action in order to determine a result. Within narrative film hybrid temporal objects are often disguised within the temporal grammar of the editing, and, in

contrast to the Fuze Tea advert, aren't deliberately foregrounded as an example of manipulated temporality. That said, action cinema is replete with hybrid temporal objects the concatenation of which gives contemporary action cinema its visceral and breathless quality. In order to magnify my focus on the specific temporalising effect of hybrid temporal objects, my analysis will centre on the digital "oner." The term "oner" is an industry colloquialism for a shot that resembles a single take despite being made up of multiple discontinuous takes, as in "I wanted the sequence to play as a 'oner.'" Digital oners are to be found almost everywhere, but particularly in capital-intensive action filmmaking, where they have emerged as an attention-grabbing technical centrepiece that acts as a calling card for the rest of the film, and not incidentally, makes for very good standalone content online. Prominent examples of the digital "oner" include the opening meteor shower from *Gravity* (2014), the rooftop chase from *Aquaman* (2019), the staircase fight from *Atomic Blonde* (2018), and the central 12-minute car-chase/fight-scene in *Extraction* (2020). The latter two are the work of Sam Hargrave, first as stunt co-ordinator, then director, who along with several of the film-makers within my thesis is emerging as a new sort of figure: the technician-auteur whose work is characterised by ever-advancing use of specific hybrid forms and VFX techniques (and a corresponding level of bankability).

They are not just increasingly prevalent; oners are getting longer and longer. One-shot films enabled by digital editing processes include *Victoria* (2015) and *Birdman or (The Unexpected Virtue of Ignorance)* (2014). In a more mainstream example, Sam Mendes converted the technical experience gained from producing the opening oner in *Spectre* (2015), which tracks James Bond from the streets of a Day of the Dead carnival in Mexico City to a rooftop vantage point, into the creation of *1917* (2020) which follows two World War One soldiers as they cross no man's land, navigate booby-trapped German trenches, escape from a sniper and struggle to stop a mass attack, and so on and so on. Writers such as William Brown (2013), Will Brooker (2009), Alexander R. Galloway (2006) and D.N. Rodowick (2007) have looked at extended durations enabled by digital manipulation but in a way that is limited by the examples available before 2010. As evidence of this, Brown reaches the conclusion that "the long take is a trope of art house cinema, regardless of its technological provenance" (2013: 31) and that "mainstream cinema… seems to be associated with an even greater level of cutting" (32). Given the wealth of recent examples to the contrary, it is clear that the emergence of digital oners in mainstream films, like the broader category of hybrid temporal objects to which they belong, has been so recent and so rapid that they are currently understudied.

The increasing ubiquity, length and intensity of these oners is what interests me in the context of the hybrid temporal object. Digital oners exhibit a profound investment in spatio-

temporal continuity despite being constructed out of discontinuous takes. This investment in an unbroken spatio-temporal flow will act as a springboard for the analytical portion of this chapter as it will allow me to build on the theoretical frameworks of Doane and Hansen and ask the following questions: what does the continuity of the oner consist of? How is it maintained? How do the aesthetics of the oner relate to their technical underpinnings? And finally: how do the contortions of continuity in the hybrid temporal object intersect with our own experiences of time? In answering these questions, I will try and build a picture of what I will call the 'operative content of continuity'. In the final section of the chapter, I will show how hybrid temporal objects produce a sensation of spatio-temporal coherence from its opposite; continuity from fragmentation; seamlessness from inassimilability. I will conclude by suggesting that this paradox at the heart of digital continuity should be viewed through the frame of franchise aesthetics, and that digital oners and hybrid temporal objects more generally manifest an emergent experience of time that is conscious of the micro-temporal increments underpinning time-consciousness.

As mentioned in the introduction to this thesis, what undergoes hybridisation in the creation of a hybrid image is not just the technical procedures of image production, but the media-epistemological frameworks that respective media generate and sustain. Mary Ann Doane's *The Emergence of Cinematic Time: Modernity, Contingency and the Archive* elucidates in great detail the relationship between cinema's transcription of duration and broader epistemological framings of time. As such, I aim to take two things from Doane's work: firstly, a characteristic structure of live-action cinematography's reproduction of duration (this will be the basic model that undergoes hybridisation by digital procedures in the examples to follow). Secondly, the role that this structure of the cinematic time plays in the epistemological framing of time in modernity; this will provide a trajectory to follow in thinking about how the representations of time in the hybrid temporal object contributes to our wider experience of time today.

Doane's basic thesis is that "the emerging cinema participated in a more general cultural imperative, the structuring of time and contingency in capitalist modernity" (2002, 3-4). Her introduction establishes a cluster of epistemologies of time in the late nineteenth- and early twentieth-century. They are manifested in telegraphy and the railroad, Taylorization in industry, the explosion of pocket watches in urban fashion, and the refinement of the Second Law of Thermodynamics (the law of entropy) in physics. All of which contributed to a knowable temporality defined by its standardisation, utility, specificity and irreversible linearity. Doane argues that cinema was developed under "the pressure to rethink temporality" (2002, 23) within this context. For

Doane, cinema responded to a need for "new conceptualizations of space and time and the *situatedness* of the subject," brought about by these massive changes. Early cinema is an answer to the following question: "how does the subject inhabit this new space and time?" (2002, 23)

The key term that needs elaborating here is "contingency," as it is the capturing of contingency on screen that gives analogue cinematography its sense of temporality, and situates the spectator within the pressurised temporality of modernity. The contingent serves two purposes for Doane; firstly, it names the horizon against which the entirety of capitalism's processes of rationalisation are aimed. (As Doane puts it: "rationalization must entail a reduction or denial of contingency" (2002, 10).) Secondly, it describes the aesthetic kernel of cinema's representation of time and is the key element within cinema's reproduction of duration. That is to say, the capturing of the contingent – the rustling of leaves in trees, for example – is what gives analogue cinematography its frisson of passing time.

Across her work, Doane points to a number of ways in which the contingent emerges as a legible aesthetic feature; something that can be pointed to within the frame that gives the passing of time on screen its sense of durée. A key example is found in the Lumiere brothers' *Boat Leaving Harbour* (1895), where the titular boat is almost overturned by a rogue wave. The capture of this moment of uncertainty and unknowability serves as "evidence of the force of contingency in the new medium" (2002, 65). Elsewhere, Doane talks about the viewers of Lumiere's *Repas de bebe* (1896) "who were enthralled with the movement of leaves on trees in the background (pure contingency) rather than the ostensible subject of the film" (2012, 348). These two films are instances where a structural characteristic of the cinema's registration of contingency is particularly visible. Contingency appears on screen as the ephemerality and multiplicity of random detail. Here, as with Flusser's reading of the seemingly objective quality of photography, the presence of such sheer quantities of detail renders a strict symbolic reading of the image impossible. The ephemerality of leaves rustling and waves rippling encourages the viewer to credit the image with reality, and crucially, conflate the flow of time seen on screen with the flow of time as it is generally experienced. The contingent then is essential to cinematography's reduplication of duration: without the random details - the visual noise of contingency - the audience wouldn't be able to recognise that the image was reduplicating a real duration, and certainly wouldn't be able to assume that the duration on screen is isomorphic to a distinct moment in time in the past when the camera was running and the wind was gently blowing.

More than just an aesthetic reassurance of the passing of time on-screen, the capturing of contingency within on-screen durations also has a significant epistemological impact: what Doane

calls “a knowledge effect.” As mentioned above, Doane’s argument implicates the representation of contingency onscreen in the ongoing structuring of the experience of time in society. Doane argues, “the lure of contingency, the fascination of a present moment in which anything can happen, is safely deployed. The present - as the mark of contingency in time – is made tolerable, readable, archivable, and, not least, pleasurable” (2002, 107). The reproduction of the contingent within moving image media, then, did two things. First, it placed a sense of unknowability at the heart of its aesthetics of passing time. Second, it frames this contingency as, in Doane’s words, “graspable, representable, but nevertheless antisystematic” (11). This amounts to the ideological defanging of the promise of that contingency; an ideological framing that is extrapolated into the general experience of time in modernity, which is only tolerable because, being rich in contingency, something unexpected might happen (even though it never does). Doane confirms that this safe deployment of contingency in cinema “is not designed simply to deal with the leakage or by-products of rationalization; it is structurally necessary to the ideologies of capitalist modernization” (11). That is to say, without cinema’s conceptualisation of time as characterised by the unknowability of what comes next - a conceptualisation that has its aesthetic figure in the medium’s capture of ephemeral detail - the deeper regimentation of time in advancing capitalism could not have taken hold.

The way Doane’s argument stresses the social implications of analogue cinema’s registration of time is persuasive because she unreels it against a vast historical backdrop, namely the dawning of Modernity. The specificity of Doane’s concept of contingency, and its double function as an aesthetic marker of passing time and an ideological figure that helps reconceptualise time for the subject of industrialised capitalism, loses some of its use in the context of narrative cinema (and more recent post-industrial forms of capitalism). Looking forward from early cinema, Doane nevertheless perceives montage, narrative, the phenomenon of “live” coverage, as well as digital media and the internet all being - in one way or another - a “subset of a larger and ongoing structuring of the access to contingency” (231). I agree with Doane that the representability of time in cinematography produces a new relationship to temporality itself, which means, crudely put, that the situatedness of the cinema spectator informs the situatedness of the subject in capitalist modernity. However, for me, her model - rigorously organised by the dual function of contingency - is most useful and acute when it can be applied retroactively. My project of franchise aesthetics is geared towards glimpsing the instrumental quality of the forms emerging within our current techno-cultural conditions. With this in mind, my use of the concept of contingency is designed to identify the element within the hybrid image that functions according to the analogue model and the degree to which the temporality of hybrid images is reliant on the presence of the contingent. Whilst I will

lean heavily on Doane's identification of the aesthetic signature of contingency in the production of on-screen duration, I won't follow her concept of the broader structuring of contingency to the letter. Instead, more loosely, I'll explore the possibility that a decentring of contingency within the aesthetics of hybrid temporal objects can be connected to an augmentation in the experience of temporality more broadly. If the hybrid temporal object depicts a duration that feels real, thanks to the presence of contingent elements, whilst at the same time being clearly manipulated, can it follow that hybrid temporal objects model a new form of "situatedness" within today's reigning temporality?

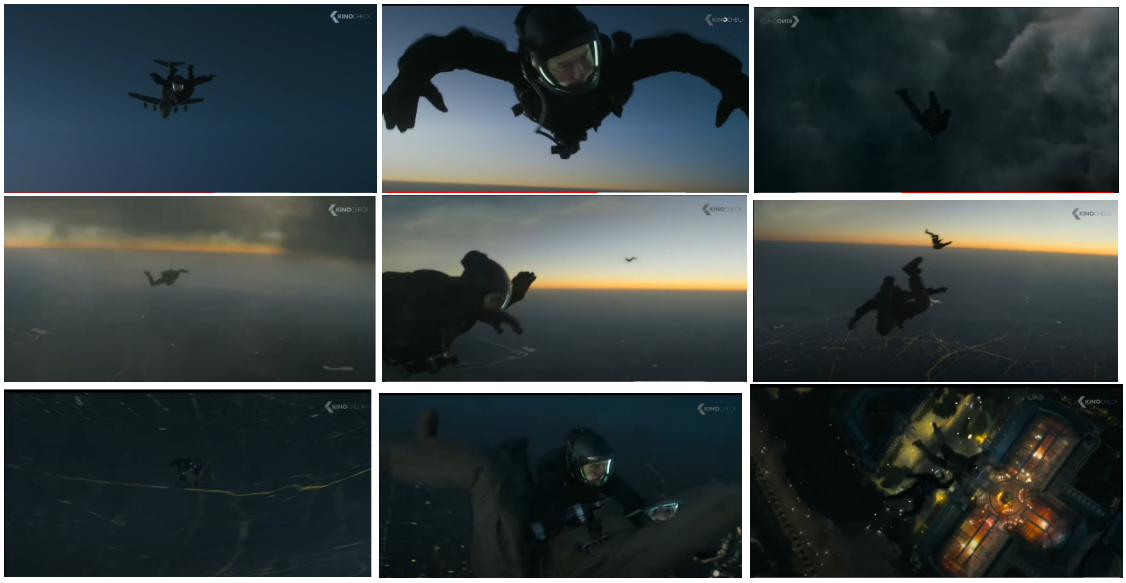
In order to cement the role of contingency in my analysis of hybrid temporal objects and also introduce some of the affordances of the processes of digitally manipulating recorded durations, I'd like to look at the skydiving sequence from *Mission: Impossible – Fallout* (2018). Skydiving sequences are illuminating in this regard because they are built out of a tension between the contingent quality of live-action cinematography and its safe deployment. Just as the breaking of waves on a shore or the rustling of leaves in a tree possess a unique temporality, a manifestation of pure contingency that cinematography is uniquely constructed to capture and represent, so objects in free-fall are subject to the urgent temporality of gravity. In fact, just as viewers are capable of intuiting the "natural" tempo of waves breaking, so images of objects in free-fall feed into our intuitive perception of depth and scale. To take a generic example: the scale of an alien ship crashing into the ground is in part communicated by how fast or slowly the object appears to move in free-fall. The slower it moves, the bigger and further away we perceive it to be, the faster it moves, the closer and smaller it appears to be. This is the phenomenon of motion parallax and depth perception (Stappers & Waller, 1993).

A typical example of one of these moments of motion parallax occurs in skydiving sequences when the shot features a character in the initial moments of freefall, captured by a camera also in free-fall with the plane receding in the background. The spatial language of this composition is what makes it so compelling. The plane, previously the static element of the shot, becomes a proxy vanishing point as it grows smaller and smaller in the sky above. The unusual imagery of a camera looking upward as it is falling backward is complicated further by the figure of the skydiver in an unstable relationship to both the plane and the lens. The framing of both plane and skydiver as the plane flies away and camera and skydiver are in free-fall is unstable and inconsistent – like the movement of leaves in a tree. The motion parallax created by three objects (camera/stuntperson/plane) rapidly moving away from each other, is best considered as an example of contingency: it is profoundly informative of our sense of time passing (and objects falling) in the shot.

Another advantage of looking at skydiving sequences is that the contingent plays a separate, highly significant role in lending the passing of time on screen a high degree of frisson. The longer the parallax effect continues, the longer the aesthetic element of pure contingency is held within the frame, the greater the effect of the contingent (and the possibility of something unthinkable happening next, even though it never does). Whilst there are several canonical skydiving films that do not rely on digital effects (such as *Point Break* (1991) and *Drop Zone* (1994)), the development of smaller stunt cameras and the improvement of seamless digital editing means that shots of free-fall featuring the motion parallax effect have become longer and longer. Even sequences that are legible products of extensive manipulation remain anchored in moments that make the motion-parallax effect as prominent as possible. For example, in *Rampage* (2017) an initially virtual camera travels backwards, from a close-up on a giant albino ape, out of a nose-diving plane, before re-framing on the bodies of the falling stuntmen; a re-framing that incorporates the motion parallax between the camera, the stuntmen and the ground, thus persuasively communicating the veridicality of the stunt (if not, of course, the reality of the crashing plane and the ape on-board). Similarly, *Godzilla* (2014) features a skydiving scene where the vast majority of the sequence is made up of computer-animated compositions. However, the plethora of effects and digital compositions are, as the director Gareth Edwards points out in his 'Anatomy of a Scene' interview with the NY Times, organised around stunt footage of skydivers in free fall (NY Times, 2018). Edwards doesn't explain why such an extensively animated sequence needed to feature some cinematographic durations, but I would argue that the tell-tale effect of motion parallax and the striking impact of its contingent quality could not be sacrificed in favour of similar shots that only simulate that quality. Lastly, *Kingsman: Secret Service* (2016) - a film to which this chapter will return at length - features a shot in which the principal character leaps from a plane before spinning in mid-air so that the camera can see his face. In this instance, intricate face replacement procedures were used to obscure the stunt-person and insert the actor, whilst maintaining the motion parallax between the camera, the body of the stunt performer and the plane. In all of these instances, digital techniques are used in ways that complement the effect of contingency that the stunt footage generates. The shots, however don't function as extended digital oners, and therefore the temporal effects aren't offered up as notably distinct from traditional montage.

An exception is found, however, in *Mission: Impossible – Fallout* (2018) which relays an entire skydive, from exiting the plane to landing on the ground, in an unbroken oner made up of three sections of footage, drawn from over 106 separate parachute jumps performed by Tom Cruise and the stunt camera team (cf. Fuster, 2018). The shot features Ethan Hunt (Tom Cruise) jumping from a plane above Paris, falling through a lightning storm, being struck by lightning, recovering and

rescuing his fellow agent Walker (Henry Cavill) by detaching his own oxygen tank and attaching it to Walker's mask, before deploying Walker's parachute and finally his own. All in free-fall and all in an unbroken oner of two and a half minutes duration [IMAGE 2]. The parallax between multiple objects in free-fall is exploited to great effect throughout the sequence, with Hunt at one point actively looking around him for the figure of Walker, with the camera (also in free-fall) continually struggling to catch both falling bodies in the same frame. In this manner, the contingency of the skydive captured by the stunt team is continually fore-grounded in the sequence, and can reasonably be credited with generating the sense of urgent temporality that characterises the sequence as a whole. But it goes without saying that the stunt people weren't able to keep Cruise consistently framed from plane to ground, and it goes even more without saying that the skydives didn't take place over Paris at dusk, and nor was there actually an electrical storm for them to jump through 106 times. The question that I'm interested in at this point, and the question that the length of the sequence allows room for, is how is the contingent and its profound effect on the temporal structure of the sequence balanced with the other digitally generated and/or manipulated elements, such as the storm or the view of Paris from above? How do the procedures that stitch together the 106 discontinuous takes negotiate the impact of the contingent across the edit and what effect does this have on our overall perspective of the sequence as resembling a single unbroken take? In short, how can we account for the sensation of unbroken temporal flow that the sequence generates despite its obvious fabrication as a continuous piece of action?



[FIGURE 2: *Mission: Impossible – Fallout,* 2018, Christopher MacQuarrie [Multiple Screengrabs]]

The seamlessness that characterises the sequence is the product of a multitude of invisible digital seams. The continuity of the sequence is enabled by passages of virtual cinematography and an array of digital manipulations. However, this doesn't account for the way in which the durée of

the sequence – structured so legibly around the contingent elements of motion-parallax and the presence of the falling stunt-performer, Tom Cruise himself – is maintained across the discontinuity occurring between the three successful takes, culled from 106 separate sky-dives. Looking closely at the specific moments of virtual cinematography is valuable here, as these moments appear to produce their temporal effect by generating a sense of disorientation that is in contrast to the processes of intuitive depth and scale perception that accompany shots featuring a high degree of motion parallax. The main passages of virtual cinematography are when Hunt dives into the storm cloud and is struck by lightning, when Hunt struggles to grab hold of the falling and unconscious body of Walker and when Hunt deploys Walker's parachute and then – only a few hundred feet above ground – pulls his own ripcord. In each instance, the relationship between the camera and the bodies of the characters changes, with the camera adopting a vertical position and looking down on the action. This is opposed to the more horizontal orientation of the stunt-camera falling alongside Cruise, which generates motion parallax by capturing both Cruise, the other body of the second skydiver *and* the distant horizon at the same time. These virtual vertical angles do several things. They place a great deal of distance between Hunt and the camera, and rely much less on the face of Tom Cruise to provide a specific point of attention within the frame. Instead, the main focus of these frames of virtual cinematography is the digital body-double. When lighting strikes and Hunt is sent into a spin, the camera enters a spin of its own, amplifying the disorientation but keeping the (digital) figure of Hunt at the dead centre of the frame. In an effect familiar from the pirouetting of bodies in space in *Gravity* (2013), the lightning strike appears to effect both the body in the frame and the camera's POV but does not result, no matter the degree of chaos and nauseating spin, in the camera ever losing sight of its object. What is created in these moments of virtual cinematography and their reliance on the disorientation of small bodies spinning in open air, is a sense, not of contingency, but of carefully managed continuity. What is being maintained in these brief moments is the attention and focus of the spectator and not the mark of the contingent.

It is also important to state the temporal experience the sequence generates is not one that simply oscillates between different registers, wherein contingency is here legibly present and there legibly absent. Rather, what we see when we invest in the sequence is a persuasive continuity that integrates the contingency of its constituent parts into a larger structure, without sacrificing the intensity of the present moment that the contingent generates. This seems to suggest that this digital oner has an excessive relation to the paradigm of "cinematic time." The temporal experience that watching the sequence creates is similar to that of the analogue one-take insofar as it is phenomenally cohesive and spatio-temporally coherent. However, it is not organised by the contingent in the same way. The structure of "cinematic time" in which the contingent is the

essential element is sublimated within a new structure of temporal continuity that is less reliant on contingency to guarantee a sense of duration and passing time. In short, what can be glimpsed in this sequence is the beginning of the hybridisation of "cinematic time" in which slices of contingency-laden durations are combined to produce a new continuity and a new duration. This hybridisation exploits but also displaces contingency within the temporal experience that it generates.

It is at this point that we can recall the model by which Doane extrapolated a generalised experience of time from the appearance of contingency within early cinema. Thanks to the capture of contingency in cinema's reproduction of duration, "the present… is made tolerable, readable, archivable, and, not least, pleasurable" (2002, 107). This opens up the following question: if contingency is displaced as a key element within hybrid temporal objects, what factors account for the sense of duration in the digital oner? How are hybrid temporal images structured, if not by the presence of contingency?

It is now time to get a sense of how digital media interact with temporal experience in a way that is distinct from Doane's thesis of "cinematic time." Doane's concept of contingency revolves around the way in which early cinema makes the flow of time visible, available to representation, and, by extension, ideological deployment. Her concept of "cinematic time" rests on the sedimentation of the visual qualities of cinematographic durations within a generalised epistemology of time. By contrast, the overwhelming number of theories that deal with digital media and time are premised on the notion that the temporality of digital media falls below the threshold of human apprehension and our general sense of time-consciousness. This perspective is typical of the anti-humanist strain of media theory embodied by writers such as Friedrich Kittler (1999) and, more pointedly, Wolfgang Ernst. Ernst's work on media-generated temporal perception takes the micro-temporal configurations of electronic media as the starting point for any structure of media-generated temporal perception (2016). A prominent expression of this way of thinking is found in Mark B. N. Hansen's post-phenomenological project and his concept of the "post-perceptual" image defined as something that "begins to operate *without being phenomenally apprehended*" (2016, 806). Given my focus on hybridity, and the legible aesthetics of the hybridisation of recorded live-action durations and processes of digital manipulation, my exploration of this branch of media theory will be cautious. What I'm looking for in engaging with Hansen is a set of concepts that can be used as a supplementary counterpoint to the model of analogue durations (and their epistemological impact) laid out by Doane. To that end I'll focus on the portion of Hansen's work that deals with media processes that fall beneath the thresholds of everyday perception, but that nevertheless play a strong role in structuring temporal experience.

In his essay "Technical Repetition and Digital Art" Hansen claims that the "digital inscription of time today occurs at an infrastructural level and at temporal scales that are beneath the threshold of consciousness and perception" (2014, 82). The key word for me, here, is "infrastructural" as it implies that the microtemporal operations of digital media establish the parameters for experience, and what is more, that temporal experience that isn't underpinned by the infrastructure of digital media is increasingly rare. In order to account for how digital media's infrastructural influence takes hold of our temporal experience, Hansen offers up a comparison with cinematic media: "whereas cinematic media inscribes time as past duration in order to re-present it to present consciousness, digital technics… makes time available for experience beyond the reference frame of consciousness." Hansen goes further and, invoking Stiegler, suggests that "the homology between the cinematic grammatization of time and the flux of consciousness no longer holds for digital technics" (2014, 85). Whilst Hansen is correct to highlight the inadequacy of analogue models of time-consciousness within a digital regime, he doesn't sufficiently acknowledge the degree to which cinematic inscriptions of time remain a residual aspect of temporal experience.

For me, Hansen's concept of a direct interaction between digital technics and time-consciousness does not cancel out the possibility of engaging (critically or otherwise) with specific temporal objects, nor does it mean that the reference frame of consciousness is somehow delegitimated, as Hansen implies. The perceptual habits that were concretised in early cinema - the intuitive recognition of the natural tempo of waves, for example - have not disappeared from our experiences of mediated durations. Nor has the embodied experience of temporality, correlated to the somatic rhythms of our breath and our heartbeat. I do not subscribe to the full implication of Hansen's argument that lived time-consciousness is, in its totality, always-already generated by the digital technics that surround and support us. Most importantly, I do not agree that digital technics are always unavailable to apprehension and aesthetic appreciation and critique. As has been seen in my discussion of the sky-diving sequence from *Mission: Impossible – Fallout*, hybrid temporal objects contain both the signature of an analogue record of time, in the form of contingency appearing as a surfeit of ephemeral detail, and evidence of its digital manipulation.

Hansen's project does not deal with hybrid objects. For him, the aesthetic emergence of sub-perceptual and infrastructural processes only happens in exceptional circumstances, in either new media artworks, glitches or both. In a discussion of Lynn Kirby's *Six Shooter* (2002) he argues that an emphasis on the artefacts of the processes of mediation, such as grain and glitch, has the following result: "the work as object becomes dissociated from the experience it generates which means that the media object can no longer play the role of 'temporal object,' can no longer be a mere mimetic mirror to the flux of consciousness" (2014, 94). Discussing the phenomenological impact of glitching,

Hansen makes the following claim: “properly digital mediation… only enters human time-consciousness from the outside, as an extrinsic accident, as what I have elsewhere called a ‘diachronic thing’” (2014, 96). Whilst I find the claim inadequate to the discussion of digital mediation and the aesthetics of the oner, I find the term “diachronic thing” very useful indeed and wish to broaden its applicability beyond moments of glitch or medial breakdown.

I propose to use the term “diachronic thing” to describe the presence of legible digital manipulation within an otherwise isomorphic reproduction of duration. The advantage of the term for me is the temporal valence that “diachronic” brings. The idea of diachrony places the medial operations that are signified by the term “diachronic thing” outside of the temporalities that are organised within the apparatus of analogue cinematography and that make up an orthodox temporal object. They are, for example, diachronic to the temporality of filming: the duration that the camera records. Likewise, they are diachronic to the temporality of exhibition: the duration that appears on screen. This places the “diachronic thing” beyond the structures of “cinematic time” and its reliance on contingency – both as it is felt to exist in reality and as it is domesticated on-screen. I’ll dive deeper into just how the diachronic thing manifests itself aesthetically as I move into my analysis, but will briefly signal here what this means going forward.

Given the infrastructural influence that digital mediation has over time-consciousness in Hansen’s model, the idea of the “diachronic thing” can be set up in suggestive counterpoint to the idea of the contingent in Doane’s model of “cinematic time.” In short, the term can stand for the structuring principle of digital media’s production of duration, as it describes the variety of means by which digital mediation underwrites our perception of time and space on screen. It will also stand as the principle means by which the contingency inherent to cinematography is displaced within digital durations. To put it into terms applicable to the sight of Tom Cruise in freefall for two and a half minutes: the discontinuous fragments of contingency-laden stunt-footage are combined into a spatio-temporal continuum by a series of procedures that exert pressure on the temporal experience of the spectator diachronically. The contingency that informs our sense of time passing in the sequence is in balance with the diachronic presence of digital mediation processes which manipulate our sense of time passing at the thresholds of perception and consciousness.

It remains to be seen whether or not this model of digital mediation as a “diachronic thing” within temporal experience impacts our generalised experience. For the time being, I plan to investigate how these two seemingly mutually exclusive structural principles co-exist within the hybrid temporal object. By understanding the relationship between the diachronic pressures exerted

by digital mediation and the presence of contingency in the hybrid temporal object, we can start to draw a new picture of the generalised experience of time as it exists today.

SECTION TWO: THE CONSTITUENT PARTS OF THE ONER

It's time now to introduce my next case study, the first two films of the *Kingsman* franchise: *Kingsman: The Secret Service* (2014) and *Kingsman: The Golden Circle* (2018). The films follow the fortunes of a young man called Eggsy (Taron Egerton) as he becomes a key player in a secret service agency notable for its gentlemanly sense of dress, decorum and derring-do, exemplified by Harry Hart (Colin Firth). In the first film Eggsy must stop the arch villain Richmond Valentine (Samuel L. Jackson) from broadcasting a signal that will cause the entire population of earth to become uninhibitedly violent. In the second film, Harry and Eggsy must team up with their American counterparts to stop a drug dealer called Poppy Adams (Julianne Moore) who poisons the world's drug supply. A key feature of both films is an extended digital oner. In the first, a massacre in a church is depicted in long unbroken takes and, in the second, the final showdown between the heroes and the villain is presented as a flowing unbroken digital oner. In contrast to the digital oner discussed in *Mission: Impossible – Fallout,* however, these sequences do not unfold according to an isomorphic temporality. In accordance with the playful generic identity of the films, the sequences have only a passing interest in verisimilitude, but a deep investment in visceral action. The spatial-temporal flow that they manifest, whilst smooth and coherent, does not correspond to any experience of lived time save for the time-consciousness that the sequences impose. Each sequence is a concatenation of violent action and absurd stunt work held together within an intensely controlled continuity. What is more, the sequences are saturated with a variety of temporal effects and stitched together by a range of digital manipulations. As such, they offer me an opportunity to do two things. First, break the continuity of the oner down into its constituent parts. Second, take a close look at the inter-operativity and/or tensions that arise as the constituent parts are brought together within a hybrid temporal object. Here, the characteristic structures of analogue cinematography - with its reliance on contingency - and digital media - with its diachronic influence over temporal experience – densely interweave with one another.

