# Spaces to Fail in:

## Negotiating Gender, Community and Technology in Algorave

Feature Article

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### Abstract

Algorave presents itself as a community that is open and accessible to all, yet historically, there has been a lack of diversity on both the stage and dance floor. Through women-only workshops, mentoring and other efforts at widening participation, the number of women performing at algorave events has increased. Grounded in existing research in feminist technology studies, computing education and gender and electronic music, this article unpacks how techno, social and cultural structures have gendered algorave. These ideas will be elucidated through a series of interviews with women participating in the algorave community, to centrally argue that gender significantly impacts an individual's ability to engage and interact within the algorave community. I will also consider how live coding, as an embodied techno-social form, is represented at events and hypothesise as to how it could grow further as an inclusive and feminist practice.

Keywords: gender; algorave; embodiment; performance; electronic music

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## Introduction

The term *algorave* came into use to describe events where people gather together to watch and perform live coding, or the act of exploring and editing code as performance.[1] Through this, algorave has emerged as a descriptor of genre—music made through live coding. Algorave brings the mundanity of computer programming to a social context where expertise is lived and live, where immediacy is skill and labour is performed. Together with the practice of projecting laptop screens, a central emphasis is placed on the technology being utilised. With this, algorave merges computer science and electronic dance music, and much research has separately explored issues around gender and participation in these fields—where women are wildly underrepresented (Vitores and Gil-Juárez 2015; Gadir 2016). It is algorave's intersection of these two practices that makes it an interesting space to critically explore the complex gender and power relations that emerge through performance and computation.

Much thinking around live coding has centred on development and application of tools and systems to perform with (Collins et al 2003; Roberts and Kuchera-Morin 2012); its practice as something that incorporates composition, notation and improvisation (Magnusson 2011; Sicchio 2014; Parkinson and Bell 2015); on liveness and embodiment (Baalman 2015; Cocker 2016) and on audiences (McLean and Burland 2016). In this article, I will explore existing discussions relating to gender in the two fields through pedagogy, practices, audiences and technologies. Algorave's merging of programming and electronic dance music results in the potential for many barriers to participation to be at play. Despite this, line-ups often demonstrate a greater gender balance than other electronic music club nights. Whilst discussions relating to diversity and equity are ongoing with organisers and practitioners, and several women and non-binary only workshops have taken place, there is little research pertaining to the impact this has had on the scene itself. Furthermore, there has been no research into the experience of underrepresented groups operating within in the scene.

Whilst live coding music is a relatively niche approach to electronic music performance, its visibility has increased through recent media attention, and much of this has been focussed around algorave. Due to its size and a tendency towards free and open source software, algorave can present as an opportunity for beginners and underrepresented groups through lesser economic barriers than many other electronic musical practices. At the same time, as an embodied performance where digital and technical expertise is wrought through and on the body, longstanding gendered concerns around embodied identity, performance, and discourse resonate in algorave (see Balsamo 1996). And we could add to these issues further discussions around gender and labour or precarity (Gill and Pratt 2008; Jarrett 2015). Until early 2016 there were only a few women active in the scene and those who were had academic backgrounds in computer music and electronic composition.

In this article, I will draw upon interviews conducted during August and September 2017 with 8 women who are active performers within the UK algorave scene. The women interviewed perform with a range of software setups in different mediums (sound and/

or visual) and come to the stage with different prior experiences of code and electronic music. Through these semi-structured interviews over PiratePad, an online live editing platform, we discussed their experience engaging, practicing and acting within the scene. Their accounts reflect the positive and open community that algorave positions itself to be through discourse and code of conduct, nevertheless, issues relating to gender and technology emerge through every woman's account. Taken together they suggest that despite the promises of both the community and the technology, the performative nature of live coding and performing algorave events deeply genders their experiences.

We discussed the disruptions that caused women to begin acting within the scene, the challenges they have faced through learning and developing their live coding skills and developed discussion across a range of themes from performances of gender, new ways of balancing creativity and technicality, questions of authenticity and supporting communities. Through this, I hope to shine a light on the work of women within the algorave scene, the barriers they have overcome and their work and activism. My biases are rather explicit: I feel a deep tenderness towards and connection with the women of algorave, as one of them. Many of the issues raised here, relating to practices, technologies and creative outcomes are relevant to all practitioners of live coding, but my intention here is not to exclude the men of algorave, but to provoke a discussion around algorave that can be led by women voices. It is also highlighted that whilst women are re-addressing the balance in algorave as a practice, they are underrepresented in the development of coding languages. I conclude by considering the next steps for Algorave in terms of developing a community of practice that addresses diversity in a more collective manner by considering technological and structural issues within the scene.

