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Analysing creative multimodal data for a scientific audience

Jennifer S. Leigh, Jennifer R. Hiscock, Sarah Koops, Anna J. McConnell, Cally J.E. Haynes, Claudia Caltagirone, Marion Kieffer, Emily R. Draper, Anna G. Slater, Kristin M. Hutchins, Davita Watkins, Nathalie Busschaert, and Larissa K.S. von Krbek

Introduction

This chapter will discuss analysis of multimodal creative and qualitative research that has been undertaken by the International Women in Supramolecular Chemistry Network (WISC, 2020). WISC's overarching aim is to create a community to support the retention and progression of women and other marginalised genders within the field of supramolecular chemistry. WISC use an ethos that 'calls in' the community and embeds equality, diversity, and inclusion (EDI) expertise (Caltagirone et al, 2021a, 2021b). We intentionally use reflective methods as part of an Embodied Inquiry (Leigh and Brown, 2021) to capture and share their 'invisible, embodied, emotional experiences' (Leigh et al, 2023, p 1) as a way to raise awareness and effect change (Leigh et al, 2022a).

Context

Science is not known for its diversity and inclusion, whether that is regarding gender (Rosser, 2012), race (Prasad, 2021; RSC, 2022), sexuality (Smith, 2019), or disability (CRAC, 2020). Women are subject to resistance in academia generally (Shelton et al, 2018; Murray and Mifsud, 2019), and this is intensified within the science, technology, engineering, and mathematics (STEM) disciplines (Rosser, 2012). Despite investment in programmes designed to address the gender imbalance, women remain a minority, particularly in more senior roles (Rosser, 2017). This imbalance is more pronounced in some STEM disciplines than others. Women are one of several marginalised groups in the chemical sciences (RSC, 2018, 2022), with the period post-PhD being when they are most likely to leave (RSC, 2019a). Although there is not one easy explanation for this, the combination of the so-called chilly gender climate and challenges in planning families and pregnancy in a lab are certainly contributing factors (Stockard et al, 2018; Leigh et al, 2022b; Slater et al, 2022). In 2019, the Royal Society of Chemistry (RSC) stated that the rate of attrition is such an issue that the current rate of change would never result in gender parity despite half

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of undergraduate chemistry students identifying as women (RSC, 2019a). The RSC recognised that women are subject to multiple small barriers (or micro-aggressions) (Ahmed, 2017), resulting in them publishing less, in lower impact journals, and in their publications receiving fewer citations (RSC, 2019b). This, combined with intersectional factors due to disability, class, and race, mean that there is a significant under-representation of women and other marginalised groups in the chemical sciences.

WISC was launched in November 2019 to address the need for support to retain and progress women and other marginalised groups within the specific field of supramolecular chemistry. Jean-Marie Lehn described supramolecular chemistry as 'chemistry beyond the molecule' with the aim of 'developing highly complex chemical systems from components interacting by non-covalent intermolecular forces' (Lehn, 2002, p 4763).

> Supramolecular chemistry can simply be defined as the study of the non-covalent interactions between molecules. This is often referred to as a host-guest scenario in which reversible interactions temporally hold together two or more chemical species, thus forming a supermolecule. In essence you can think of these supramolecular reversible interactions that hold molecular species together as a type of atomic hook and loop fastening, similar to those developed by VELCRO®. If you pull the hook and loop partner strips apart, they remain unaltered, bring them back together and they will stick to each other, holding two pieces of material in place. This is a process that can be repeated, depending on the quality of your hooks and loops, an infinite number of times, and is the key principle behind all areas of supramolecular chemistry. (Leigh et al, 2022a, p 69)