For the first task, I'll focus on the first film. In the so-called "church fight" sequence in *Kingsman: The Secret Service*, Harry Hart attends a church service, where all the congregants are gun-toting bigots. Unbeknownst to Harry, Richmond Valentine is about to test a signal that

emanates from mobile phones and turns even the most meek and mild person into a rampaging lunatic. Valentine's plan is to have the entire congregation go mad and start killing one another, and, in the process, kill Harry as well. When Harry gets up to leave, Valentine triggers his device and what ensues is an orgy of senseless violence, sound-tracked by the song "Free Bird" by Lynyrd Skynrd. It ends with Harry as the last man standing. The scene has been celebrated and deconstructed several times in a variety of online forums, although not as yet in an academic context. For example, the YouTube video "Kingsman: The Secret Service – Every(ish) Hidden Cut in the Church Fight" (Aaron Field, 2017) points out every moment in the sequence where a break in the temporal flow of the footage has been hidden by a digitally assisted match-cut. For my purposes, it is enough to point out that the sequence is bursting with moments of manipulated spatio-temporal continuity. Within it are instances of slow-motion, fast-motion, digital compositing, as well as match-cuts and/or crash-zooms that are techniques of digitally re-framing the action whilst maintaining a sensation of managed continuity. It is from this basic list that I'd like to start compiling a partial taxonomy of the temporal effects that are, or can be, present within the digital oner. My aim is to gauge the degree to which contingency is still visible within the sequence before using this factor as a way of accessing the degree to which "cinematic time" is hybridised by the diachronic processes of digital mediation.

I'll start by focussing on temporal effects that have, as it were, an analogue pre-history, and therefore a grounding in the formations of "cinematic time:" specifically, slow- and fast-motion effects. Slow- and fast-motion are temporal effects achievable either in camera or in the act of projection and have played an interesting role in cinema's representation of time since the late nineteenth century; as such, we can reasonably expect them to be grounded in the representation of contingency. In first isolating the contingent in slow- and fast-motion effects and analysing its role in the temporalising effect of the images, I can establish a benchmark from which to examine the displacement of contingency by digital mediation.

Slow-motion plays a prominent role in the *Kingsman* sequence. At one point, Harry recovers from having been knocked to the floor by an explosion. The frame features Colin Firth in close up whilst over his shoulder two congregants continue fighting. Amidst the violence, the slow-motion pushes certain details into the foreground, and essentially amplifies the contingent qualities of the profilmic scene in which Firth performed in front of the camera. Particularly notable in this respect is the fall of Firth's hair across his face: the brief dilation of time opens up space for the audience's attention to register more than just the basic content of the frame. As such, as Harry Hart picks himself up off the ground, the audience has the chance to register that his hair, usually so immaculate, has fallen out of place. The presence of such an ephemeral detail has an interesting effect on our overall engagement with the sequence. Slow-motion, and its promotion of the

contingent details of the profilmic duration – specifically, the details of Firth's hair - augments the quality of the attention that it is possible to pay to the frame, and allows us to see that the character of Harry Hart, usually so calm under pressure, is reaching the limits of his suavity. Contrary to the overwhelming tone of the sequence, which celebrates Harry Hart's killing spree with very little nuance indeed, this moment of slow-motion and its foregrounding of contingent details gives a degree of shade to this presentation. Ultimately, Harry survives the Church fight but not without being rattled to the core, an insight facilitated by the use of slow-motion and its handling of the contingent qualities of Firth's performance.

[FIGURE 3: *Kingsman: The Secret Service,* Matthew Vaughan, 2014 [Screen Grabs]]

This telescoping in on contingent details has a strong impact on the temporalising quality of the sequence and an attendant effect on the temporal experience of the spectator. Jean Epstein recognised this aspect of slow-motion cinematography in his various celebrations of the effect. "What the mind does not have time to retain, what the eye has neither the time nor the field to see in one expression… all this is what slow-motion displays at will" (2012, 55). Epstein translated the amplification of perceptual capacities of slow-motion into amplified analytical intensities, celebrating slow-motion's "ability to dismantle feelings, to enhance drama, to infallibly represent the sincere movements of the soul…" (Quoted in Cortade, 2012, 169). Or in this case, slow-motion captures the unexpected movements of Firth's hair, and gives us time to draw meaning from it. The slow-motion section amplifies the contingent qualities inherent within the footage, and as such intensifies the dynamics of "cinematic time." Contained within this dynamic, as outlined in the first section of this chapter, is an experience of temporality organised around the safe deployment of contingency. The representability of time, especially a moment unfolding in slow-motion, feeds into the larger rationalising of temporal experience in every aspect of life. The promotion of contingent details such as Firth's unkempt hair carries with it the lure of chaos and things going wrong, even as it demonstrates the degree to which slow-motion cinematography is capable of harnessing this chaos in service of an action spectacle.

In contrast to this moment of slow-motion, a sped-up feeling characterises several portions of the sequence. In these instances, fast-motion has the opposite effect of slow-motion, but is no less reliant on the presence of contingency for its temporal effect. Whereas slow-motion picks the violence out detail by detail, fast-motion effects contribute to the overall impression of the scale of

violence in the scene. Instead of promoting the significance of individual, contingent details, fast-motion signals the abundance and incomprehensibility of details contained within a given duration. This manifests a different relation between cinematography and the contingency of profilmic durations, but it has an effect on the quality of the spectator's attention comparable to that of slow-motion.

Fast-motion does not dilate our attention and invite analysis, like slow-motion does; instead it contracts attention and invites a sense of temporal synopsis: time is passing, day to night, night to day. But that is not to say that a fast-motion sequence does not produce its own characteristic temporal experience, generated from the way in which contingency is captured. Rather than revealing the micro-temporal dimension of contingency, fast-motion situates the contingent in the macro-temporal; for instance, the scudding of clouds across a landscape is testament to the inability of our experience of time to account for slow changes in atmosphere. Like slow-motion, fast-motion provides an insight into what lies beyond the apprehension of the temporal frame of ordinary experience. Namely, the contingent qualities of macro-temporal systems, and the impossibility of knowing which detail - of the millions of details captured in fast-motion - will be of particular significance. Extended fast-motion sequences are rare, but when they do occur, they offer an opportunity for gauging the quality of attention solicited over a longer sped-up duration. Take, for example, the time-lapse sequences in *Requiem for a Dream* (2000) or *Breaking Bad* (2008-13) which prioritise the experience of time passing in expectation of a come-down or a drop off. They produce a distracted time-consciousness that is cognizant of the abundance of contingent details contained in every frame, but unable to glean any specific meaning or significance from any of them. This time-consciousness is acutely aware of events occurring at speed, as such it provokes a visceral and agitated sense of time passing, without anchoring that sensation to the content of each and every moment. This agitated sense of time passing is connected to the altered perception of contingency within the duration and, I'd suggest, is a characteristic product of the fast-motion effects in evidence throughout the "church fight" sequence.

Both fast- and slow-motion effects qualify what Christophe Wall-Romana has called the "materialist side… of duration" (2013: 73), in so far as their appearance goes some way towards disclosing the technical underpinnings of cinematography's representation of time and its reliance on the stable material conditions of the camera, the lens and the registration of light on the film-stock. Despite the explicit technicality of the effects and their overt de-naturalisation of time, Mary Ann Doane has surprisingly little to say about fast- and slow-motion. In a parenthetical aside she notes "fast-motion, slow-motion, the freeze frame, and other distortions of time become, precisely, *special* effects, relegated to the marginal status of heavily coded – and rare – moments" (2002, 189).

Whilst this dismissal fits with her period of study, it is no longer true that special effects *per se* are rare, nor do they occupy a marginal space in visual media's generation of temporality. Whilst Doane doesn't find much room in her work for special effects, that is not to say that her model of "cinematic time" is not useful in understanding how the effects function. Fast- and slow-motion rely on a stable relation between a past duration and its mediation as a denaturalised temporal object and as such can be considered off-shoots of "cinematic time." This is especially clear when considered from the perspective of the contingent, the presence of which is amplified in both effects and which plays a significant role in producing the sensation of passing time on screen.

However, an irony that emerges here is that in the contemporary visual media landscape, fast and slow-motion are more often than not experienced in juxtaposition, one after the other, brought together by an effect called time-ramping. In these instances, the relative impact of the contingent elements of the frame are accentuated, with the magnification of detail in slow-motion made all the clearer by the way that the details get lost in the sudden onrush of fast-motion. Likewise, the sensation of an abundance of contingent material in fast forward, recedes dramatically when slow-motion intercedes and pushes a different order of detail into prominence in the frame. The irony resides in the fact that this accentuation of the features of "cinematic time" only occurs as a result of an effect native to processes of digital mediation. I'd now like to examine time-ramping in detail in order to ascertain how this balance is struck between contingency and the diachronic pressures of digital mediation.

Time ramping or speed ramping is the oscillation between tempos within a single shot, exemplified in such films as *300* (2006), where the battle of Thermopylae plays out in a fluctuating temporality or *Sherlock Holmes: Game of Shadows* (2011), where Holmes' pre-emption of a fight-to-come telescopes between jittery fast-motion and super-slow-mo. It is to be found in subtle variations throughout the church fight in *Kingsman: The Secret Service* but most notably in the transition into and out of slow-motion bracketing Harry Hart's moment of near defeat after he is thrown to the floor by an explosion. As opposed to the fast- and slow-motion which are effects native to analogue media and could have been achieved in camera by the manipulation of motor speed, time-ramping is a relatively ubiquitous affordance of digital editing software. Whilst it is frequently included within the cluster of digital effects that make up the contemporary action film in the work of Lisa Purse (2019) and Nick Jones (2019), a granular analysis of the effects the process has on the spectator has yet to be carried out. To facilitate this analysis, I'd like to consider time-ramping from the perspective of Hansen's writings on digital media and their production of time-consciousness from below the threshold of visibility and outside the structures of "cinematic time."

Evan Calder Williams, in his book *Shard Cinema* gives a careful description of time-ramping aesthetics. He notes that:

> if one looks for an aesthetic equivalent of the way that it sways between total stillness and rapid acceleration, it isn't to be found in previous cinema so much as in the timeline of digital video software where one "scrubs" through with a cursor, the images flickering at top speed until the arrow pauses for a moment and everything stops and hangs and waits (2017, 204).

Williams' description of the aesthetic correlates of time-ramping is apt but does not address what effect time-ramping might have on the temporal experience of the viewer. Even though Williams complains of a "continual whiplash" (2017, 203) as a result of speed ramping effects, it remains to be determined what positions he is being rapidly pulled between. I contend that the concertina-ing temporalities of time-ramping manipulate the attention of the spectator, and this is the cause of the whiplash. As discussed, slow-motion and its relation to the contingent saturates an image with meaning, whilst fast-motion hollows it out. Ramping between the two has a real-time effect on the qualitative nature of our attention and our ability to sustain or re-stabilise it. Crucially, this effect does not emerge from the stable relationship between a past duration and its re-presentation (at whichever tempo), but from a temporality diachronic to both the profilmic duration and the duration of its representation on screen.

So what is the constitutive element of the temporal experience in time ramping, and where does it come from? Time-ramping's fluid re-moulding of our attention results in a destabilised experience of duration. The flow of time on screen has no isomorphic relation with the duration being represented, and the temporal experience that it produces has no correlation to the ordinary flow of time. Within time-ramped sequences, each second doesn't have an equivalent duration to the second that preceded it. Unlike the "materialist" grounding of fast- and slow-motion effects, described by Wall-Romana, the duration of time-ramping isn't bound by the length of the profilmic duration, or any single technique of re-presenting that duration. Similarly, unlike with analogue fast and slow-motion effects, there are infinite degrees of fast- and slow-motion within the time-ramped sequence. It is the phasing between or across these speeds, as opposed to the speeds themselves, that gives time-ramping its peculiar temporal effect. Not only can the diegesis be accelerated or slowed to a standstill, but, crucially, the oscillation between the two effects takes on a temporal rhythm of its own. This rhythm is as constitutive of the experience of time within the sequence as the profilmic duration or its presentation.

Drawing on Evan Calder Williams' work, it is possible to identify a third temporality that informs the present tense of a time-ramped sequence: that of the editing software in which a user "scrubs" through the footage. In questioning how the duration of the time-ramping effect is structured, the notion of a diachronic temporality, such as that of the editing suite, is very useful indeed. I'd suggest that it is the diachronic temporality of digital editing software that generates the screen duration of the time-ramping effect. The cinematography of the time-ramped sequence remains grounded in its capture and reproduction of contingency, a grounding that is more or less evident depending on the degree of fast- or slow-motion being used. However, the contingent in the sequence is no longer the principal structuring element of the duration. The duration of a time-ramped sequence is generated diachronically, via the interventions of digital editing software. The "whiplash" of time-ramping is the result of the oscillating intensity of contingency within the frame, the rhythm of which is determined by a diachronic process palpable within the sequence without being inherent to the recorded durations undergoing manipulation.

William's use of the term "whiplash" implies that time-ramping is disorienting, an experience characterised by rupture and discomfort. Whilst this might sometimes be the case, it is certainly not an essential aspect of time-ramping's temporal effect. In the *Kingsman: The Secret Service* church fight sequence, the time-ramping plays a very specific role in the curation and direction of attention across the sequence, making the action in each spurt of fast-motion more legible and the salient details in each slow-motion portion more graspable. Time-ramping primes and guides our attention, indeed, it is a prerequisite for our attentive engagement with the action. For example, when Harry catches, and then, rather improbably, dismantles a gun to stab an assailant with its various parts [FIGURE 4], the time-ramping between the action of his deconstructing the weapon and his subsequent use of it keeps our attention honed in on his hands, and protects the action from becoming lost in the otherwise unreadable melee.

[FIGURE 4: *Kingsman: The Secret Service,* Matthew Vaughan, 2014 [Screen Grabs]]

Time-ramping's manipulation of tempo exerts a pressure on the spectator's ability to discern the content of the frame. Shifting tempos shift the degree to which the spectator can engage with the contingent quality of the duration. It follows that the time-consciousness that is generated within a time-ramped sequence is one that is responsive to the lure of the contingent within a frame, whilst being simultaneously determined by digital mediation's moulding of attention through

the control of tempo. Our experience of the present tense of time-ramping, then, responds to the traces of "cinematic time" within the frame even as it proceeds via the structures of digital mediation, imposed diachronically to either the profilmic duration, or the duration on screen. In short, time-ramping is a process that hybridises "cinematic time" by destabilising the temporal object and its relationship to an actual duration. This destabilisation imposes a fresh set of pre-conditions on the familiar experience of perceiving a temporal object. The contingent quality of the cinematography is displaced within this temporal structure, and arguably becomes a secondary effect within the flow of time on screen, which is principally enabled by the digital technique of time-ramping.

In the conclusion of this chapter, I will speculate further on the demotion of contingency within the hybrid temporal object. For the time being, I'll illustrate how two further processes of digital mediation perform a similar function and set the perceptual parameters by which the spectator responds to the contingent elements within a sequence. So far, I have considered fast-motion, slow-motion, and time-ramping; the final effects I'd like to dwell on are digital compositing and virtual cinematography, each of which contributes to the temporal effect of the oner. As noted above, the piece of action featuring Harry dismantling a gun and using it as a stabbing weapon revolves around a moment in which the gun is thrown into the air and the camera zooms in on it, making it the centre of an otherwise empty frame, at which point Harry's hand reaches out to catch it. On close inspection, it is clear that the gun in mid-air has been composited into the empty frame and that the segue back into the handling of a practical gun by Firth is assisted by a match-cut at the point where the gun is caught. Of course, these details are not visible within the real-time of watching the sequence, but the collective effect that these procedures have on the attention of the spectator is crucial. I'm interested in them here because, despite remaining largely outside of the frame of visibility, they are the dominant factors determining the sense of duration in the oner.

There are other instances in the film, where the use of compositing in combination with slow-motion cinematography more legibly determines the way in which the spectator is supposed to experience the flow of time on screen. I turn to them here in order to get as clear a picture as possible of the way that the effects set the perceptual parameters for how the audience can engage with the contingent qualities of any given sequence that features compositing, whether or not it is easily visible. In an earlier fight scene, Harry Hart takes on a group of thugs in a pub. At one point, an assailant has a tooth knocked from his mouth and the sequence descends to slow-motion to track the path of the bloody tooth as it sails past the face of a startled henchman. The effect is strongly reminiscent of the Fuze Tea frozen moment discussed earlier in this chapter. The moment is brief, no longer than a second or so, but long enough to perceive the comic performance of the startled

henchman, the gory detail of the bloody tooth *and* intuit the fact that they have been brought together not through the expert staging of the action, but through some sort of special effects trickery.

[FIGURE 5: *Kingsman: The Secret Service,* Matthew Vaughan, 2014 [Screen Grabs]]

This combined use of slow-motion and digital compositing demonstrates how the slow-motion's promotion of the contingent elements of the performance strongly informs our experience of duration in the sequence, but only within the attentional architecture established by the use of digital compositing and its direction of the gaze. The temporal experience that the shot generates is responsive to the traces of "cinematic time" contained within slow-motion and its representation of contingent details, but, again, only from within an attentional frame strongly determined by the process of digital compositing. Once more, the temporal effects of digital mediation are felt as a pressure exerted diachronically on our experience of recorded live-action durations from outside of the orthodox relationship between a profilmic duration and its representation.

Before moving on to discuss the effects of these multiple temporal elements interacting and overlaying one another in the modular structure of an extended oner, it is necessary to briefly note one final key component: passages of computer-animation or virtual cinematography. As in the example of *Mission: Impossible – Fallout*, passages of virtual cinematography are used to stitch together longer takes without breaking the spatio-temporal continuum of the oner. In the church fight scene, there are several instances where microscopic examples of virtual cinematography or other techniques such as re-framing are used. But by and large they escape our attention, guiding our gaze and determining our engagement with the image, but without impinging noticeably within the frame.

More reflexive and legible examples of the effect, however, are not difficult to find. For example, the very opening shot of *Kingsman: The Secret Service* (2014) is a "oner" incorporating a great deal of special effects even as it lays out a coherent spatio-temporal organisation. The shot starts on the turning central cog of a cassette in a tape-deck, the camera pulls back from this extreme close up to reveal two armed men listening to the music, a helicopter appears in the background, shots are fired, the shot tracks the helicopter, turning 180 degrees and revealing a large fortification now under-fire. The shot pushes forward, as the walls of the fort explode and the

tumbling bricks form the names of the production companies. The camera pushes past the credits, zooming in on a dark window, before finally pushing through the window and into the room where an interrogation is taking place. The sequence, from the close up on the tape deck to the interrogation room, whilst containing many photographic elements, is principally animated. The temporal experience of the sequence is generated by a variety of overlapping stimuli, such as the prominent soundtrack and the movement of various elements across the frame, such as the helicopter and the tumbling letters of the credit sequence. In the absence of contingency to ground the shot in a relationship to an actual duration, the animation proceeds, like the brief segments of virtual cinematography in the skydiving sequence of *Mission Impossible – Fallout,* via over-stimulation, making the impact of contingency a minor element within the duration of the sequence.

The use of microscopic segments of animation to bind together otherwise discontinuous pieces of footage is, arguably, most effective when entirely invisible within a sequence (hence my reluctance to try and use the oner of the church fight, where examples are legion but never very legible, to illustrate its operation). Ultimately, either as a prominent feature of a sequence, or an invisible element supporting the otherwise seamless flow of a shot, the technique is integral to the production of continuity within the oner. In fact, I'd argue that the often-invisible nature of processes such as compositing or the interpellation of segments of virtual cinematography does not diminish their instrumentality or the effect they have on the spectator. Rather, they are clear examples of diachronic operations that produce temporal experience by hybridising durations of "cinematic time" and imposing a new structure for the spectator's experience of the flux of time on screen.

SECTION THREE: THE OPERATIVE CONTENT OF CONTINUITY

So far, we have accounted in miniature for the effect of a variety of temporal effects - analogue, digital and hybrid - on the spectator's sense of the contingent qualities within an image, and by extension, the flow of time on screen. But a crucial feature of digital oners is that they are modular and combinatorial constructions of a range of temporal effects. Within the digital oner, the anchor of "cinematic time" is overlaid and manipulated in so many ways that it is not appropriate to assume that a settled spectatorial mode – hybrid or otherwise - can account for the temporal experience generated by the sequence. Instead, we must investigate how the spectator navigates

the vacillating intensities that arise from the constant modulation of “cinematic time” by the diachronic pressures of digital mediation.

It is at this point that my chapter will start to open onto the issue of the operative content of continuity, and connect to my larger project of analysing the ways that hybrid imagery contributes to an ongoing reconstitution of the epistemologies of time within and on behalf of a society facilitated by digital media and the myth of immediacy that it puts forward. It is at this point, too, that my analysis of hybrid temporal objects will begin to share a clear horizon with my broader project of franchise aesthetics. This is because I perceive hybrid temporal objects to be standardising an emergent intensified temporality that exposes the subject to the microtemporal increments within the flow of time. Hybrid temporal objects both give aesthetic form to this new temporality, and, given the temporalising quality of moving image media, produce temporal experiences that are in line with the new forms of temporality brought about by digital media. Lastly, these particular instances of franchise aesthetics further the reach of capitalism into the barely perceptible increments of our time-consciousness, by fallaciously positioning this heightened experience of time as an experience of “me-time” or even an opportunity for greater agency. However, is it true that the more choices we are aware of, the greater the degree of agency available to us? By inserting more moments of decision and uncertainty into our experience of the passing of time, I’d argue this manifestation of franchise aesthetics is just intensifying the temporal qualities of the “fully mediated mise-en-scène that provides humans with contexts and options for response that are productive for capital” (Beller, 2006, 29).

In the case of the hybrid temporal object, operations such as time-ramping figure the flow of time as consisting of multiple temporal scales, including the macro- and micro-temporal scales of digital mediation, and the more familiar scales of “cinematic time.” In figuring the flow of time as made up of millions of tiny increments that can be traversed forwards and backwards and at any speed, the digital inscription of time reveals the inadequacy of “cinematic time” and the epistemologies that stem from it. That is to say, the role of contingency in early cinema can no longer be used to address the problem of the situatedness of the subject within the new times and spaces of digital media. But it is possible to see the hybrid temporal object as a new way of answering the same old question, specifically: “how does the subject inhabit this new space and time?” (Doane, 2002, 23) The hybrid temporal object manifests the multi-layered complexity of temporal experience and its determination by digital processes, whilst producing an experience of continuity that smooths over the inconsistencies and discontinuities that this multi-layered temporality brings to the surface. This continuity of the digital oner is operative insofar as it responds to the “pressures to rethink temporality” (Doane, 2002, 20) that are manifest in

technologies of digital mediation. This is the operative content of continuity: despite embodying a mode of inscribing time that exceeds the temporal frame of human perception, and is imposed diachronically, from beyond the reference frame of conscious experience, it nevertheless produces an experience of situatedness. The hybrid temporal object simultaneously undermines the epistemological formations of "cinematic time" and uses the aesthetics of continuity to replicate the situatedness that "cinematic time" offered. The question that motivates this final portion of my chapter is whether or not the dynamics of the hybrid temporal object can be used to establish a perspective on the degree to which contingency has been displaced as the organising conceptual and aesthetic means of understanding and representing time?

It is now time to look at the oner from the second film, *Kingsman: The Golden Circle* (2017) in order to draw some conclusions about the experiential qualities of a full-blown digital oner, and make room for some speculations about what the aesthetic experience of continuity here might say about our experience of time more generally. The climax to *Kingsman: The Golden Circle* features a show-down between the two English protagonists, Harry and Eggsy, and their erstwhile American collaborator turned arch-villain Whiskey (Pedro Pascal), as they fight over a briefcase containing the means to save the world. The sequence includes a digital oner that lasts for one and half minutes, and involves the protagonists tumbling back and forth over a diner counter, various pieces of gun-play, an extended knife-fight, a lasso, a giant mincer and a plethora of stunt-work. Unlike with the images so far used to illustrate my points, breaking down the sequence into thumbnails would not be particularly informative, because the sheer discontinuity between the individual frames, and the sheer range of images included within the sequence, would not help illustrate the continuity of the shot as a whole. The temporal flow of the sequence oscillates to the point of disintegration. The camera moves both flow and judder; the bodies and objects that fly back and forth in the frame stretch the plausibility of the continuity beyond any possible homology with an actual staged duration. Thought of, on the other hand, as a continuous duration produced under the pressure exerted by the interventions of digital media, the contortions of continuity and the extremities of the temporal flow of the sequence disclose the nature of its own production. The over-abundance of temporal effects *within* the continuity means that the processes that underpin it shift dramatically in and out of the foreground. In other words, the "diachronic thing" of digital mediation marks and dominates the flow of "cinematic time" in a variety of clearly legible ways.

Speaking in a VFX breakdown featurette, VFX Supervisor Mark Breakspear described the production process in the following terms:

> The sequence is a huge single camera move that's made up of hundreds of different clips. On set we shot a combination of first and second unit, and some cases third unit, we shot motion control, steadicam, standard lock off, just general plate reference, we would shoot green screen equivalents for face replacements and there are an awful lot of face replacements in this sequence. We shot all the different types and we positioned it together, we used LIDAR to line things up and for a good couple of months, just assembling the footage that made up the multiple minutes that that sequence is, took an awful long time and was incredibly complicated (ImageworksVFX, 2017).

The result is an artificial continuity whose true content is not a representation of a continuous duration but a demonstration of the means by which spatio-temporal flow can be constructed. The sequence is so overfull of technique that the intensifying experience of continuity, building as the duration extends and extends, relies less and less on any contingent quality within the frame, and more and more on the profound sensorial impact that digital manipulations of space and time have on our active processes of perception. What emerges as the main content of the continuity isn't the fight scene that it is communicating, but the underpinning technical procedures that communicate it; not the action that fills the duration, but the media that produce the duration itself. By insisting on such an extreme spectacle of spatio-temporal coherence, the sequence encourages the spectator to intuit the contours of the diachronic thing(s) that determines its structure, and pay less and less attention to the contingent qualities of a given moment. The flow of time on-screen doesn't appeal as a reproduction of a past duration, as the replication of the stunts that make up a fictional fight; rather, it is more a demonstration of how a duration, and one exhibiting all the hallmarks of spatio-temporal continuity, can be extruded from heterogenous fragments and diachronic procedures. We don't need Breakspear to attest that putting the relatively short sequence together "took an awful long time and was incredibly complicated;" the evidence for such a conclusion is visible within the very continuity of the sequence itself.

Drilling down into specifics, the range of temporal effects continually overturns, re-establishes and re-configures the way in which the action is perceived, and in every instance marginalises the contingent quality of the frame, promoting instead the temporal effects of digital procedures such as compositing or time-ramping. For example, the fast-motion whip-pans overwhelm the spectator's ability to attend to the specificities of the frame whilst perceiving the unbroken nature of the oner. That said, a pistol dropped on the floor and, micro-seconds later, lassoed by Whiskey and returned to his hands, becomes a clear focal point for the spectator's attention. This is achieved through a combination of slow-motion cinematography, which dilates the

temporal flow and allows for an intensified perception of the content of the frame, and compositing and digital re-framing, which guides that sharpened attention to specific elements in the frame, in this instance the lasso and the gun. The instability of the temporal flow of the sequence continually re-moulds attendant attentional structures and disintegrates any sense of a stable relationship between lived time-consciousness and the distending and contracting temporality on screen.

This effect cannot necessarily be approached descriptively, not least because in describing the sequence in prose, the temporalising effect is immediately lost. Rather than being operative as isolatable and sedimented effects within a static structure, the scene suggests that digital oners generate a temporal experience that exceeds sequential description, deconstruction or demodularisation. Digital oners, whilst demonstrably consisting of a number of carefully ordered temporal effects, match-cuts and virtual camera manoeuvres, aren't coherent as a chronology of one effect after another. Instead, the continuum of the oner consists of fluidly interchanging attentional cues that restlessly re-orient the viewer second by second. What we are most receptive to as spectators, what most informs our sense of time passing in these extended durations, is the transitioning or phasing between one temporal effect and attentional structure and the next. Whilst contingency is glimpsed here and there - a trace of the randomness of real-life peeking through in some tiny detail or other - its role in the generation of duration in the sequence is displaced. Central to the frisson of time passing is not the lure of contingency but the contortions of the continuity itself. Put differently: the sensation of passing time in the sequence stems from the sensation of the management of attention by diachronic procedures, as opposed to an engagement with the actuality of a previous duration and its contingent qualities. Whilst within the regime of "cinematic time," the experience of continuity relied on an ever-renewing engagement with the contingent qualities of an image (an engagement that was provoked by the lure of contingency itself), drawing the spectator into its representation of time through its capture of time's profound unknowability, the continuity of the oner is produced through the micromanagement of attention and is not reliant on the contingent to produce the frisson of passing time. The direct interaction between procedures of digital mediation and the basic structures of attention is enough to generate a sense of the flow of time on screen.

With this in mind we can start to glimpse the raw instrumentality of the digital oner in action. Watching the final sequence of *Kingsman: The Golden Circle* with an eye on where the edits fall, as opposed to an investment in the unfolding duration, causes the sequence to fall away into the thousands of fragments from which it was produced. The continuity that hybrid temporal objects can produce is difficult to grasp precisely because it is experienced as continuity. Formal analysis falls

short of assessing the true impact of digital continuity because it holds the most visceral aspect of the experience at a distance. Ultimately, we experience digital continuity *as such*, despite our intuitions as to the discontinuity of its component parts, and despite its excessive relation to the time-consciousness that it is supposedly representing, and despite our best analytical intentions. In fact, I'd go so far as to say that the aesthetic effect of spatio-temporal continuity produced here is intensified by the evident absence of a single duration underlying it. Exemplified in the bravura nature of this sequence is the paradoxical notion that the aesthetic effect of digital continuity thrives on fragmentation. As implied by Breakspear, the continuity would not be so effective had it not been so difficult to achieve. Central to the paradox in which the impact of the continuity is correspondent to the degree of fragmentation it coheres is the occlusion of contingency by digital processes, which produce durations diachronically to any recorded time, or any duration as it might ordinarily be experienced by human time-consciousness. The question that remains to be answered is if hybrid temporal objects reduce the significance of contingency for the creation of duration on screen, what impact might this have on what Doane calls our "generalised experience of time?" (2002, 163) Or to reframe the question in more Flusserian terms, if the semantic content of the oner is spatio-temporal continuity (all the more impressive for its being construed out of a range of fragmented and discontinuous durations), what is the pragmatic content? Pragmatically speaking, what new forms of "situatedness" are being promoted as a result of the displacement of contingency within our broader understanding of temporality?