## Disruption, Activation and Overcoming Barriers

> Gendered processes are seen as constitutive of what is recognised and valued as technology and technological expertise; simultaneously, technology is one of the ways in which gender identities and regimes are reproduced and/or transformed (Vitores and Gil-Juárez 2015: 10).

Computing has been coded masculine. Historically men have controlled technologies (Faulkner 2001) and this is no different in Algorave, where languages are developed by men, gigs are mostly organised and promoted by men, and (historically) lineups were majority men. In discussions, many men have been sympathetic to these issues offering notions of solidarity, and some men have actively supported women-centred activities through funding and resources. Several women I spoke with alluded to a sense of hierarchy in live coding, whether it be in terms of the gatekeepers or promoters, or the dominance of conversation on online platforms around the technical or the idea that some performers are "bigger names" than others. Whether this hierarchy is imagined or felt (or both), it is important to note that both the human and computational generate this sense of structure. As Maureen McNeil has long argued, technology has always been bound up in and as a gender relationship (McNeil 1987: 5), which includes the social, material, the lived and the imagined.

As someone who is active within the community, it would be challenging for me to begin directly unpacking these structures that I in some way form. Instead, I will analyse the experiences of the women I have interviewed and suggest ways in which these structures impact them, and suggest ways in which these barriers can be lessened towards a feminist Algorave future.

The lack of women engaging in computer science has been a subject of analysis for decades. Common explanations for women's lack of engagement include perceptions of coding as a masculine activity and "the image and stereotypes of computer scientists and people in computer science as awkward, nerdy males who lack interpersonal skills and are obsessed with technology" (Vitores and Gil-Juárez 2015: 3). Many initiatives have been designed to support women back into computing (Lagesen 2007) on precisely this premise. Girls who Code for example, an initiative to encourage young women and girls into computer disciplines, tells us that "the gender gap in computing is getting worse... in 1995, 37% of computer scientists were women. Today it is only 24%".[2] Concepts such as the leaky pipeline (Vitores and Gil-Juárez 2015)—the notion that women are funnelled through computing education and leak out of it at various junctures—fail to address the historic and social issues that result in women "voting with their feet" and not engaging with computing (Faulkner 2001: 79). This pedagogically centred, linear approach presents women as an issue to be fixed rather than focusing on systems by which gender technologies are socialised, for instance stereotypes of women lacking the capacity to develop skills in computing (Vekiri and Chronaki 2008). Such stereotypes are reflected in some of the interviews, where women talk about early experiences and encounters with programming.

> Algoraver 2: I'd been given the opportunity a few years back to take part in [an introductory SQL programming course], but didn't really think I had the ability to really understand it.

A pivotal moment within Algorave, which sought to overtly re-address the gender balance, was a free all-women live coding workshop at Huddersfield University in December 2015. Since that workshop, the number of women actively live coding within Algorave has increased considerably. Such workshops seek to challenge assumptions that (live) coding is a purely technical practice, while the practices during the workshops can function to bridge experiential gaps (Lagesen 2007), so that the performative elements of (live) coding can also become more routine and habituated and less of a performance. It also broadened the professional backgrounds of women live coders: many had no previous experience of coding and limited experience of electronic music production. Algorave frames coding within an arts context, revealing that it can exist outside of mathematics and data analytics. It has been suggested that improving the teaching and feminising the content of programming can work to encourage women to engage with the discipline (Lagesen 2007). Furthermore, it challenges "the perception of computer-related subjects as unattractive and/or boring" (Vitores and Gil-Juárez 2015: 3). The women I interviewed identify the ease at which a satisfying outcome can be achieved as a motivational factor in continuing their engagement with live coding.

> Algoraver 4: I was able to create a quick simple techno track after an hour or so of learning ixi lang, which was so satisfying.
>
> [I] really didn't know coding could be used for fun until then. . . . I could understand how people used it to retrieve data etc., but that was about it. . . . I think it's made me realise that with understanding just the basics you can make things happen.