WISC takes an intersectional approach (Crenshaw, 1989), recognising that gender is not binary, intersects with other protected characteristics such as race and ethnicity, and cannot be considered in isolation. While WISC uses the word 'women', we explicitly include trans women, genderqueer women, and non-binary people who are significantly female-identified. Rather than take a generalist approach to the long-standing (Fara, 2018) or wicked problem of marginalisation of women and other groups in STEM that is seemingly resistant to initiatives and funding (Rosser, 2004; Colwell and Bertsch McGrayne, 2020), we chose to build and extend a network to create a sense of kinship and responsibility so that the supramolecular chemistry community looked after its own.[1] The power of networks and community to support marginalised groups has been long recognised (O'Leary and Mitchell, 1990). Since its launch, WISC has established a mentoring programme, a website,[2] and bank of resources, collaborated on a series of webinars with an RSC Special Interest Group (RSC, nd), held events, created specialist support clusters (for parents, disabled/chronically ill/neurodivergent supramolecular chemists), and undertaken both community and funded research projects. These clusters have generated projects

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around aspects of parenting (Leigh et al, 2022b, 2022c; Slater et al, 2022) and accessible laboratories (Egambaram et al, 2022). WISC have also published on lived experiences of managing research through COVID-19 (Leigh et al, 2022a), and the more general lived experiences of women principal investigators (Leigh et al, 2022d), combining community research such as qualitative surveys with more reflexive projects incorporating creative research and collaborative autoethnography. The collaborative autoethnography was utilised to explore topics such as balancing work and family life, supporting research groups, career challenges, and life milestones in greater depth. Autoethnography (Bochner and Ellis, 2016) and collaborative autoethnography (where a group collaborates to combine experiences and insights, see Chang et al, 2016) are qualitative research techniques that use autoethnographic data to gain rigorous understanding of an issue set within a wider context. This chapter will primarily discuss the analysis of data collected as part of WISC's work with research groups and ongoing reflexive collaborative autoethnography into the lived experiences of women leading research in supramolecular chemistry.

Ethical and theoretical concerns

WISC unashamedly undertakes feminist research that does its best to capture and share the voices of those who are marginalised (Evans-Winters, 2019). Our research with the wider supramolecular chemistry community utilises conventional online qualitative surveys (Silverman, 2006). However, in order to capture and explore the emotional and embodied reality of lived experiences of women principal investigators working in a field in which they are marginalised due to their gender, we chose to take a phenomenological approach (Merleau-Ponty, 2002) and conduct an Embodied Inquiry (Leigh and Brown, 2021). This resulted in our approaches and data including open-text survey responses and transcripts together with objects and images used as metaphors for experiences (Lakoff and Johnson, 2003), video as method (Harris, 2016), rhythmanalysis (Lyon, 2019), and evocative collaborative autoethnography (Bochner and Ellis, 2016; Chang et al, 2016). Our analytical processing of these data was also embodied and creative (Leigh and Brown, 2021).

In terms of ethical approvals, the process was quite complex. The lead university in the funded research project did not require formal ethical approval for a collaborative autoethnography, as it was understood that the research was being undertaken with and by the group who would be conducting the analysis and publishing from the process. However, this is not the case for every institution, and it is wise to clarify ethical requirements before beginning a collaborative autoethnography research project (Bochner and Ellis, 2016). It is vital that any collaborative autoethnography group establish their agreed ground rules of how they intend to go about their research in terms of meetings, expectations, and publications at the very beginning of the process (Chang et al, 2016). Formal ethical approvals were needed for the research carried out using online surveys

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with the wider supramolecular chemistry community, the work with specific research groups, and to film in laboratory spaces. In addition to the formal ethical approval process (which was conducted through a social science department), which discussed methods, anonymity, data protection, and informed consent, WISC also had to gain approval and consent from the science department to bring cameras and recording equipment into the laboratory. In terms of participant recruitment, the online survey participants were recruited through social media and at in-person and online supramolecular chemistry conferences and events. The collaborative autoethnography participants were recruited through word of mouth from WISC board members, and the specific research groups who took part were led by collaborative autoethnography participants who volunteered.

