Crumble

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1 Program Notes

Duration: 12’01”
Format: Video with quadrophonic audio.

Crumble depicts the fracturing of a mind grappling to reconcile traumatic events spiritually, emotionally, and logically through interweaving text layers in a multi-channel sound environment. It is a survivor-led presentation of the psychological space during and following (a) distressing event(s). The piece symbolizes the fragmented threads of thought that may emerge when someone is trapped in situations beyond their control, in a bid to make sense of them in the broader context. This chaotic mental space, where thoughts rapidly shift from ideas to fears, seeks self-governed meaning, cause, and remedy.

Six pre-recorded, interwoven text layers are played through separate speakers and divided between neutral and emotionally charged content. Each line of text is voiced as a different character based on its narrative content. The scripts reveal layers of thought stemming from sexual trauma, weaving through memory fragments, varying viewpoints, and forbidden knowledge, offering a confessional glimpse into the mind’s innermost workings.

Three neutral-toned voices intellectualize the events, attempting to neutralize the emotional content. One acts as a loudspeaker announcement broadcasting a trigger warning. Another discusses biopsychological mechanisms behind memory and trauma as an academic-style presentation. A third summarizes sexual crime statistics in workplaces and universities as a newscaster. These voices contrast with three emotionally charged layers, including censored recordings, re-enacted journal excerpts, and a text derived from a Somatic Experiencing® exercise [7]. The layers interlace to create a verbal soundscape, or *word bath* (a textured sound environment that fills the space and submerges the audience without an explicit focal point). Each *character* has a corresponding track which live-samples the initial voice to further fragment the narrative. Additional sound components include sampled audio, such as retimed and repitched mobile phone vibrations against a wooden surface. The audio environment is designed to allow the audience to roam freely within the space and listen to different excerpts of text, “mixing” their own experience of the piece.

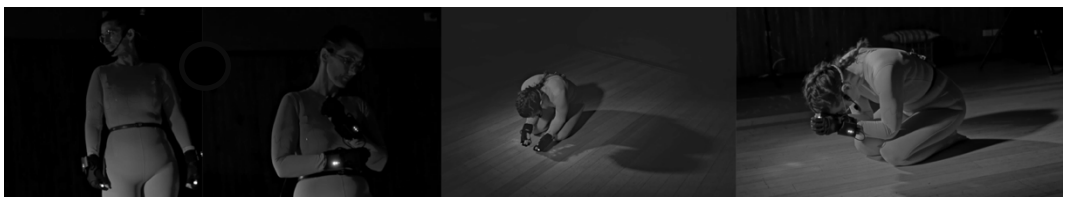

Figure 1. The standing position is followed by the performer slumping to the floor and ending with hands clasped.

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2 Project Description

Crumble is an electroacoustic performance, which can also be experienced as an installation, created through practice-based research [3] as performative autoethnography [19], using voice, gesture, and spatialization. The work investigates how internal psychological states, particularly anxiety, grief, anger, self-monitoring, and cognitive overload, can be externalized via interactive systems and experienced as a shared environment.

Given the disordered nature of this space, inspiration was drawn from Laetitia Sonami's *Dreams of Control, Dreams of Chaos* [15], which features the disintegration of intelligibility and semantic meaning over time. *Crumble* combines text, whispering, though fragmentation, and spatial elements, similar to the immersive performance, *SAFE* [10, 13]. The use of mimetic and abstract sonic elements in *Crumble* aligns with Ramjil Fischman's aural-mimetic continuum, in which the ambiguity between real and surreal soundscapes cultivates engagement [5].

The performer navigates the space, weaving through the audience while delivering a live soliloquy, which is sampled live and deconstructed through granular synthesis. To incorporate everyday gesticulation, text is grasped with "puppet hand"[1] and fist gestures, spatialized, and then released by either hand's [puppet + wrist flick] or [open hand + wrist flick] to imply tossing the thought away. This setting grants the audience access to the inner thoughts and concurrent streams of consciousness of a person under severe cognitive load in response to sexual trauma. The performer's "throwing away" of ideas shows a nihilistic attitude and is similarly confessional, making extreme situations appear mundane. Each live speech is preserved and woven into later performances, contributing to the growing layer of aural confusion. The piece ends as the performer sags to the ground, curls into a ball, and places their head in their hands. This approach departs from conventional expressive mapping by prioritizing symbolic, everyday gestures and the accumulation of discarded material over continuous parameter control, shifting performer agency from precision and optimization toward interruption, release, and loss of control, while positioning the audience within an increasingly dense and unstable sonic environment.