This question dovetails with Jonathan Beller's assertion that cinema produces a "fully mediated mise-en-scène that provides humans with the contexts and options for response that are productive for capital" (2006, 29). Not least, because he identifies within the evolving language of cinema "new orders of spatiality and temporality that [are] technologically enabled and were previously impossible" (2006, 3). Within this scheme, the novel temporal forms of the hybrid temporal object could be seen, albeit very dogmatically, as elaborations of a further order of temporality that trains the viewer in the new heightened experiences of time inherent to contemporary capitalism. Indeed, this is in harmony with Steven Shaviro's notion of "post-continuity." Post-continuity, in Shaviro's work, names a spatio-temporal language that has evolved in the shadow of both classical continuity and David Bordwell's famed notion of "intensified continuity" (Bordwell, 2002). Where classical continuity places an emphasis on congruity and coherence and intensified continuity takes these principles to the verge of disintegration and beyond, post-continuity elaborates a spatio-temporal systematicity "that is expressive of, as well as being embedded in, the delirium of globalized financial capitalism" (Shaviro, 2016, 60). Under the influence of post-continuity, the viewer experiences this delirium and is allowed to "enter into the

spacetime of modern physics; or better… the 'space of flows' and the time of micro-intervals and speed-of-light transformations, that are characteristic of globalized high-tech financial capital" (2016, 60). In both writers' work the emergence of new forms of mediated temporality serves as a vanguard, a foretaste of new modes of temporal experience that are safely deployed in order to be ideologically contained. However, in contrast to Doane, what is safely deployed is not a temporality characterised by contingency, but delirium. It is not a carefully structured temporality, assisting in making the experience of time tolerable, it is an un-navigable admixture of temporal scales and speeds, a frenzy afforded by digital media.

Whilst this view complements my own perception of the hybrid temporal object as reflecting a broader displacement of the role of contingency within contemporary orders of temporality, it does not address individual sequences or categories, such as the digital oner, with any specificity. What is lacking from Beller and Shaviro's diagnosis of the delirious temporality of globalised high-tech capital is a way of accounting for the investment in continuity and the sensations of spatio-temporal contiguity that digital oners produce. At issue here is not the discontinuity and multi-linearity of contemporary experience but rather the operative content of continuity itself: what purpose does continuity serve in a visual culture displaying marked tendencies towards the fragmented spatio-temporal languages of intensified continuity and post-continuity? In concluding this chapter, I would like to gesture beyond the work of Beller and Shaviro and focus on the instrumental function of the hybrid temporal object in which a heterogenous set of durations and procedures are rationalised as an experience of a structured continuum.

CONCLUSION

Recapping what I've argued so far: digital oners have emerged as a prominent category of moving image sequence, whose temporal effects are not reducible to either the long-take of analogue cinema (that communicates the frisson of passing time through its capture and representation of contingency) nor the temporal effects of digital media (that produce durations diachronic to any real slice of time). Instead, digital oners are part of a larger category that I have named the hybrid temporal object. In the hybrid temporal object, the structural influence of analogue cinematography's capture of contingency and digital media's diachronic production of duration are in constant balance and negotiation. Given the dual theoretical pillars that describe, first, the analogue capture of contingency shaped epistemologies of time in the early 20th Century,

and, second, that digital media have an infrastructural influence over time and time-consciousness in the 21st Century, it follows that the hybrid temporal object can be seen as playing an instrumental role in our broader framings and understanding of time as they are evolving currently.

Through my analysis, I explored how the manifold temporal effects that make up a digital oner impact the degree to which the contingent does or does not stand out as a prominent feature of the onscreen duration. As combinations of recorded durations and digital processes such as time-ramping, compositing and computer-animation, hybrid temporal objects produce spatio-temporal continuity out of a heterogenous set of fragmented durations. In so doing, they displace the contingent from within our experience of onscreen duration, emphasising instead a temporality of multiple interlocking temporal scales. Rather than the inherent excitement of not knowing what comes next, these sequences demonstrate a total control over the flow of time on screen. They replace the core promise of contingency with the spectacle of a duration irreducible to any single slice of lived-time. Ultimately, they offer an aesthetic experience that manifests the degree to which time-consciousness can be generated diachronically. We can take our immersion in the contorted spatio-temporal continuity of the oner as a measure of how far our experiences of temporality and continuity are already generated diachronically, that is from beyond the direct grasp of our consciousness. Putting it another way, the pragmatic content of the digital oner is to demonstrate how our sense of situatedness in the flow of time is a tenuous one. Our sense of time is no longer anchored by the rustle of leaves in trees. Digital oners put us in the position of the protagonist from the Fuze Tea advert, navigating an array of interlocking temporal scales. However, unlike the protagonist of the Fuze Tea advert, oners do not deliver up a slice of "me-time." Rather, making us aware of the nanoseconds inside the milliseconds inside the microseconds of every passing moment, they intensify temporal experience, informing us that even the increments of time that we cannot perceive are available to calculation, rationalisation and determination.

This is the point at which my notion of franchise aesthetics as a critical mode that engages directly with the instrumental qualities of hybrid images becomes most useful. Central to my concept of franchise aesthetics is its function - via the perception of the instrumental qualities of hybrid images - of simultaneously enjoying individual instances of franchise aesthetics and inhibiting the degree to which they determine structures of feeling beyond the screen: being sand, not oil. To that end, drawing back from full-blown diagnostics (and the assertion that hybrid temporal objects are symptomatic of the reconstitution of temporality being brought about by digital technics and their attendant forms of capitalism), franchise aesthetics offers a way of critically engaging with hybrid temporal objects, recuperating pleasure from the analytical tendency towards techno-determinism.

With regard to the hybrid temporal object, a very recent and very puzzling iteration of the dynamics discussed in this chapter is found in Christopher Nolan's film *Tenet* (2020). In my understanding, *Tenet* is the story of the future attempting to take revenge on the present for having so badly decimated the planet. The film proceeds from the perspective of The Protagonist (John David Washington) who learns about a technology capable of reversing entropy (called "inversion") so that "inverted" objects and people move backwards through time. The premise of the film relies on a climactic sequence in which two teams of operatives (one moving forward through time, another moving backward) converge in a sort of temporal pincer. In these sequences, backwards and forwards movement are represented in the same duration. It appears that sections of footage featuring one temporal direction have been composited into footage running in the opposite direction. Notable scenes include shots in which characters witness action unfolding in reverse, just behind a glass window; aerial footage of "inverted" and non-inverted troops and vehicles moving in the same space; and a shot in which a building seems to explode in reverse, pieces of rubble climbing into the air and re-forming as walls, only to be blown up all over again by a non-inverted explosion, rubble flying outwards this time. Several sequences display contrasting temporal vectors unfolding within the same frame and space. In some instances, this effect is achieved through the use of "backwards" choreography (forward movement choreographed to look like backward movement), however there are several instances when it is clear that discrete durations have been overlaid within the same sequence, with one running in reverse. In short, they are hybrid temporal objects that clearly evidence the diachronic procedures that produce their duration. They share a great deal of affinity with Evan Calder William's analogy of time-ramping resembling a scrubbing back and forth in the timeline of an editing software program.

Despite this overlapping of forwards and backwards temporalities, the film produces a coherent sense of spatio-temporal continuity which rolls forward in accordance with the narrative trajectory of the film. Moments of confounding exposition notwithstanding, the film consistently operates from a perspective correspondent to a "situated" subject. Despite the temporal and narrative involutions, the film's action sequences reassuringly address the question of how to inhabit this new space-time, by offering up a high degree of kinaesthetic continuity. As such, these scenes in *Tenet* stand as the latest iteration in the evolution of the hybrid temporal object as it has been identified in this chapter. Isolating these sequences as examples of franchise aesthetics allows us to critically engage with them within the context of the ongoing reconstitution of temporal experience by digital media and the contortions of continuity that simultaneously highlight and compensate for this dynamic.

The question regarding the operative content of *Tenet*'s continuity becomes particularly acute when Nolan's credentials as a live-action director deeply concerned with capturing effects in-camera are taken into account, as well as the troubled status of *Tenet* as the film that was supposed to save cinema during the pandemic. Both of these facts – the celebration of the amount of material Nolan captures using practical means, and the insistence that the IMAX is the only venue that does justice to the durations contained in the film – evoke the conceptual significance of contingency within the film's ideological framing of time. However, this promotion of contingency as crucial to the impact of the durations on screen is belied by the narrative conceit of the film as well as the prominence of hybrid temporal objects within its representation of the flow of time. Indeed, I'd suggest that this rhetorical emphasis on profilmic performance and authentic un-manipulated durations accentuates the superannuation of this way of thinking about filmic temporality and its relationship to time more broadly. For all their originality, several moments in *Tenet* are easily identifiable as extensions of the digital temporal effects that have come to characterise capital-intensive film-making over the past twenty years.

I'm not suggesting that *Tenet* is a hybrid temporal object cynically masquerading as an authentic slice of "cinematic time." Rather I'd like to position the film as a beacon or a point on a trajectory that can be only very roughly sketched. The paratextual material surrounding the film (disseminated and consumed at amplified rates given the film's release in the middle of the pandemic and into a mortally wounded exhibition section) boasts of the amount of footage captured practically, an emphasis on profilmic staging and performance that insists that the durations within the film are directly correspondent to real slices of time. Indeed, the director himself made the claim that the film has fewer VFX shots than the average rom-com (Sharf, 2020). For me, this emphasis on the idea that the durations on-screen, whether inverted or not, correspond directly to the actual durations of the film's extensive and expensive production process serves to amplify the opposite point. Specifically, that diachronic manipulations of time are so pervasive that even films about temporal manipulation promote themselves via the anachronistic rhetoric of "cinematic time."

At work in *Tenet* and its relationship to real profilmic durations, as opposed to the durations of VFX-heavy films, is the same paradoxical logic identified above with regard to the oner at the end of *Kingsman: The Golden Circle.* Namely, the impact of the continuity is amplified by the implied discontinuity underpinning it. What does Nolan's practice of live-action capture do if not highlight the achievements of the post-production manipulation of live-action durations? The film and its surrounding material posit a false correspondence between the durations offered by *Tenet* and a generalised experience of time that is free from the infrastructural influence of digital media. In practice, what it demonstrates is the degree to which diachronic manipulations of temporal

experience have embedded themselves even within the most overt embodiments of “cinematic time,” and indeed within the generalised experience of time that supposedly corresponds to the structures of cinematic time. Highlighting this false correspondence between the film’s temporal aesthetic and a time-consciousness not overly beholden to the diachronic pressure of digital media, the film contains the line: “Don’t try and understand it. Feel it.” Here, my critical practice of franchise aesthetics is given the opportunity to dig in its heels. Without understanding the degree to which recorded live-action durations are always available to hybridisation, we are unlikely to be able to feel the encroaching influence of digital media on our temporal experience and unpack what Sean Cubitt refers to as “the myth of immediacy” (2014, 236). And if we merely “feel” the hybrid temporal object without trying to understand it, we risk succumbing to the default effect of digital media’s hybridisation of cinematic time. As exemplified in the Fuze Tea advert, and scaled up and refracted through *Tenet,* this default effect of the hybrid temporal object is the intensification of temporal experience. This results in the invasion of even the briefest lived-durations of “me-time” by provocations for micro temporal responses; the demand that we situate ourselves within a multi-layered and dispersed temporality; turning “me-time” into labour.

CHAPTER FOUR: COMPUTER-ANIMATION AND MATERIAL CULTURE

At its most straightforward, the focus of this last chapter is family friendly computer-animated films, such as the *Toy Story* (1995-2019) and *LEGO Movie* (2014-2019) franchises, and the relationship between computer-animated images and merchandise. Within this frame, my emphasis is on how this relationship is generated and mediated via the specific aesthetic features of capital-intensive computer-animation that dominate the animation landscape. This represents two things, firstly a move away from the explicit focus on hybrid image processes and, secondly, a concretisation of the dynamics already sketched between franchise aesthetics and capitalism. I'd like to open this chapter, therefore, by stressing some of the continuities between my next case study and the preceding ones, whilst also hinting at the ways in which this last case-study departs from the patterns of the previous three.

In terms of hybridity, my turn to computer-animated aesthetics is still grounded in a palpable tension of aesthetic registers that imply the presence of distinct medial processes hybridised within the same image. Specifically, this chapter is concerned with assets within computer-animated images that appear to have been recorded by live-action cinematography, despite being embedded in a clearly cartoonish context. There is a strong tradition of interleaving recorded live-action elements into animated frames, which runs all the way from Walt Disney's early *Alice Comedies* (1923-1927), via Bob Hoskins' adventures in Toon Town in *Who Framed Roger Rabbit?* (1988) to the pieces of *Hello, Dolly!* (1969) that are dotted throughout *Wall-E* (2008).

[FIGURE 1: *WALL-E* (Andrew Stanton, 2008) Screen Grab]

However, in these instances the cinematographic elements are legibly positioned as artefacts of a different medium. *Wall-E*'s remediation of *Hello, Dolly!* is a demonstration of computer-animation's absorption of the analogue media that preceded it. It fulfils Lev Manovich's assertion that cinema has always been a subset of animation (2001, 34). However, this teleological perspective - wherein all media are destined to become digital media - risks losing sight of the ambiguities and tensions that arise as computer-animated images incorporate and negotiate with simulated cinematographic elements (and their residual epistemic cues and lures).

In distinction from these moments of reflexive and legible hybridity, the effects that I am interested in occur when items within the frame render the boundaries of animation and live-action porous. My focus is on assets within a computer-animated frame that trouble our easy distinctions between the symbolic codes of animation and what Flusser calls the "apparently non-symbolic, objective" nature of photographic capture which "leads whoever looks at them to see them not as images but as windows" (2000, 15). *Wall-E* is littered with such assets, not least because it represents a trashed world littered with artefacts from our present; the delightful impact of which is dependent on our quick and easy recognition. During a day at work, the little robot collects a rubber duck and a nodding dog toy which he stores in his battered lunch-box. Each of these computer-animated assets is delicately textured and intricately rendered. This makes their referential connection to familiar mass-produced objects so strong that any easy recognition of the actual medial conditions of their animation – the wireframe models that organise their dimensions, for example, or the algorithms that underpin the texture mapping and rendering protocols – more or less impossible to discern. Despite being computer-animated, these assets possess such verisimilitude and veridicality that the medial distinctions between cinematography and animation, image and window, are rendered highly ambivalent.

[FIGURE 2: *WALL-E* (Andrew Stanton, 2008) Screen Grab]

The hybridity that I will focus on, then, is not an explicitly technical one, given that recorded live-action cinematography does not play a role in the production of computer-animated images. Instead, what I aim to discuss is the impact of things appearing "real" within a visual medium that is not reliant on any indexical connection to a profilmic reality. *Wall-E* is now over a decade old and the techniques and procedures that made it so pioneering and impressive have been tweaked and re-iterated many, many times over, with the foundational tools at the heart of Pixar's RenderMan software undergoing significant revisions (Christensen et al. 2018) The ambivalent relationship between computer-animated imagery and mass-produced merchandise that the film embodies (and narrativises into a tale of total ecological collapse) has become a characteristic affordance of computer-animated aesthetics. When we say that computer-animation is getting better and better, what we mean is that we are getting worse and worse at discerning when something is animated and when it is not. And this erosion of our ability to discern between animated and non-animated elements within an image has very real consequences for our engagement with the material world around us.

This aesthetic phenomenon is connected to my larger project of franchise aesthetics in several ways. Firstly, and most prominently, the sale of merchandise is the most immediate way in which a film text becomes a franchise, spreading itself across diverse paratexts and digital and material cultures. What is more, the sale of toys is a clear way in which the aesthetic impact of a film can be measured in financial terms. There is a great deal of literature dealing with the variety of interconnections between film texts and merchandising, including analyses of the business models they instantiate (Johnson, 2018), appreciation of the fan cultures they contribute to (Scott & Click, 2017) and critiques of the ideologies they promulgate (Affuso & Santo, 2018). Likewise, when it comes to children's media and consumerism, a huge amount of writing has analysed the way in

which children are addressed in this context, not least by Derek Johnson (2019) whose work on children's merchandise builds on the foundational work on children's media by Ellen Seiter (1995) and Marsha Kinder (1999). My current argument acknowledges this broad intellectual context whilst maintaining a strong aesthetic focus. By necessity, I will bracket out the dynamics of licensing deals, children's media regulations, and the myriad forces already well-examined that shape the merchandising market place. Likewise, although there is a great deal of developmental psychology that illuminates when children (admittedly, the target audience of many of the films to be discussed below) learn to differentiate between fantasy and reality (Hui et al. 2019), and live action and animation (Kapitányá, 2020), I'll refrain from narrowing my focus to the reception of specific texts by specific audiences. Instead, the central question of this final case study is: what role do the specific aesthetics of computer-animation play within the epistemics of consumerism?

Significantly, in recent years, the traditional model for the franchising of film-texts through toy-licenses has been reversed. Whereas toy makers have previously licensed film IP in order to sell media-inspired merchandise, mainstream film-culture has recently become inundated with a range of merchandise-inspired media, such as the *Transformers* franchise (2007-), the *Pirates of the Caribbean* franchise (2002-17) which had its origins in a theme park attraction, as well as forthcoming films that exploit the cultural prevalence of the Barbie and Hot Wheels toy lines. This reversal is characteristic of a subtler reversal taking place within computer-animation aesthetics and the epistemological formations they generate. To quickly illustrate what I mean, the films that I will be looking at in this chapter are connected to two major merchandising and toy brands, Disney and LEGO, both of whom in recent years have received patents for 3D printing technologies (cf Gardner, 2014 and Mearian, 2016). Whilst, for the time being, these patents have not resulted in any consumer technologies, and whilst they may only ever be of use to Disney and LEGO as pieces of IP, it does not take a great leap of the imagination to perceive a scenario in which a piece of Disney or LEGO related media can offer the viewer the immediate at-home printing of customised merchandise, without even pausing the film. This is the reversal I'm hinting at. Whereas the image in analogue cinematography rests on a causal relationship with a profilmic object, the situation that is emerging with computer-animation has seemingly reversed this causality, with the image having a quasi-causal relationship with the manufacture of the object. Dwelling on the inversion of the object-image/image-object relationship, I will explore the ways in which the aesthetics of computer-animation - and their hybridisation of the epistemological forms associated with live-action cinematography and animation - can be implicated in the previsualisation, promotion and production of merchandising lines. Reinforcing and extending this basic premise, I will use the framework of franchise aesthetics to suggest that the more pervasive computer-animated aesthetics

become, the more acutely they exert an influence over emergent material cultures. Thematically speaking, this brings my thesis full circle. Having argued that colourisation augments our access to the past and digital compositing and time-ramping reshape our experiences of time and space, the essence of this last chapter is that computer-animation aesthetics, as they are developing within visual culture today, are helping shape the way we imagine the future (and are helping fill that future with merchandise).

This dynamic has already fully taken root in other manufacturing and construction industries, wherein a computer-animated image simultaneously serves as a design tool and promotional material. The former part of this inter-relationship - the connections between animation software and computer-assisted design (CAD) has been noted by scholars such as Manovich (2007). The latter part, where industrial objects, or flats in a building yet to be constructed, are presold through the use of computer-animation has been less well examined. In car adverts, for example, the images of cars, typically in an environment such as a wind-tunnel or empty city-street, are overwhelmingly computer-animated (Knight, 2016; Miller, 2017), with the manufacture of the actual car often only taking place after a threshold of pre-sales has been reached. Likewise, in architectural previsualisations used to sell houses off-plan, the building that is depicted does not exist (Degan et al. 2016). Flippantly put, the computer-animations take on an ontological potency despite the fact that the things they represent don't yet exist. The cars and buildings seen in promotional materials can be perceived to be real, because they refer to something that will be real. As such, they are temporally oriented towards the future. Accordingly, the perspective of computer-animation that I will offer situates it as the most acute operation of franchise aesthetics. Computer-animated images contribute to the shape of the future, and the limited range of consumer (and other) choices that we have in it. By analysing the aesthetic effects of computer-animation I hope to demonstrate a way of critiquing and inhibiting those tendencies within the medium that are implicated in the over-determination of material culture.

SECTION ONE: BACKGROUND AND THEORETICAL CONTEXTS

In order to expand on this argument, a number of points need to be clarified. First, I will make clear what exactly I mean by "computer-animation" (and its hyphen). Referring to "computer-animation" with a hyphen is firstly, designed to indicate, after Christopher Holliday, an "industry, style and genre," (2019) that has become increasingly dominant within visual culture. As Holliday

suggests, this dominance rests on a number of narrative tropes and aesthetic signatures, not least of which is a "presumed telos of naturalism" (16), with computer-animation advancing towards a total incorporation of the aesthetic standards of analogue cinematography and its privileged relationship to reality. In what follows, I will be looking specifically at images which contain a clear tension between the animated and the photographic register. Thus, the hyphenated term helps me indicate both the tendencies towards the total simulation of photographic media that often motivates CGI (the previously mentioned car adverts are a prime example of this) as well as the presence of figurative codes and cartoon physics that gives contemporary computer-animated films their liveliness and frisson.

With regard to analogue animation techniques, the "computer" portion of computer-animation indicates that several of the operations involved in traditional animation techniques - drawing, modelling, iterating movement for frame-by-frame capture - are computerised, that is to say automated. However, following Stephen Prince and Aylish Wood's arguments against the term "computer-generated," this computerisation does not result in a "soulless, mechanical imaging process," (Prince, 2012, 9) in which the animatedness of the animation disappears. In line with Aylish Wood, my use of the term "computer-animation" should highlight the new set of aesthetic inscriptions that arrive with computerisation, enabling both a discourse of "encroaching realism" and indicating the technologies (and the technological affordances) that produce these effects (2007b, 25). Ultimately, I'm most interested in assets within a frame whose aesthetic simulation of the photographic register (enabled by a host of ray-tracing, surface-mapping and texturing algorithms) provokes a response from the viewer that exceeds or sits in parallel to the perception of the frame as animated. Flusser claimed that the camera should be thought of as a proto-computer (2000). And indeed, it is the computerisation of animation that has allowed computer-animation to ingest the epistemological and ontological formations associated with photographic media. Rigidly retaining the hyphen in computer-animation then could help to suggest that the responses that computer-animation can provoke are, themselves, hyphenated or hybridised versions of the perceptual habits associated with analogue cinematography (with its indexical relation to material reality) as well as analogue cartoons (with their systems of symbolisation and codification).

Before modelling how this aesthetic tension can be seen to galvanise a degree of epistemological hybridisation, it is necessary to note the contexts that help shape my thinking about the relationship between computer-animated aesthetics and our engagement with emergent material culture, or, to put it another way, the future. A critical horizon for the dynamics that this chapter will sketch is found in Mark Fisher's work *Capitalist Realism: Is There No Alternative?* (2009) that posits the open-ness of the future as being contingent on the medial conditions of the present,

and thus implicates the specific features of prevailing aesthetic forms in what he calls elsewhere "the slow cancellation of the future" (2014). Narrowing this idea down to the specificities of animation, Joel McKim's essay "Speculative Animation: Digital Projections of Urban Past and Future" (2017) explores the relationship between current media forms and our epistemological engagement with the future. McKim begins with a useful overview of the work of Bernard Steigler and Mark Hansen and their shared theorisation of media technologies as "blocking access to our collective past and curtailing our ability to project forward into the future" (288). For both Steigler and Hansen it is the "post-phenomenological" and "non-experiential" quality of digital media that enables it to so firmly insinuate itself into everyday experience, and thereafter take on a profoundly determining role in our affective and cognitive functioning. Indeed, the argument that frames our total dependency on digital media as a capitulation of our ability to effectively engage with the future as open-ended is echoed in other areas of media and cultural theory. It is the digital-media-specific equivalent of Frederic Jameson's famed lament that it is easier to imagine the end of the world than the end of capitalism. If we are unable to think without the prostheses of digital media, then the future and our thinking of it is always curtailed and determined by the dynamics inherent to digital media. Whilst this might seem a strange paradigm within which to consider films like *The LEGO Movie 2: The Second Part* (2019), what needs to be held in mind is the fact that these films best instantiate a new relationship with "realism" as it is channelled through the medium of computer-animation, as well as with the reality that emerges in the wake of this particular type of realism.

The Steigler/Hansen strand of media philosophy (see also Pisters, 2012 and Massumi, 2015 as well as Hansen, 2015) is useful for confirming the way media can predetermine the future and our imagining of it. But this thinking is decisively weighed towards the sub-phenomenal, infrastructural influence of media. This leaves little room for productive engagement with the media objects and images themselves. Joel McKim's article corrects this balance by arguing for the "continued relevance of animation." McKim suggests that "animation may still remain as a kind of representational last stand and a viable form of resistance in relation to dehumanizing forms of digital calculation" (294). My own investigation of computer-animation rests, with McKim, on the continued relevance of aesthetics. Whereas McKim works with experimental examples of "speculative animation" that diverge from and expose the super-saturation of our lives by digital media, I am interested in the core, normative and, by now, deeply familiar aesthetics of computer-animation. I will argue that it is the very familiarity of these aesthetics that, after McKim, "curtails our ability to project forward" (288) into an unknowable future, thus foreclosing a future that has not already been imagined via the dominant visual media. I aim to disclose the ways in which the

specific aesthetics associated with computer-animation both enable and then intensify the futural orientation of the images in a way that, in essence, premediates material culture.

My use of the term premediation is grounded in the work of Richard Grusin. Whilst it has been elaborated and engaged with by a number of scholars (Brown and Fleming, 2014; Gandolfini, 2019; Hansen, 2015b), not least Grusin himself (Grusin, 2010), it is Grusin's 2004 essay that remains, for my purposes, the most interesting expression of the idea, providing a graspable model for the media formations - only loosely glimpsed in the work of Hansen and Stiegler - that determine both our ideas about the future and, in some respects, the shape of the future itself. I'll run through the salient points of premediation here in order to, firstly, confirm its position as a precedent for my own thoughts about the futural orientation of computer-animation. Secondly, Grusin's model will suggest a few formal approaches to the problem of thinking about how present mediations impact future situations. Lastly, Grusin's historical location of the emergence of premediation at the turn of the century, but also, not coincidentally, towards the apex of the digital turn, should be noted. Chronologically speaking, Grusin's media-theoretical concept sits alongside the technical procedures of hybridity explored elsewhere in this thesis. As with digital compositing, time-ramping and colourisation, the dynamics of premediation appeared as an affordance of the emergent digital regime, catalysing a set of epistemological augmentations that have greatly intensified in the two decades since they first emerged.

Grusin pinpoints the terrorist attacks of 9/11 as a moment of emergence for the processes of premediation. He argues that one of the consequences of the trauma of the terrorist attacks as mediated globally in real-time across a vast televisual media network was to produce a desire that we should never be surprised by the future again. "In a kind of cultural reaction formation," Grusin writes, "the desire or demand since 9/11 has been to make sure that when the future comes it has already been remediated, to see the future not as it emerges immediately into the present but before it ever happens" (2004, 21). Grusin elaborates on the formal features of premediation in a number of ways. Firstly, he clarifies that premediation is not about accurate forecasting: after all, very few of the news reports about what life will be like next month or next year ever prove themselves to be accurate; indeed, many of them are incompatible with one another. "Unlike prediction," Grusin writes, "premediation is not chiefly about getting the future right…. In fact, it is precisely the proliferation of future scenarios that enable premediation to generate and maintain a low level of anxiety to prevent the possibility of a traumatic future" (2004, 29). This would suggest that premediation is predominantly an affective phenomenon, in which media produces an affective realm so inured to catastrophe that nothing could possibly come as a surprise.

However, Grusin is also at pains to stress the aesthetic and logistical features of the premediation of the future in the present. Specifically, Grusin tethers his concept of premediation to media technologies and their ontological connection to the world. He describes a shift from "historically oriented technologies like print, photography, and film" to "real-time technologies" like "video and the Internet" and suggests that this shift is responsible for how "news media have begun to give up on – or perhaps more accurately to subordinate – their historical role in favour of a prophetic or predictive role of reporting what might happen" (2004, 23). The new media technologies, and their relationship to the present as opposed to the past, galvanise historically oriented media to pre-emptively re-mediate the affective and logistical content of the future. So, for example, as internet news media and digital technology allows a greater focus on the live coverage of unfolding events, so the content of that coverage functions more and more as premediation, in so far as it is concerned with pre-empting or speculating about, or in some way participating in, what comes next.

Within the realm of narrative film and television, Grusin identifies further ways in which the remediation of future technologies within present representative norms also contributes to the process of premediation. Grusin suggests that speculation about future media forms, within the technological parameters of present media forms guarantees a continuity between today's media and tomorrow's. This chimes with my argument, from a previous chapter, about how hologram effects institutionalise a new language of screen space, which in turn premediates the arrival of new methods of spatialisation across all media forms. Grusin's point, however, is that this process of remediating future media forms in the present anchors the future in the medial conditions of the present/past, and as such serves to protect us from the traumas of rupture and sudden change. In the furthest extrapolation of this model, the future is rendered safely unsurprising both in terms of its form and its content. Grusin concludes: "premediation simultaneously insists on imagining the future in terms of new media practices and technologies and on extending the media networks of the present so that they seem to reach indefinitely into a securely (if indeterminately) colonized future" (2004, 37).

My use of the term premediation stresses the idea that the aesthetic forms can reach temporally forwards by grounding whatever might occur in the future in the representational and medial conditions of the present. As will be discussed momentarily, computer-animation relies on precisely this dynamic, as the radical affordances of digital imaging technologies constantly threaten to exceed the boundaries of comprehension unless they are anchored in an atavistic visual language more properly associated with analogue cinematography. Taking an architectural pre-visualisation as an example, the spaces of the as-yet non-existent building can only be comprehensive, and take on a

modicum of ontological potency, if the images simulate the familiar form of a slow tracking camera moving from room to room. Premediation occurs where the referential trajectory towards a future material culture (a building yet to be constructed) is grounded in terms that stress the medial and representational continuities between the present and the future. No matter how speculative these architectural pre-visualisations might be, how tenuous or un-manifested their futural orientation, they are inevitably grounded in the (ocular) perspective, and representational norms, of an upright human moving at just below average speed, and trying not to bump into the furniture.