In both the collaborative autoethnography and specific research group meetings multimodal data were gathered in the form of meeting recordings and automatic transcripts, images, drawings, and presentations created and shared by participants. The analytic process was iterative and collaborative. The creative outputs showcased and discussed here formed part of the analysis process and are not simply the product of creative methods of data generation. We used a process of identifying embodied responses and reactions to data (Leigh and Brown, 2021), generated through and by the collaborative autoethnography group, to identify 'hotspots' (MacLure, 2003), which were then discussed. We combined this process together with a reflexive thematic analysis of data generated through the online community surveys and worked with specific supramolecular chemistry research groups led by collaborative autoethnography participants (Braun and Clarke, 2006, 2019) to triangulate data of different types and from different sources (Leigh et al 2022a, 2022d).

When it came to wider ethical and axiological issues of avoiding harm (Kara, 2018), and given the close-knit nature of the supramolecular chemistry community, WISC decided to use a creative approach to ensure that there was no risk to any participant by inadvertently allowing them to be identified, even after a process of anonymisation or pseudonymisation. WISC has an ethos of 'calling in' rather than 'calling out' (Caltagirone et al, 2021b). The issues that WISC was exploring included experiences of harassment, discrimination, and marginalisation (Leigh et al, 2022d). Just as we did not want any potential 'victims' to worry that they might be identifiable, we did not want any potential 'perpetrators' to be recognised either. The collaborative autoethnography group had concerns that if it was possible, or even if audiences believed it was possible, to identify individual stories from participants of the group, then these participants would become vulnerable to being accused of complaining (Ahmed, 2021) or suffer the consequences of whistle-blowing (Bjørkelo, 2013). While we were keen to use a narrative approach, many draw on autoethnographic experiences and allow the author(s) to be identified (Shelton et al, 2018; Caine et al, 2022). We addressed this by using a process of fiction as research (Leavy, 2016) to construct a series of fictional narratives or vignettes. The use of narratives within research has a long history (Clough, 2002). WISC used the process of creative writing as part of

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the analytic process as well as to produce a means of disseminating 'true' stories that were not 'real', in part to safeguard research participants from harm (Bakan, 1996). The vignettes were created from all the research data available to us (see example Second Vignette Adi. All vignettes are available in the Open Access book *Women in Supramolecular Chemistry: Collectively Crafting the Rhythms of Our Work and Lives in STEM* (Leigh et al, 2022a)). The vignettes were shared with the collaborative autoethnography participants and with the specific research groups involved in the study before a process of editing and sharing iteratively to ensure that the vignettes did not inadvertently allow any individual to be identified and that they represented the themes and stories that were important to participants. The iterative process allowed participants and creators to reflect on the stories themselves, how the stories were shared, and how they as participants and their stories were represented within the vignettes, and allowed for edits and changes at every stage.

SECOND VIGNETTE ADI, 23, INTERNATIONAL PHD STUDENT

I don't think I want to stay in academia. I don't know what I want to do yet; there's a big part of me that wants to use my degree as I have worked so hard and spent so much time on it, but I don't think academia is for me. For one thing I don't see any faculty who look like me – there aren't any Black women in my department. I look at my supervisor and see all the hours she works.

Last year I know she was in the lab until 11 or 12pm every night. She tells us that she has to work that much just to get things done. She's not even a professor yet. There never seems to be any time to take stock of where we are and everything we've done – as soon as something works we just move on to the next thing. Before COVID we used to celebrate in the pub if the group published a paper, but these days it just doesn't happen. It can't happen.

I don't think it's only my supervisor either. I remember how burnt out all my lecturers looked when I was an undergrad. Always rushing from one thing to another. It's not that they didn't help – they did or I wouldn't be here now – but I don't think it's what I want for myself. Someone I know got a job as a lecturer straight after a post-doc. Almost unheard of right? But he has to do so much teaching and with everything online I can see that it's almost breaking him. At least my group isn't as bad as some. One friend I know is expected to work 11 hours a day 6 days a week and her supervisor regularly sets meetings at 8pm on a Friday night. I don't think I could cope with that; I want to have a life!

