

**VestAndPage's Performance Opera *Under Scars*****Reflections on the use of sound**

By daz disley

We are continually immersed in a rich world of sounds and that yet the sound is often somewhat overlooked by the general audience. However, creating extended diffusion formats like surround sound offers the possibility of bringing the audience into a new world for the duration of their exposure. It prompts the listener to reconsider their perception and appreciation of the world they are ordinarily immersed in.

Building on the notions of liveness, realness, and the body as a site of discovery and debate, as foregrounded in this article, I will spend a few words unpacking my role in using sound in the performance opera *UnderScars*.

*UnderScars* featured a pre-existing sound work I developed to contribute to the 2020 VestAndPage performance-based film *Anam Cara: Mirror in the Mirror*, produced and released in 2020 during the COVID-19 pandemic.

Before delving into the specifics of the underlying mechanism of the resultant synthetic work, I would like to broadly unpack, or at least place my perspective on, what music is and what sound is.

Music operates in multiple simultaneous domains. Mathematically speaking, it is a singular complex domain. First, we have the pitch domain: what notes are heard? Are they low, high, or somewhere between?

Then we have the time domain: when things happen—notes, sounds, words, pauses, or changes of pace. We also have the energy domain: how loud is something when it is heard?

These three domains offer sufficient parameters to create a piece of music or a musical score: a collection of visual data notating and symbolising what notes are played when and at what volume.

Digging deeper, we find the domain of frequency and timbre, which expresses and describes the sound of the pitches being presented: loosely speaking, this can be illustrated by imagining the difference in sound between, for example, a flute and an electric guitar.

Practically speaking, other than the unit impulse, also known as the Dirac delta function (Hassani, 2009), all sound is based on repetition - the oscillations of a speaker, the vibrations of the body of an instrument, the resonances of the receiving body - all operate on a cyclical-basis. Differentiating a flute from an electric guitar is a process of the body's ability to measure a collection of individual yet correlated frequencies and to recognise the inherent patterns and relationships between them. Tones and timbres might be considered hierarchical objects where a fundamental (root) frequency informs our sense of pitch, and its attendant pattern of overtones (partials and harmonics) informs our understanding of the qualia or timbre of a given sound. A vast

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majority of “musical” sounds follow this pattern of patterns, with the notable exception of cymbals and gongs, which offer a less mathematically structured collection of frequencies, perceivable/interpreted as a ‘crash’ or perhaps ‘noisy’ element when compared to a more structured musical note from, for example, a saxophone or a piano.

Robert Moog understood that these musical instruments also combine the domains of time and energy, describing an envelope, with attack, decay, sustain, and release (and more) referencing how volume (energy) is modulated through time (Glinsky, 2022). This is sufficient to pinpoint the compositional parameters used throughout the history of music up until the inclusion of electronics in composition emerging mid-20th Century, through the first steps into digital techniques in the 60s and 70s, and ubiquity at the dawn of the 21st century.

In this contemporary world of increasing accessibility of both equipment and technique, further compositional parameters emerge. My research, spanning 20+ years of experimentation and facilitation, works predominantly with the parameter of space as a compositional tool to ask not just when a sound is heard, its spectral quality, or the envelope of its presence but to include *\_where\_* the sound emerges from. I might typify my work more as creating (sonic) environments representing alternative worlds than purely a musical compositional pursuit.

As a software developer, I use the live opportunity of the performance opera setting to stress-test my work and to provide me with a sense of danger in the live moment, spurring my sense of presence with the other performers. I “dogfood” (the practice of using one’s products or services, and an expression introduced in 1988 by Microsoft manager Paul Maritz) my tools-in-development as an element of risk parallel to the risks other performers might take through their use of objects, or transgressing the body.

Rather than rely on the tools of others, accepting their worldviews and biases, I create code from the text as a pure form of creative expression, leading to tools that further enable the (further abstracted) creative expression of others. My practice, whilst to an audience is predominantly received as audible, is founded on navigating the grammar and syntaxes of code in search of potential semiotic pathways (afforded) of their eventual deployment.

None of this includes, precludes, or excludes the use of human language as an additional technology. For the most part, in music, language is blended in its mode of delivery in the form of song, where the outcome is a synthesis of both words and additional musical dimensions. Latterly, voice and speech have become an accepted part of music for their inherent musicality, tone, rhythm, and timbre (Reich, 2002) and are no longer relegated to the functions of narration, reflection, or acting one might find in a regular theatrical or sung-performance setting. For my practice, the expressive use of language(s) is a red thread, forming the algorithms of technical delivery, leading to higher-level human delivery algorithms.

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None of this is relevant if we ignore the presence of the listener's body and how it interacts with and relates to its mid-performance environment. During *UnderScars*, I presented the music composition *Home* with the live voice of British performance artist Ash McNaughton and the recorded voice of Italian performance artist Nicola Fornoni.<sup>1</sup> The manipulation (rather than acceptance) of time and temporality and the dissemination of virtual objects within the synthetic space of its diffusion is fundamental to the inner workings of the composition *Home*. It is a multidimensional attack on the perceptions and nervous systems of the audience in service of the broader context of the whole within which it is situated.

All sound presented using two or more speakers offers mirages in the form of (virtual) sound objects to the audience, as studied by Pierre Schaeffer (2017) and Curtis Roads, who was the first to implement granular synthesis on a computer in 1974 (2001).

In the example of a single voice mixed into a monaural position (the same signal level at both speakers), we perceive that the voice emanates from a place situated *\_between\_* the speakers—in physical terms, an impossibility and the result of our perceptual decoding of the sonic wavefronts arriving simultaneously at both ears and the same volume.