At the core of my concept of premediation is this dynamic between the familiar and the novel; the analysis that follows will unpack the ways in which the novel medium of computer-animation subsumes the perceptual prompts and epistemological formations of photographic media in order to shore up its referential trajectories. Looking at the *Toy Story* franchise I will introduce the concept of the skeuomorphic asset, a portion of an animated frame that channels a photographic register, as a critical tool to unpick how computer-animated images confound our ability to differentiate between animation and live-action photography. I will explore the effects of this doubled, ambivalent or hybrid perception and make some observations about how this putative sense of the underlying hybridity of the image affects our perception of the medium of computer-animation more generally, especially in the shadow of the highly influential Pixar films. The later sections of my analysis will look at films from the LEGO Movie franchise, and use the work of Eric Jenkins (2014) to explore the ways in which this hybrid perception of the computer-animated image might be instrumentalised within the epistemics of consumerism. I will also look at the work of Leon Gurevitch (2008, 2012, 2015) and open up the ways, hinted at above in my brief mention of 3D printing, in which digital images are connected to processes of product design and manufacture. Taken together, these two pieces of analysis will propose that computer-animation generates an ambivalent attitude towards the material reality of assets on screen. This ambivalence allows the viewer to invest in the material reality of those assets, despite the animatedness of the images as a whole. This hybrid, ambivalent view is then instrumentalised as an orientation towards an immanent material culture which can be exploited by the shared technologies underpinning computer-animation, and, for example, 3D print designs.

SECTION TWO: SKEUOMORPHS, *TOY STORY* (1996-2019), LUXO WORLD

John Lasseter speaking in 2001 noted that

> at Pixar we like to think we use our tools to make things look photo realistic without trying to reproduce reality. We like to take those tools and make something that the audience knows does not exist. Every frame they know this is a cartoon. So, you get that wonderful visual entertainment of 'I know this isn't real, but boy it sure looks real' (Lasseter and Ross, 2001).

It is precisely this phenomenon of "photo realistic" things within a cartoonish context, precisely these moments of "I know this isn't real, but boy it sure looks real," that I am pursuing. Examples abound across all manner of computer-animation.

[FIGURE 3: *Moana*, 2016, Disney/Pixar]

Taking the image from *Moana* as a typical example of the representative affordances of contemporary computer-animation, Moana's hair and the glint of the sea in the background has a compelling realism at odds with the ovals and squares of the cartoonish character designs. The house-styles and specific aesthetics of other leaders in the field of capital-intensive computer-animation show the same tendencies. The nap and fuzz of the surface textures in *Trolls* (2016) and *Trolls: World Tour* (2020) have a striking haptic quality that sits in contrast to the facial performances of the characters themselves. The surface detailing of individual bricks throughout the LEGO Movie franchise (2014-) perpetually confounds our knowledge that the film is *not* produced via analogue stop-motion. The domestic detailing fleshing out *The Secret Life of Pets* (2016, 2019) could be lifted from any number of spreads in an interior design magazine. Across all these texts there is a striking tension between the animated and the photographic register, varying in intensity from asset to asset. This presents many problems for analysis, not least of which is one of terminology. How does one describe the way in which multiple registers, evoking multiple degrees of realistic appearance and/or photographic mediation, jostle together within what is undeniably a "cartoon?"

In order to move forward, I'd like to introduce a term that refers to those assets that stand out from their cartoonish surroundings and invoke epistemological and ontological registers more closely associated with analogue indexical media, as opposed to computer-animation. I will refer to them as 'skeuomorphic assets'. The origin of the term skeuomorph comes from design language, wherein the design of a derivative object retains a non-functional piece of ornamentation that demarcates its relationship to the object from which it is derived. An example that I find helpful is the presence of 3D detailing and shading on 2D touch-screen buttons. It is not integral to their functionality that these buttons resemble physical buttons, hence they, or more specifically the shading that makes them appear 3D, are/is skeuomorphic. Significantly, the effort involved in simulating the appearance of physical buttons does not inhibit the digital interface. The reference that the design of the 2D button makes to real buttons (its skeuomorphic aspect) is latent to its functionality; it may prompt people to recognise it as a button, but by and large its ornamentation exists in parallel to, or in excess of, the principal operations taking place on the touch-screen interface. Within the context of computer-animated images, a skeuomorphic asset refers to an asset or a detail within a frame that evokes a process of photographic mediation (and entices us to read the image photographically) despite its role within an obviously animated image. Skeuomorphic assets are those little details within an image which break through our knowledge that the frame is animated and solicit Lasseter's cry "I know this isn't real, but…"

Katherine N. Hayles elaborates on the function of skeuomorphs in an "archaeology anthropology" mode, stating that "skeuomorphs visibly testify to the social or psychological necessity for innovation to be tempered by replication" (17). Hayles refers to them as "threshold devices, smoothing the transition between one conceptual constellation and another" (17). It is worth noting the commonality between Hayles' skeuomorph and one of the structural principals of premediation, namely that futural orientation of a given form (be it a conceptual constellation in cybernetics, or a discourse of prediction and pre-emption, or the previsualisation of a merchandising line) must be grounded by familiar features, even if those features have lost their original functionality. From the examples cited above, the detailed rendering of Moana's hair stands apart from the iconographic aspects of her character design, and challenges us to read the computer-animated image as, in some measure, photographically captured (that is, the aesthetics of the hair skeuomorphically evokes an analogue way of reading the digital image). At its base, the skeuomorph complicates any straightforward perception of the image, as its introduction of multiple aesthetic, pictorial and medial registers produce multiple ways of looking at and decoding the image, creating an uncertainty that is persistently over-ridden and re-introduced as the animation unfolds.

Whilst the idea of the skeuomorph arises in a variety of critical-theoretical contexts (cf. Beller, 2018; Jaffe, 2019, for two recent deployments of the term) a more elaborate engagement with the idea was carried out by William Brown and David Fleming in their article "A Skeuomorphic Cinema: Film Form, Content and Criticism in the 'Post-Analogue' Era" (2015). Brown and Fleming use the term in order to point to what is novel about digital cinema, whilst also naming those elements within digital cinema that remain shackled to analogue conventions. Brown and Fleming begin by diagnosing a generalised perception of newly emerging digital forms that is, in their eyes, too beholden to analogue aesthetics. As a result, digital cinema falls short of fulfilling the digital's radical potential: it is only ever skeuomorphic. Brown and Fleming suggest that, when it comes to digital forms, we aren't "quite seeing them for what they are and always unconsciously trying to understand them in terms of the old and familiar" (85). This perspective allows them to channel Hayles' concept of skeuomorphs as "threshold devices." They are frustrated that "digital cinema… has not yet appeared to be as radically transformative as typically promised," arguing that "many of the skeuomorphic features that contemporary digital cinema retains/displays highlight the aetiological or atavistic link between digital cinema and its twentieth century, analogue predecessor" (85). Amongst these skeuomorphic features which point backwards towards the conventions of analogue media, perhaps the most pointed example is editing. They argue that "digital cinema retains cutting as a skeuomorphic convention, which only hides the 'gaseous' spatial and temporal perception that digital technology can otherwise allow" (96). Whilst I agree that digital cinema does not have to contain edits, and that by merit of this affordance, cutting is, in some degree, skeuomorphic, I'm wary of promoting the connotations that come hand in hand with this version of skeuomorphism.

Why can't skeuomorphism be an instrumental part of what is new in digital cinema? In particular, why must the skeuomorphism that dominates computer-animation be framed in the negative, and not as central to computer-animation's emergent role as the quintessential medium of premediation? Brown and Fleming conclude by widening their focus from specific instances, with the claim that "the digital is skeuomorphic. That is, the retention of old techniques and conceptual frameworks is useful, but it also blinds us to what is truly novel about digital cinema" (100). I am in agreement, but with a different emphasis. Yes, the skeuomorphic assets that I'm interested in deliberately evoke and remediate familiar perceptual modes and in doing so obfuscate the true nature of the image. However, I'd suggest that despite its inherent atavism, this version of skeuomorphism need not always inhibit novelty and represent a failure in the evolution of visual media. Without the atavistic link to prior media, computer-animation would not be able to incorporate the epistemological framework of cinematography, thus giving the potential futural

orientation of the images a grounding in the familiar, a prerequisite of premediation. What is more, against Brown and Fleming, I argue that the "radically transformative" aspect of digital cinema can be found not in what mainstream cinema is *failing* to do (i.e. produce images commensurate to the new perceptions allowed by digital technology) but in the effects that it is *already* having. The novelty of digital cinema and its propensity to hybridity lies in the degree to which franchise aesthetics are taking hold of our imaginative relation to the past, our temporal and spatial orientations, and lastly, on the merchandise that proliferates in our emergent material cultures.

To illustrate my version of the concept of the skeuomorphic asset, I have chosen as a case study the *Toy Story* franchise. I have as a precedent, Eric Herhuth's work, which touches on Hayles' version of the skeuomorph to confirm that "Pixar films are certainly skeuomorphic" replete with resemblances to "familiar film and video conventions and everyday physical objects" (74). Herhuth's use of skeuomorphic logic, however, is designed to enable his sense of the ungrounded experience of watching Pixar films. "Skeuomorphic logic," Herhuth writes, "implies the need for a familiar foundational referent precisely when there is uncertainty about whether an original referent even exists" (75). Unlike Herhuth, who reads Pixar texts as positively illuminating the uncertainties involved in everyday life, my general argument would suggest that the particular aesthetics of computer-animation deepen our entanglement with digital culture and commerce. Indeed, as my argument moves forward, I'll suggest that it is precisely this uncertainty with regard to the original referent within computer-animation that leaves room for the quasi-causal relation between the image on screen and the object/product/merchandise in one's home. Aside from this temperamental difference, I take a lot from Herhuth's work, in particular his focus on the earlier films within the Pixar catalogue and the way in which they contain the nascent forms of what have emerged since as prominent aesthetic epistemological tendencies.

To begin I'll use the very first computer-animated feature film, *Toy Story* (1995), to demonstrate the prevalence of skeuomorphic assets, and analyse what happens to our own relation to the animated image when a skeuomorphic asset snags our attention.[5] After this, I will move through the series looking at *Toy Story 2* (1999), *Toy Story 3* (2010) and *Toy Story 4* (2019) to demonstrate how skeuomorphic assets, and the way in which they capture, divert or snag our

[5] Also, the first film stands as evidence in one of the first claims of this chapter, namely that computer-animation, as a facet of its franchise aesthetics, exerts a considerable influence over the emergence of material cultures. For all its retrospective aesthetic shortcomings, *Toy Story* had a very real impact on the material world. According to Sam Summers, the Mr Potato Head toy made by Hasbro, received an 800 percent increase in sales, and likewise Etch A Sketch, made by the Ohio Art Company, sold 4,000 percent more units after the release of the first film (Summers, 2017). Both the Etch-A-Sketch and Mr Potato Head, are, certainly in the later iterations, skeuomorphically rendered assets that in referring to real world commodities further blur the boundaries of the animated/realistic dichotomy.

attention, are instrumental in creating a degree of epistemological/ontological ambivalence with regard to the image as a whole and indeed computer-animation as a medium. Looking at the ways in which Pixar films use skeuomorphic assets, especially in the form of Easter Eggs, to signify beyond the frame of the narrative, I'll examine how the skeuomorph generates a sense of polysemy within the computer-animated image. I'll then suggest that this polysemy multiplies possible approaches to the image way beyond the illusion/reality dichotomy, and lays the foundation for the structures of premediation and the degree to which the image can refer temporally forwards into our emergent material culture.

The narrative cosmology of the first *Toy Story* has been approached from a variety of angles, which cumulatively speak to the cultural significance of the film. The film and its particular handling of the relationship between commodities that come to life and the humans who are oblivious of this liveliness has become a lightning rod for a variety of critical conversations, ranging from psychoanalysis (Rosing, 2011), marketing (Lanier, 2013), and children's media studies (Roberts, 2017). Particularly important to reference at this stage is the work of J.P. Telotte who recognised in the first film a "pattern of internal tensions" (2010, 209) that establish a discourse about the aesthetic potentials and affordances of computer-animation more broadly. Telotte positions Pixar's films (and proprietary software) as balancing between "the simultaneously realistic and fantastic possibilities that both challenge and mark all digital animation" (221). As a result, many of the points he makes about animating space either plastically or realistically, are echoed in my own analysis. My work builds on Telotte's, however, in so far as his consideration of computer-animation's realistic/fantastical aesthetics is invested in the expressive possibilities of computer-animation as an art form. Looking beyond the medium of computer-animation, my focus is on the way in which its particular aesthetics inculcate certain perceptual habits, and, by extension, what the epistemological effects of those perceptual habits might be.

It is for this reason that I perceive the basic premise of the film as institutionalising a way of looking at the on-screen assets and consistently reinforcing the position of each asset along a spectrum of skeuomorphic intensity. All of this bleeds into our quick and routinised perception of a human character looking cartoonish, a set or room looking realistic, and a Mr Potato Head that can walk and talk as a potent and significant mixture of the two. With regard to the latter, the Potato Heads across the franchise refer to real commodities, but without disrupting the fantastical diegesis in which they are embedded. Containing these differences, the film establishes a set of existential categories: human, toy, object. Attached to each category is a set of representative codes by which the audience is prompted to perceive the assets along a scale of skeuomorphic intensity, in which some assets are clearly cartoonish and others more provocatively channel a photographic register.

Accordingly (as has been frequently noted by a range of scholars, particularly those like Malou van Rooji (2019), or Heather Holian (2018) who are directly concerned with traditions of character design) the humans in *Toy Story* are the most cartoonish: borderline humanoid with exaggerated proportions in their eyes and mouths, heads and bodies. It is commonly held that the design of these characters intentionally avoided any possible proximity to the uncanny valley (see for example, Settembre, 2019). On the flip side, Michael Barrier credits the film with "cannily" creating a story out of a cast of toys, whose clear artificiality would always render them "more charming than disturbing" within the limitations of computer-animation (1999, 572). Whilst it is impossible to misrecognise the humans as anything other than house-style cartoons, furniture and other incidental objects tend more towards the skeuomorph, in that their appearance respects the physical properties of the objects they refer to and channels the photographic register. Situated between incidental objects and human characters are the toy protagonists. Diegetically speaking, from the point of view of the humans, these toys are merely toys, that is, lifeless objects. However, when the humans aren't looking, the toys spring to life.

Thus, the protagonists are situated between two existential categories and the aesthetic registers that come with them. My particular contribution to the discussions concerning the animated aesthetics of *Toy Story* emerges when one starts to map the scales of skeuomorphic intensity onto this narrative and design dynamic. When they are being played with, the toys adopt a static object-hood, rendering them existentially and aesthetically comparable to the skeuomorphically depicted object-world around them. When Andy is playing with Woody, Woody's rag-doll physicality is accentuated; the way in which he flumps to the floor, the way in which his plastic eyes stare blankly give a skeuomorphic aspect, insofar as his lack of animation correlates with an intensity of the photographic register. However, moments later, he leaps to life, stretches his stitched joints and calls a staff meeting, and the balance is shifted back towards 'animatedness' and the skeuomorphic intensity recedes away from Woody and onto the incidental props and furniture that dot the background.

This dynamic can be illustrated by a glance at the skirting boards in an early scene of the first film. The scene in question comes very early in the film when the little plastic army men are trying to spy on Andy's birthday party. Making their way across a hallway, they freeze when Andy's mum comes through a doorway. In the brief moment when the figures freeze the frame becomes temporarily de-animated, so to speak, and the textural detailing of the skirting board and door fringes, behind the frozen tableau, draws the eye. The de-animated bodies of the army men and the inanimate nature of the background details coalesce in an image that has all 'animatedness' evacuated from it, and now has more is common with an ordinary photograph than with a piece of

computer-animation. For an instance, the image, dense with tiny static details, is easier to read as if it were a photograph; however, when the army men leap back to life, this epistemic lure recedes and the cartoon codes re-emerge as the dominant way by which to perceive the image.

Lucy Fife Donaldson (2017) deals with work on surfaces and textures in the first film, pointing to several examples where the shader programmes work explicitly against what William Schaffer (2004) identified as the plasticity and sheen of early CGI. Despite being most often in the background, Donaldson gives details such as skirting boards and door fringes an elevated status, both as pieces of animation craft, but also as elements within the frame that have an intensified pull on our attention. Donaldson writes:

> Attention to texture demands a more precise approach, calling on us to notice the fine details and 'subtlety of specific things' that flesh out the fictional world on screen. This necessitated attention to the complex work of the designers… pulls against the potential insubstantiality of CGI, refusing to characterize it as thin or insubstantial, but rather as richly crafted and materially full as any other film's design. (2017, 83-4)

I quote Donaldson at length because the description of the way in which the incidental details of texturing in the frame exert a certain pressure on the viewer complements my own thoughts about the pull of skeuomorphic assets, as well as demonstrating how they are legibly present even in the earliest computer-animated features. What this example, and Donaldson's reading, shows is how pervasive the possibility of illusion and misperception is within such an early text (as well as the consequences of such moments of misperception for the casual and critical engagement with the text).

These perceptual ambiguities are an essential part of Herhuth's analysis. For Herhuth, the texts produced by Pixar in its early years offer opportunities for practising a distinctive mode of perception. Herhuth writes that "animated films have become a mode for explicitly addressing the instabilities involved in processes of judging, for knowing and evaluating the particulars of the world..." (2017, 25). Suggesting that the films offer themselves up for special attention as "the aesthetic storytelling of animated films becomes a conventional mode for contemplating the unconventional," (25) each text becomes an opportunity to "better see and sense how pervasive the role of aesthetics is in our highly mediated, digital, global and neoliberal context," through the analysis of "highly aestheticized, obviously artificial, synthetic worlds that tend to feature narratives about aesthetic experience" (29). Herhuth sees the instabilities inherent to the perception of skeuomorph-rich computer-animation as consistently narrativised across the plots of all Pixar films, suggesting Pixar is always reflexively engaged with the conditions of its own consumption. A case in

point is Buzz Lightyear and his trajectory, in the first film, from unflagging self-belief in his identity as a space ranger, to the realisation that he is just a toy. The narrativisation of self-realisation, pegged to a sense of materiality and a confused sense of origin, is not confined to the early films. Forky, in *Toy Story 4* is potentially the most acute version of what Herhuth describes as passages of "epistemological confusion and conversion" (2017, 21). Forky's narrative trajectory takes him from a stubborn conviction that he is merely "trash" to an understanding that he, despite the arbitrary and discarded nature of his constituent parts, has the special status of being a beloved toy.

Herhuth continually overlaps the narrative trajectories of the various characters with the aesthetic experiences created by computer-animation. This chimes with my ideas, as the negotiation of existential status and identity performed by Buzz (space ranger or mass-produced toy?) and Forky (toy or bricolage of trash?) acts as a continual dramatisation and explicit thematisation of the impact of skeuomorphic assets within the texts. The stories echo the epistemological confusion generated by the way in which the skeuomorphic assets co-exist with the animatedness of the frame; their appeal to read the image as if it were a photograph sitting inside and within the self-evident animation. What is more, the narratives, and the cosmology of the *Toy Story* universe guide the spectator's experience of gauging and negotiating the various skeuomorphic lures and invitations to epistemological confusion, not least because the character's confusions are often born of their proximity to the sort of homogenous mass-produced object (Forky's spork body, for example) that are skeuomorphically rendered within computer-animation.

Whilst my analysis largely dovetails with Herhuth's discussion of how computer-animation evokes "the instabilities involved in processes of judging, for knowing and evaluating the particulars of the world," (2017, 25) my particular focus on skeuomorphic assets draws my argument away from Herhuth's as, ultimately, I propose that the instability injected into the image and our interpretation of it by computer-animation will become instrumental in the formation of the structures of premediation. Where Herhuth's passage of "epistemological confusion" offers the spectator an opportunity for contemplation, and results in the conversion of the protagonist to a more grounded sense of self and the world, it is my position that the epistemological confusion generated by the computer-animated image will be converted into the premediation of consumer expectations and, ultimately, the arrival of a variety of mass-produced objects, retroactively referred to by the image, in our homes.

In order to illustrate the passages of epistemological confusion and conversion generated by computer-animation, I'll expand on my brief glimpse at the skirting boards, and look at images which deliberately juxtapose disjunctive pictorial registers, provoking a degree of confusion and setting off

a negotiation with the varying degrees of skeuomorphic rendering that can be contained within a single frame.

[FIGURE 4: *Toy Story* (John Lasseter, 1995) Screen Grab]

The image above shows a small moment in the credit sequence of the first film, in which Woody appears in front of a 2D background. Coming very early in the film, the viewers have not yet had a chance to acclimatise to the heterogony of styles and registers contained within computer-animation. Here, the mismatch in the pictorial style of the landscape, with the 3D modelling of Woody's head and shoulders, sets off a comparative interrogation of the pictorial strategies coding the discrete elements of foreground and background. The background appears to be some sort of rendering of Monument Valley, with its iconic features present and correct: the low angled, orange sunlight, ballooning clouds, red perpendicular rocks, desert grasses, etc. Distinguishable within the background image are intimations of gestural brushwork and a crosshatch texture giving the impression of canvas. By contrast, Woody appears in crisp focus, with not a hint of brushwork about him. In Telotte's reading, these tensions amount to a discourse internal to the image about the multiple ways in which computer-animation can produce space. I'd add to this my own assertion that the aesthetic tensions relate to a set of existential categories, and thus position the various assets along a sliding scale of skeuomorphic intensity. Crucial to my argument is the idea that the internal tension of the image can provoke an epistemological tension within the viewer with regard to the relative veridicality of the assets on screen. Is Woody somehow more real than the background against which he is depicted?

Woody has already been introduced as a toy, a prop in the play scenarios of his owner Andy. His appearance in front of the Monument Valley landscape comes as something of a reframing. Where Woody had previously been seen amongst other toys, he now appears in a generically appropriate setting, bobbing along as if on a horse. That said, whilst the tropes of cowboy and Monument Valley background appear to be reaching a form of generic synthesis, their relative pictorial registers are cleaved apart. The smooth surfaces of Woody's hat and face contrast with the feathery brushwork of the background. Proffering a generic synthesis whilst explicitly deploying contrasting pictorial registers, the image challenges the viewer to account for the tensions in the image with what little information is available. The brief shot is dense with possible references; the 3D figure against a 2D background alludes to the back-lot aesthetics of television serials, the lolloping movement of Woody is reminiscent of a tightly framed puppet show. All the while the enigmatic texture of the background, and its clear representation of brushwork, emphasise a 2D image even as the movement of Woody in the foreground clearly demonstrates the 3D nature of computer-animation. The skeuomorphic detailing of the background canvas-like surface attracts our attention and destabilises a straightforward recognition of precisely what is going on in the shot. Where exactly is Woody? What are the rules governing the representation?

The next shot answers these questions, revealing that the background is a painting on the landing of Andy's house, with Andy passing underneath with Woody on his shoulders. The delay of this revelation invites the audience along a passage of confusion and conversion as we are encouraged to misperceive the relationship between Woody and the background along a number of trajectories, listed above. It therefore opens up a degree of confusion as to who or what Woody is, what milieu he exists within and whether or not we are supposed to perceive him as a skeuomorphically rendered asset or a cartoon cowboy riding across the desert plains. This confusion becomes, akin to Herhuth, a conversion, when the background is revealed to be a canvas print, and Woody a prominent toy within a richly imagined domestic landscape. However, even in the light of this resolution/conversion, the settling of the ambivalent relation between foreground and background in the image above depends upon the skeuomorphic rendering of the surface texture of the canvas print. What appeared to be anomalous textures in the initial shot, generating a sense of disjunction between the pictorially rendered background and the skeuomorphic asset (Woody) in the foreground, are revealed to be brushwork on some wall-art. Thus, the balance of skeuomorphic intensities shifts; the picture on the wall is perceived as one amongst many convincingly rendered domestic props, and Woody is re-centred within the frame, alive with latent animation and waiting to spring into action when the eyes of the humans are off of him. Conversely, as soon as we

understand that the background image is merely a prop, we never give our attention to it again, and Monument Valley recedes from the diegesis altogether.

This jostling between a semi-trompe-l'oeil effect and a skeuomorphically rendered asset in 3D space occurs across the franchise. In the second film, Buzz and co cross the parking lot of Al's Toy Barn pushing a shopping trolley spray-painted to look like a cow. As can be seen in the images below, the relationship between the background mural and the foreground asset is one of assonance and dissonance, throwing into relief the variety of figurative vernaculars and representative standards a single moment of computer-animation can contain: the flattened perspective of the mural sits in contrast to the rigid geometry of the trolley, but the crude figuring of the cow in the background is slyly matched by the silly gilding of the trolley with steer horns and a cow-hide pattern.

[FIGURE 5: *Toy Story 2* (John Lasseter, 1999) Screen Grab]

The toy-box from the third film is another example, insofar as it is painted to resemble a covered wagon, however the faded and chipped ornamentation, when serving as a background for Woody's speech to the other toys, resembles a bleak dustbowl landscape with a distant flat horizon. The toybox becomes more than just a prop in the scenes in which Woody tries to convince his friends not to feel rejected, it becomes the stage for and an exemplification of the battered resignation that the toys no longer have the same meaning to Andy as they once did. In each instance, the skeuomorphic rendering of the assets allows them to slip away from their initially assigned meaning and become polysemous assets within the frame. As with the painted background

from my first example, the contrasting aesthetic registers and differing skeuomorphic intensities of the assets in these frames solicit a degree of confusion as to how to properly decode the frame, leaving the viewer oscillating between a perception of the animatedness of the frame (Lasseter's "I know this isn't real") and an awareness of how that animatedness is made up of shifting relations between discrete skeuomorphic assets ("but boy, it sure looks real").

[FIGURE 6: *Toy Story 3* (Lee Unkrich, 2010) Screen Grab]

Herhuth argues that this mode of perception resembles an aesthetic judgement without determinative concepts; a perceptual mode that prepares us for the uncertainties of living within digital culture. Whilst the continual sense of epistemological confusion and conversion solicited by computer-animation might, on a text by text basis, reflect a wider cultural experience, I'd like to shift my focus now and speculate about how this mode might translate into a general and habitual perception of computer-animation itself. This feeds into my thinking about the relationship between computer-animation and premediation. Instilling a degree of ontological confusion with regard to the animated image generates the epistemological uncertainty that, in turn, enables processes of premediation, including the explicit previsualisation of unbuilt houses, or the translation of onscreen toys into consumer products.

Pixar, via the *Toy Story* franchise has played a decisive role in the familiarisation of computer-animation as a visual medium, as is made abundantly clear in the subtitle to the recent edited collection on the film *Toy Story: How Pixar Reinvented the Animated Feature* (Smith, Brown & Summers, 2017). Therefore it is reasonable to suggest that some of the effects found in the series

have become typical aesthetic features of computer-animation. Of course, animation is not confined to the parameters established by the capital-intensive films looked at so far; however, the exceptions that occur - such as *Spider-Man: Into The Spiderverse* (2018) - tend to prove the rule, in so far as this latter film, with its graphic appearance and destabilisation of space, positions itself in explicit counterpoint to the dominant aesthetics of computer-animation. This connection is important to my argument and my overall project of franchise aesthetics as it establishes the idea that the particular set of aesthetic tensions inherent to the *Toy Story* franchise are on a trajectory towards ubiquity. Within the framework of franchise aesthetics, this ubiquity means that these particular aesthetic practices could pass a "vanishing point," beyond which they, and our responses to them, become routinised and increasingly less available to critique or even contemplation. To reiterate: central to the dominant mode of computer-animation as it is practiced by Pixar is the contrasting pictorial registers and the polysemous nature of the individual assets detailed above. Given the prominence of this aesthetics, and its emergence as the normative mode of computer-animation, I'd suggest that the persistent inclusion of skeuomorphic assets across the Pixar canon can be seen as influencing the general perception of computer-animation, and our epistemological engagement with digital onscreen assets and their origins. I'd like now to dwell on the perceptual routines that make sense of this polysemousness and that bridge the gap between reading the image spontaneously as a piece of animation replete with clear iconographic and symbolic codes, and as an image made up of a conglomeration of discrete and pre-existing digital assets.

Christopher Holliday coins the phrase "Luxo World" to tackle the problem of ontology in computer-animation and to simultaneously give an account of a generalised perception of computer-animation as it has emerged in the past decade. Holliday's concept of the Luxo World describes how the fictional worlds of computer-animation emerge from an intertextually rich array of polysemous digital assets and spaces. Stemming from Burr Snider's 1995 remark that '*Toy Story* was shot entirely on location – in cyberspace,' Holliday's theory accounts for the ways in which computer-animated films create fictional worlds "through a fluid act of production" (67) in which a distributed array of workers develop, reference and co-ordinate a digital backlot that pre-exists the animated world that appears on screen.

Holliday highlights a specific affordance of this "fluid act of production" writing:

> The persistent nature of Luxo worlds is also especially conducive to the production of computer-animated film prequels, sequels and spin-offs… David A. Price notes that *Toy Story 2* 'reused digital elements from *Toy Story*, the making of which had left behind a kind of digital backlot.' (2009: 182) Any number of environments can therefore be summoned from

> the copious digital archives, revisited and remade as new performance spaces in the latest cinematic instalment as part of a cost-effective economy of production (73).

This sheds further light on this notion of the polysemous nature of the computer-animated image, because it elevates intertextuality to the level of (cost-effective) production. Computer-animated films aren't created out of an assemblage of assets that merely *appear* to belong to a world outside the diegesis, by merit of their skeuomorphic rendering, but that actually do originate in an alternative text altogether, a sort of in-house Pixar mega-text. Thus, Holliday's conception of the Luxo World can demonstrate how, within the production context, individual assets can be recycled and re-deployed from text to text, much like physical props, their analogue counterparts.