Even doing this is stressful. I cannot tell you the levels of stress that I just seem to cope with on a day-to-day basis and see as normal now! Worrying about not getting enough data, worrying when things don't work, worrying that I am not living up to the huge sacrifices I made to come here. So much

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> worry and fear. Leaving my family and boyfriend and only seeing them a few times a year is horrible. I worry that when things aren't working I'm letting my supervisor down. I have to live up to all their expectations of me and make this worthwhile. My whole support network is in another country. There are wellbeing services and things at uni – but they are really general and the waiting lists are so long it's like I'll graduate before I get any real help. My mental health is definitely suffering. As an international student the worry about the financial and emotional cost of my PhD is huge. And every time I want to apply for any kind of financial help they ask for a million things and really intrusive information so I just give up.
>
> Even if I did want to stay, it's not as though getting a job is easy. There are so few positions out there, and everywhere people are being made redundant. I heard somewhere that a CV that won't get you into a post-doc these days would have been better than one that would have got you tenure 30 years ago! It's as though expectations just keep going up and up and up and the pressure goes up with them.
>
> I also know I want to have a family and I just don't see how that's possible in academia. None of the really senior women I see in the field have children. I know that there are more younger ones coming through who have had kids or who are having kids, but who knows if they will make it to professor? There is so much holding women back in the field, doesn't being a mom just make it harder? How could I be the kind of parent I want to be and work that hard?
>
> That said, I don't know what I am going to do. Industry seems to be almost as bad. Maybe publishing or editing is the way forward. Something where I can use my science but also have a life. (Leigh et al, 2022d, p 50)

WISC's primary audience is the wider scientific community, more particularly those working within the chemical sciences, and specifically those within the field of supramolecular chemistry. One of the main challenges for us as researchers has been documenting, disseminating, and justifying the analytic processes in a way that is understandable and deemed rigorous enough for a scientific audience. Scientific ideas of objectivity and meritocracy dominate within STEM disciplines (Popper, 1959). Meritocracy implies that success is awarded by merit, and undermines the evidence seen in the data and lived experiences of those who are marginalised and face additional barriers to success in science (Rosser, 2017; McGee and Robinson, 2020). The idea of objectivity means that qualitative research can still be viewed with suspicion by some more used to the idea that there is an 'objective truth' (Bakan, 1996), and this is particularly true for creative qualitative approaches (Leigh, 2023). Even conventional qualitative approaches such as data saturation do not always apply to reflexive thematic analysis (Braun and Clarke, 2021) or phenomenological research methods (Moustakas, 1994). This does not mean to say that we shied away from using creative and embodied

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methods of data gathering, analysis, or dissemination despite the fact these were unfamiliar to the participants and co-researchers. In fact, we intentionally brought these into our analytic process. Reflecting on how it felt to be, in the words of Sarah Franklin (2015, p 158), a 'wench in the works', one collaborative autoethnography participant wrote:

> so aware of heart pumping and expanding
>
> not sure whether terror or pride.