As well as presenting coding as something that has satisfying outcomes, Algorave places coding in a social scenario. Through the medium of Algorave, coding can be framed as a social activity, not least because of the performative and interactive elements of the events, but also because of the peer learning and support that underpins the accompanying workshops. This framing works to a certain extent to dispel the idea that coding does not necessarily have to be an obsessive or one-to-one relationship between human and computer, but one that is more relational and involving many different parties (Gansmo et al. 2003; Vitores and Gil-Juárez 2015). If we add the notion of liveness here too, live coding explores code as communication, as human, as lived and as embodied (Cronin and Roger 1999). What was noticeable from the conversations with Algoravers, was that it was these latter issues that were commented on:

> Algoraver 1: [The social is] a really important aspect of it for me actually, I've met so many people through live coding.
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> Algoraver 4: I guess I like hanging around those people, and they create a supportive environment for me. If they weren't so encouraging of beginners, I wouldn't be here. . . . I think that the Algorave/live coding environment is a really stimulating one overall, that just welcomes people of all levels and lets them do whatever they want, really.

Perceptions of coding as a masculine activity, have previously been reported to significantly decrease women's interest in it (Lagensen 2007), but it is noticeable from the two excerpts above that the social dimensions of Algorave—which I am arguing lends a differently gendered lens to it—are what is cited as important. Their participation is not a result of the technology itself, but the supportive and encouraging dimensions generated by the social and human element. In a similar vein to longstanding work on women and gaming (see Kerr 2003; Thornham 2011), all the women I spoke with were activated (i.e. became active performing in the Algorave scene) by having a direct encounter with someone already involved in Algorave: they joined because of social connections. One interviewee had attended a workshop on a whim, and she relayed how direct encouragement and being offered a local gig presented an opportunity for her to hone her skills and have something to focus on.

Through these activities, the number of actively performing women has significantly increased in the UK Algorave scene and has resulted in a critical mass (Roberts, Kassianidou and Irani 2002). This suggests a real potential for algorave to change the current gendered landscape of coding. A critical mass can work alongside the visibility of women role models in contemporary algorave scenes to shift a wider perception of coding as normatively gendered masculine (Lagensen 2007).

More than the visibility of role models, the social dimensions of coding workshops and the critical mass of women in the algorave scene though, what many women cited as important was the performative dimensions of algorave as something that was a turning point in terms of their coding and involvement in algorave:

> Algoraver 1: We were told that there was an algorave coming up, and anyone who wanted could have a go. That piqued my interest.
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> Algoraver 2: I really wanted to say yes to force me to engage with coding, it was a welcoming scene and being asked [to play] was a huge factor in making me do it. Having people who are willing to give those opportunities is definitely important.
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> Algoraver 6: I wasn't going to perform, like, ever, but [someone] convinced me to, and I am glad I did! . . . I could never picture myself making anything anybody would want to see. I never thought I would enjoy performing, but I really *really* ended up doing so!

## Playing Through Feel, Living Through Code

> Algoraver 4: No sound is the right sound.

It is this that is really interesting when thinking through issues of gender and technology, not least because of the longstanding feminist work around female subjectivity and issues of embodiment. Algorave stands in direct contrast with early writings about the disembodied promises of virtual reality or cyberspace (Rheingold 1991) which were picked up by feminist scholars (Turkle 1995) in relation to the possibility of leaving your real body behind and playing "a role as close to or as far away from one's 'real self' as one chooses" (1995:12). Here the body is not left behind and it is the performative and embodied act of algorave which is both initially terrifying and deeply persuasive. Coding has become one element of performativity (Butler 1990) so that interviewees emphasize the embodied experience rather than (for example) the act of coding or the technological successes and failures. I am suggesting here that we acknowledge this as part of the success of algorave in terms of rectifying a deep gender imbalance around gender and coding. Furthermore, algorave performers come from a multiplicity of musical disciplines, which might explain their readiness to perform and the variety and openness of stylistic approaches. Although there are discernible conventions emerging in terms of sound quality and rhythmic structures, algorave encompasses and shifts through many genres and is used as a description of a genre in itself. As a fledgling scene, the sonic qualities of algorave are open to interpretation and reconstruction by people with different aesthetic preferences. There are three discernible elements caught up in a performance: the body, the interface/code editor and the project screen image allowing audience member to see the code. The women I spoke with often emphasised embodied performance, as opposed to the relationship with the interface and projected code. Women acting within the scene find a sense of freedom in programming as a means of exploring sound in ways that they could not in consumer-available Digital Audio

Workstations (DAW). The tensions between the technicity of interface and approaches to performing and developing materials is discussed in the section below.

