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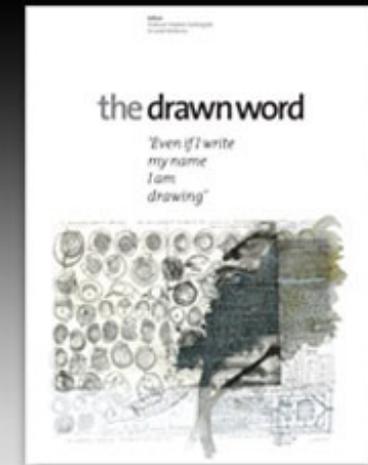
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## Aura Satz: 'I think of all my works as conversations'

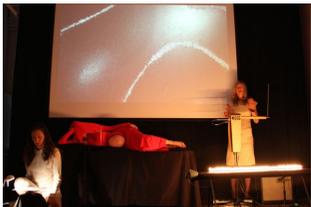
The artist reveals some of the hidden stories that inspire her film, performance and installation works, exploring different techniques for visualising sound and seeking to recover the unheard female voice

by ANNA McNAY



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Dr Janet McKenzie

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When she was pregnant with her daughter in 2003, the London-based artist Aura Satz (b1974, Barcelona) used her belly as the antenna for a bespoke theremin – a musical instrument that is played by proximity and hand gestures. She was already a performance artist and sculptor, but this new performance piece awakened Satz’s interest in sound and the correlation – or, more often, mismatch – between sound and vision. Since then, and increasingly through the medium of film, Satz has been exploring acoustics, vibration, sound visualisation and musical gesture. Another strand to her work focuses on gender and women’s (often unseen) contributions to technology. Many of her works combine the two, with months of research and complex backstories, which often remain largely unappreciated by her audience.

With a retrospective drawing to a close at the John Hansard Gallery in Southampton, and a new exhibition opening in Dallas, Satz invited Studio International to her studio to take a look at her work on screen and to hear about some of these thrilling and enthralling footnotes.

**Anna McNay: Your current exhibition at the John Hansard Gallery in Southampton “explores acoustics, vibration, sound visualisation and musical gesture with an aim to wrest the space between sound and image, to see how far these can be stretched apart before they fold back into one another”. Is this fairly typical of your work on the whole?**

**Aura Satz:** There are two primary strands to my work to date:



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one is music, sound technology, vibration and acoustics, and the other is more to do with gender and women's contributions to technology. The works on show at John Hansard are very much around acoustics, but it's really a retrospective of sorts. There are five films from the past six years, some new photographic works, and a new film and a sound installation, which comes from my Leverhulme residency with the Institute of Sound and Vibration Research and the music department at the University of Southampton. So yes, it's very much a body of work in line with my work as a whole.

**AMc: You began working with sound when you were pregnant in 2003, using your belly as a kind of instrument. How long have you been working with film?**

**AS:** The sound piece I made when I was pregnant, *Ventriloqua*, was more performative, really. There are films to document it, but it was a performance. Then, in 2008, I made a film about mechanical music and that was the moment from which I really began to prioritise film-making and move away from sculpture and performance. In 2010, I made a film about phonograph grooves and, after that, I got really into sound. Several of the works on show in Southampton are to do with acoustic devices and vibration. In a way, I was looking at different historical instances of sound visualisation technology. For example, *Vocal Flame* (2012) shows a Rubens' tube, which visualises sound as a standing wave of flames, and *Onomatopoeic Alphabet* (2010) uses a Chladni plate



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Piotr Uklański  
interview: 'I think of  
death all the time'

names, and Chromatopoei (2010) uses a Chladni plate, which led to the birth of acoustics. If you sprinkle sand or salt on to it, the vibration of the metal creates these beautiful, highly symmetrical sound patterns. What you see is a true representation of how the vibration is affecting matter, so the sound and image are linked. In the earlier works around acoustics, I was more interested in a connection or synchronicity. Later on, I became more interested in complicating that relationship between sound and image and testing the misfits and how much you can pull them apart. Perceptually, we always connect what we hear to what we see, but if you disrupt it a bit, interesting things start to happen.