Realities of researching and analysing data in the real world

WISC's original plan was to set up a collaborative autoethnography project, where the participants would meet once a month for the duration of the funding, and use arts-based and reflective methods to explore aspects of their work and lives. Jennifer Leigh, once-chemist turned creative and qualitative researcher (Leigh, 2020), led this social science aspect and was to also work closely with one supramolecular chemistry research group, meeting them weekly and introducing them to reflective and arts-based methods to facilitate communication, group dynamics, and, hopefully, moments of creativity and inspiration. She would film in the laboratory, using time-lapse photography, to conduct a rhythmanalysis of the space and see how the researchers utilised the space within the lab. This work with the research group and the rhythmanalysis would feed back into the collaborative autoethnography, and throughout the period of funding there would be visits to the laboratories and research groups of other members of the collaborative autoethnography, to conduct shorter ethnographic studies, rhythmanalysis, and in-person workshops with each group. In addition, we originally planned to use a mixed-methods approach, to collect data on indicators of achievements at fixed time points, and to see if we could show quantitatively whether our creative and reflective approach had facilitated more and/or higher quality science. However, the project began in 2020 during a period of national lockdown due to COVID-19. The members of the collaborative autoethnography and their individual research groups were for the most part shut out of their labs. The collaborative autoethnography meetings became a site of peer support and connection as well as research. Work with the research group had to be online, which changed the shape of sessions from exploratory and creative workshops using arts materials and Lego© to online meetings on a virtual platform for group video calls (Peabody and Noyes, 2017). Leigh was not allowed into the labs when they reopened, as space was at a premium, with maximum numbers of bodies in a room, and it was imperative that the chemistry research be prioritised. A small amount of footage was filmed when access to the labs was less restricted. Travel was curtailed, and so planned visits to other collaborative autoethnography members' labs could not take place.

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Figure 6.1: 'Care packages' of art materials sent to participants



Collaborative autoethnography

The issues that people were sharing in the collaborative autoethnography and reflective research group meetings went beyond the expected trials and challenges of chemistry research and navigating academia to a broader sense of collective trauma; loneliness, isolation, helplessness, and burnout. As illustrated in Figure 6.1, participants were sent out 'care packages' to facilitate self-care and participation in reflective and artistic activities.

The value of the meetings as a safe space to vent, share, explore, and process became very clear to the participants as they reflected on their own and others' experiences and explored various themes and ideas about how they could be a chemist during COVID-19 with no access to a laboratory, or how to have the courage to take their own advice.

The project's timing meant that the collaborative autoethnography participants discussed the benefits and challenges of working from home, and how they experienced the continual pressure to work and not let life get in the way while being 'brilliant' within the neoliberal 'hustle culture' of academia:

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> What is hustle culture anyway? In a nutshell huStLe cUlTurE (as the name implies) means constant working <she writes before 9 am>
>
> Bombarded with stuff
>
> Brain overload
>
> Never resting
>
> Never sitting down
>
> Never good enough. (Collaborative autoethnography participant)

Other topics included the importance of communicating transparently in order to build a healthy research group culture or community, broader issues such as abortion and women's rights – 'I'm worried we have less rights now than in our mothers' generation' (collaborative autoethnography participant based in the US) – and acceptable clothes to wear in the lab:

> Conventionally, in a chemistry laboratory it is imperative for health and safety reasons to ensure that along with wearing a lab coat, gloves, and safety goggles, all skin is covered up. … In practice, 'lab-safe' clothes can equate to being told to wear a typically masculine uniform of baggy cotton jeans, trainers, and the like. The argument for this is that clothes in the lab need to be able to be removed easily in case of spills. Adding into the equation oversized lab coats and hair that has to be tied back can mean that for young women being in the lab is somewhat equivalent to removing their femininity, if they have been used to expressing that femininity through their clothes. Although some may say that a lab is not a place to express personality and identity, this perspective homogenises lab workers, and expects them to all tend towards the 'average' – which of course is skewed by imbalanced representation. We all have personality and identity, but only some are told that this should not be expressed, or that it is the wrong sort of personality. In the labs where we have been, typical 'blokey' behaviour raised very few eyebrows, but overtly feminine behaviour had a different impact depending on the group.
>
> The goal of equality is not to remove femininity in order for women to be considered on a par with men. This does not put people on a level playing field. Instead, it reinforces the idea that only some bodies (male) are allowed to exist within the space. Equality and inclusivity mean that the space needs to genuinely reflect diversity and be comfortable to all people who might inhabit it. (Leigh et al, 2022a, p 101)

The collaborative autoethnography group quickly expanded from the original and intended six members to 14 across the UK, Europe, US, and Japan, as the original participants reached out to others within the supramolecular

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community who were struggling. They found support knowing that other people were feeling the same: 'It feels so good to speak about my feelings with you! Thanks a lot for let me be part of this [sic]' (collaborative autoethnography participant).