> Algoraver 2: I found them [DAWs] interesting, but something about it made me feel disconnected from the process . . . getting into making electronic music felt complicated, and perhaps even a big investment to get the right tools.
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> Interviewer: When you say right tools what do you mean?
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> Algoraver 2: Programs such as Ableton, but also maybe synths etc. Most people I know who make electronic music seemed to really know about synths etc. A perception from me (wrongly) that a level of expertise was needed, perhaps more so than with guitars/other instruments.
>
> Algoraver 1: Tidal is much more conducive to creating groove than a lot of conventional software, in my experience anyway! I think also as a beginner there is so much that e.g. Ableton can do that is impenetrable or difficult to access/figure out.

This notion of right tools reflects an assumption that a considerable amount of prior knowledge is required before being able to create music with these technologies—anyone who has led or taken courses on these tools will know this is not strictly true. Whilst digital technologies are often considered methods of democratising the music making process, issues around gender equity emerge when looking at their user base (Bell 2015). These technologies have been gendered through their design by developers who are predominantly men—and their representation in culture and society through advertisements and media. Several of the women I spoke with, who were not trained in music technology or computer music, had previously explored hardware synthesizers and software, particularly Ableton Live. They found investments of time, labour and money and requirements to acquire and use the right tools a daunting prospect. Furthermore, the above quote from Algoraver 2 reflects how they felt the need to demonstrate an understanding of what is under the hood to be able to engage with a technological interface in a creative manner. A typical commercially available DAW is in many ways a closed system and is generally black box in its design. It is also dependent on a user's interaction with a graphical interface. These systems are expansive and offer the music creator a complex range of processes and effects that can be applied to sounds that are organised within the simple piano-roll time grid. By reducing the interface to code, live coding presents an opportunity to perform differently—an environment with the appearance of technicality where sonic complexity ensues through the interaction of different code elements. Constraints arise through language and a performer's knowledge of it and through this, performers demonstrate a technical proficiency with their tool.

> Algoraver 2: I did [play around with synths previously], but not through trying to understand how they worked, really just messing around until something sounded interesting.

> Algoraver 4: That was so important to me personally: the immediate result. The idea that I wouldn't need to wrestle with a learning curve that would put me off before I'd even created one thing.

Messing around emerged as a method for the performers I interviewed to develop their style. Many of the women I spoke with developed their practice through a sense of exploratory feel—seeking a groove that they couldn't quite explain. Many women interviewed discussed their approach in abstract and intangible terms that are not goal orientated but felt experiences. The focus is shifted from the tools and mechanics or the materiality of code, to how it is lived through a performance. For my interlocutors, it is not about optimising algorithms, but embodying them and allowing their own musical voice to emerge through them.

> Algoraver 1: I practice to get a feel for what works, but this is a tricky balance because I don't like to overprepare.

Even the more experienced performers practice in this way, developing systems that challenge how and why they perform with code. This is demonstrated in an interviewee's (Algoraver 8) performance system. Here, the performer is not trying to explore the code as a mathematical process, but as something that is performed, embodied and lived.

> Algoraver 8: I made a piece with a concentration feedback loop—basically it tried to distract you by giving you new code to perform with when your concentration level gets high.

Through performance practitioners display a confidence in experimentation with code and an acceptance and enjoyment of failure, which does not necessarily emerge in how they discuss their relationship with the technology itself. Many of the women I spoke with didn't feel a need to have an in-depth technical understanding of the language they were using outside the demonstration of technicality on stage: "The audience has no or little preconceptions of what is a skilled performer and that makes it very accessible to enter as a newbie" (Algoraver 4). They didn't feel compelled to spend time learning Haskell and hack Tidal, or SuperCollider to hack Ixi Lang.[3] They are working within the constraints of their interfaces, playing through feel and at times pushing their limits. This presents some difference to the descriptions of some women's initial interactions with synthesizers and DAWs where they didn't feel confident using them as they weren't sure how they worked technically. At this stage in its conception, live coding as a technical practice is considerably more niche than operating Ableton, for example. The mechanics of live coding practice are explicit in performance, but audiences' general unfamiliarity with code-as-interface provides a space for women to mess around on stage. This seems to leave the only technical critique of a woman's live coding performance to be something along the lines of "did you code this all by yourself?"—well yes, you just saw me (an issue that will be discussed later in this article).