This piece explores how NIMEs can be incorporated into performance through everyday gesticulations, articulating emotional landscapes in sound through trauma-informed practice, rather than by developing new interfaces. It advances interactive control by demonstrating how gesture vocabularies, voice fragmentation, and real-time spatialization can serve as primary parameters of interaction, shaping both the sonic outcome and the performer's agency. A journal article discussing the use of anamnesis and spatialization is available through *Organised Sound* [12]: 10.1017/S1355771825100642.

Technology

Crumble uses the MiMU dataglove system to capture gesture data [8, 9]. Movements are mapped to various audio parameters, such as spatialization, filtering, granulation, and temporal displacement of the voice, using Ableton Live [1] and Max [3]. This creates a shifting environment that reflects the performer's physical and emotional states. For example, sound rotation around the listener highlights directionality and movement, continuously engaging the audience in an active spatial-audio experience. Figure 2 shows the data and signal flow.

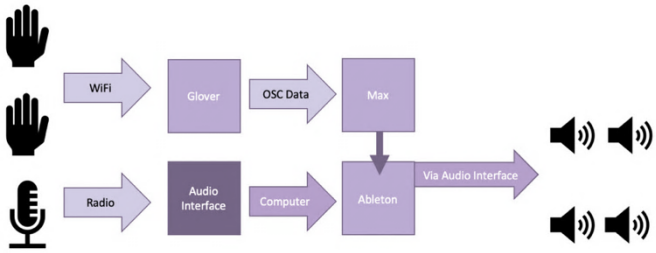

Figure 2. MiMU gloves and audio inputs connect wirelessly to the computer. Data is translated in Max and Ableton, then sent to the loudspeakers.

Using MiMU gloves, the performer manipulates spatialization and parameters in real-time, transforming gestures into auditory cues that deepen the embodied experience. This interaction fosters agency, aligning with embodied cognition principles, where the mind and body work together to perceive and interpret sensory information (Rohrer, 2008). The performer's movements connect the body and narrative, engaging the audience through physical and emotional resonance (see Figure 3). Furthermore, these movements directly influence the sound, adding physicality to the auditory experience by disconnecting and reconnecting the acoustic and amplified voices, thereby shaping an eerie, anxious soundscape that mirrors dissociation and fragmentation.

Figure 3. Changing hand positions to 'let go' of a loop or layer of consciousness (left to right).

Spatialization

Traumatic experiences can also exhibit spatial forms in therapeutic reenactments [6]. Spatial music places sonic events around a space to exploit sound localization for an immersive effect [16]. In this work, voice, technology, and gesture are intertwined in multichannel sound environments that contextualize the landscape of the mind. *Crumble* uses spatial music techniques to create an immersive environment in which sounds are strategically placed to evoke memory and emotional response, surrounding the listener in a chaotic auditory field. Leveraging utterance [17] and source-bonding sonic material through gesture [14], spatialization acts as a mimetic interpretant in shaping narrative meaning [5]. This design reflects the chaotic mental space of a trauma survivor.

Speech strands are distributed across a multichannel speaker system, allowing different sonic elements to occupy distinct regions of space. Some sounds appear close to the performer, while others move to the periphery or behind the audience. Spatial trajectories are shaped in real time, creating a dynamic listening environment in which attention is continually redirected. The rotation and positioning of sound create a sense of movement and immersion, mirroring the performer's fluctuating mental states and disarray.

Precise placement and movement of sounds act as perceptual cues, triggering specific memories or emotional responses. Sudden shifts in direction or acoustic properties may evoke familiar sensory experiences, aligning with Jean-François Augoyard's assertion that sound can merge perception and memory [2].

By transitioning between recognizable, mimetic sounds and abstract, surreal elements, the work moves along a *real-unreal continuum* that reflects shifts between conscious memory and dissociative states [5]. These sonic configurations externalize psychological space, separating and reconfiguring temporal and emotional states without compromising immersion. The disorienting arrangement of sounds, combined with overlapping text layers, replicates the fragmentary nature of traumatic memory, evoking anxiety, dissociation, and confusion. Furthermore, the sudden shifts evoke pendulation from Peter Levine's Somatic Experiencing® [7] – rhythmically shifting between two opposing emotional states [4]. This is further evident in the live soliloquy, where topics are flitted through according to the performer's proximity to the loudspeaker at any given moment.

Gestures remain economical and grounded, focusing attention on the relationship between movement and sound, foregrounding the body as a site of negotiation rather than representation. These technologies enhance agency and strengthen the connection between physical movement and auditory expression [11], supporting a tactile approach to narrative creation.

By situating listeners within the same sonic field as the performer, *Crumble* frames listening as an act of co-presence. The audience is not positioned as an external observer but as a witness embedded within the work's psychological space. Rather than forming a discrete community within the performance space, this shared listening context reflects and engages with broader social realities surrounding trauma, gendered violence, and the conditions under which such experiences are witnessed, interpreted, and often silenced.