A combination informs audio spatial perception of volume difference (Inverse Square Law), the time difference (Haas effect), transmission loss (Olson, 1957), and all stereo reproduction, whether the result of a live stereo recording or a synthetically designed mix relies on this combination of volume, time, and spectral difference to generate a virtual impression of a sound coming from a space where there is no physically located speaker. As surprising as this may sound, it is a fundamental basis by which all stereo reproduction is received.

My work with multi-speaker presentation and diffusion, whilst still using notions of virtual sonic objects, challenges the predominant understandings of Alan Blumlein's stereo concept and stereo production (Alexander, 2017) in that I do not mix for an ideal listening position, instead encouraging audience members to locate their independent vantage points (Speakman, 2019). This is further teased out in the performance opera context by placing additional speakers outside the main space where the sound is presented.

In addition to this approach of using a collection of virtual objects in navigable virtual space, I further use time and rhythmic differentials to influence/trick the listener's perceptions based on sympathetic resonance (von Helmholtz, 1885), a form of extrinsic source bonding in spectro-morphological terms (Smalley, 1997).

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<sup>1</sup> An excerpt of daz disley's *Home* musical composition with Nicola Fornoni reading *Interjection n.1* by Antonin Artaud is audible in the short film *Under Scars* by Matilde Sambo (2023) from 6'30" to the end. [https://www.dropbox.com/scl/fi/hihrdh2iqo8lgipkeedps/UNDERSCARS\\_The-short-film.mp4](https://www.dropbox.com/scl/fi/hihrdh2iqo8lgipkeedps/UNDERSCARS_The-short-film.mp4)

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According to the British Heart Foundation, the accepted resting heart rate is between 60 and 100 beats per minute (BPM), and it follows from this that when presented with a rhythm at 60 BPM, the (open) listener's heart rate eventually moves towards synchronisation without their conscious input. Higher-tempo music can be found in places such as fitness centres and nightclubs where a higher heart rate is concordant with the activities therein - and conversely, lower tempi in circumstances where the listener desires their heart rate to relax. Integer multiples also cause resonant effects, so music set at 120, 180, or even 30 BPM can have the same potential impact as 60 BPM. This same model of induced resonance also applies to the brain rhythms of listeners, such that audiences (as well as performers) can exhibit interbrain synchrony (Gugnowska et al., 2022), promoting a shared experience.

To compose *Home*, I use a base tempo at around 115 BPM to provoke a slowing of heart rate (57.5 base BPM) and then further compound this by suggesting an additional parallel but more dominant rhythm, splitting the same time measure into nine beats instead of the 4 or 8 one might typically expect. The underlying rhythm is in 4/4, but the dominant cycle splits this into nine units that present as a 4/4 repeating pattern. Whilst this may manifest as an example of polyrhythm, I am not so much interested in the polyrhythmicity of the result but instead in the effectual impact of composed transitions between temporal domains.

The net result is one tempo at 115 BPM (below resting heart rate) and a more up-front, or leading tempo of around 128 BPM (slightly elevated, but not so much as to provoke an up-beat resonance). For most of the piece, the 9-based rhythm leads, but then we encounter the "straight" 4/4 rhythm, played gently but insistently on a piano in a rising motif. This collision of tempi creates the sensation of time slowing down (when, in fact, the overall meter is static), which is further reinforced through repetition. One of the listeners' fundamental body-clocks is repeatedly disrupted whilst both regimens promote a physiological response more aligned with relaxation than high-paced activity. I introduce an element of uncertainty, contextualised by a frame of relaxation and calm, and persuade my listeners to experience the elasticity of time, as presented through an assemblage of virtual objects.

In the middle of this physiological listeners' dilemma, I introduce the voice of Nicola Fornoni reading passages from Antonin Artaud's *Interjections n.1*, written in 1946 (1983) and translated into Italian. In a rolling sea of mutable temporality, a disembodied voice emanating from a virtual location recites what, to some, perhaps some of the most brutal and desperate text originated. He speaks calmly, muted, almost disinterestedly, creating a sense of dissociation and disconnection. We float in a space of calming sound, our bodies' clocks pulled this way and that, as a central invisible figure delivers eviscerating text. This placing of an acousmatic voice within a virtual space operates to abstract the listener from the violence of the linguistic content in much the same way that violent imagery on film is often placed on a screen within a screen (such as a CCTV monitor), which likewise dissociates the viewer from the violence.

The term 'acousmatic' derives from the Greek word akousmatikoi (ἀκουσματικοί), which referred to the pupils of the philosopher Pythagoras who were required to sit in absolute silence to listen to their master delivering his lecture from behind a veil to make them better concentrate on his teachings. The first to use the term was Jérôme Peignot and Pierre Schaeffer around the mid-50s (Peignot, 1960).

Of course, all of this does not happen in isolation. The performance opera UnderScars takes place in six rooms surrounding a central hall, and sound serves not just as an individual offering and discrete object but also as a call for other performers to gather. Echoes and reflections of this virtual elastic time/space reverberate around the building, percolating into and disrupting the context and content of other performers' actions.

Towards the end of the presentation of Home musical composition, as the performers gather in the main space, drawing the audience with them, Ash McNaughton adds their voice to the soundscape, circling the satellite spaces in the act of beating the bounds (trad. England/Wales/Scotland) Ash McNaughton renews awareness of the physically present body/voice, reclaiming and consolidating space and presence, bringing the audience away from the virtual experience of the previous 10 minutes to (re)set the stage for the following sonnet of the work: a physical performance involving the body of Andrea Pagnes, and fractured sheets of mirror and glass.

The mirror may hold many meanings, but for me, in this context, it is a tangible illustration of the fragmented surface between worlds, where virtual and physical collide as the body re-seats the performative as visceral amidst the echoes of fluid and ever-modulating synthetic time/space.

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