But has this affordance of computer-animation translated into a normative practice that informs our habitual perception of computer-animation? To answer that question, we can look at Pixar's proliferating use of "Easter Eggs". Easter Eggs are details hidden within digital images that signify over and above the immediately accessible content of the image. Initially found in video games, the discovery of an Easter Egg represented the disclosure of certain information external to the game, or brought about a significant alteration in the logic of the game and/or world. When created by accident, unintentional Easter Eggs disclosed the limits of the game's programming. In film and television, Easter Eggs are more typically intertextual references that exceed the diegesis without compromising the rhythm of the narrative. Even though Easter Eggs are supposed to be a rewarding surprise, more often than not across the Pixar canon, the promise of Easter Eggs is more significant than the presence of such things. Whether or not they have a manifest impact on the viewing experience, I'd argue that they typify a very specific affordance of computer-animation, to re-use assets from the digital backlot, despite the assets not being referentially secured within the principal animated narrative. What is more, I'd suggest that this substrate of asset libraries that pre-exist the creation and production of the animated sequence onscreen increasingly informs the ways in which we engage with computer-animated images as polysemous, containing multiple (divergent, contradictory) significatory trajectories. Once again, the image inculcates a degree of epistemological and ontological confusion, with regard to the referential statuses of all the assets visible in the film. The use of Easter Eggs, whilst secondary to the narrative of a given film, is operative within our perception of computer-animation as a sense of ambivalence about the referential status of any given asset. This referential ambivalence translates into, or complements an ontological ambivalence when the asset in question exhibits a heightened degree of skeuomorphism. That the asset – an angle-poise lamp, say – may have been recycled from a different text exacerbates our sense of medial confusion and, I'd suggest, strengthens the degree to

which we perceive the asset via the epistemological routines of photographic media, that is as a window through which to look, rather than an image to decode symbolically.

The most recent iteration of the franchise, *Toy Story 4* (2019) is also the film that best encapsulates the role of Easter Eggs in the film's production and marketing, as well as the subtle influence that Easter Eggs have on our perception of computer-animation at large. Recycling assets from previous Pixar films and subtly hiding them within the frame doesn't impinge upon the story-telling in *Toy Story 4*. But the possibility that every frame is dense with such quotations (producer Jonas Rivera promised to digitalspy.com that "every frame of [the Antiques Store] sequences has something from every single film" (Sandwell, 2019)) does place a certain pressure on the viewing experience. I, for one, was aware of the rich array of inter-textual material in *Toy Story 4* long before seeing the images on screen. Typical of the marketing content accompanying the release were list-icles devoted to the hidden details to be found, such as the Buzzfeed piece "*Toy Story 4* Has The Most Easter Eggs Of Any Pixar Film – Here's A List Of Them." (Rackham, 2019) Whether or not one then enters the viewing experience in a distracted frame of mind, on the hunt for Easter Eggs, the concept of intertextually laden assets dotting every frame creates a feedback loop with the modes of perception solicited by skeuomorphic assets and their simulation of the photographic register. In fact, the intertextual ontologies of individual assets reinforce and underwrite the simulation and incorporation of photographic ontologies in skeuomorphic rendering, and vice versa. The prior existence of certain assets within other Pixar texts exacerbates our mistaken perception of skeuomorphic assets and our sense of epistemological confusion ("I know this isn't real, but boy it sure looks real").

One of the environments of *Toy Story 4* is an antiques store, the Second Chance Antique Mall. According to Mike Seymour the Second Chance Antique Mall had between "10,000 and 11,000 props hand dressed into the set, based on about 2,000 uniquely modelled prop assets (instancing)" (Seymour, 2019). The impact of this volume of assets on the final image is two-fold. In the first instance, the intensity of skeuomorphic detailing erodes the epistemic certainty that the image is, in fact, animated. The second uses Easter Eggs to demonstrate that despite computer-animation's ability to overwhelmingly simulate the photographic register, the image nevertheless remains dotted with assets that undermine any sense of a material or profilmic consistency of the depicted space and the objects in it. The amount of detail provides plenty of opportunity for skeuomorphic rendering, and sets up an equivalence between the volume of detail on display and the intensity of the simulation of the photographic register within the image. This is made clear in the complex "chandelier shot" (below) where Woody arrives at the top of a shelf to watch the morning sun glint through a hanging array of dozens of intricate chandeliers. A key feature of the image is the several

instances where the passage of light through a prism within the chandeliers has broken the light beam down into its constituent reds, greens and blues. These dots of colour where the light beam has split are not simple pictorial flourishes. They are a clear example of the dual trajectory Aylish Wood describes for computer-animation: manifesting an encroaching realism at the same time as demonstrating the technological procedures underlying them (2007b, 25). The dots of red, blue and green are indicators of the complexity of the ray-tracing algorithms at work, attesting to the simulation of light at the level of the wavelength, and the way in which this simulation of light lends a different character to every single prop that it interacts with. The refracted light breaking down into constituent colours in one chandelier becomes the specular highlights and diffuse glow on another. This shot is a self-conscious display of the complexity of the calculations that make up a computer-animated image. Furthermore, it seems designed to suggest that our capacity to decode the image according to the quality of its animatedness can be easily overwhelmed. This shot demonstrates how the volume of detail within a given composition corresponds to the intensity of the image's impact within the photographic register. It exceeds even Lasseter's doubled act of perception - "I know that this is not real, but it sure looks real." The ray-tracing of uncountable light-beams has the power to render any epistemic certainties as to the conditions of the image secondary to the aesthetic impact of its manifold skeuomorphic features. To loop back to Herhuth's arguments about the aesthetic impact of the early *Toy Story* films, I'd suggest that the technological evolution of computer-animation evinced in this shot transcends concerns for the "instabilities involved in processes of judging, for knowing and evaluating the particulars of the world" (25). The density of skeuomorphic detailing within this shot provides stability within our perception of it, as it encourages us to view the image according to the familiar epistemological formations of photographic media. Moreover, even though we know that the contents of the image aren't real, that knowledge is not an equal partner in our dichotomous engagement with the skeuomorphic/animated aesthetics of the image. To my mind the balance between animation and skeuomorph is tipped so that the emphasis falls *on how real the image looks*, rather than *how sure* the spectator is that it isn't real.

[IMAGE 7: "The Chandelier Shot" *Toy Story 4* (Josh Cooley, 2019) Source: vfxguide.com]

Further indicating the degree to which the photographic impact of the image is immune to any knowledge about its actual conditions as a piece of animation, the environment of the Second Chance Antiques Mall is full of Easter Eggs. The second impact that the voluminousness of this image has on our perception of the computer-animation has less to do with the overall effect of the image, and more to do with the cumulative effect of so many potential Easter Eggs. The heterogeneity of the detail in the Second Chance Antiques Mall set provokes the underlying awareness that all the assets on display are *also* sites of dense intertextuality that can incite referential trajectories that transcend the diegesis, the universe of the *Toy Story* franchise, and in some cases, Pixar lore altogether. Positioned within the Mall are numerous props from other Pixar films, such as the three-footed cane with tennis ball dampeners that featured in *Up* (2009), a record from *Coco* (2017), a diving mask from *Finding Nemo* (2003), and so on. Whether or not these assets directly impinge upon our attention is not the point: the presence of the Easter Eggs makes the inter-textual dynamics of computer-animation an *a priori* feature of the image, which nonetheless doesn't dismantle the coherence of the frame. Rather, it contributes to our expectations of what can and can't be depicted in computer-animation, and the range of things to which computer-animation can refer.

To reconfirm the affinity between these dynamics and the structures of premediation, the ontological insecurity brought about by the complex and polysemous nature of these images galvanises an epistemic uncertainty with regard to the actual nature of the assets depicted on screen. This is the underlying dynamic that enables a potentially futural orientation of the image; the skeuomorph grounds the image in the epistemological routines of analogue media. Given this

grounding it's now time to look at the ways in which the digital nature of the computer-animated image can fulfil the structure of premediation, building on familiar (in Grusin's terms, "remediated") perceptual routines in order to rehearse novel affects, usher in new sensations and orient the spectator towards an emergent material culture of as-yet-unproduced merchandise.

SECTION THREE: SPECIAL AFFECT AND *THE LEGO MOVIE* (2014)

So far, I have suggested that the multiple pictorial registers within computer-animated images serve a germane and illustrative purpose: showing how computer-animated images are made up - like Forky - of multiple constituent parts, each of which retain a number of skeuomorphic features. This onscreen multiplicity translates into a sense of the polysemous nature of digital assets, and their referential potential beyond the animated frame. Skeuomorphic assets can not only refer to physical objects in the material world that have a veridical presence, such as the toys licenced for appearance in the first *Toy Story* - Mr Potato Head, and Etch-A-Sketch. They can also refer to physical objects in the real world whose veridicality is not yet settled, such as the numerous Buzz Lightyear figures who were manufactured in the wake of *Toy Story*'s success. What I'd like to explore, as I turn my argument back towards the structures of premediation, is how the perception of computer-animation as a conglomeration of referential trajectories and a space in which the epistemological formations of animation and photographic media overlap, is emerging as characteristic of our habitual engagement with computer-animated images at large. It lies at the heart of the dynamic by which the assets perceived on screen premediate an immanent material reality. In what follows, I'll treat this way of perceiving computer-animated images – as referring to commodities with an unsettled veridical presence in the real world - as a new modality. On that premise, I'll explore the ways in which computer-animation's futural reference to as-yet-unproduced merchandise relates to the ways in which we, as consumers, understand the world around us.

Eric Jenkins's work is essential in forwarding my argument here. The thesis of Jenkins' book *Special Affects: Cinema, Animation and the Translation of Consumer Culture* (2014) is that "a consumer boom seems to accompany the emergence of every new communication medium, as the alterations of perceptual capacities transform into habits that subsequently become the source of economic value" (1). Jenkins charts this transformation from new communication medium to new consumer boom in the following way:

> By making new modes available, media create the potential for new affections, affections that, when habituated result in newly perceivable consumers, newly articulable commodities, and new translations of consumerist ideology. In short, there is a fundamental connection between media and consumerism because media enable new modes of affection, and affection underwrites both the desire to consume and the translation of those desires into consumerist ideology. (13)

In order to map Jenkins' ideas onto my own analysis of skeuomorphic assets in computer-animation, and to confirm that computer-animation, as I am considering it, fits within Jenkins' concept of a new medium, it's necessary to unpack a few things. Firstly, what Jenkins means by new modes and new affections, as well as the specific relation between the two and how it can be generated by new media forms. For Jenkins, encounters with new media involve new perceptual experiences, specific disruptive instances that Jenkins calls "sparks." Channelling Deleuze, Jenkins elaborates on the moment of the spark as "when the outside becomes infolded inside, splitting affective, neural and perceptual pathways differently from how it occurs in accustomed and habituated modes of perception" (8). In the examples that Jenkins gives he describes the new affections created in terms of a doubleness, a pleasurable disavowal of the fact of representation found in all sorts of media. The classical Hollywood mode, for example, "folds the subject between the viewer and the spectator position (the camera position), enabling the viewer to witness the event *as* the spectator, *as if* they were present" (8). Likewise, Disney's mode "allows subjects to fold themselves between affections sensing the characters as alive and their conscious knowledge that they are not, producing the tickle or tingling sensation many describe as wondrous" (8). This chimes with my own discussions so far of the polysemous nature of computer-animation and the epistemological confusion brought about by skeuomorphic assets. For this reason, thinking of computer-animation as a new media form is justified.

Bringing Jenkins' terms together with the by-now very familiar quote from John Lasseter, skeuomorphic assets could be said to fold the subject between the affections of "I know this isn't real" (i.e. conscious knowledge of the animation) and "it sure looks real" (allowing ourselves to forget that it's only animated). Following Jenkins' model, it is this new mode, that - when it becomes habituated - creates new perceptual parameters for the reception of skeuomorphic assets. I'd suggest that this could be characterised by an ambivalent relation to the reality of the skeuomorphic asset. As has been discussed with regard to the chandelier shot in *Toy Story 4*, the complexity of skeuomorphic rendering puts pressure on the viewer's ability to discern that the frame is computer-animated. One possible result is that the perception of the image, and its multiple individual and intertextually resonant assets, within the epistemological routines associated with the photographic

register, precedes and overwhelms any reading of the image according to the symbolic and iconographic codes of traditional animation. This, I'm suggesting, is the starting point for the emergence of a what Jenkins might call a new consumer; as it is within the context of this new mode of perception that new desires are articulated and new commodities created to satisfy those desires. Evidence that this consumer emerges as a result of the perception of skeuomorphic assets can be found in the online reaction to the cat featured in the trailer for *Toy Story 4*. The disbelief at how "crazy real" the animation looked spread in a variety of forms online, generating pre-release publicity for the film through the articulation of a consumer actively grappling with the skeuomorphic intensity of the computer-animated cat. As a typical online article summarised: "Pixar fans are freaking out about how real the cat in the new "Toy Story 4" trailer looks" (Rees, 2019).

Further illuminating how particular aesthetics can be seen to bring new consumer/commodity relations to light, Jenkins notes the shift away from merchandise towards experiential commodities within Disney's output. In his argument, this essentially turns the "special affective pleasures" of the animation into a renewable source, which nevertheless still directs and encourages more transactional forms of consumerism. In Jenkins' words, "selling affect… helps fuel the brisk pace and seeming insatiability of modern consumerism. Affect's renewability makes it a perfect source of value for capitalism, as long as culture industries can continue to produce and control new modes" (195). For Jenkins the context of computer-animation is not just the shift from analogue to digital technologies in Hollywood, but the broader proliferation of media across multiple screens, devices, etc. Again, Deleuze provides the theoretical touchstone in his discussion of the control society and its transmutation of individual consumers into dividuals, "divisible bundles of affects that emerge in the transition from one modulation to another" (193). Within this conception of digital culture, the consumer that emerges as the result of new digital communication mediums is not an individual with a preference for one new platform, but a "mode-switcher" (203). This mode-switcher is no longer concerned with the affordances of one medium or another, one text or another, but with the affective register of flitting between ever proliferating modes of consumption. Jenkins positions computer-animation as embodying and enabling this "mode-switching." Riffing on Manovich's concept of the deep remixability of the digital (which I discuss in my introduction) Jenkins views computer-animation as a hybrid form in which "the computer mixes all previous art forms, translating them into a digital code that enables their entering into hybrid relations much easier than was possible before" (201). By merit of this hybridity the act of watching a computer-animated film necessarily involves a great degree of mode-switching, as well as the affective pleasures brought about by all the moments in between. Analysing *Wall-E* Jenkins describes how "viewers know this is computer animation (marvel) yet are stunned or amazed by the astonishing,

life-like movement" (201). As a result, the ecological message of the film, in Jenkins' reading, is undermined by the "special affect" that the computer-animation brings about. Despite being a lament for the ecological destruction brought about by "mode-switching" consumption, the film's aesthetic nevertheless participates in the dynamic wherein new media technologies generate new modes, which in turn fuels the brisk pace and insatiable appetite of modern consumerism.

The concept of "mode-switching" is an interesting adjunct to the dynamic I've been outlining regarding the epistemological confusion brought about by computer-animation and its deployment of skeuomorphic assets. Limiting my discussion to the relationship between computer-animation and merchandise, I take Jenkins' concept of new modalities as a stepping stone in the process by which computer-animation exerts a determining influence over emergent material culture through the inculcation of a specific set of expectations and desires with regard to the content of that material culture. His argument that the modality of mode-switching is one of the engines that keeps digital consumerism running serves as a model for my own analysis of the way in which the habituated perception of skeuomorphic assets has an impact on our expectations of the future. Jenkins' mode-switching instrumentalises the aesthetics of computer-animation in order to sketch how it generates a restless consumer constantly in search of new affects. My own take is that the instrumentalising quality of computer-animation can be seen to have a material impact as well, in so far as the new affects and desires it makes visible are catered for within material culture through the manufacture of merchandise.

To flesh out the implications of Jenkins' argument, and my extension of it, I will now look at films from the *LEGO Movie* franchise, and explore the ways that the skeuomorphic assets featured across those texts exhibit a quasi-causal relationship with physical pieces of merchandise. In doing so, I will continue to build on my argument that computer-animation has a premediating tendency reliant on the epistemological confusion generated by skeuomorphic assets. The films use the aesthetics of computer-animation to literally previsualise LEGO merchandise in a fashion that articulates new consumer desires, which the consumer product wing of LEGO is ready to satisfy. Having shown how Jenkins' work applies to the LEGO Movie franchise, I will explore further the idea that digital images have a quasi-causal connection with the merchandise they model. I'll look at the use of LEGO's own proprietary free-building software, the LEGO Digital Designer (LDD) as a design tool within the computer-animation of *The LEGO Movie 2: The Second Part* (2018). With the help of the work of Leon Gurevitch I will analyse this interpellation of a LEGO consumer platform within the production pipeline of the films themselves as an instrumentalisation of the special affect generated by the computer-animation. It is this instrumentalisation of the epistemological mode brought about by computer-animation's aesthetics that stands as the final element in the premediating impact of

computer-animation. I will conclude by outlining the technological underpinning that holds together the quasi-causal chain of computer-animation, the perceptual habits it generates and the material culture that emerges in correspondence to this new modality. It is important to note at this point that the link between animation aesthetics and merchandising is not limited to the skeuomorphic-rich computer-animation, with its ingestion of the epistemological routines of analogue media. Indeed, for every capital-intensive computer-animated feature that stresses merchandise, such as the *LEGO* or *Toy Story* films, there are untold numbers of lower-budget animated texts that successfully promote merchandising lines. Within the LEGO-universe the *Bionicle* series of films (2003-2009) features non-skeuomorphic animation in order to promote the Bionicle line of LEGO mini-figs and play-sets. Likewise, the My Little Pony toy line, owned by Hasbro, is featured in the flash-animated series *My Little Pony: Friendship is Magic* (2010-2020), with the merchandise represented in the animation in stretchy 2D, with no correlation struck between the physical properties of the products and the style of the animation. These texts have very specific audiences and their impact has as much to do with community building and the promotion of play-styles than any overwhelming connection between on-screen assets and products on a shelf. In focussing on the aesthetics of skeuomorphic rendering my intention is to highlight the epistemological impact of this particular feature of computer-animation, and its relationship to material culture, both at its most generalised, and crucially, as it approaches its "vanishing point." The epistemological confusion brought about by skeuomorphic assets is not dependent on a narrow audience of younger viewers, I contend, it is characteristic of computer-animation at large. With this in mind, inhibiting the instrumental qualities of skeuomorphism becomes a vital part of my larger critical project of franchise aesthetics.

Unlike *Wall-E*, the *LEGO Movie* franchise does not disguise or sublimate its relationship with the contemporary modes of consumerism. As has been widely documented and analysed (Goggin, 2017; Holloway III, 2016; Archer, 2019), the franchise's sly remediation of advertising tropes and ironic distancing from other active franchises and franchising practices promote, through obfuscation and refraction, the straightforward imperative of the film, which is this: buy LEGO merchandise! For example, across the multiple narratives, a tension is constantly established between rule-followers and rule-breakers, with the result that the free-building inspirations of the 'Master Builders' are positioned as transgressive. However, despite this narrative emphasis on breaking-the-rules and radical non-conformism, the resulting LEGO constructions are available in brick for brick replications in the merchandise marketplace. Will Forte's performance as Batman is another example. It suggests a distinctive, non-heroic and deeply ironised mode of engaging with the Batman IP, as a buffoon as opposed to a hero. However, this coy remediation of the normative

identification between archetypal hero and audience/consumer goes hand in hand with the translation of the LEGO Batman assets into commercial merchandise: after the release of *The LEGO Batman Movie,* for example, the Bat-Mobile became available in a variety of iterations (inspired by the versions featured in the film) with price points as high as £169.99. That said, this form of product placement (the placement on screen of commercial products, whose presence substantially contributes to the funding of the film-making etc.), whilst evidently well-honed in the LEGO movie franchise, isn't unique to these films. Productions such as *The Playmobil Movie* (2019) endeavour to replicate the way the LEGO franchise builds fantastical narratives out of specific bits of merchandise, thereby promoting the merchandise and guiding the play styles associated with them. And seeing the LEGO films operating through simple product placement falls short of analysing them according to the concept of Jenkins' special affects.

The advantage of Jenkins' model is that it provides us with a method for picking out the particular effects of *The LEGO Movie's* use of skeuomorphic assets that extends well beyond the featuring of LEGO merchandise within the narrative. The skeuomorphic-rich images of the LEGO Movie can instead be implicated in the generation of new modes of perception, which in turn create, after Jenkins, new modes of consumption. The image below is emblematic of the way in which computer-animation, and its mobilisation of the perceptual routines and epistemological formations surrounding analogue photography, can generate a special affect that suspends the viewer in between an awareness of the computer-animation and an investment in the material existence of the assets in the image. Tellingly, the image also contains a number of cues by which that special affect might be channelled towards a set of consumer behaviours.

[FIGURE 5: "I am a Master Builder" *The LEGO Movie* (Phil Lord & Christopher Miller, 2014) Screen Grab]

The image shows the hero of the *LEGO Movie* (2014), Emmet Brickowski, at the moment at which he becomes a "Master Builder." Up until this point in the film, Emmet has suffered from a terrible lack of imagination: he is unable to envision how the LEGO pieces that make up his everyday world might be re-purposed in order to build something new. However, when he gets mistaken for the subject of a prophecy regarding "The Special One," he breaks out of the regimented world that he lives in and discovers that the LEGO universe is full of a wide variety of characters (from a wide range of IPs). Amongst these new characters are a number of "Master Builders," characters with the power to dismantle the LEGO world around them and build wild and innovative props to further the hectic action set pieces. This quasi-superpower is accompanied by a specific visual trope, exemplified in this image. As the Master Building unfolds, various LEGO pieces form a version of an "exploded view," a 3D diagram familiar from flat-pack construction manuals and factory schematics. These individual pieces glow a luminous blue, hovering prominently in the frame accompanied by a multi-digit number that is presumably a serial number notionally identifying the individual LEGO block and its ID number within the LEGO catalogue.

This suspended moment of the exploded view prefigures the act of building, offering a signal that the LEGO pieces are going to be radically re-purposed by the Master Builder. Hand in hand with this dismantling of the diegetic LEGO world, these exploded views are also notable for the way in which they dismantle the central conceit of the animation style, consistent across the films: specifically, the computer-animation of the LEGO movies is designed to resemble stop-motion animation. For example, the movement of the characters is often articulated on-2s, creating the jerkiness characteristic of stop motion animation in general, and amateur LEGO stop-motion (known as Brick Films) in particular. Likewise, the texturing of individual bricks within the film stresses the material and haptic properties of LEGO bricks, and in doing so simulates a photographic register within the film that disavows the computer-animated nature of the film as a whole. The exploded view, by contrast, disregards these aesthetic simulations of analogue animation techniques and stresses the digital nature of the image. The disaggregation of the LEGO pieces from their place on the set, their texture-less luminosity, combined with the action-spectacle physics of the characters leaping through mid-air, all herald the image's status as a piece of computer-animation.

This break in the film's textural and aesthetic quality has a number of effects, most interestingly on the temporal orientation of the image itself. Highlighting its digital nature, this image transcends the self-imposed strictures of stop motion aesthetics and points forwards, towards an immanent display of spectacular computer-animation, rather than backwards, towards a (notionally) profilmic arrangement of LEGO pieces in front of a camera. It points forwards to an immanent re-organisation of the material fabric of the diegetic world and a turn in the action.

Emmet unshackles his creativity and builds a giant mech with tank tracks for feet, digger buckets for hands and with spinning wrecking balls sticking out of its shoulders. However, the exploded view of the LEGO pieces is more than just a narrative foreshadowing or aesthetic prefiguring of a piece of action. By undercutting the stop-motion aesthetic and signalling the digitality of the bricks within the image, the exploded view manages to introduce a striking polysemy to the frame, as well as the individual assets within them. Alongside the narrative prefiguring, the image points beyond the simulations of the computer-animation itself, as well as the diegetic Luxo World, emerging as a fluid act of production, all the way to LEGO as a facet of material culture, as well as to specific LEGO bricks and pieces of LEGO merchandise. Thus, each brick within the image has multiple referential trajectories attached to it, as it refers to an object in the narrative universe of the film, a veridical object within LEGO's already well-established material footprint, and an element within the consumer products that will emerge to build on audience engagement with the film.

Emmet's sudden ability to be a Master Builder explicitly models and demonstrates the function of LEGO outside of the film text. The animation very explicitly demonstrates that Emmet's master building can be replicated in real world LEGO. Not only can the vehicle that Emmet builds be built from LEGO (incorporating, of course, the individual bricks featured in the exploded view), but it can be purchased as a piece of merchandise associated with the film. (At the time of writing LEGO Movie 70842 Emmet's "Construct-O-Mech" is available on ebay for £59.99.) Indeed, in a very real sense, the mech that Emmet constructs after learning his master builder powers premediates the toy as it will appear in the merchandising market place. Thus, Emmet's newly learned powers of master building don't just generate an object within the animation of the film: the action of Emmet's master-building, as well as the way in which it is visualised, serial numbers and all, gesture beyond the film towards physical products in a wider commercial landscape.

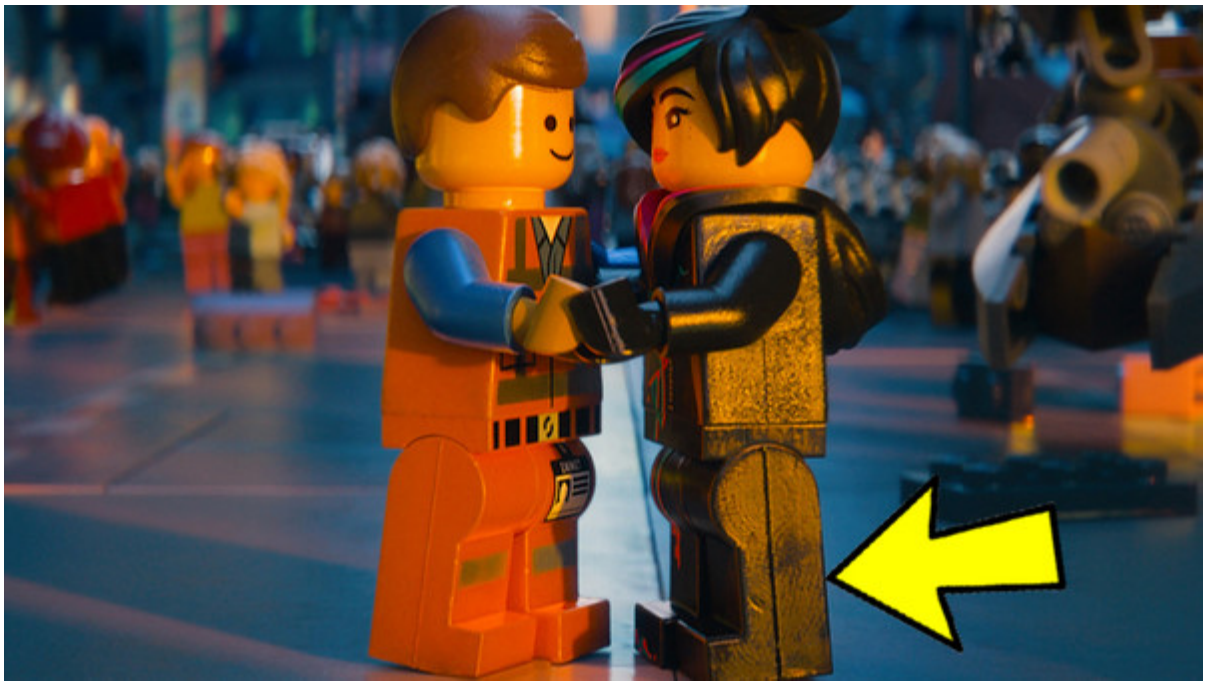
It's worth looking more closely at two specific features of the computer-animation that are consistent across the franchise as a whole, as they will help pinpoint more accurately how the images generate a perceptual framework that blends the epistemic modes associated with both analogue media and computer-animating. Attempting to define these aspects of the special affect will help clarify the ways in which the LEGO films further instrumentalise the epistemic confusion and ontological ambiguity they provoke. The LEGO movies are computer-animated films that simulate a sub-genre of stop motion animation, called Brick films, which use LEGO bricks and figures (known as mini-figs) to tell usually simple and limited stories (Einwächter, 2017). The films use the limitations of stop motion to continually establish and overturn a set of expectations with regard to what can and can't be shown within this curious format. Key to my argument is the fact that the "limitations" of the brick film format imply that whatever can be represented within the animation

can in fact be built (and bought) in LEGO. The kernel of the special affect generated by the aesthetics of the film, then, involves the doubled perception that acknowledges that the images are computer-animated, whilst simultaneously engaging with the stable ontological logic wherein everything on screen has a corresponding material existence in LEGO.

Recalling Christopher Holliday's concept of the Luxo World, wherein the computer-animation is constituted of assets and environments plucked from an endless digital backlot full of polysemous digital assets, the basic conceit of the franchise is that the "back-lot" in question is all LEGO. Unlike the usual grandiosity of capital-intensive exercises in computer-animation, the LEGO movies miniaturise everything, rendering it in the playable scale of LEGO bricks. The irony that this aesthetic trades on is the fact that the only pieces of actual stop-motion within the franchise are the end-credits. Every brick represented on-screen is a skeuomorphic asset that has been designed, modelled and instanced to appear like a real LEGO brick. Unlike the Pixar or Disney mode of computer-animation, wherein there's a pleasurable contrast between skeuomorphic assets and squash and stretch physics, the films of the LEGO Movie franchise have, in essence, been animated entirely out of skeuomorphic assets. This skeuomorphism is particularly pronounced in the representation of scale and of movement, both of which simulate the physical dimensions (and limitations) of LEGO bricks, and strongly evoke the haptic experience of playing with LEGO. In analysing the presentation of scale and movement in the films, my aim is to try and outline the special affect of the films, and demonstrate how they are examples of a new modality that is, in part, directly oriented towards premediating the material commodities that the skeuomorphic assets represent and simulate.

In terms of scale, a consistent feature of the franchise is a macguffin in the form of a "real" object that throws into relief the diminutive scale of the mini-figs. In the first movie this is the tube of super-glue, the lid of which becomes stuck on the back of Emmet Brickowski; in *The LEGO Ninjago Movie* (2017), this human-scaled item is trailed as the "Ultimate, Ultimate Weapon" and is revealed to be a small laser pointer which the mini-figs have to hoist around on their shoulders. In a further confirmation of the "actual" scales of the mini-figs, the "ultimate ultimate weapon," summons a cat, known as Miaowthra, who arrives to dwarf the entire diegetic universe of the film and cause catastrophe by knocking down entire buildings with the swipe of a paw. Whilst these demonstrations of scale help set up many of the sight-gags that characterise the franchise, the instancing of the individual blocks within the frame establishes a much more pervasive sense of scale and ultimately one that continually reinforces the putative scalar relations between the on-screen assets and the fingertips of the audience.