Living through code is a common theme that emerges in our discussions—from those who have been coding professionally for many years and those with less experience. For some, code emerges as a way of dealing with or organising life, for others code allows an expression of self, or a way of manipulating lived experiences and speaking back to them creatively. One person interviewed spoke about code as a way of working through their daily life, adding structures to it and providing functions for being. These lived patterns merge with their daydreams and expressions of colour and geometry to form her live coded visuals. One interviewee reflected on coding as a meditation—a daily practice and something that structures them. Another spoke about her sonic palette and how code helped her develop a sense of self in performance: "[incorporating] my own sounds into live coding is what makes me connect with it, makes it feel personal to me" (Algoraver 1). Using their *own* lived sounds allows the performer to express a sense of self on the stage that brings a sense of authenticity and has allowed her to develop her own musical voice within algorave. Doing code for some of the women I spoke with was never something they thought they were capable of, yet through live coding they have found code to be something they live and know. To a certain extent, these issues would seem to implicate the body and the notion of performativity in notions of expertise and knowledge enacted through the performance. But what is noticeable is that the women algoravers do not approach their performances in this way: their bodies are part of a wider experience and perhaps this is what enables them to experiment and fail behind the projected screen.

## Finding Joy in Error and Space to Fail in

> Algoraver 4: I do also often feel the annoying need to explain that I'm really just doing fairly simple stuff. It's a very strange dichotomy. On the one hand, I want to show that I am getting better with each gig, but on the other hand, when someone (male or female) asks me a question about my work, I tend to tell them I'm using a very simple language that does very simple things.

Many women directly identify a feeling of impostor syndrome, whilst others demonstrate characteristics of it through discussion. One more experienced performer describes this feeling initially but growing through it, but another is still plagued by feelings of inadequacy every time they enter the stage. Simplicity and complexity are themes that arise through most interviews. With this, many women I spoke with were quick to underplay what they do. The quote above is from an internationally performing algoraver who regularly features on mixes, has released an album and facilitates live coding workshops.

> Algoraver 3: One barrier to participation is the need to be perfect or produce perfect work. . . . Women find it hard to do something in a male dominated technical field because we do not allow ourselves to make mistakes, or our mistakes seem worse somehow because we are carving out our space in that world. I think to live code as a woman is to be exposed and then vulnerable to men who feel more comfortable in a tech environment and get things wrong and make mistakes and own the performance space.

> Algoraver 8: We talked about failing a lot when initiating new women into the scene and I think that's maybe changed some discourse for the better.

In computer science pedagogy, one argument that has been put forward to explain the lack of engagement from women is their fear of failure. Such fears were not currently held by any interview subjects, but most reported these concerns at the very outset of their live coding journey. Algoraver 2 made it clear that coding seemed like something inaccessible to her prior to starting live coding. This demonstrates a common barrier women face when engaging with coding—the idea that it is beyond their capacity, outside their interests and something that is intangible, with unclear outcomes and potentials (Lagensen 2007). It became clear through these interviews that by presenting and experiencing failure as something that could be every day, performative and creative it did not present such a barrier to women.

> Algoraver 4: Seeing a live coding workshop advertised for absolute beginners with no coding background and for women only. That sold it to me . . . removing the reason for that feeling [of being daunted in a tech environment], i.e. men, really helped the appeal. I felt that I could ask to repeat something, or ask a silly question just about getting the computer started up or the sound going, that sort of thing. . . . I would have felt hesitant to show my lack of skills in a mixed group, because I would have the overwhelming feeling of 'needing to know that stuff by now'.

Through all-women and non-binary workshops, underrepresented groups found a safe space to fail in their learning. Many of the women who first encountered live coding through this route echo the comments above. In their lived memory, men have taken technology and defined it as a male space. Although many women are keen to stress that this is not the actions of all men, it can take just one comment to create an invisible and impenetrable barrier to their access.

Algorave offers performers a space in which to fail constructively. From its inception, failure has been an expected and at times thrilling outcome of live coding performances. Failure emerges as errors through performance in number of ways—errors in code input and structure i.e. syntax, runtime and logic, made by the human performer; musical errors, or errors that cause sound to change in a way that is unintended; fatal errors that result in crashes and (often) restarts; and hardware errors, issues with powering connections and sound systems. Live coding is a practice of spontaneity, uncertainty and instability. Crashing has long been part of the algorave aesthetic as an expression of liveness and technicality—merging systems with bodies to the point of no return. Remembering a 2014 high-profile performance, one interviewee describes her experience of a crash.