One of the tropes that I'm interested in is ventriloquism, where the sound doesn't match the lips or is separated from its source. That's a way of testing ideas of embodiment, but also it's really interesting in relation to gender and the way women's voices are used or appropriated or misused or moulded. For Vocal Flame, I devised a spoken-word piece that tapped into the idea of the word as fire – a biblical idea – but then it narrativises certain elements of popular film such as The Exorcist, where the possessed young girl is voiced by a much older woman – it's dubbed, which is a kind of ventriloquist act in itself – and then also My Fair Lady, which is about moulding the voice, both in terms of the narrative, but also Audrey Hepburn's singing voice was actually dubbed over. I constantly test this voice and image mismatch or deceptive fit in my work.

Another thread that runs through some of the other works in the show is my use of a kind of sound quality that is somewhere between the acoustic voice and electronica. The film Theremin

(2010) uses the instrument of the same name, which is played by proximity. There's an antenna and you control pitch and volume by hand gestures. Lydia Kavina, the performer in the film, is actually the grandniece of Léon Theremin, the instrument's Russian inventor. Obviously, the question of mismatch is raised again, but I'm also really interested in the sound quality of the instrument. This idea of disembodied sound – electronic music, which is sound generated from nothing – is something that I am constantly researching as well. The haunting quality of sound evokes science fiction or horror film genres. It is somehow gendered as well – recalling the disembodied female voice.

The piece that really marked my shift of interest from sound technology and the history of acoustics to a more gendered angle is my film on Daphne Oram, *Oramics: Atlantis Anew* (2011). She was a pioneer of electronic music and one of the founders of the BBC Radiophonic Workshop. She was an inventor as much as a composer and she came up with this idea of the Oramics machine. She inverted the principle of optical sound (sound wave on film), so that whatever she drew would then be sonified. I was really fortunate because her machine was found and purchased by the Science Museum and I got to tinker with it just before it went on display. The soundtrack is made up of pieces she composed using her machine. It's a crazy machine.

**AMc: It's not a particularly pleasant sound, either. It's very high pitched.**

**AS:** That's a matter of opinion. It's early, experimental electronica with a lot of reverb. What's really interesting to me again is this

idea of the ghost in the machine. I don't always work with obsolete technologies, but I am really interested in technologies that are made to look unfamiliar. This machine looks like all kinds of things – almost like a bomb. It works with 35mm filmstrips and there are several parameters: pitch, vibrato, and so on. Ultimately, Oram was devising a new form of notation as much as inventing a new musical instrument. Although it is mechanical music, it wasn't quite dehumanised – she was still really interested in the hand-wrought qualities, so some of the filmstrips are hand-drawn.

**AMc: So she drew on the films and fed them in to the machine, and that's what the machine plays?**

**AS:** Yes, she was exploring what graphic shapes might sound like. This film led me in to my research on women, computers, coding, programming or notation – all these different facets of finding a language – many women remain unheard in the history of music and composition, and certainly in the history of technology and invention. There are a lot of things around voice and women that interest me and this Daphne Oram piece was seminal in making me focus on that and take it further.

For my residency in Southampton, I was asked to make something new based on this body of work that would be in the show. I was invited to work with the people at the Institute of Sound and Vibration Research and the composer Leo Grant from the music department. What interested me most was to get close up and look at things vibrating. It was also very much a formal experiment and exploration of particular string instruments, stretching and pulling apart the way that the sound and the image relate to each other.

We ended up constructing a completely new sound sphere with 32 speakers. It uses a special sound spatialisation software – it's like surround sound x 32. You stand in the middle of the installation and you hear the sound through it. It has a real architectural feel. It's called the Trembling Line – which then became the umbrella title for the whole show – because I think this really helps to encompass my understanding of a lot of things, not just the technicalities of acoustics. Obviously, vibration is a disturbance of equilibrium, but, to me, the idea of a sense of instability or constant oscillation is really interesting in relation to ideas of reading and deciphering. A lot of my other works look at technologies of sound writing, sound recording and sound playback, but they are also about enabling a different way of reading and looking, rewriting that relationship in a way that is constantly alive, unlike a normal alphabet, which is set in one particular way and we know how to read it back. I wanted to shake that up a bit and make it tremble. The films often look at things that haven't been heard or haven't been seen – unsung pockets of history – in a sense I also want to destabilise a more static reading of history.