"Instancing" is the practice of rendering multiple copies of the same geometric shape, using a small set of differentiating parameters in order to avoid the appearance of repetition. Most often used for details in processually generated environments such as trees and shrubs, its use in the LEGO movies establishes a minimal difference between every single brick in the frame, producing digital environments that are, like in real life, made of a series of similar but unique assets. In the LEGO movie franchise, instancing algorithms are applied to the texture maps of each brick in order to disrupt any sense of overwhelming uniformity that would undermine the stop motion aesthetics and at the same time simulate a texture on each brick that suggests that it has been touched and handled by human hands (Seymour, 2017). Occasionally, the texture mapping is made more prominent, such as when, as in the image below, thumbprints are clearly visible on the character's bodies.



[FIGURE 6: *The LEGO Movie* (Phil Miller & Christopher Lord, 2014) Screen Grab w/ added arrow]

The thumb-print is a skeuomorphic detail as it sparks a significatory trajectory that transcends the narrative and the diegesis, insisting falsely on an atavistic relation between the mini-fig and a stop-motion animator with sticky thumbs (or indeed, the kid who plays with it). Throughout the franchise skeuomorphic details such as this perpetually reiterate the scalar relation between the animated brick and the fingertips of the audience. And yet, by merit of the films' expansive set pieces, enormous locations and occasional disruptions within the brick-film aesthetic (i.e. the visual trope accompanying "Master Building") these skeuomorphs go hand in hand with our knowledge that the film is computer-animated throughout. What the skeuomorphs provoke then is the doubled

spectation of Jenkins' special affect, wherein our knowledge that the bricks are digitally generated sits in pleasurable tension with the constant reminder of the haptic qualities of real LEGO bricks.

A similar tension is generated by the presentation of the characters' movements "on twos," not least because the simulated jerkiness of stop-motion animation is repeatedly smoothed out and elongated in the flagship action-sequences. "On twos" is an animating technique essentially indicating that movement is drawn across every second frame, rather than every frame. In hand-drawn cel-animation, representing repetitive movement – such as the back and forth action of arms and legs in a running figure – was a way of cutting down labour costs (fewer drawings) and representing greater speed (the limbs appear to flit back and forth very rapidly). In a computer-animation context, animating something "on twos" is skeuomorphic, a technical anachronism invoking analogue constraints that no longer exist in a digital context. Across the franchise, several sequences display a double emphasis, on both the constraints of animating action in stop motion, and on the fluidity and affordances of computer-animated movement. For example, an early sequence in which the Wyldstyle (Elizabeth Banks) saves Emmet from being tortured has the little mini-fig Wyldstyle fighting with all the panache of a character out of *The Matrix* (1999). She performs outrageous aerial manoeuvres, dodging laser rays and defying gravity all the while kicking and punching her way through bad guys, despite having the limited physical articulation of a LEGO mini-fig: legs with no knees, arms stiffly bent at the elbow. A counterpoint to this stiffness in the animation of the action is found in the fluidity of the camera work and the moments of time-ramping that the sequence also deploys. The time-ramping, in particular, complements the skeuomorphism of animating "on twos," with a clear signalling of the computer-animated nature of the frame. The sequence oscillates between a "real time," marked as it is with the simulated interval between frames, and a slow-motion that fills in the intervals between those frames. As with the instancing of highly detailed texture maps on each brick, this double emphasis on skeuomorphic movement and digitally enabled fluidity emphasises the actual physical limitations of the material objects referred to on-screen even whilst demonstrating the computer-animated nature of the image as a whole. As a consequence, the computer-animation of the LEGO movies generates a special affect wherein the audience relishes spectacular action sequences that could never be achieved in LEGO, whilst also perceiving the images as if they were, in fact, entirely constructed out of LEGO. This reaches its apotheosis in sequences such as when Emmet becomes a Master Builder which can be implicated not just in the generation of a specific mode of attention but in the direct channelling of that attention towards specific pieces of merchandise.

As I move towards a conclusion, I would like to look at the work of Leon Gurevitch in order to discuss the final element in computer-animation's structures of premediation. Specifically, the

connections between computer-animation processes and the manufacturing processes that produce artefacts in material culture. Having looked at the ways in which computer-animation establishes an anticipatory mode in the viewer, as a result of computer-animation's conglomeration of media-epistemological modes and the special affect that it creates, it's time to explore the ways in which the technologies lying behind computer-animation are predisposed to produce the material culture envisioned by the images.

Gurevitch's 2008 work on "The Cinema of Transactions" addressed an emerging mainstream visual culture wherein a cinematic text was always found to "operate […] beyond the boundaries of its own immediate textual limits," thanks to its aesthetic, technological and commercial linkages to "promotional culture," industrial design and manufacturing processes as well as overarching corporate structures and interests (3). Updating Andrew Wernick's theorisation of the referential networks of promotional culture, Gurevitch places the digital image and computer-generated effect, characterised as being endlessly reproduce-able and interchangeable, at the heart of "a continual process in which business is promoted" (14). Gurevitch both widens and narrows his concept of business (from the specifics of product and brand placement, to the American model of capitalism) but rests his argument on the contention that "the CG attraction is a single currency that acts as legal tender in multiple audiovisual economies" (15). This line of thinking owes a great debt to Jonathan Crary's insight regarding the homology between photographs and money in the late nineteenth century, and Gurevitch's work on the CG image has similar implications for the pervasive imbrications of digital image culture and contemporary capitalism.

Gurevitch's work most fully overlaps with the dynamics featured in the *LEGO Movie* franchise in his discussions of the common ground between the processes behind CG asset design and product design and manufacture. Gurevitch explains that "Pixar's real-world merchandised toys are now created from the same processes of computer product design already required for and completed in, the construction of the features themselves" (2012, 140). That is, like the toys that they later become, the digital assets created by Pixar are built with software that "cross the boundaries between creative expression and industrial fabrication" (140). Within the animation process the assets already have "their physical parameters articulated: size, structural integrity, aerodynamics and material construction are all worked out and dependent upon each other in a myriad of complexly interrelated computer algorithms" (140). As a result, the characters that we see on screen "are not simply images, they are industrial simulations" (140). This is acutely the case where the characters are industrial objects such as cars or toys, or LEGO bricks. The computer-animation of the *LEGO Movies* with its skeuomorphic rendering of LEGO merchandise takes this a step further, and essentially builds an entire film franchise out of what Gurevitch might consider a

process of industrial simulation. From the perspective informed by Gurevitch, the images within the LEGO films become always-already a pre-visualisation of an industrial product. [6]

This overlap of design and animation software, and the consequences it has for the spectator-consumer, is most pointedly manifested by the most recent iteration in the LEGO Movie franchise, *The LEGO Movie 2: The Second Part* (2019), in which LEGO's proprietary LEGO Digital Designer software was integrated into the production pipeline. Prior to its role within the production of *The LEGO Movie 2*, the LDD platform attempted to fulfil multiple roles for LEGO. It was an online building and collaboration platform that sought to challenge similar block-based digital building environments such as Minecraft (Kamen, 2017). It was a forum for a certain brand of LEGO fan practice, namely the freestyle building carried out by hobbyists and artists alike. Indeed, it was effectively a tool for harnessing the improvisations of LEGO users within the strict parameters of LEGO's construction language. And it is this last point that makes its integration into the production pipeline for *The LEGO Movie 2* so interesting. According to VFX journalist Ian Failes, a great deal of the incidental assets such as explosions, minor sets and elements within environments were built within LDD before being imported into Maya for animation (Failes, 2019). As such, the LEGO construction language, transmuted from plastic hardware into online software, is more than merely simulated in the production of the film, it is situated as the Luxo World from which the animation can emerge. Furthermore, given the software's parallel function as a free-building platform wherein users could design their own LEGO sets and subsequently order them up, brick by brick, to build them in real life, it completes the overlap between industrial object and industrial image. The *a priori* build-ability of all assets within a LEGO movie frame confirms Gurevitch's contention that, given the connections between the computer-animated image, product design and promotional culture, "the distinction between the object, the image and the advertising image through which

[6] Going further, in his 2015 essay "The Transforming Face of Industrial Spectacle: A Media Archaeology of Machinic Mobility," Gurevitch extends his argument in order to suggest that, in certain contexts, the "product placement" taking place within an image refers not just to the imaged commodity, but the software that generated the image itself. Adopting an archaeological approach, Gurevitch notes that Autodesk who distribute Maya – one of the foremost pieces of animation software in the VFX industry – are also the leading distributers of software packages to the automotive and architectural design industries. His suggestion is that the collection of algorithms and techniques that underpin special effects in cinema (and that are, then, following the logic of franchise aesthetics, deeply involved in the reconstitution of our everyday experience) also underpin the design and promotion of cars as well as the design of buildings. Guiliana Bruno's alignment of cinema and architecture (2002) has been fully literalised: cinema spectatorship and our experience of the built environment don't just intersect, they are produced by the same software.

imaged and actual objects gain meaning is considerably reduced if not removed completely" (2012, 144-5).

What I would add to Gurevitch's arguments about the indistinguishability of the object/image/advertising image is that when the image and the object become completely overlapped, the futural orientation of the image takes on a causal dimension. This is the case in *The LEGO Movie 2*, where assets within the image can be produced as objects thanks to their origination in proprietary LEGO free-building software; in this instance, the potential futural orientation of the digital image can be easily fulfilled as the image now stands at the beginning of a quasi-causal chain notionally available for ordering up brick by brick for construction in the living room. A final example of this is outlined by animation scholar Daniel Martin who points to a minor joke in *The LEGO Batman Movie* (2017). Here, Batman repeatedly shoots his new sidekick Barbara with a merch gun until settling upon her favoured Batgirl costume design. Martin points out that it's a "rapid-fire visual gag… Yet all of these blink-and-you'll-miss-it costume variations of Batgirl were *actually manufactured* by Lego and made available to consumers" (2020, 104). Martin's emphasis seems to suggest that the task of producing toy lines such as 'Disco Batgirl' and 'Surfer Batgirl' is somehow incommensurate to the amount of screen time that the costume variations receive. I would suggest that the opposite is true. In the logic of premediation brought about by the overlap between computer-animation and merchandise manufacturing, the fact that the costume variations appeared on screen at all renders it more or less inevitable that they should emerge within material culture.

CONCLUSION

Gurevitch's dissection of the confluence of interests between the digital image and various forms of capitalism challenges us to find some other way of drawing meaning (and indeed, enjoyment) out of the computer-animated image that is not overwhelmed by the strictures and inevitabilities of premediation. To recap, computer-animation's deployment of skeuomorphic assets overlays or hybridises the habituated perceptions and epistemological routines associated with animation and photographic media. This hybridising of the perceptual routines associated with discrete media creates what can be described as a "special affect," a particular mode of perception that both acknowledges the animated nature of the image whilst investing in the (futural) material existence of certain portions of the image (the car, the penthouse, the toy). This special affect can be linked to a new set of consumer desires; given the digital nature of the computer-animated image,

these new consumer desires are now easily fulfilled by a manufacturing and design process that overlaps with computer-animation software. The spectator's investment in the materiality of the skeuomorphic asset is fulfilled by the causal chain that leads from the image to the emergence of the consumer product in material culture: because the images were featured in, say, the computer-animation of the LEGO Movie, they can also be found as consumer products.

To risk overstating the case, I'd like to end by suggesting that this tendency is inherent not just to specific iterations of computer-animation and media aimed at children, but to the medium as a whole. Anywhere computer-animation exhibits a skeuomorphic tendency that incorporates the epistemological associations of photographic media into its aesthetics, it lays the foundation for a process of premediation. The proliferation of skeuomorphic assets across all manner of computer-animated texts produces an affective orientation towards a material culture that is correspondent to the one depicted on screen. The only difference between computer-animation and photography in this regard is that photography is oriented towards a past and present material culture, whereas computer-animation is oriented towards a material culture that is yet to emerge, but that nevertheless will be brought about by the images, and the effect they have.

As computer-animation evolves and its deployment of skeuomorphic assets intensifies, this will exacerbate a mode of perceiving computer-animated images - regarding the images quasi-photographically - that is not necessarily equipped to interrogate the reality or irreality of the objects on screen. As this mode becomes more and more mainstream, so the structures of premediation within computer-animation will become more and more assertive. As I've demonstrated, presenting consumer products as skeuomorphic assets generates an affective engagement with the product which renders its status as animated (i.e. not yet real) irrelevant. Given the inter-connections between computer-animation and digital design and manufacturing, this renders the emergence of computer-animated toys into material culture increasingly probable. The only thing that's missing from the LEGO movie is a "Buy Now" button. Considering computer-animation more broadly, it becomes a question of what exactly is being premediated. The LEGO movies assertively premediate the expansion of their toy brand by omnivorously overlapping the LEGO aesthetic with a range of pre-existing merchandise-friendly IP. In a similar, but more diffuse fashion, Disney, or for example, companies such as eOne (recently bought by Hasbro) and Mattel (which recently launched a film production wing) can be seen to use computer-animation aesthetics to premediate the flooding of material culture with cheaply manufactured toys. Through this lens, and speaking hyperbolically, although not without precedent, computer-animation aesthetics is an ecological issue, as the more the aesthetic techniques associated with skeuomorphic rendering evolve, the more they provoke a degree of epistemological confusion. The more this is leveraged

within a structure of premediation, anchoring the future in the medial parameters of the present, the more the aesthetics can be seen to determine our choices and options for response with regard to the content of material culture.

This is where a return to Jenkins is useful. A reminder that the computer-animation of *The LEGO Movie*s generates a special affect that enlivens the viewing experience, as opposed to just rendering us saps to the product, is important. In thinking about the relationship between computer-animation and merchandise, the pleasure that we take from the images themselves is something to be continually recuperated from the overbearing logic of premediation within which the images and their associated affects are entrenched. But a pleasurable engagement with computer-animation's premediating tendencies is not only possible, but necessary. After all, engaging with the instrumentality of franchise aesthetics is a route to enjoying them more fully. Here, once again, Flusser's contention that "the critical reception of technical images demands a level of consciousness that corresponds to the one in which they are produced," (2011, 22) becomes relevant. Mobilising an awareness of the premediating tendencies of computer-animation allows for a granular engagement with the image that can celebrate the aesthetic impact of skeuomorphic assets, revel in the special affect that they generate, whilst also inhibiting the quasi-causal chain between the image and the proliferating material cultures that these images can inaugurate. Our engagement with the images can be two-fold, celebrating the wonder they provoke whilst discerning the ways in which that wonder can be instrumentalised in the production of a causal relation between computer-animated images and material objects. What matters is the automatic nature and the pre-ordained structures of that response: we can appreciate the wonder provoked by computer-animation without automatically setting the 3D printer whirring.

CONCLUSION

In my introduction I stated that the task of my thesis was to name, explain and reframe the ways in which hybrid images not only dominate what we see, but have come to shape how we see. To fulfil this task, across the body of the thesis, I have put forward the concept of franchise aesthetics. Understood as an intensification of hybrid image techniques that is correspondent to an ongoing reconstitution of experience within contemporary capitalism, franchise aesthetics gives a name to the collection of hybrid techniques that are ubiquitous within capital-intensive film-making. In order to explore and explain the correspondence between images and experience, each of my chapters focussed on a particular hybrid technique as well as a related set of media-epistemological formations. Building on the media-epistemological foundations of a range of writers, foremost of whom is Vilém Flusser, franchise aesthetics notes both the epistemological forcefulness of dominant media as well as the ubiquity of hybrid forms and - from this platform - pursues what is essentially a hybrid-media-epistemics.

The task of each chapter, then, was to unpack the ways in which a given process of hybridising recorded live-action cinematography and animation techniques produced not just a hybrid image but a hybrid mode of perceiving the image, and by extension a hybrid way of being in the world. Unifying my diverse analyses of hybrid images and the experiential qualities they ingrain was the contention that the media-epistemological impact of hybrid techniques was best understood as extending the "fully mediated mise-en-scène that provides humans with the contexts and options for response that are productive for capital" (Beller, 2006, 29). This framework invested my concept of franchise aesthetics with an anti-instrumentalist *raison d'etre,* as bringing to light these dynamics meant inhibiting their operativity. That said, this framework also placed a burden of proof within each chapter to discern the subjective phenomenological fallout of narrow categories

of images and build connections between ubiquitous hybrid processes and the obscure systematicity of capitalism.

The facets of franchise aesthetics that have emerged from the case-studies are not equal sides of a closed structure. For each sub-category of hybridity, a new iteration or mutation of capitalism came to light. As a result, the chapters do not interlock in an even or systematic fashion. The benefits of an anti-instrumentalist mode of critique and the pressures of directly connecting hybrid images with the qualia of life under capitalism are unevenly distributed, but they do inform one another asymmetrically. I don't think this is to the detriment of my project as a whole. However clear the media-epistemological ramifications of hybridity might be within any given category of images, a stable equation between hybrid imagery and the lifeworld of contemporary capitalism is elusive. Revisiting my chapters here, I'd like to dwell on the cumulative impact of my approach and offer some final, more generalised, remarks on the ubiquity and epistemological impact of hybrid imagery.

In chapter one I examined the hybrid process of digitally colourising black and white archive footage with the intention of investigating how the process interacts with our perception of history and the moving image archive. I argued that colourisation sharpens our phenomenological access to the past whilst profoundly narrowing the moving-image archive itself. I demonstrated through an engagement with Peter Jackson's documentary *They Shall Not Grow Old* the way in which colourisation not only intercedes with the meaningfulness of the black and white archive, but threatens to marginalise great swathes of the archive that are not amenable to the colourisation process. Positioning colourisation as a process on the verge of ubiquity, and soon to pass its "vanishing point," I made a case for reading digital colourisation as complicit in the perpetuation of, amongst other things, racialising systems of representation. I offered franchise aesthetics as a critical framework with which to disrupt the hold that colourisation, and its internal biases, threatened to have over the moving image archive, and, by extension, over popular forms of collective memory. Conforming the past to the techno-cultural standards of the present, I suggested, was a means of valorising today's way of thinking about the past (entwined with the dynamics of today's version of capitalism) at the expense of a more nuanced appreciation of the material specificity of analogue archives.

In chapter two I looked at the hologram effects that have become a routine part of science-fiction film and television. I suggested that hologram effects exemplify how digital compositing, with its hybridisation of recorded live-action spaces and layered composite spaces, can generate hybrid screen spaces that do not necessarily conform to the spatial codes of perspectivalism. Instead, I

argued that digital compositing directly addresses the attention of the spectator, managing the way in which the gaze moves between discrete layers within an image. I then examined the degree to which our habituation to the layered and quasi-perspectival spaces of digital compositing might interact with our psychophysiological experience of space as it evolves in an environment increasingly saturated with digital media. I argued that digital compositing's production of space through the management of attention can be thought of as expanding our psychophysiological experience of space, so that we understand our environments to be more than just 3D spaces we look and move around, but volumes latent with layers of information ready and waiting to crowd our visual field. Here, franchise aesthetics was a means of glimpsing the ways in which on-screen spatial experience is instrumental in creating and normalising the structures of feeling surrounding our contemporary experience of space. The crowded foregrounds of hologram-rich sci-fi were seen to model a new way of experiencing space as a "screenless image;" reality as augmented by default, dense with calls on our attention on behalf of digital commerce.

Leading on from chapter two, chapter three was interested in temporal experience, and specifically the temporal experiences generated by hybrid temporal objects. I defined hybrid temporal objects as legible manipulations of analogue cinematography's isomorphic capture of time. I suggested across the chapter that through dismantling and reconstituting the structure of cinematic time, hybrid temporal objects reflected an emergent experience of time. Within this emergent experience of time, our awareness of the microtemporal increments underpinning our time-consciousness was greatly intensified. Furthermore, given cinema's influence over temporality in the early twentieth century, and the theoretical legacy this influence entailed, I examined the temporalising effect of procedures like time-ramping, or the creation of digital oners, which generate spatio-temporal continuums out of distorted or discontinuous durations. The chapter argued that hybrid temporal objects could be directly implicated in contemporary structures of time-consciousness. Franchise aesthetics was a way of theorising the overlap between the experience of time in contemporary action cinema and the experience of time more generally, implying that the intensification of temporal experience brought about by, and exemplified in, the hybrid temporal object benefited capitalism and its intrusion into not just leisure time, but the individual milliseconds that make up our experience of time passing.

Honing in more explicitly on the inter-relations of contemporary visual media aesthetics and capitalism, chapter four examined the connections between computer-animation and the epistemics of consumerism. I defined assets within computer-animated frames that looked persuasively "photorealistic" despite being embedded in a clearly cartoonish context as skeuomorphic, insofar as they channel a photographic register that atavistically incorporates the epistemological frameworks

of analogue indexical media into computer-animation. I looked at the way in which these skeuomorphic assets provoke passages of epistemological confusion and conversion, a dynamic which - when refracted through Richard Grusin's concept of premediation - allowed for the spectator to invest in the material reality of consumer products that had not yet been manufactured. I argued that this futural orientation of computer-animation, and its capacity to refer to things with an uncertain veridical presence in material culture, was instrumentalised within mainstream computer-animation. This process of instrumentalisation exploited computer-animation's propensity for skeuomorphs in order to generate a new modality, built on epistemological confusion and ontological ambivalence, which in turn brought new consumer desires to light. I concluded the chapter by looking at the ways in which computer-animated software overlapped with digital design and manufacturing software to such a degree that digital assets could be thought of as having a quasi-causal relationship with merchandise and commodities that were manufactured in their wake. Within the scope of my thesis, this chapter argued that skeuomorphic assets in computer-animation, as a facet of franchise aesthetics, exerted a determining influence over emergent material cultures and resultingly, how we collectively imagine the future.

Taken together, the chapters amount to a partial catalogue of the representational techniques that are increasingly prevalent within a visual culture that operates within and on behalf of capitalism. The connections between franchise aesthetics and capitalism are drawn with varying degrees of intensity, but, to my mind, this reflects the fact that the operativity of the aesthetics occurs along a spectrum from the abstract to the explicit. Reflecting on these arguments, a common thread emerges: hybrid techniques, as I have examined them, exert an acute degree of control over the semantic content of the image. The application of colour in digital colourisation purports to bring the image "closer to reality" by erasing the ambiguity of the greyscale. The hybrid spaces of digital compositing manage the way the eye travels across the image, constructing a sense of three-dimensionality out of a sequence of attentional cues. Hybrid temporal objects, expand and contract durations and in doing so control the degree to which contingent elements within a frame impact the time-consciousness of the spectator. Skeuomorphic assets within computer-animation refer in a seemingly non-symbolic fashion to assets whose ontological ambivalence is resolved by attendant manufacturing pipelines. In discussing the interrelations between the semantic and pragmatic dimensions of technical images, Flusser argued that "to try and analyse what they show is to get lost in empty questions…Technical images do not show us their meaning: they show us a way we may be directed" (2011b, 49). The profoundly unambiguous content of capital-intensive hybrid images, then, is beside the point. The simple fact that *Pacific Rim: Uprising* (2018) features holograms *and*

giant robots *and* giant lizards from another dimension, is interesting if you like that sort of thing, but it is not sufficient to the pragmatic content of hybrid images. One of the last questions to be asked is as follows: what is the pragmatic flipside of the micromanagement of the semantic content of the hybrid-image?

In order to critically encounter the pragmatic dimensions of technical images, Flusser writes "requires an analysis of their trajectory and an analysis of the intention behind it… This is because technical images, with their inverted vectors of meaning, have an unprecedented meaning: they don't signify anything; they indicate a direction" (49-50). Disregarding the significance of the giant lizards and holograms and so forth, the question becomes: what are the instrumental qualities of the image that support the unambiguous appearance of these things? How have the media-epistemological anchors of time, space, colour and surface (all of which have previously been secured through the dominance of analogue media) evolved in order to generate this image and its phenomenological impact? My thesis has provided a partial toolbox with which to analyse the ways in which the hybridisation of analogue cinematographic media (and analogue media-epistemics) by processes of digital manipulation make the semantic content of *Pacific Rim: Uprising*, not only possible, but routine and, to a degree, quite banal.

But from the perspective of the instrumentality of hybrid media, the banality of recent hybrid spectacles, and examples of franchise aesthetics, presents its own set of questions. My project of franchise aesthetics and its deliberate emphasis on multi-film series which exhibit an intensification of hybrid techniques across a given period of time is useful here. By deliberately looking at franchise film-making, we can discern a clear trajectory. Hybrid techniques are becoming increasingly ubiquitous, increasingly invisible, and increasingly instrumental in the fine-tuning of the semantic content of the frame. They attest to a reigning media regime less and less anchored by the criteria of live-action cinematography and more and more determined by the ways in which live-action cinematography can be manipulated and hybridised with animation techniques. And yet the residual perception of hybrid images as windows rather than surfaces, a perceptual mode reinforced by hybrid imagery's tight control over the semantic dimension of the frame, means that this shift in media-regime means a correspondent shift in media-epistemology. "As they currently surround us" Flusser continues, "technical images signify models, instructions about the way society should experience, perceive, evaluate, and behave. They signify instructional programs" (50). The intensification of hybrid procedures has meant both an intensification of the way in which the semantic content of the image is controlled, but also an intensification of the degree to which these new orders of temporality and spatiality stand as models for experience beyond the confines of the cinema. The pragmatic flipside of this intensified control over the contents of the image, then, is a

correspondent intensification of the degree to which these new hybrid media-epistemics instruct us how to live. Hybrid media's deepening control of the semantic content of mainstream cinema transforms the instructional program they signify, the new orders of time, space, historicity and futurity they manifest, into an imperative so ubiquitous as to be banal. But that is not to say that counter-readings and critical engagements are not possible. Only, that they are growing increasingly untenable as hybrid techniques pass their vanishing point and transform into one of the unseen norms of contemporary visual experience.

It remains to assert franchise aesthetics as a critical practice and give it a platform from which to operate going forward. In order to do so, I'd like to briefly contrast it with some recent critical projects that aim to draw strong connections between film and media aesthetics and capitalism after the 2008 financial crash. There have, in the past few years, been a number of books which tackle the problem of the representability of capital by seeking aesthetic disclosures of the essential dynamics of capitalism as it has stumbled on since 2008. These books include Kirk Boyle and Daniel Mrozowski's *The Great Recession in Fiction, Film and Television: Twenty-First Century Bust Culture* (2013), Clint Burnham's *Frederic Jameson and The Wolf Of Wall Street* (2016), Alberto Toscano and Jeff Kinkle's *Cartographies of The Absolute* (2014) as well as two books by Milo Sweedler: *Rumble and Crash: Crises of Capitalism in Contemporary Film* (2019) and *Allegories of the End of Capitalism: Six Films on the Revolutions of Our Times* (2020). Two things unite these books, the first is an affinity, pledged with varying degrees of explicitness, with Frederic Jameson's methodology and, in particular, his concept of cognitive mapping. As Clint Burnham describes it, cognitive mapping is the practice by which we "understand the world via its objects" (37). These objects – film and other media amongst them, as well as the materials we use to consume them - form "a map that we only consult unconsciously, as if it is forbidden to directly acknowledge the social totality in which we live our daily lives" (36). This concept bequeaths a methodology for these books wherein the totality of capitalism can be furtively and incompletely glimpsed within media objects. The second thing that unites these books is the assumption that capitalism - as it continues after the 2008 crash - is in a state of crisis. Leaving aside the straightforward riposte outlined by David Harvey in his 2010 book *The Enigma of Capital and the Crises of Capitalism* that capitalism is fuelled by crisis, and has therefore never been without crisis (Harvey, 2010), this presupposition gives rise to a great deal of informative analysis. This analysis assumes that the crisis will be visible in the tensions, incongruities and affective strategies of mainstream film culture, and is an exemplary critical tool for examining films like *Wolf of Wall Street* (2013) which exhibits a great deal of unease within its explorations of finance. Axiomatic of this school of criticism, Toscano and Kinkle trace the outline of what they call the "bleak naturalism of crisis" (2014, 238). Likewise, Milo Sweedler

discerns - in his six carefully selected films - both the contours of capitalism as it expresses itself via mainstream cinema and the fissures of discontent that have opened up in the downturn. Thus, for Sweedler, films "mediate movements in the global economy while issuing a renewed call to arms to people that may have momentarily retreated from the battle against the behemoth of multinational capitalism" (10). The linked criteria that guide this form of analysis are, firstly, the assumption that capitalism is in crisis, and, secondly, that the aesthetic ramifications of capitalism-in-crisis appear only occasionally, and within texts which are exceptional or uniquely positioned to reflect on their socio-economic context and the processes of their own production.

Precluded from this line of thinking is the idea that mainstream cinema is an expression of capitalism *not* in crisis, but functioning at its smoothest, thriving through deepening humanitarian and democratic and ecological catastrophes. Furthermore, what holds these exercises in cognitive mapping back, from my perspective, is an overemphasis on how capitalism-in-crisis and its attendant atrocities is anxiously transmuted into one or two prominent films in mainstream culture. This perspective means that as a critical mode it is constantly in search of defining texts, and can't pay due attention to the dominant tropes of the mainstream. Surely, if we're looking for a text to typify the current contortions of global capital, the first place we should look is in the franchises being churned out by globally dominant companies like Disney. If franchise aesthetics can be seen, in one light, as an aesthetic consequence of twenty first century digital capitalism thriving *despite* the deepening crises of the past decade, it follows that as capitalism responds to the global pandemic and its ensuing economic fallout, the emergent forms already identified within my thesis will intensify, extrapolate and proliferate. This is the platform for franchise aesthetics. Of course, given the trajectory of mainstream cinema towards VFX laden confections, saying that films are only going to get more and more stuffed with hybrid imagery risks profound banality. However, armed with the critical apparatus of franchise aesthetics, the banality of a mainstream visual culture saturated by hybrid image techniques can be pointedly and usefully critiqued.