> Algoraver 8: There was probably about 200 or so people there in a club. Anyway, my sound cut out 20 minutes into my 1 hour set. I had to do some debugging for a while to work out what was going on and basically either my FireWire cable died or it got pulled out or something—but there was a 15 minute debugging break in the middle

> of my set. I was pretty mortified, but talked to a few people and they didn't seem to mind—I think someone else also had a pretty big crash in the same show which helped a bit. I think the general consensus was that live coding is risky and shit happens.

The process of her crash was exposed and performed to the audience. A veil of silence lay over the club. Moving from the obvious, to the unexpected to the impossible she found the unlikely culprit: a hardware failure. Unravelling systems and wires on stage, a test of keeping your cool. Drunk, tired, stressed in the club looking for errors that aren't posted, tangible and that could be located at any point from software to laptop to audio interface to the venue's sound system itself. Stunning the audience with silence. Mortified, of course. Could this be celebrated in any other space? As the algorave scene has expanded its technologies have become more refined, setups are more stable and languages higher-level and more constrained. This has worked to reduce input errors and lower the knowledge threshold. The latter has been a powerful tool in engaging women in the practice. One interviewee, who has been performing for around a year, suggests they have never experienced a crash on stage. To many of the early live coders, this opportunity to fail publicly was a celebrated and crucial part of the art. The refinement of languages coupled with a shift towards artists pre-preparing large portions of their code suggests a move from algorave's raw experimentalism to composed performances. With performances becoming increasingly slick there is a space to explore the new tensions that arise when error occurs. This is particularly necessary to examine as the scene matures and commercial pressures increase.

## Dismantling Barriers and Performing Diversity

> Algoraver 4: It is never the male presence in itself that is a barrier, but it is the reactions of some men that will create an invisible barrier that says to women 'you don't belong here in the way that I do'.

All women are keen to discuss their positive experiences within the community, expressing similar sentiments to Algoravers 5 and 3, "I feel like the algorave scene is very inclusive" and "Algoraves are supportive of women and a safe space for women to work". Many of the women interviewed describe how they were encouraged by men to participate and offered performance opportunities by men. This atmosphere is fostered through a Code of Conduct developed by community members that extends to all those participating in events.[4] The main areas that were highlighted to be problematic for women were interactions with men in the audience after playing, and participation on the live coding chat forum on Slack.

Like all improvisational practices, audience feedback in the moment and post-performance is a critical element of an individual developing their practice and such interactions can be invaluable. Some of the performers I have spoken to require positive feedback to feel that their performance was a success. Those that report negative experiences at algoraves normally receive comments from men that undermine their technical ability. Men have shown genuine surprise at a woman's ability to code, resulting in the comments and behaviours

illustrated below. They do not necessarily relate to the quality of the performance—often the comments are made because the individual deems a performance to be good—but seek to suggest that the woman is incapable of producing complex code.

> Algoraver 8: Sometimes you can tell that they are a bit too surprised, but that's all. . . . I don't think I've ever had a direct criticism of my algorithms, but have had stuff like, "Was it really you doing the coding?"

> Algoraver 2: Someone [asked] me whether I'd actually made it myself, whether I'd written the code myself . . . or was just triggering [it]. . . . When I asked the question back of 'why' I did get positive feedback of, 'oh, it was really good, looks complicated'. . . . I did wonder at the time whether he would've asked the same to another guy.

> Algoraver 3: I have had an audience member mansplain brackets to me after I missed one and could not see it for ages.

In their performance with code, women algorave performers are dismantling stereotypes and gender norms. Some audience members (all those I interviewed said these comments came from men) are unable to bypass stereotypes even after seeing a woman coding onstage for thirty minutes. Whilst algorave places the act of coding in a very social and lived scenario, the stereotype of the programmer permeates through the attitudes and behaviours of some audience members. Interviewees identify similar issues in pedagogical contexts, where less-experienced men seek to undermine their knowledge and materials during teaching.