**AMc: Is it all shot using a normal film camera?**

**AS:** Some of it is, but some of it, instead of being shot at 25 frames per second, is very high speed, 1,000 fps. The small vibrations reveal a constant pulsing – and that idea of things being potentially alive really appeals to me, things that we normally wouldn't see. Another film I made, Sound Seam (2010), looked at Rilke's idea of playing back the coronal suture [a seam in the human skull] with a phonograph needle – bringing hidden sounds into speech. The

sounds were not encrypted as grooves, they were never written in the first place – we just need the correct technology to decipher them. The phonograph is one such technology. I love the idea that there are lots of hidden sounds and voices that we just need to activate.

**AMc: Where did your interest in sound come from?**

**AS:** I think it was that performance piece that you mentioned – Ventriloqua – that I made when I was pregnant. I've re-enacted it a number of times since with pregnant bellies that weren't my own. The pregnant person becomes the antenna, using a bespoke theremin. They become a musical instrument, a channelling device. As I said, I am interested in displaced voices and, being pregnant, there was a sense in which I had another person's voice inside me. I don't mean that in a possessed, horror film kind of way, or even in the sense of fertility – it was more about my being a temporary container for another voice. I think of a lot of my works as a kind of conversation – whether it's someone that I'm collaborating with now or someone in the past that I'm speaking to and whose voice I am bringing out.

**AMc: Your work is really quite specific and informed. Did you study physics?**

**AS:** No. Every project is intensely research-based and each project leads from one to the next. Before I began working with sound, I did a lot of projects around magic. I was really interested in puppetry and ventriloquism, but from a slightly lateral angle. I was making sculpture and performance and photographic works. I also

made some films using archival footage of magicians. The idea of misdirection really interests me. I'd been working on a piece about the female body – the magician's assistant, getting cut up into pieces and put together again, a reassembling of body image. I had done a lot of research into iconoclasm as well – ways in which breaking things can affect their value or reinforce it. All those ideas around getting inside something, prying it open and revealing its mechanics definitely influenced my camerawork. It's not particularly about understanding the mechanics, though. I become an amateur enthusiast of whatever technology I am looking at, be that mechanical music or colour grading in films. I consult with historians, engineers and a whole range of people who are specialists and really know the technology. I just dip into it and learn as much as I can. I don't want to make didactic work. For example, *Doorway For Natalie Kalmus* (2013) looks at the analogue colour grading machine and the mechanics of its lenses, mirrors and colour filters, but I think that the way I shot it, people wouldn't know what it is. It starts to look like all kinds of other things.

**AMc: Who is, or was, Natalie Kalmus?**

**AS:** Natalie was the wife of Herbert Kalmus, the inventor of Technicolor. She worked with colour almost like a musical composition, encoding the chromatic range of many of the famous Technicolor films. I really wanted to mark out a space for her because she isn't as acknowledged as she ought to be. When you think of Technicolor, you don't automatically associate it with her.

**AMc: How did you come to make the work? Was it that**

**you knew about Natalie Kalmus and wanted to make something on her, or were you making something on Technicolor and discovered her during your research?**