Contributions

Crumble contributes to NIME discourse by demonstrating how interactive music systems can articulate internal psychological states through embodied interaction, spatialization, and voice. Using voice, gesture, and spatial audio, the work externalizes fragmentation into a sonic environment that can be inhabited and endured. As a survivor-led presentation of psychological space during and after a distressing event, the piece foregrounds lived experience while addressing the ethical considerations of portraying trauma in performance.

The work extends discourse on embodied interaction by foregrounding trauma-informed practice as a methodological framework. Drawing on principles from Somatic Experiencing®, *Crumble* uses interface integration to support agency, boundary negotiation, and non-verbal meaning-making.

It also treats spatialization as an active compositional and interactional parameter rather than a presentational layer. The use of the *real–unreal continuum* [5], combined with trauma-informed principles, enables the construction of environments that reflect cognitive overload, dissociation, and attempts at meaning-making.

The work situates the performance within broader social contexts of trauma, witnessing, and shared listening. By positioning the audience as witnesses embedded within the work's psychological space, *Crumble* reflects the conditions under which such experiences are encountered, interpreted, and often silenced.

Finally, the work introduces a gestural mapping strategy based on everyday symbolic actions. Grasping and releasing gestures spatialize and discard vocalized text, prioritizing interruption, accumulation, and loss of control. Spoken material is preserved and layered across performances, producing an evolving and unstable sonic environment that shifts performer agency and situates the audience within a field of fragmented thought.

3 Technical Notes

This piece is proposed for a fixed-media format with quadraphonic sound. A list of trigger warnings is provided in Table 1.

Table 1. Performer requirements.

Channels:	4-10
Duration:	12'01"
Space required	Video with quadraphonic audio
Equipment requirements from venue:	4-10 channels Projector and screen
Performer to supply:	Stereo/binaural down-mix of video documentation, and Quadrophonic/surround video
Trigger warnings:	Sexual trauma, coercion, and abuse Psychological distress (anxiety, dissociation) Distressing vocal material and fragmented speech Immersive/disorienting audio Embodied representations of distress

Source: Performer requirements

For live performance: The performer occupies a relatively small performance area (approximately 2m^2). It employs a 4–10-channel circular speaker array, with real-time audio and visual processing. Spatialization strategies can be scaled to suit the available system, with the aim of surrounding both the performer and the audience within a continuous sonic field. Lighting is kept low and neutral.

Table 2. Installation requirements.

Channels:	5-9; quad- to octophonic sound with one central speaker
Duration:	12'01"
Space required	3x3m room minimum, black box or very dim lighting
Equipment requirements from venue:	5-9 loudspeakers plus cables and stands (up to 8 around the room, one central loudspeaker on a plinth pointing up) Small plinth to hold central speaker Projector for projections (ceiling mounted, pointing down) OR dim spotlight pointing at central speaker

As a fixed media installation, this work should be presented in a black-box or darkened environment with a multichannel loudspeaker array (minimum of 5 channels, up to 9). A ceiling-mounted projector should be positioned above the central speaker to project onto the floor, or alternatively, panoramic wall projections may be used, depending on the space. Spatialization strategies can be adapted to the available system to enclose the audience within a continuous sonic field. Ambient lighting should remain low and neutral. Trigger warnings must be displayed on a placard outside the room, including one local sexual violence response hotline and one general mental health hotline. A full list of trigger warnings is provided in Table 1. See Figure 4 for a room map.

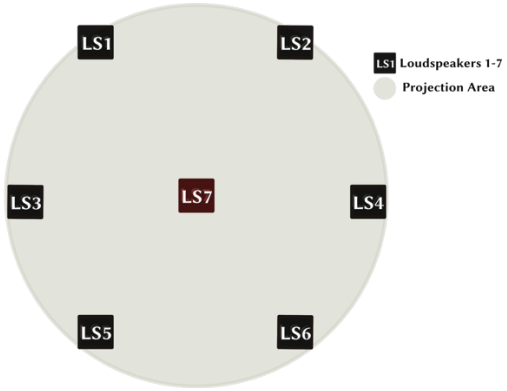

Figure 4. Loudspeaker arrangement and projection map for installation.

4 Media Link(S)

- https://youtu.be/yi3eLjx9Nl0 (Live performance link)

Acknowledgments

This work was supported by the University of Melbourne.

Ethical Standards

This paper conforms to NIME's Code of Practice on Ethical Research. Funding was received from the University of Melbourne for this project. The creative output of this research addresses sensitive content and was produced with specialist guidance. Audience members were informed of this content prior to performances. Furthermore, performances were open/relaxed, allowing anyone to exit if necessary.

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