Franchise aesthetics doesn't rely on a context of capitalism in crisis, given that, as I've argued, hybrid live-action/animation techniques are often bound up in the normalisation and promulgation of perceptual modes that benefit, as opposed to contradict, capitalism. However, that is not to say that as a critical framework franchise aesthetics cannot be turned towards analysing capitalism in crisis. As a last thought, I'd suggest that franchise aesthetics, in recognising the intensification of hybrid imagery since 2008 and the role that hybrid imagery plays in extending our capitalistic mise-en-scène, can offer a range of insights into the role of visual culture, beyond the rubric of Kinkle and Toscano's "naturalism of crisis" (2014, 238). Rather than proposing an aesthetics *of* crisis, franchise aesthetics can begin to name the aspects of visual culture that will compound and

intensify in response to crisis. As capitalism iterates and mutates through the Anthropocene and into the unknown territories of pandemic recovery and ecological impasse, capital-intensive and hyper-financialised film culture will continue to articulate the parameters for option and response that benefit capital. Franchise aesthetics stands as a way of identifying this process, relishing the technological ingenuity and new phenomenologies of hybridity, and inhibiting the instrumentalising media-epistemologies that form around new hybrid effects and the constellations of live-action cinematographic media and digital animation techniques that are yet to emerge.

REFERENCES

1917 (2020) dir. Sam Mendes[Film] (Amblin Partners)

300 (2006) Zach Snyder [Film] (Warner Bros.)

8i (2017) *Holo* [Mobile App] Available Apple App Store:
https://apps.apple.com/gb/app/holo/id1194175772 (Last accessed 02/02/2021)

"A Bit of Me-Time" (2019) Fuze Tea [Advertisement] Coca-Cola Online:
https://www.youtube.com/watch?v=O5bZiqmI0lo&feature=emb_logo (last accessed 17/03/2020)

"A Trip Through New York, 1911" (2019) Prod: Denis Shriyaev [YouTube Video] Available online:
https://www.youtube.com/watch?v=hZ1OgQL9_Cw

Adam Savage's Tested (2018) "Hands-On: The Looking Glass Holographic Display" [YouTube Video]
https://www.youtube.com/watch?v=htFotQi_-jY Last accessed 20/07/20

Affuso, Elizabeth & Santo, Avi (2018) "Mediated Merchandise, Merchandisable Media: An Introduction" [Journal Article] *Film Criticism* Vol 42 Issue 2 (November 2018) Available:
https://quod.lib.umich.edu/f/fc/13761232.0042.201/--mediated-merchandise-merchandisable-media-an-introduction?rgn=main;view=fulltext (Last accessed 18/01/21)

Alice Comedies (1923-27) Prod: Walt Disney [Film Series] (Disney)

Allen, Matthew (2017) "Memory in Technoscience: Biomedia and the wettability of mnemonic relations" in *Digital Memory Studies*: *Media Pasts in Transition* ed. Andrew Hoskins (New York; Routledge)

Altered Carbon (2018) Series 1, Dir/Prod. Laeta Kalogridis [TV Series] (Netflix)

America In Colour (2016-20) Prod. John Cavanagh [Television Series] (Smithsonian Channel)

Aquaman (2019) Dir: James Wan [Film] (Warner Bros., DC Films)

Archer, Neil (2019) *Twenty-First Century Hollywood: Rebooting the System* (New York; Wallflower Press)

Armitage, Hugh (2019) "How Iron Man's First Film Almost Destroyed Marvel" [Online article] DigitalSpy.com available: https://www.digitalspy.com/movies/a26232993/iron-man-marvel-loan-bankruptcy/ (last accessed 26/07/21)

AR Show (2018) "Barry Sandrew on the Controversy of Colorizing the Classics" [Podcast] Available: https://www.thearshow.com/podcast/012a-barry-sandrew-part1 (last accessed 01/02/21)

Asseli, Olivier and Gosselin, Louis Auger (2013) "This Side of Paradise: Immersion and Emersion in S3D and AR" in *3D Cinema and Beyond* Dan Adler, Janine Marchessaul, and Sanja Obradovic, eds., (Toronto, Public Books)

Aswad, Jem (2020) "The Beatles "Get Back" Preview" [Online Article] Variety.com https://variety.com/2020/film/news/beatles-get-back-preview-peter-jackson-1234871690/ [last accessed 01/02/21]

Atomic Blonde (2018) Dir. David Leitch [Film] (87Eleven)

Auschwitz Untold: In Colour (2020) Prods. FullWell 73 [Television Mini-Series] (Channel 4)

Avatar 2009 dir. James Cameron [Film] (20th Century Fox)

Barrier, Michael (1999) *Hollywood Cartoons: American Animation in its Golden Age* (Oxford; OUP)

Baudry, Jean-Louis (1974) "Ideological Effects of the Basic Cinematic Apparatus" [Journal Article] *Film Quarterly* (Vol. 28 No.2 Winter 1974-5) pp. 39-47

BBC Teach (2018) "They Shall Not Grow Old – First World War resources" [Online Teaching Tool] BBC.com Available: https://www.bbc.co.uk/teach/they-shall-not-grow-old-first-world-war-resources/zh7mgwx Last accessed: 01/02/21

Beckman, Karen ed. (2014) *Animating Film Theory* (Durham NC; Duke University Press)

Beller, Jonathan (2002) "Kino-I, Kino-World: Notes on the cinematic mode of production" in *The Visual Culture Reader* 2nd Edition ed. Nicholas Mirzoeff (London; Routledge)

Beller, Jonathan (2006) *The Cinematic Mode of Production: Attention Economy and the Society of the Spectacle* (Lebanon, NH; Dartmouth University Press)

Beller, Jonathan (2018) *The Message is Murder: Substrates of Computational Capital* (London; Pluto Press)

Beller, Jonathan (2021) *The World Computer: Derivative Conditions of Racial Capitalism* (Durham; Duke University Press)

Belton, John (2008) "Painting by the Numbers: The Digital Intermediate" *Film Quarterly* 61(3): 58-65

Belton, John (2012) "Introduction: Digital Cinema" *Film History* Vol. 24 pp. 131-4

Bennets, Leslie (1986) “Colorizing Film Classics: A Boon or Bane?” *NY Times*, Aug 5th 1986 available online: https://www.nytimes.com/1986/08/05/movies/colorizing-film-classics-a-boon-or-a-bane.html (last accessed: 28/04/20)

Berardi, Franco ‘Bifo’ (2009a) *Precarious Rhapsody: Semiocapitalism and the pathologies of the post-alpha generation* (London; Minor Compositions)

Berardi, Franco ‘Bifo’ (2009b) *The Soul at Work: From Alienation to Autonomy* (Los Angeles; Semiotext(e))

Berg, Adam (2009) “Carousel 2:19” [Advertisement] Philips

Bergson, Henri (1911 [1975]) *Creative Evolution* (Westport Conn., Greenwood Press)

Bionicle: Mask of Light (2003) Dir. Terry Shakespeare, David Molina [Film – Straight to Video] (The LEGO Group)

Birdman, or (The Unexpected Virtue of Ignorance) (2014) Dir. Alejandro G Iñárritu [Film] (Fox Searchlight Pictures)

Blade Runner 2049 (2018) Dir: Dennis Villeneuve [Film] (Sony)

Black Panther (2018) Dir: Ryan Coogler [Film] (Marvel Studios)

Bolter, J David & Grusin, Richard (1999) *Remediation: Understanding New Media* (Cambridge MA; MIT Press)

Bordwell, David (2002) “Intensified Continuity: Visual Style in Contemporary American Film” *Film Quarterly* Spring 2002 Vol 55 No. 3 pp.16-28

Bosley, Rachel (2018) “Uncanny Valley: *Blade Runner 2049*” in *American Cinematographer* Available online: https://ascmag.com/articles/uncanny-valley-blade-runner-2049 Last Accessed 20/07/20

Boyd-Barrett, Oliver and Mirrlees, Tanner eds. (2019) *Media Imperialism: Continuity and Change* (London; Rowman & Littlefield)

Boyle, Kirk and Daniel Mrozowski (2013) *The Great Recession in Fiction, Film and Television: Twenty First Century Bust Culture* (London; Rowman & Littlefield)

Breaking Bad (2008-13) Prod. Vince Gilligan [TV Series] (ABC)

Brinker, Felix (2016) “On the Political Economy of the Contemporary (Superhero) Blockbuster Series” in Denson and Leyda (eds) *Post-Cinema: Theorizing 21st Century Film* (Falmer; Reframe Books)

Brinkmann, Christine (2014) “The Tensions of Colour in Colourized Films” in *Colour and Empathy* (Amsterdam; AUP)

Britain In Colour (2019) Prod. John Cavanagh [Television Series] (Smithsonian Channel)

Brown, William (2013) *Super Cinema: Film-Philosophy for the Digital Age* (Oxford; Berghahn)

Brown, William and Fleming, David H (2020) *The Squid Cinema From Hell: Kinoteuthis Infernalis and the Emergence of Chthulumedia* (Edinburgh; EUP)

Brown, William and Fleming, David H. (2015) "FCJ-176 A Skeuomorphic Cinema: Film Form, Content and Criticism in the 'Post-Analogue' Era." *The Fibreculture Journal* Issue 24 available at http://twentyfour.fibreculturejournal.org/2015/06/04/fcj-176/ (Last accessed, 01/09/2020)

Bruckner, Franziska (2015) "Hybrid Image, Hybrid Montage: Film Analytical Parameters for Live-Action/Animation Hybrids" *animation: an interdisciplinary journal* Vol 10 (1) pp.22-41

Bruno, Giuliana (2002) *Atlas of Emotion: Journeys in Art, Architecture and Film* (London, Verso)

Buchan, Suzanne, (2012) *Pervasive Animation* (London, Routledge)

Burnham, Clint (2016) *Frederic Jameson and the Wolf of Wall Street* (London; Bloomsbury Academic)

"Chaos Cinema" (2011) Prod: Matthias Stork [Video Essay] Online: https://vimeo.com/28016047 (last accessed 17/03/2020)

Cholodenko, Alan ed. (2007) *The Illusion of Life II: More Essays on Animation* (Sydney, Power Publication)

Christensen, Per – Lead Author, with: Julian Fong, Jonathan Shade, Wayne Wooten, Brenden Schubert, Andrew Kensler, Stephen Friedman, Charlie Kilpatrick, Cliff Ramshaw, Marc Bannister, Brenton Rayner, Jonathan Brouillat, and Max Liani. (2018). RenderMan: An Advanced Path Tracing Architecture for Movie Rendering. ACM Trans. Graph. 37, 3, Article 30 (July 2018), 21 pages. https://doi.org/10.1145/nnnnnnn.nnnnnnn

Chun, Wendy (2016) *Updating to Remain the Same: Habitual New Media* (London, MIT Press)

Chun, Wendy (2011) *Programmed Visions: Software and Memory* (London, MIT Press)

Clark, Andy (2010) "Minds in Space" in Mix, Kelly S., Smith, Linda B., and Gasser, Michael (eds.) *The Spatial Foundations of Cognition and Language: Thinking Through Space* pp. 7-15 (Oxford, OUP)

"Color film was built for white people. Here's what it did to dark skin." (2015) Prod: Vox [YouTube Video] Posted Sep 18, 2015 Available: https://www.youtube.com/watch?v=d16LNHIEJzs (Last Accessed 28/04/20)

Color-Hex.com (2019) (Website) "Caucasian Skin Tone Colour Palette" last accessed April 11, 2019 https://www.color-hex.com/color-palette/737

Cook, Roger F. (2020) *Post-Cinematic Vision: The Coevolution of Moving-Image Media and the Spectator* (Minneapolis; University of Minnesota Press)

Cook, Roy T. & Bacharach, Sondra eds. (2017) *LEGO and Philosophy: Constructing Reality Brick-by-Brick* (London; Wiley-Blackwell)

Cortade, Ludovic (2012) “The ‘Microscope of Time’: Slow-motion in Jean Epstein’s Writing” in Sarah Keller & Jason Paul (eds.) *Jean Epstein: Critical Essays and New Translations,* Amsterdam; Amsterdam University Press pp. 161-176

Crary, Jonathan (1990) *Techniques of the Observer: On Vision and Modernity in the Victoria Age* (Cambridge MA, MIT Press)

Cronin, Paul (2014) *Be Sand, Not Oil: The Life and Work of Amos Vogel* (Vienna; Austrian Film Museum)

Crow, David (2019) “*Jurassic Park*: Still the Best Use of CGI in a Movie” [Online Article] denofgeek.com Available: https://www.denofgeek.com/movies/jurassic-park-still-the-best-use-of-cgi-in-a-movie-steven-spielberg/#:~:text=In%201992%20and%201993%2C%20Spielberg,with%20CGI%20in%20Jurassic%20Park. (last accessed 19/11/20)

Cubitt, Sean (2004a) *The Cinema Effect* (Cambridge MA; MIT Press)

Cubitt, Sean (2004b) “Review Article: The Shape of Things” *Leonardo* (2004 Vol 37 No. 5) pp 403-5

Cubitt, Sean (2014) *The Practice of Light: A Genealogy of Visual Technologies from Prints to Pixels* (London; MIT Press)

Cubitt, Sean (2016) Legibility:: ESSCS 2016 European Summer School in Cultural Studies, Leiden & Amsterdam 20-24 June 2016

Cubitt, Sean (2010) “Making Space” [Online] Senses of Cinema Available: http://sensesofcinema.com/2010/feature-articles/making-space/ (Last Accessed: 20/07/20)

D’Ancona, Matthey (2017) *Post-Truth: The New War on Truth and How to Fight Back* (London; Ebury Press)

Darley, Andrew (2000) *Visual Digital Culture: Surface Place and Spectacle in New Media Genres* (London; Routledge)

Debord, Guy (2005) *The Society of the Spectacle* trans. Ken Knabb (London; Rebel Press)

Degen M, Melhuish C and Rose G (2017) “Producing place atmosphere digitally: Architecture, digital visualisation practices and the experience economy”. *Journal of Consumer Culture* 17(1): 3–24

Denis Ivanov (2015) *Hologram 3D Pet Simulator* [Mobile App] Available in Apple Store: https://apps.apple.com/gb/app/hologram-pet-3d-simulator/id991257407 (Last accessed 02/02/2021)

Del Rio, Elena (2016) “Biopolitical Violence and Affective Force: Michael Haneke’s *Code Unknown*” in Denson and Leyda (eds) *Post-Cinema: Theorizing 21st Century Film* (Falmer; Reframe Books)

Denson, Shane (2014) *Postnaturalism: Frankenstein, Film and he Anthropotechnical Interface* (New York; Columbia University Press)

Denson, Shane (2016) "Crazy Cameras, Discorrelated Images, and the Post-Perceptual Mediation of Post-Cinematic Affect" in Denson, Shane, and Leyda, Julia (eds.) *Post Cinema: Theorizing 21st Century Film* (Falmer, REFRAME Books, 2016) pp. 193-233

Denson, Shane and Leyda, Julia (2016) "Perspectives on Post-Cinema: An Introduction" in Denson, Shane and Leyda, Julia eds. *Post-Cinema: Theorizing 21st Century Film* (Falmer; Reframe Books)

DeOldify (2018) "About" https://deoldify.ai/ [Last accessed 01/02/21]

Divergent (2014) Dir: Neil Burger [Film] (

Doane, Mary Ann (2002) *The Emergence of Cinematic Time: Modernity, Contingency, The Archive* London; Harvard University Press

Doane, Mary Ann (2007) "Indexicality: Trace and Sign: An Introduction" *differences* (18) 1 pp. 1-6

Doane, Mary Ann (2012) "Notes from the Field: Contingency" Arts Bulletin, September 2012 Vol XCIV No 3 pp. 348-9

Donald, Merlin (2002) *A Mind So Rare: The Evolution of Human Consciousness* (London: W.W. Norton)

Donaldson, Lucy Fife (2017) "Rough and Smooth: The Everyday Textures of *Toy Story*" pp 73-86 in Smith, S. , Brown, N. , & Summers, S. (Ed.). (2018). *Toy Story: How Pixar Reinvented the Animated Feature*. London: Bloomsbury Academic. Retrieved September 2, 2020, from http://dx.doi.org/10.5040/9781501324949

Dowd, Maureen (1987) "Film Stars Protest Coloring" *NY Times* May 13th 1987 available online: https://www.nytimes.com/1987/05/13/movies/film-stars-protest-coloring.html (Last accessed: 28/04/20)

Drop Zone (1994) Dir. John Badham [Film] (Paramount Pictures)

Edwardian Britain in Colour (2019) Prod. Leo Gizzi [Television Series] Channel 5

Einwächter, Sophie Gwendolyn (2017) "How Digital remix and fan culture helped the LEGO comeback" *Transformative Works and Cultures* Col 25 (2017) pp. 87-96

Elcott, N. (2020) The Phantasmagoric Dispositif: An Assembly of Bodies and Images in Real Time and Space. In Sæther S. & Bull S. (Eds.), *Screen Space Reconfigured* (pp. 283-316). Amsterdam: Amsterdam University Press. doi:10.2307/j.ctv12pnt9c.15

Elsaesser, Thomas (2016) *Film History as Media Archaeology: Tracking Digital Media* (Amsterdam; Amsterdam University Press)

Epstein, Jean (2012) *Jean Epstein: Critical Essays and New Translations* Sarah Keller & Jason Paul (eds.) Amsterdam; Amsterdam University Press

Erlich, Nea (2019) "Conflicting Realism: animated documentaries in the post-truth era" in *Studies in Documentary Film*, DOI: 10.1080/17503280.2019.1663718

Ernst, Wolfgang (2012) *Digital Memory and the Archive* (London, University of Minnesota Press)

Ernst, Wolfgang (2016) *Chronopoetics: The Temporal Being and Operativity of Technological Media* (Rowman & Littlefield)

Extraction (2020) Dir: Sam Hargrave [Film] (Netflix)

Failes, Ian (2019) "The Building Blocks Behind The LEGO Movie 2" [online article] vfxvoice.com, available at http://vfxvoice.com/the-building-blocks-behind-the-lego-movie-2/ (last accessed 02/09/2020).

Feiersinger, Luisa, Friedrech, Kathrin, Queisner, Moritz Eds. (2018) *Image-Action-Space: Situating the Screen In Visual Practice* (De Gruyter)

Feyersinger, Erwin (2010) "Diegetic Short-Circuits: Metalepsis in Animation" in *Animation* Vol 5 (3) pp. 279-294

Feyersinger, Erwin (2017) *Metalepsis in Animation: Paradoxical Transgressions of Ontological Levels* (Universitatsverslag Winter)

FIAF (2008) International Federation of Film Archives, "FIAF Code Of Ethics" accessed April 11, 2019 https://www.fiafnet.org/pages/community/code-of-ethics.html

Field, Aaron (2017) "Kingsman: The Secret Service – Every(ish) Hidden Cut in the Church Fight" [YouTube Upload] https://www.youtube.com/watch?v=ozjAdOXPYp8 (last accessed 17/03/2020)

Fight Club (1999) Dir: David Fincher [Film] (Fox 2000 Pictures)

Fisher, Mark (2009) *Capitalist Realism: Is there no alternative?* (London; Zero Books)

Fisher, Mark (2014) "The Slow Cancellation of the Future" [YouTube video] 22 May 2014, Available https://www.youtube.com/watch?v=aCgkLICTskQ (Last accessed 01/09/2020)

Fisher, Mark (2014) *Ghosts of My Life* (London; Zero Books)

Fitterman, Robert (2011) "Replacing References to Photography with References to the Web in Vilém Flusser's "Towards a Philosophy of Photography" (1983) in *English Language Notes* 49(2): 161-163

Flueckiger, Barbara (2008) "Digital Bodies" trans. Mark Kyburz extract from *Visual Effects* (Marburg; Schuren).

Fluekiger, Barbara (2017) "Timeline of Historical Film Colours," [website] available: filmcolors.org (last accessed 28/04/20)

Flusser, Vilém & Bec, Louis (2012) *Vampyroteuthis Infernalis: A Treatise, with a Report by the Institut Scientifique de Recherche Paranaturaliste* trans., Valentine A Pakis (Minneapolis; University of Minnesota Press)

Flusser, Vilém (1979) "Film Production and Consumption" (Uncollected Essay) Available: http://flusserbrasil.com/arte49.pdf

Flusser, Vilém (2000) *Towards a Philosophy of Photography* trans., Anthony Mathews (London; Reaktion Books)

Flusser, Vilém (2011a) *Does Writing Have A Future* trans. Nancy Ann Roth (Minneapolis; University of Minnesota Press)

Flusser, Vilém (2011b) *Into The Universe of Technical Images* trans., Nancy Ann Roth (Minneapolis; University of Minnesota Press)

Flusser, Vilém (2013) *Post-History* trans. Rodrigo Maltez Novaes (Minneapolis; Univocal)

Flusser, Vilém (2014a) *Gestures* trans., Nancy Ann Roth (Minneapolis; University of Minnesota Press)

Flusser, Vilém (2014b) *The History of the Devil* trans., Rodrigo Maltez Novaes (Minneapolis; Univocal)

Flusser Vilém (2014c) *On Doubt* trans., Rodrigo Maltez Novaes (Minneapolis; Univocal)

Franklin, Sebastian (2015) *Control: Digitality as Cultural Logic* (London; MIT Press)

Frie, Vincent (2018) "Jurassic World: Fallen Kingdom" [Online Article] artofvfx.com Available: https://www.artofvfx.com/jurassic-world-fallen-kingdom-david-vickery-overall-vfx-supervisor-alex-wuttke-visual-effects-supervisor-jance-rubinchik-animation-supervisor-industrial-light-magic/ (last accessed: 19/11/20)

Fuster, Jeremy (2018) "Mission: Impossible – Fallout – How Tom Cruise Pulled off That Insane Skydive" [Online Article] thewrap.com, https://www.thewrap.com/tom-cruise-mission-impossible-fallout-skydive-stunt/ (last accessed 17/03/2020)

Galloway, Alexander R. (2006) *Gaming: Essays on Algorithmic Culture* (Minneapolis; University of Minnesota Press)

Gandolfini, Enrico (2019) "Playing the post 9/11 on game service platforms: Premediation in The Division via Twitch.tv and Steam" *Convergence: The Journal of Research into New Media Technologies.* Dec2019, Vol. 25 Issue 5/6, p826-847. 22p

Gardner, Alan (2014) "LEGO Awarded 3D Printing Patent, May Allow Users to Print at Home" 3dprint.com available at https://3dprint.com/1383/lego-awarded-3d-printing-patents-may-allow-users-to-print-own-

bricks/#:~:text=Just%20last%20month%20Lego%20was,in%20a%20variety%20of%20ways. (last accessed 01/09/2020)

Ghost in the Shell (2017) Dir. Rupert Sanders [Film] (Paramount)

Godzilla (2014) dir. Gareth Edwards [Film] (Warner Bros.)

Goggin, Joyce (2017) "'Everything is Awesome': The LEGO Movie and the Affective Politics of Security" *Finance and Society* Vol. 3 Iss. 2 pp.143-58

Grainge, Paul (1999) "Reclaiming Heritage: Colourization, Culture Wars and the Politics of Nostalgia" *Cultural Studies*, 13:4, 621-638, DOI: 10.1080/095023899335077

Grainge, Paul (2002) *Monochrome Memories: Nostalgia and Style in Retro America* (Praeger, New Haven)

Gravity (2013) Dir. Alfonso Cuaron [Film] (Warner Bros.)

Grusin, Richard (2004) "Premediation" *Criticism* Vol. 46 No. 1 pp17-39

Grusin, Richard (2010) *Premediation: Affect and Mediality after 9/11* (London; Palgrave Macmillan)

Grusin, Richard (2015a) "Introduction" in Grusin, Richard (ed.) in *The Non-Human Turn* (Minneapolis; University of

Grusin, Richard (2015b) "Radical Mediation" *Critical Inquiry* Vol. 42 No.1 (Autumn 2015) pp 124-148

Gunning, Tom, Fosatti, Giovanna, Yumibe, Joshua, Rosen, Jonathon (2015) *Fantasia of Colour in Early Film* (Amsterdam, Amsterdam University Press)

Gurevitch Leon (2015a) "From Edison to Pixar: The spectacular screen and the attention economy from celluloid to CG" *Continuum: Journal of Media & Cultural Studies* (June 2015) Vol 29. Iss 3 pp445-465

Gurevitch, Leon (2008) "The Cinemas of Transactions" PhD Thesis, University of Lancaster

Gurevitch, Leon (2010) "The Cinemas of Transactions: The Exchangeable Currency of the Digital Attraction" *Television & New Media* (Sep2010) Vol 11 Iss. 5 pp. 357-386

Gurevitch, Leon (2012) "Computer Generated Animation as Product Design Engineered Culture or Buzz Lightyear to the Sales Floor, to the Checkout and Beyond!" [Journal Article] *Animation* Vol 7 Iss. 2 pp.131-49

Gurevitch, Leon (2015b) "The Transforming Face of Industrial Spectacle: A Media Archaelogy of Machinic Mobility" Senses of Cinema Issue 75 pp1-36

Gurevitch, Leon (2016) "Cinema Designed: Visual Effects Software and the Emergence of the Engineered Spectacle," in Denson and Leyda (eds), *Post-Cinema: Theorizing 21st-Century Film* (Falmer: REFRAME Books, 2016). Web. <https://reframe.sussex.ac.uk/post-cinema/3-1-gurevitch/>.

Hanna, Emma (2009) *The Great War on the Small Screen* (Edinburgh; Edinburgh University Press)

Hansen, Mark B.N. (2004) *New Philosophy for New Media* (London; MIT Press)

Hansen, Mark B.N. (2006) "Media Theory" *Theory Culture and Society* 23 (2-3) pp. 297-307

Hansen, Mark B.N. (2014) "Technical Repetition and Digital Art, Or Why the 'Digital' in Digital Cinema is not the 'Digital' in 'Digital' Technics" in Rania Gaafar and Martin Schultz (eds.) *Technology and Desire: The Transgressive Art of Moving Images* (Chicago; University of Chicago Press)

Hansen, Mark B.N. (2015b) "Our Predictive Condition, or, Prediction in the Wild" [Book Chapter] in in Grusin, Richard (ed.) *The Non-Human Turn* (Minneapolis; University of Minnesota Press)

Hansen, Mark B.M. (2015a) *Feed-Forward: On the Future of 21st Century Media* (Chicago; University of Chicago Press)

Hansen, Mark B.N., (2016) "Algorithmic Sensibility: Reflections on the Post-Perceptual Image," in Denson and Leyda (eds), *Post-Cinema: Theorizing 21st-Century Film* (Falmer: REFRAME Books, 2016). Web. <https://reframe.sussex.ac.uk/post-cinema/6-3-hansen/>.

Hansen, Miriam (1999) "The Mass Production of the Senses: Classical Cinema as Vernacular Modernism" in *Modernism/Modernity* Vol 6 No. 2 pp 59-77

Hayles, Katherine N. (1999) *How We Became Posthuman* (London; University of Chicago Press)

Haraway, Donna (1985) "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s" in *Socialist Review* (Iss: 80) pp 65-108

Herbert, Daniel (2017) *Film Remakes and Franchises* (New Brunswick; Rutgers University Press)

Herhuth, Eric (2017) *Pixar and the Aesthetic Imagination: Animation, Storytelling and Digital Culture* (University of California Press, Oakland)

Hesselberth, Pepita (2014) *Cinematic Chronotopes: Here, Me, Now* (London; Bloomsbury)

Higgins, Scott (2007) *Harnessing the Technicolor Rainbow*: *Color Design in the 1930s* (Austin; University of Texas Press)

Hight, Craig (2014) 'Automation within digital videography: From the *Ken Burns* Effect to 'meaning making' engines' *Studies in Documentary Film*, Vol. 8, Iss. 3, 235–50.

Holian Heather, L. (2018) "New and Inherited Aesthetics: Designing for the *Toy Story* Trilogy One Film at a time" in Smith, S. , Brown, N. , & Summers, S. (Ed.). (2018). *Toy Story: How Pixar Reinvented the Animated Feature*. (London: Bloomsbury Academic)

Holliday, Christopher (2018) *The Computer Animated Film: Industry, Style and Genre* (Edinburgh, Edinburgh University Press)

Holloway III, John Daniel (2016) "Everything is [Not] Awesome: Critique and Embrace of Ideology in the LEGO Movie" *International Journal of the Image* Vol 7, Iss 3 pp.55-63

Hoskins, Andrew Ed. (2017) *Digital Memory Studies: Media Pasts in Transition* (New York; Routledge)

Hoskins, Andrew, (2017) "The Restless Past: An Introduction to digital memory and media" in *Digital Memory Studies*: *Media Pasts in Transition* ed. Andrew Hoskins (New York; Routledge) pp. 1-24

"How Colorized Historical Footage is Painstakingly Made" (2017) Prod: The Smithsonian Channel [YouTube video] Available online: https://www.youtube.com/watch?v=uTy9fRo6D78 [Last accessed: 19/10/20]

Hui, Li; Liu, Tao; Woolley, Jacqueline D.; Zhang, Peng (2019) "Reality Status Judgements of Real and Fantastical Events in Children's Prefrontal Cortex: An fNIRS Study" *Frontiers in Human Neuroscience* Vol 13 (2019) Available: https://doaj.org/toc/1662-5161

Hutchinson, Pamela (2018) "LFF Review" Silent London, October 16 2018, Available online: https://silentlondon.co.uk/2018/10/16/lff-review-they-shall-not-grow-old-honours-veterans-but-not-the-archive/

I Am Not Your Negro (2018) Dir. Raoul Peck [Film] (Velvet Films)

ImageworksVFX (2017) "Kingsman: The Golden Circle – Fight over Briefcase" [YouTube Upload] https://www.youtube.com/watch?v=FEGQ1KWaaWs&feature=emb_logo (last accessed 17/03/2020)

Iron Man (2008) dir. Jon Favreau [Film] (Marvel Studios)

*Iron Man 2 (*2010) dir. Jon Favreau [Film] (Marvel Studios)

Iron Man 3 (2013) Dir. Shane Black [Film] (Marvel Studios)

It's A Wonderful Life (1942, colourised 1987) Dir. Frank Capra [Film] (MGM)

Jackson, Peter (2018) "Interview with Mark Kermode, LFF 2018" [DVD Special Feature] on *They Shall Not Grow Old* Dir: Peter Jackson [DVD] (WingNut Films)

Jaffe, Aaron (2019) *Spoiler Alert: A Critical Guide* (Minneapolis; University of Minnesota Press)

Jameson, Frederic (1991) *Postmodernism, or, the Cultural Logic of Late Capitalism* (Durham, NC, Duke University Press)

Jenkins Henry (2006) *Convergence Culture: Where Old Media and New Media Collide* (London, NY University Press)

Johnson, Derek & Herbert, Daniel (2019) *Point of Sale: Analyzing Media Retail* (New Brunswick; Rutgers University Press)

Johnson, Derek (2018) "Reluctant Retailing: Amazon Prime Video and the Non-Merchandising of Kids' Television" [JOURNAL ARTICLE] in *Film Criticism* Vol. 42 Issue 2 (November 2018) Available: https://quod.lib.umich.edu/f/fc/13761232.0042.208?view=text;rgn=main (last accessed 18/01/21)

Johnson, Derek (2019) *Transgenerational Media Industries: Adults, Children and the Reproduction of Culture* (Ann Arbor; University of Michigan Press)

Johnston, Sean F (2016) *Holograms: A Cultural History* (Oxford; OUP)

Jones, Nick (2015a) *Hollywood Action Films and Spatial Theory* (London; Routledge)

Jones, Nick (2015b) “Quantification and Substitution: The Abstract Space of Virtual Cinematography. In: *animation: an interdisciplinary journal*. Vol. 8, No. 3. pp. 253-266.