**AS:** It was a bit of both. I was making a film about optical sound, so I was hanging out in film labs looking at the technology for encoding and deciphering sound. Then I saw this colour lamp house [analogue colour-grading machine] and knew immediately that I needed to make a film about it. I started researching the history of colour in film, so obviously Technicolor was key, and I became really interested in Kalmus. A lot of my films have a backstory like this, but it's not important that people should know it to appreciate the works – I hope they stand alone. The way I structure them, though, is really influenced by these footnotes – or, as I sometimes call them, a form of invisible labour. Anyhow, Kalmus would receive a script, say *Gone with the Wind*, and she'd say: "Scarlett, she needs to wear a dress this colour." So she'd score it – and apparently she would write these scores much like music. None of the scores survived, but she wrote a more theoretical text called *Colour Consciousness*, in which she suggested thinking about the process musically. So here was a woman putting her stamp on something massive – the way we view colour and how that informs our understanding of narrative. Just like sound, colour is something that's very difficult to pin down. It's also a wavelength, transformed by lighting conditions and reflections. Everyone sees colour differently. And then there's constant degradation – it's always fading. It's inherently unstable, just like sound. It also resists being notated – even if you have the Pantone chart, it's very difficult to pin it down. For me, this film was thinking about all of these things.

**AMc: How much information do you feed your audience? Do you provide exhibition texts with some of these “footnotes”?**

**AS:** Yes, but I think it’s enough, in this instance, for the audience to know that it’s a film presenting a colour-grading machine. There’s another part to the Natalie Kalmus backstory – in addition to Colour Consciousness, I came across an article she wrote, which was called Doorway to Another World, and it was about this experience with her sister on her deathbed – she witnessed her seeing other dead relatives, whom she couldn’t have known were dead. For me, the doorway, the valves of the machine, and the idea that she was colour composing all seemed to somehow fit. I think it’s useful to know the basics from the title, but, if you don’t know any of that, then it’s still an abstract colour film, and that’s intriguing in itself.

My films are not devised for a specialist audience. It is important to me that they speak to a wide range of audiences. People who want to scratch beneath the surface and find out more about the background story can. It makes it richer and gives it substance, but it’s not necessary. I do a lot of research, though, which is why I call it invisible labour, and I think that’s also an interesting term in relation to some of the historical moments I am addressing. Kalmus’s labour was invisible, as was some of the labour of women astronomers, whom I’ve also been looking at recently. I question myself sometimes as to why I need so much research to make the work: I need it in the generating process, but I don’t think the viewer does.

**AMc: How much of your time is spent doing the research as opposed to the producing? Is it a 50-50 split?**

**AS:** It might be a little bit more than that, maybe 60 research, 40 making. What happens is I spend a lot of time first gathering all the material and then I can start thinking about ideas. With Doorway For Natalie Kalmus, I knew what I was going to film, and I knew roughly what it was going to look like, because I'd been experimenting and I'd done several site visits, but to get to the Natalie Kalmus bit and think about that process, I did a lot of reading. It depends on the project really, but because each project is a constellation of research, it often then manifests later in another project.

From this project, for example, I went on to make one about Joan of Arc, or, rather, about the [1916] film, Joan the Woman, having researched women's work in hand-colouring early film – another kind of invisible labour. That then led on to a project I did last year at the George Eastman Museum in New York. The museum was doing a big show on the history of Technicolor and it got in touch because it really wanted to show the Kalmus film. I agreed on the condition that I could make a new piece using its archive, which includes the entire Eastman Kodak collection.

**AMc: Do a lot of your residencies come about through previous connections like this?**

**AS:** A lot of the time, yes. Sometimes I can make an archive speak in a way that it might not do otherwise and I can make it circulate

differently in different contexts.

**AMc: Do your host venues get something as a result of your time spent with them?**

**AS:** Yes. In the case of the George Eastman Museum, it co-commissioned the work, Chromatic Aberration (2014), together with Tyneside Cinema, where it premiered, but I was later invited to the George Eastman Museum to give a talk, and it also has a copy of the film in its archives. In the case of the Oramics film, the Science Museum had this amazing new acquisition and it co-commissioned the film as a way of making something more out of it than just simply putting an object on display. Again, it got to keep a copy in its archives. It is always an exchange.