Reflective research groups

The sessions with the supramolecular research groups were more structured and boundaried than the collaborative autoethnography meetings, as they were delivered to support the students and their development as well as gather or create data (Leigh, 2023). The two groups that Leigh worked with had different needs, and the focus of sessions was adapted in response. For example, one research group required more explicit input to establish a cohesive and supportive environment. In line with the research study's aims to improve scientific outputs through creative and reflective methods, work with this research group aimed to develop a group culture, improve communication, and create a supportive group dynamic to facilitate an environment more conducive to productivity. Towards the beginning of working with them, one group member said about the culture, 'it's not very team driven' (man 24, postgraduate research student (PGR)). The sessions explored a lot of themes including expectations of self and others, creativity, productivity, and communication. On reflection, the participants described the sessions as 'a bit more like group therapy when we started' (man 21, PGR). Leigh has a background in therapeutic work (Leigh, 2020), and she was able to contain and boundary the work as it became more therapeutic (Leigh, 2023). At the end of the project participants reflected:

> Lots of changes for the better … and that has improved my research. I have improved as a chemist in my ability to be an independent researcher. (man 23, PGR)

> The last year has seen a significant amount of change and progress. I struggled to take responsibility and ownership of my PhD. … A lot of things needed to click into place and I have now done 2/3 [of the work necessary to complete] in 8 months. … The culture of the group has changed – more accountable for themselves and also willing to help. Adds to a community and makes it more enjoyable and we can be more productive. (woman 22, PGR)

> The first year/year and a half were difficult. … Lots of stress and anxiety and imposter syndrome. … [Now I'm] much happier with what I'm doing, how I work, more positive feelings. (man 26, PGR)

> The group in general have come a long way. Everybody seems more involved and feeling the ownership. (man 21, postdoc)

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While some meetings were less cathartic (Finlay, 2022), they still addressed issues such as pressure, expectations of themselves and others, and what success might look like or feel like (Figure 6.2):

> Success is when I don't feel overwhelmed at the start of the day. (woman 14, PGR)

> There are two parts to it – professionally and in academia it's about being acknowledged and acknowledging what I've done. … Success I want to attain is just being happy. (woman 13, PGR)

Both supramolecular chemistry research groups used images and objects as metaphors for their experiences (Lakoff and Johnson, 2003), for example a rollercoaster ride as their PhD journey, or an 'I ❤ Jesus' bracelet as a symbol of gratitude and a reminder to enjoy every second of life. They reflected that they found the sessions very helpful, valued feeling part of a community, and that it was beneficial to hear how people were feeling as well as to talk about research. The meetings gave them a confidence boost, and helped them appreciate the things that went right, and to celebrate the small things more.

> 'Makes it easier to get on with the actual science' (woman 18, PGR)

This comment encapsulates the wider aim of the research project, which was to use reflective and creative methods to enable individuals and groups to do better science.

Strengths, challenges, and further developments

A strength of WISC's creative data analysis process was that it allowed us to implement transdisciplinary perspectives (Stone, 2015), and move beyond scientific and disciplinary norms and expectations of research (Aikenhead and Ogawa, 2007). Qualitative research is very different from the cutting-edge chemical research the members of WISC and the supramolecular chemistry community engage in day to day. Qualitative research is not, and nor should it be, generalisable (Braun and Clarke, 2013). Instead, our approach was designed to capture and record lived experiences, and, at the same time, allow time and space to process these experiences (Evans-Winters, 2019). This approach continued through analysis. The images and accounts shared here are products of analysis as much as of a data capture process. The aim was to create a multilayered account, and at the same time allow the analytic process to 'be soul work that serves to heal thyself' (Evans-Winters, 2019, p 7). The fictional vignettes were created to capture the lived and embodied realities of women working within a discipline in which they are marginalised. Their purpose was to evoke emotions from the audience (Bochner and Ellis, 2016) so that they might better understand and