Jones, Nick (2019) “The Perpetual Motion Aesthetic of Action Films” in James Kendrick ed. *A Companion to the Action Film* London; (Wiley Blackwell) pp. 99-117

Jones, Nick (2020) *Spaces Mapped and Monstrous: Digital 3D Cinema and Visual Culture* (New York; Columbia University Press)

Jurassic Park (1993) Dir: Steven Spielberg [Film] (Amblin)

Jurassic World (2015) Dir: Colin Treverrow [Film] (Amblin)

Jurassic World: Fallen Kingdom (2018) Dir: J. A. Bayona (Amblin)

Kamen, Matt (2017) “Lego World is a fantastical building behemoth… just don’t compare it to Minecraft” [ONLINE] *Wired.co.uk* 24th Feb. 2017 Available: https://www.wired.co.uk/article/lego-worlds-ps4-xbox-one-nintendo-switch-interview (last accessed 15/01/21)

Kapitányá, Rohan; Nelson, Nicole; Burdett, Emily R. R.; Goldstein, Thalia R. “The Child’s Pantheon: Children’s Heirarchical Belief Structure in Real and Non-Real Figures” *PLoS ONE,* Vol 15 (6) Jun 17/2020 ArtID: e0234142 PLoS One

Kermode, Mark (2018) “They Shall Not Grow Old review” The Guardian 11th November 2018, available online: https://www.theguardian.com/film/2018/nov/11/they-shall-not-grow-old-peter-jackson-review-first-world-war-footage (last accessed 19/10/20)

Kim, Ji-Hoon (2016) *Between Film, Video, and the Digital: Hybrid Moving Images in the Post-Media Age* (New York, Bloomsbury Academic)

Kinder, Marsha (1999) *Kid’s Media Culture* (Durham, Duke University Press)

Kingsman: The Golden Circle (2017) Dir: Matthew Vaughan [Film] (20th Century Fox)

Kingsman: The Secret Service (2014) Dir: Matthew Vaughan [Film] (20th Century Fox)

Kirby, David (2010) “The Future is Now: Diegetic Prototypes and the Role of Popular Films in Generating Real-World Technological Development” *Social Studies of Science* 40, No.1 (2010): 41-70

Kittler, Friedrich (1999) *Gramophone, Film, Typewriter* trans., Geoffrey Winthrop-Young & Michael Wutz (Stanford; Stanford University Press)

Knight, Shawn (2016) “This is how car commercials are filmed without the actual car” [online article] techspot.com available at: https://www.techspot.com/news/65337-how-car-commercials-filmed-without-actual-car.html (Last accessed 04/09/2020)

Konda, Kelly (2016) “Captain Finance”: The Secret Hero Behind Marvel Studios” [online article] available at: https://weminoredinfilm.com/2016/05/05/captain-finance-the-secret-hero-behind-marvel-studios/ (last accessed 26/07/21)

Kunkel, Benjamin (2014) *Utopia or Bust: A Guide to the Present Crisis* (London; Verso)

Lamarre, Thomas (2009) *The Anima Machine: A Media Theory of Animation* (Minneapolis; Minnesota University Press)

Lamarre, Thomas (2018) *The Anime Ecology* (Minneapolis; Minnesota University Press)

Lanier, Clinton D. (2013) “Anthropomorphism, Marketing Relationships and Consumption Worth in the Toy Story Trilogy [Article] *Journal of Marketing Management* Jan 2013, Vol 29. Issue 1-2 pp. 26-47

Lasseter, John (interview with Jonathon Ross) “Welcome to My World” *The Guardian* 23 November 2001, available online https://www.theguardian.com/film/2001/nov/19/londonfilmfestival2001.londonfilmfestival2 last accessed (01/09/2020)

Lawnmower Man (1992) Dir: Brett Leonard [Film] (Allied Vision)

Lazzarato, Maurizio (2014) *Signs and Machines: Capitalism and the Production of Subjectivity* translated by Joshua David Jordan (South Pasadena CA, Semiotext(e))

Lazzarato, Maurizio (2019) *Videophilosophy: The Perception of Time in Post-Fordism* trans. Jay Hetrick *(*New York, Columbia University Press)

Leslie, Esther and Joel McKim (2017) “Life Remade: Critical Animation in the Digital Age” *Animation* 12 (3): 207-213

Levitt, Deborah (2018) *The Animatic Apparatus: Animation, Vitality, and the Futures of the Image* (London, Zero Books)

Lewis Roberts (2017) “It’s a dangerous world out there for a toy”: Identity Crisis and Commodity Culture in the Toy Story Movies [article] *Children’s Literature Association Quarterly* 42 (4): 417-437

Lewis, Sarah (2019) “The Racial Bias Built Into Photography” *Aperture Magazine* Special Issue “Vision & Justice: A Civic Curriculum” Reprinted in *NY Times* April 25th 2019, available: https://www.nytimes.com/2019/04/25/lens/sarah-lewis-racial-bias-photography.html (Last accessed 28/04/20)

Litten, Frederick (2011) “A Mixed Picture – Drawn Animation/Live Action Hybrids Worldwide from 1960s to the 1980s” [Online Essay] Available Online: http://litten.de/fulltext/mixedpix.pdf (Last accessed, 19/11/20)

Lui, Yong (2018) *3D Cinematic Aesthetics and Storytelling* (New York; Palgrave)

Mangolte, Babette (2003) “Afterword: A Matter of Time” [Chapter] in *Camera Obscura, Camera Lucida: Essays in Honour of Annette Michelson* (Amsterdam, AUP) pp. 261-274

Manovich, Lev (1993) “Mapping Space” [Essay] Available online: http://manovich.net/index.php/projects/mapping-space (Last accessed 04/12/20)

Manovich, Lev (1998) “Navigable Space” [Essay] Available online: http://manovich.net/index.php/projects/navigable-space (Last accessed 04/12/20)

Manovich, Lev (2001) *The Language of New Media* (Cambridge, MA; MIT Press)

Manovich, Lev (2002) “The Poetics of Augmented Space” [Essay] Available online: http://manovich.net/index.php/projects/the-poetics-of-augmented-space (Last accessed 04/12/20)

Manovich, Lev (2006a) “After Effects, or Velvet Revolution Part 1” [Article] Available online: http://manovich.net/index.php/projects/after-effects-part-1 (Last Accessed 19/11/20)

Manovich, Lev (2006b) “After Effects, or Velvet Revolution Part 2” [Article] Available online: http://manovich.net/index.php/projects/after-effects-part-2 (Last Accessed 19/11/20)

Manovich, Lev (2007) “Understanding Hybrid Media” [Online Article] Available online: http://manovich.net/index.php/projects/understanding-hybrid-media (Last Accessed 19/11/20)

Manovich, Lev (2015) *Software Takes Command* (New York; Bloomsbury)

Manovich, Lev (2016) “What is Digital Cinema?”[Chapter] in Denson and Leyda (eds), *Post-Cinema: Theorizing 21st-Century Film* (Falmer: REFRAME Books)

Marks Laura U. (2000) *The Skin of the Film* (Durham, NC; Duke University Press)

Martin D. (2020) “Reanimating the Dark Knight: Superheroes, Animation and the Critical Reception of The Lego Batman Movie” *Animation*. 2020;15(1):93-107. doi:10.1177/1746847719898785
Martin, Adrian 2009 “Revolutions in the Head: Vilém Flusser” in *Film, Theory and Philosophy: The Key Thinkers* Ed. Felicity Coleman (London, Acumen)

Martin, Randy (2002) *Financialisation of Daily Life* (Philadelphia; Temple University Press)

Mason, Paul (2015) *PostCapitalism: A Guide To Our Future* (London; Allen Lane)

Massumi, Brian (2015) *Ontopower: War, Powers, and the State of Perception* (Durham, NC; Duke University Press)

McKernan, Luke (2018b) “The Colours of War,” *Sight and Sound,* Vol. 28 Issue 4, April 2018

McKernan, Luke, (2018a) “Colouring the Past” online blog available: http://lukemckernan.com/2018/01/25/colouring-the-past/ (last accessed April 11, 2019)

McKim, Joel (2017) “Speculative Animation: Digital Projections of Urban Past and Future” *Animation: an interdisciplinary journal* Vol 12(3) pp. 287-305

McLuhan, Marhall (1964 [1994]) *Understanding Media* (Cambridge MA; MIT Press)

Mearian, Lucas (2016) “Disney files patent for near instantaneous 3D printing” *computerworld.com* 2 Mat 2016, available at https://www.computerworld.com/article/3063786/disney-files-patent-for-near-instantaneous-3d-

printing.html#:~:text=Disney%20Research%20has%20filed%20a,%22a%20nearly%20instantaneous%20manner.%22 (last accecssed 01/09/2020)

Miller, Stuart (2017) "The Blackbird Can Be Any Car It Wants To Be" [Online Article] Newsweek.com Available at: https://www.newsweek.com/2017/02/17/blackbird-can-be-any-car-it-wants-be-553295.html#slideshow/552416 (Last Accessed: 04/09/2020)
Minnesota Press)

Minority Report (2002) Dir: Steven Spielberg [Film] (Dreamworks)

Misek, Richard (2010) *Chromatic Cinema: A History of Screen Colour* (London, Wiley-Blackwell)

Mission: Impossible – Fallout (2018) Christopher McQuarrie [Film] (Paramount Pictures)

Mitchell, W.J.T. (2005) "There Are No Visual Media" Journal Of Visual Culture Vol 4(2) pp. 257-266

(London; SAGE)

Moana (2016) Dirs. Ron Clements, John Musker [Film] (Pixar/Disney)

Monteiro, Stephen. (2014) 'Rethinking Media Space'. Continuum 28, no. 3 (Spring): 281-285.

Mroz, Matilda (2014) *Temporality and Film Analysis* (Edinburgh; EUP)

Mulvey, Laura (2006) *Death 24x a Second: Stillness and the Moving Image* (London; Reaktion)

myheritage.com (2020) "In Colour" [Website] https://www.myheritage.com/incolor [Last accessed 01/02/21]

My Little Pony: Friendship is Magic (2010-2020) Prod. AllSpark Animation/Hasbro [TV Series] (Boomerang, UK)

Napper, Lawrence (2018) "They Shall Not Grow Old (2018) and the Elephant In the Room," International Association For Media and History, October 23, 2018, Available online: http://iamhist.net/2018/10/they_shall_not_grow_old/

Ndialianis, Angela (2004) *Neo-Baroque Aesthetics and Contemporary Entertainment* (Cambridge MA, MIT Press)

Neissen, Neils (2011) "Lives of Cinema: Against its 'death'" *Screen*, Volume 52, Issue 3, Autumn pp. 307–326

Niantic, Inc (2016) *Pokemon GO* [Mobile App] Available Apple Store: https://apps.apple.com/gb/app/pok%C3%A9mon-go/id1094591345 (last accessed, 02/02/21)

Nicholson, Tom (2020) "YouTubers are upscaling the past to 4K. Historians want them to stop." [Online Article] Wired.com Available online: https://www.wired.co.uk/article/history-colourisation-controversy (Last accessed: 20/10/2020)

Nord, Liz (2017) "Oscar-Nominated "I Am Not Your Negro": How Editor Alexandra Krauss Cut An 'Impossible' Film" [Online Article] nofilmschool.com Available online: https://nofilmschool.com/2017/02/i-am-not-your-negro-oscar-editor-alexandra-strauss-interview

Pacific Rim (2013) Dir. Guillermo del Toro [Film] (Legendary)

Pacific Rim: Uprising (2018) Dir. Steven S. DeKnight [Film] (Legendary)

Panofsky, Erwin (1997) *Perspective as a Symbolic Form* trans. Christopher Wood (London, Zone Books)

Peck, Raoul & Ryfle, Steve (2017) "The POV Interview: Raoul Peck Talks "I Am Not Your Negro" [Interview] POV Magazine Feb 2nd 2017 Available online: http://povmagazine.com/articles/view/i-am-not-your-negro-interview (last accessed 20/10/20)

Pentzold, Christrian & Kaun, Ann & Lohmeier Christine (2020) "Imagining and instituting future media: Introduction to the special issue" *Convergence: The International Journal of Research into New Medi Technologies* Vol 26(4) pp. 705-715

Pierson, Michele (2002) *Special Effects: Still In Search of Wonder* (New York; Columbia University Press)

Piper, Melanie (2017) "Blood on Boylston: Digital Memory and the Dramatisation of Recent History in Patriots Day" *M/C Journal*, Oct 2017 Vol 20 Issue 5 pp.

Pisters, Patria (2012) *The Neuro-Image: A Deleuzian Filmphilosophy of Digital Screen Culture* (Stanford; Stanford University Press)

Playmobil: The Movie (2019) Dir. Lino DiSalvo [Film] (DMG Entertainment)

Point Break (1991) Kathryn Bigelow[Film] (20th Century Fox)

Pokemon Go Death Tracker (2016) [website] www.pokemongodeathtracker.com (Last accessed 04/12/20)

PR Newswire (2020) "Best Stocks for the AR/VR Boom" [Financial News Report] PR Newswire (01/22/20)

Prince, Stephen (1996) "True Lies: Perceptual Realism, Digital Images, and Film Theory" *Film Quarterly* 49, no.3 27-37

Prince, Stephen (2012) *Digital Visual Effects in Cinema: The Seduction of Reality* (London; Rutgers University Press)

Purse, Lisa (2007) "Digital Heroes in Contemporary Hollywood: Exertion, Identification, and the Virtual Action Body" [Article] *Film Criticism* Vol 32. No. 1. Pp 5-25

Purse, Lisa (2011) *Contemporary Action Cinema* (Edinburgh; EUP)

Purse, Lisa (2013) *Digital Imaging in Popular Cinema* (Edinburgh; EUP)

Purse, Lisa (2018) "Layered Encounters: Mainstream Cinema and the Disaggregate Digital Composite" *Film-Philosophy* Vol 22 Issue 2 pp. 148-167

Purse, Lisa (2019) "The New Dominance: Action-Fantasy Hybrids and the New Superhero in 2000s Action Cinema" " in James Kendrick ed. *A Companion to the Action Film* London; Wiley Blackwell, pp. 55-73

Rackham, Casey (2019) "*Toy Story 4* Has The Most Easter Eggs Of Any Pixar Film – Here's A List Of Them" [Online Article] *Buzzfeed.com* Available: https://www.buzzfeed.com/caseyrackham/toy-story-4-easter-eggs Last Accessed: 05/02/21

"Rachel, Jack and Ashley Too" (2019) Episode of *Black Mirror* Dir. Anne Sewitsky (Netflix)

Rambo, David (2016) "The Error-Image: On the Technics of Memory" in Denson and Leyda (eds)

Post-Cinema: Theorizing 21st Century Film (Falmer; Reframe Books)

Rampage (2017) Brad Peyton [Film] (Warner Bros.)

Ready Player One (2018) Dir: Steven Spielberg [Film] (Dreamworks)

Reddit.com Archived Thread (2020) "In the Lego Movie... Whenever a character had a shiny surface on them, you can see a thumbprint clearly on the surface" [Online Thread] Available at: https://www.reddit.com/r/MovieDetails/comments/6n2y7l/in_the_lego_movie_whenever_a_character_had_a/?utm_source=share&utm_medium=web2x&context=3 (last accessed: 04/09/2020)

Rees, Arianna (2019) "Pixar fans are freaking out about how real the cat in the new "Toy Story 4" trailer looks." [Online Article] Deseret.com available at: https://www.deseret.com/2019/4/19/20671257/pixar-fans-are-freaking-out-about-how-real-the-animated-cat-in-the-new-toy-story-4-teaser-looks#a-cat-got-pixar-fans-tongues-friday-after-the-studio-released-a-new-teaser-trailer-for-toy-story-4 Last accessed: 15/01/21

Renberg, Dan (1989) The Money of Color: Film Colorization and the 100th Congress (11 Hastings Comm. & Ent. L.J. 391 (1989)) Available at: https://repository.uchastings.edu/hastings_comm_ent_law_journal/vol11/iss3/1

Requiem for a Dream (2000) Dir. Darren Aranofsky [Film] (Artisan Entertainment)

Reynolds, Daniel (2019) *Media in Mind* (Oxford, OUP)

Rodowick, David (2007) *The Virtual Life of Film* (London, Harvard University Press)

Roe, Annabelle Honess (2014) *Animated Documentary* (Basingstoke, Palgrave-Macmillan)

Rosen, Philip (2001) *Change Mummified: Cinema, Historicity, Theory* (Minneapolis; University of Minnesota Press)

Rosing, Lilian Munk (2011) "The Hysteric's Guide to Pixar: On Voice and Gaze in Toy Story 1-2" *International Journal of Zizek Studies* Vol 5 Issue 4

Ross, M. (2020). Reconfigurations of Screen Borders: The New or Not-So-New Aspect Ratios. In Sæther S. & Bull S. (Eds.), *Screen Space Reconfigured* (pp. 105-126). Amsterdam: Amsterdam University Press. doi:10.2307/j.ctv12pnt9c.8

Ross, Miraim (2015) *3D Cinema: Optical Illusions and Tactile Experiences* (NY; Palgrave Macmillan)

Roth, Lorna 2009 "Looking At Shirley, the Ultimate Norm: Colour Balance, Image Technologies, and Cognitive Equity" *Canadian Journal of Communication* 2009, Vol 34 Issue 2 pp 111-136

Sandwell, Ian (2019) "Toy Story 4 Contains an Easter Egg from the New Pixar Movie Onward" [Online article] *digitalspy.com* Available: https://www.digitalspy.com/movies/a27305663/toy-story-4-easter-eggs-onward/ Last Accessed 05/02/21

Sæther, S., & Bull, S. (Eds.). 2020. *Screen Space Reconfigured*. Amsterdam: Amsterdam University Press. doi:10.2307/j.ctv12pnt9c

Schaffer, Willliam (2004) “The Importance of Being Plastic: The Feel of Pixar” *Animation Journal* Vol 12. Pp72-95

Schiller, Dan (1999) *Digital Capitalism* (Cambridge, MA; MIT Press)

Schroter, Jens (2014) *3D: History, Theory, and Aesthetics of the Transplane Image* (New York; Bloomsbury)

Scott, Suzanne & Click, Melissa (2017) *The Routledge Companion to Media Fandom* (New York; Routledge)

Seiter, Ellen (1995) *Sold Separately: Children and Parents in Consumer Culture* (New Brunswick; Rutgers)

Settembre, Amelia (2019) “How Deep is Uncanny Valley?” [online article] Medium.com Available at: https://medium.com/@amesett/how-deep-is-uncanny-valley-15a0ff2dfe5

Seymour, Mike (2017) “The Batman Movie: Keeping it Real” [online article] fxguide.com Available at: https://www.fxguide.com/fxfeatured/the-batman-movie-keeping-it-real/ (Last accessed: 04/09/2020)

Seymour, Mike (2019) “Toy Story 4” [podcast] the vfx show

Sharf, Zack (2020) “Tenet has under 300 vfx shots” [Online] Indiewire, Available: https://www.indiewire.com/2020/08/christopher-nolan-tenet-under-300-vfx-shots-1234578375/ (last accessed 06/01/2020)

Shaviro, Stephen (2010) *Post Cinematic Affect* (London; Zero Books)

Shaviro, Steven (2016) “Post-Continuity: An Introduction,” in Denson and Leyda (eds), *Post-Cinema: Theorizing 21st-Century Film* (Falmer: REFRAME Books, 2016). Web. <https://reframe.sussex.ac.uk/post-cinema/1-2-shaviro/>

Sherlock Holmes: Game of Shadows (2011) Dir. Guy Ritchie [Film] (Warner Bros.)

Shriyaev, Denis (2020) “Denis Shiryaev” [YouTube Channel] https://www.youtube.com/channel/UCD8J_xbbBuGobmw_N5ga3MA Last accessed: 01/02/21

Sin City (2005) Dirs. Robert Rodriguez and Frank Miller [Film] (Miramax)

Sky Captain and the World of Tomorrow (2004) Dir Kerry Conran [Film] (Paramount)

Smith, S. , Brown, N. , & Summers, S. (Ed.). (2017). *Toy Story: How Pixar Reinvented the Animated Feature*. (London: Bloomsbury Academic) Retrieved September 2, 2020, from http://dx.doi.org/10.5040/9781501324949

Smithsonian Channel (2017) “How Colorized Historical Footage is Painstakingly Made” [YouTube Video] Available: https://www.youtube.com/watch?v=uTy9fRo6D78&t=7s (Accessed: 01/02/21)

Sobchack, Vivian (1992) *The Address of the Eye*: *A Phenomenology of Film Experience* (Princeton; Princeton University Press)

Sobchack, Vivian (2004) *Carnal Thoughts: Embodiment and Moving Image Culture* (London; University of California Press)

Solo: A Star Wars Story (2018) Dir: Ron Howard (Disney)

Sony Pictures (2010) *Spiderman: Far From Home* [Mobile App] Available Apple App Store: https://apps.apple.com/fr/app/spider-man-far-from-home/id1244334475?l=en (Last accessed 03/02/21)

Spectre (2015) dir. Sam Mendes [Film] (Columbia Pictures)

Speed Racer (2008) Dir: Wachowski Siblings [Film] (Warner Bros.)

Spiderman: Far From Home (2019) Dir Jon Watts [Film] (Marvel Studios)

Spiderman: Into the Spiderverse (2018) Dirs. Bob Perischetti, Peter Ramsey, Rodney Rotham [Film] (Columbia/Sony/Marvel)

Stappers P. & Waller P. (1993) "Using the free fall of objects under gravity for visual depth estimation" Bulletin of the Psychonomic Society 31 (2) 125-127

Star Wars (1977) Dir. George Lucas [Film] (Lucasfilm)

Star Wars: Attack of the Clones (2002) Dir. George Lucas [Film] (Lucasfilm)

Stauffer, John; Trodd, Zoe; Bernier, Celeste-Marie (2015) *Picturing Frederick Douglass: An Illustrated Biography of the Nineteenth Century's Most Photographed American* (New York; Liveright)

Steigler, Bernard (2011) *Technics and Time 3: Cinematic Time and the Question of Malaise* Stanford; Stanford University Press

Strauss, Alexandra (2016) "I am not your negro, montage d'un film" [Blog post] alexandrastrauss.fr Available online: https://www.alexandrastrauss.fr/i-am-not-your-negro-montage-dun-film/ (Last accessed 20/10/20)

Street, Sarah (2012) *Colour Films in Britain: The Negotiation of Innovation 1900-1955* (London, Bloomsbury)

Sudmann, Andreas (2016) "Bullet Time and the Mediation of Post-Cinematic Temporality" in Denson and Leyda (eds) *Post-Cinema: Theorizing 21st Century Film* (Falmer; Reframe Books)

Summers, Sam (2017) "From Shelf to Screen: Toys as a Site of Intertextuality" in Smith, S. , Brown, N. , & Summers, S. (Ed.). (2018). *Toy Story: How Pixar Reinvented the Animated Feature*. London: Bloomsbury Academic. Pp. 127-140

Sweedler, Milo (2019) *Rumble and Crash: Crises of Capitalism in Contemporary Film* (Albany, SUNY Press)

Sweedler, Milo (2020) *Allegories of the End of Capitalism: Six Films on the Revolutions of Our Times* (London, Zero Books)

Telotte, J. P. (2010) *Animating Space: From Mickey to Wall-E* (Lexington; University of Kentucky Press)

Tenet (2020) Dir: Christopher Nolan [Film] (Warner Bros.)

The Beatles: Eight Days a Week – The Touring Years (2017) Dir. Ron Howard [Film] (Apple Corps)

The LEGO Batman Movie (2017) Dir. Chris McKay [Film] (Warner Bros)

The LEGO Movie (2014) Dir. Christopher Miller and Phil Lord [Film] (Warner Bros)

The LEGO Movie 2: The Second Part (2019) Dir. Mike Mitchell [Film] (Warner Bros)

The LEGO Ninjago Movie (2017) dirs. Charlie Bean, Paul Fisher, Bob Logan [Film] (Warner Bros.)

The Matrix (1999) Dir: Wachowski Siblings [Film] (Warner Bros.)

The Matrix Reloaded (2003) Dir: Wachowski Siblings [Film] (Warner Bros.)

The Pacific War in Colour (2018) Prod. John Cavanagh [Television Series] (Smithsonian Channel)

The Secret Lives of Pets (2016) Dirs. Chris Renaud, Yarrow Cheney [Film] (Universal)

The Wolf of Wall Street (2013) Dir. Martin Scorcese [Film] (Paramount)

They Shall Not Grow Old (2018) Dir: Peter Jackson [DVD] (WingNut Films)

Thor: Ragnarok (2017) Dir: Taika Waititi [Film] (Marvel/Disney)

Timecode (2000) Dir: Mike Figgis [Film] (Screen Gems)

Toscana, Alberto and Kinkle, Jeff (2014) *Cartographies of the Absolute* (London, Zero Books)

Toumarkine, Doris (2014) "Master of Conversions" *Film Journal International* Sep 2014 Vol. 117 Issue 9, pp. 52-98

Toy Story (1995) Dir. John Lasseter [Film] (Pixar/Disney)

Toy Story 2 (1999) Dir. John Lasseter [Film] (Pixar/Disney)

Toy Story 3 (2010) Dir: Lee Unkrich [Film] (Pixar/Disney)

Toy Story 4 (2019) Dir. Josh Cooley [Film] (Pixar/Disney)

Transformers (2007) Dir: Michael Bay [Film] (Hasbro)

Trolls (2016) Dir. Mike Mitchell; Walt Dohrn [Film] (Dreamworks)

Trolls: World Tour (2020) Dir. Walt Dohrn [Film] (Dreamworks)

Usai, Paolo Cherchi (2001) *The Death of Cinema: History, Cultural Memory and the Digital Dark Age* (London; BFI Publishing)

Van Camp, Julie (1995) "The Colorization Controversy" *The Journal of Value Inquiry* 29 pp. 447-469 https://doi.org/10.1007/BF01237531

Van Camp, Julie (2004) “Colorization Revisited” *Contemporary Aesthetics* Vol 2 (2004) Available online: https://contempaesthetics.org/newvolume/pages/article.php?articleID=254 (Last Accessed: 28/04/20)

Van Rooij, Malou (2019) “Carefully Constructed Yet Curiously Real: How Major American Animation Studios Generate Empathy Through a Shared Style of Character Design” [Journal Article] *animation: an interdisciplinary journal* Vol. 14 (3) 191-206

Victoria (2015) dir. Sebastien Schipper [Film] (MonkeyBoy)

Video Review (1986) Interview with Jimmy Stewart Video Review, June. 1986

VR Virtual Reality Inc (2017) *Holo.Cam LIDAR 3D* [Mobile App] Availiable Apple Store: https://apps.apple.com/gb/app/holo-cam-lidar-3d/id1271485980 (Last accessed: 02/02/21)

Wall-E (2008) Dir: Andrew Stanton [Film] (Pixar)

Wall-Romana, Christophe (2012) “Epstein’s *Photogenie* as Corporeal Vision: Inner Sensation, Queer Embodiment, and Ethics” in Sarah Keller & Jason Paul (eds.) *Jean Epstein: Critical Essays and New Translations,* Amsterdam; Amsterdam University Press pp. 51-72

Waltz With Bashir (2008) Dir: Ari Folman [Film] (Bridgit Folman Film Gang)

Warsaw Uprising (2014) Dir. Jan Komasa [Film] (Alvernia Studios)

Whissel, Kristen (2014) *Spectacular Digital Effects: CGI and Contemporary Cinema* (Durham, NC; Duke University Press)

Whissel, Kristen (2016) “Parallax Effects: Epistemology, Affect, and Digital 3D Cinema” *Journal of Visual Culture* 15 no.2 (2016) pp. 233-49

Who Framed Roger Rabbit? (1988) Dir: Robert Zemeckis [Film] (Touchstone)

William, Evan Calder (2017) *Shard Cinema* (London; Repeater Books)

Williams, Raymond (1977) *Marxism and Literature* (Oxford; OUP)

Wood, Aylish (2007a) “Pixel Vision: Digital Intermediations and Micromanipulations of the Digital Image” *Film Criticism* Quarterly Review of Film and Video, Film C (1). pp. 72-94

Wood, Aylish (2007b) *Digital Encounters* (London; Routledge)

World War One in Colour (2003) Nugus/Martin Productions [Television Series] (FreeMantle Media)

World War Two in HD Colour (2008) Prod./Writer. Jonathan Martin [Television Series] (World Media Rights)

Yuen, Jojo (2017) *FUI: How to Design User Interfaces for Film and Games* (CreateSpace)

Yumibe, Joshua (2012) *Moving Color: Early Film, Mass Culture, Modernism* (Rutgers University Press)

Zielinski, Siegfried (1999) *Audiovisions: Cinema and Television as Entr'actes in History* (Amsterdam, Amsterdam University Press)

Zuboff, Shoshana (2019) *The Age of Surveillance Capitalism* (London; Profile Books)