**AMc: Can we talk a little about your forthcoming exhibition in Dallas? What will you be showing there?**

**AS:** The work for Dallas grew out of Impulsive Synchronisation, a piece commissioned by, and exhibited at, the Hayward Project Space in 2013. Again, it was about women, scientific invention and mechanical music. Hedy Lamarr was this amazing actress in the 30s and 40s. Before she emigrated to America, she had been married to an arms dealer and together they had hosted the likes of Hitler and Mussolini. With the outbreak of the second world war, the US was soliciting the general public to start inventing things to help the war effort. Lamarr really wanted to help, so she met with the composer of the score for Ballet Mécanique, George Antheil – a real bad boy of American music, doing experimental stuff with pianolas – and together they came up with an idea called

“frequency hopping”, which was awarded a patent in 1941.

Frequency hopping was designed to protect radio-controlled torpedoes from enemy disruption by distributing the signal over many frequencies and synchronising the transmitter and receiver in rapidly changing patterns. The idea came from pianola paper. In the end, it wasn't used in the second world war, but it was later used for missiles in Cuba and somehow the technology – the idea of bandwidth – evolved and ultimately led to the invention of Wi-Fi and broadband. So there's this crazy migration of Hollywood acting, avant-garde composing, the pianola, mechanical music and ways of notating, leading to ideas of encryption in warfare, and in turn feeding into telecommunications. It's an amazing story. In the same year that the patent was granted, 1941, Lamarr made a film with James Stewart, *Come Live With Me*. Basically it's a love story and there's just this one little scene where she is signalling in firefly code – a kind of morse – and I've re-encoded it so that she's signalling part of her patent text, which was called the Secret Communication System. It's a very simple shot, projected on to five scrolls of pianola paper encoded with the music of *Ballet Mécanique*. The soundtrack features underwater explosions and other underwater sounds – such as passing submarines – that were recorded during the second world war.

The project got me really interested in women and computing. There's a link to Oram's work too, so you can see what I mean about the research migrating and expanding. I became obsessed with human computers, which were basically women doing data processing – these women were doing repetitive data collection and computation, a bit like the tinting of film frames. “Computer” was, in fact, the word for someone who computed, back when it

was a person doing it, rather than a machine. There were these women working in astronomy at Harvard, among other places, basically just mapping the stars: looking at photographic reproductions and meticulously transcribing this data. The images I used were a mix of archival images of these women – Maria Mitchell was one character I looked at, and Henrietta Swan Leavitt was another – showing them studying or mapping data, and then there were images of the things they would have been looking at, the photographic plates. There are craters on the moon named after these women and I used images of these as well. Often they're on the dark side of the moon, or lesser known, very small craters. Swan Leavitt actually made an important discovery, published in a paper on variable stars. But also she was deaf, so there's a lot going on there around pattern perception. The Blink Comparator I used is based on a perceptual aid for amateur astronomers. When you're looking at two nearly identical images of stars, the small differences aren't apparent side by side, but if you overlay them and make them flicker, the differences blink at you. I composed the images so that they would overlap in a way that caused an interesting optical animation effect. Sometimes it's quite funny. There might be a cluster of stars that appear to burst where the woman's brain might be as she is looking at something. It makes me think of the big bang and all kinds of other associations. The installation is called Her Luminous Distance because of these women's craters being on the dark side of the moon.

While I was researching human computers and women astronomers, I came across the role played by women in ballistic research, which I guess is also close to the Lamarr project. This is

what I am finishing now for the Dallas show. Once again, women who were good at maths were being roped in to the war effort. Their task was essentially to study the trajectory of a bullet and how you interpolate or calculate that arc. They had these very complicated firing tables and it was extremely time-consuming. Obviously, when there's war, lots of money is thrown at new technologies and these women helped to operate and programme the first computer, which was called the ENIAC [Electronic Numerical Integrator and Computer]. Again, this belongs to the lesser-known history of computing.