The live coding Slack channel (<https://livecode.slack.com>) is a key community space where live coders discuss their work.[5] The women I interviewed either never or very rarely enter into discussions on the Slack forum, reporting that they have felt ignored and undermined on the platform. Fast paced discussions of tools dominate general topic threads and this works to centre the technical in discussions. The dominance of technical discussion on Slack underpins the maleness of the forum. Discussions focussed on the technical and developmental can reinforce "women's exclusion from innovation and technological creation" (Vitores and Gil-Juárez 2015: 5).

## Towards a (more) Diverse Future

In the UK, an increase in the uptake of live coding by women can be traced back to several women-only workshops including one in December 2015, and another workshop at Nottingham Pride in summer 2016. These direct interventions were intended to pique the interest of women from a range of expertises—from music technology history to administration and market analysis. Through interventions and activism, the women of algorave are forging for themselves a space within Algorithmic dance culture. Algoraver 6 suggests that this is one thing that motivates her continued engagement with the community, "also how open the ladies are, and proactive too. That's important." This work has not gone unnoticed. A recent article by Mixmag suggests that women algorave

performers are crafting the future of electronic music (Bolt 2017). Women practitioners are conscious that despite their recent increase and exposure, the diversity of algorave should be continually questioned. As live coding continues to grow, activities to ensure a critical mass of women live coders must be sustained (Lagensen 2007). Furthermore, certain areas of underrepresentation need desperate attention: "I think there is a real issue with whiteness in algorave" (Algoraver 1).

Creating spaces for women to learn and fail within and external to the core community has significantly increased the number of women actively engaging within it. This requires time and labour and to a certain extent signifies a burden of representation on the women who are marginalised as it is. Many of the women I spoke to felt dutiful about "passing on" their live coding education which speaks to the strong sense of community felt between women of the algorave. Many women working within algorave have full time jobs and responsibilities elsewhere, but several have already conducted workshops for women and non-binary people. But there are still questions as to how algorave can create opportunities for women who need childcare support, financial support and come from different educational backgrounds. Ultimately, algorave women have made a huge contribution to live coding: they present a diversity of practice through expanding genres and styles, they offer new ideas and opportunities, wider communities and different knowledge. They remove live coding from its often-technical discourse by centring creativity. From these interviews, it became clear that a feminist narrative can be strengthened in live coding in several ways. Firstly, by shifting the discourse in live coding away from tools and developing those that focus on performance processes, experiences and creative outcomes. Secondly, by providing a stage and platform for women and other underrepresented groups to perform. Thirdly, creating opportunities for women to lead the organisation and promotion of events. Although the first and second of these are already being addressed to a certain extent by the community, this burden is not shared equally, and there is a need to develop these activities further.

Although women are using live coding languages to develop their musical practice, they are still finding themselves on the "receiving end" of a technology. This technology is not gender neutral—when men are have historically made most of the decisions pertaining to its design and achieved wider recognition as skilled workers in their use of it (Faulkner 2001). This gendering of technology underpins the live coding community. Women algorave performers are acting in a space that further confounds the complex gendering of technical skills and knowledge. These tensions around simplicity vs complexity, technicality vs creativity and authenticity vs knowledge rupture through ill-considered comments from audience members and, more passively, through technically dominated discussion of live coding by male practitioners on online forums. With this, another area that needs to be addressed is the environments and languages for live coding that are predominantly developed and sustained by men.[6] Whilst effort has been made to involve women as performers, little has been done to support women in developing their own languages. It could be suggested that a language developed by women would act as the next significant cornerstone in further feminising the algorave scene.

## Notes

1 Although recently algoraves have begun to incorporate performances involving algorithmically generated music in a wider sense.
2 See <https://girlswhocode.com/about-us> and <http://www.tech-girls.org/latestresearch.html> (accessed 10 January 2018).
3 Over time, this surface-level approach needs to be challenged, and opportunities for women to deepen their understanding of computation concepts and constructs need to be provided to have true structural and technological equity within the scene.
4 The full Code of Conduct can be found at this link: <https://github.com/danhett/algoraveconduct/blob/master/conduct.md> (accessed 10 January 2018).
5 This chat forum has recently moved from Slack to <https://talk.lurk.org/home> (accessed 8 May 2018).
6 There are notable contributions by women to the development of live coding languages. This includes Marije Baalman as a longstanding contributor to SuperCollider and part of the Modality team (see <https://modalityteam.github.io/team>), Amy Alexander's "The Thingee" and Olivia Jack's "Hydra" (see <https://github.com/ojack>).

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