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Figure 6.2: What 'success' looks and feels like



empathise, without being distracted by attempting to identify *who* a story was about. WISC have shared these vignettes at international conferences as a way of highlighting lived experiences at different career stages. The response we have had has been unequivocally positive. The mode of sharing images created by participants, or reading out a fictional vignette or 'story-time', is very different from conventional scientific conference papers based around figures, graphs, and numbers. However, every time we have taken this approach we have been overwhelmed with positive feedback from the audience, expressing to us that it was as though we were telling their personal story. For example, each time after sharing Adi's vignette, international students, postdocs, and early career researchers have approached us to say that before hearing it they had thought they were the only one that felt that way. As a consequence of hearing our fictional vignette they felt less alone and more connected to the supramolecular community. Similarly, those who had not directly experienced those emotions were more able to recognise them in others, and see where they could bring about change. By disassociating the stories within the vignettes from 'realness' we are allowing the community space to take stock and enact change to more proactively include those who might otherwise be marginalised.

One of the biggest limitations of our creative analytic process has been finding where to situate our work generally, for scientific audiences in particular. Our

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analytic process resulted in objects, free-form writing, images, and drawings, including those shared here, which can be challenging to incorporate into conventional academic outputs. The content of our initial paper on WISC's ethos and approach to EDI (Caltagirone et al, 2021a) might have 'fit' better into a journal on higher education; however, it would not have reached the scientific audience we wanted to reach. For the most part, disciplinary scientific journals are set up to publish and disseminate scientific data.[3] Reviewers for chemistry or science journals are versed in methodological techniques appropriate for their specialisation, and are not generally experts in EDI issues, social science, or qualitative or creative methods. This has meant that some chemistry and science journals and funders, while stating the importance of WISC's work and aims for developing an inclusive and diverse research culture, are unable to 'fit' us into their standard criteria for publication or funding. Another limitation connected to this is the reputation and standing of EDI work generally (Ahmed, 2012). EDI work is undervalued, and if a chemist or scientist is seen to focus on EDI work this can in fact have a negative impact on their career. They can be perceived as being less dedicated to their science, with the time and energy spent on EDI work detracting from the research that 'counts' for matters of prestige, reward, or recognition. We need to change this within the wider research culture, and begin to value and reward EDI work, recognising that those who are marginalised or face barriers are often those most engaged with EDI (Ahmed, 2012). WISC members and others passionate about addressing EDI and research culture risk potential damage to their careers by devoting time to this work rather than their chemistry or scientific research.

Our aim is to continue with our approach of combining creative data creation *and* creative data analysis with more conventional data collection and analytic methods to triangulate our findings so that we can disseminate our work to a wide audience. Our choice to undertake an Embodied Inquiry (Leigh and Brown, 2021) through design, redesign, and data creation and analytical processes resulted in rich, evocative outputs such as those shared here, which are able to 'haunt' our audience (Wilson, 2018). This evocation of emotion is necessary to persuade people to effect change and address the barriers faced by those who are marginalised. In addition, our creative analytic method allowed the collaborative autoethnography participants to make sense of and process their own lived experiences beyond the catharsis of sharing their stories. We believe that our approach of using creative data analysis and creating *true* but not *real* stories has many possible applications, highlighting marginalised voices and experiences within research culture and other scenarios.

Notes

[1] A wicked problem is a problem whose solution requires a great number of people to change their mindsets and behaviour. For more on wicked problems see Rittel and Webber's (1973) original paper defining wicked problems in planning, and Lönngren and van Poeck's (2021) mapping of the literature.

[2] www.WomenInSupraChem.com

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[3] Please see Helen Kara's *Qualitative Research for Quantitative Researchers* (Kara, 2022) for exceptions to this in STEM disciplines, such as qualitative physics, as developed by de Kleer and colleagues in the 1980s (de Kleer and Brown, 1984; de Kleer, 1993).

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