In the exhibition, I'll be showing this new film and the slide projection piece on the women astronomers, in conversation with one another, and also a series of lenticular prints of bullets and bullet holes. Justine Ludwig, the curator at Dallas Contemporary, had seen my Hedy Lamarr piece and was really interested in working with me. I'd finished the astronomy piece and was fascinated by women and ballistics, but I didn't really want to make the work. I was reluctant because all my other works around women are about making the unseen visible or the unheard audible, as a kind of ethical project, but this is more complicated. I certainly don't want to glorify war. But when she contacted me, I thought it was a perfect challenge to make a film about ballistics to be shown where JFK was assassinated, in the heart of gun-toting America. It's different from my other works, where the backstory is something that's just there and that maybe only I know about, because here it speaks to what's happening in America right now. The recent shootings and police brutality kept feeding into my thinking process. Even if I didn't necessarily want it in the piece, I know it's there and I know I'm speaking to it. It's showing in a

place where guns are a serious issue. That said, the starting point was historical and, for me, the primary constellation remains women, ballistics, holes, projectiles and punch cards – early ways of marking data with binary code. Even formally, a punch card and a bullet hole are very closely related. But there's also the idea of who counts and what is counted.

Women and the right to vote are also a key part of the backstory – particularly in the UK, where I came across an article from 1911 about several suffragettes who, because they hadn't yet acquired the right to vote, didn't want to be counted in the census, and so they hid. The argument was: if I can't vote, I don't count and I won't be counted or represented as data on a punch card. All of that is the groundwork, but then the film does its own thing. It's very dense and a bit of a departure for me. The title, *Between the Bullet and the Hole*, refers to the calculations the women were doing. In the film, the frame is constantly changing – it's devised in a similar way to the Blink Comparator. There's a kind of animation effect between the images. The idea of interpolation was key to me because you are interpreting that distance between two images – something that, on a perceptual level, is quite hard to take in. To me, interpolation as a way of calculating the space between the bullet and the hole also suggests a space to think. Unlike what these women were doing – which was calculating it at the service of warfare, trying to make a better killing machine – I am suggesting we have that space as a gap to stop and think. The way the lenticular prints will be hung will put the viewers directly in that space, standing between the bullet and the bullet hole. I don't know if the film does what I set out to do, but it's full of

disruptions and gaps.

**AMc: When you have a soundtrack with a work that is composed or performed by someone else, how involved are you in that part of things? Do you hand over control?**

**AS:** It is very much a conversation. I don't completely hand it over. It's really important to me to be respectful of whatever musical source I am using and to use it in a way that the musician, dead or alive, would be happy with. For the soundtracks for the ballistics film, and also Chromatic Aberration, I worked very closely with an electro-music composer called Scanner. He might do a first draft and then we'll ping pong back and forth. I'll say: "I need this to be more that, less this" or "Can you smooth this bit?" or "I want this to be a counterpoint rather than something that goes with it". I might come with quite a clear idea and then he might take it somewhere completely different. Depending on who I'm working with, that's actually exactly what I need – to be taken outside of myself. It's very claustrophobic otherwise.

**AMc: Does this come after you've done the visual part?**

**AS:** Nearly always. For some of the films, for example Doorway For Natalie Kalmus and Chromatic Aberration, I start with the mechanical sound, or the base rhythm, and I compose the film in relation to the sounds of the machine. For the ballistics film, the initial sound is actually the Chladni plate rattling. That comprises the first minute or so of the film and then the rest is by Scanner, who used this as a starting point. As I said, I think of all my works as conversations or dialogues.

- *Aura Satz: The Trembling Line* runs at the [John Hansard Gallery, Southampton](#), until 23 January 2016. *Her Marks, A Measure* is showing at [Dallas Contemporary, Texas](#), from 17 January – 20 March 2016.
- The European premiere of *Between the Bullet and the Hole* will take place at the [International Film Festival Rotterdam](#), between 27 January – 7 February 2016, and the UK premiere, alongside other films and followed by discussion, will take place at the [Whitechapel Gallery, London](#), on 18 February 2016.
- *Satz* will also be showing in the [20th Sydney Biennale: The Future is Already Here – It's Just Not Evenly Distributed](#), curated by [Stephanie Rosenthal](#), from 18 March – 6 June 2016.

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