

# Solstice: A new work centred on music, bridging disciplines and creative freedom with instruments

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Figure 1: Solstice, with instruments, stage windows and changing light, and audience placement

## Abstract

*Solstice* is a 40-minute performance work for double bass, spatial audio, gestural controllers, and augmented instruments, developed by two interdisciplinary practitioners working across distinct musical and technical communities. The piece emerged from a shared decision to prioritise musical goals, and to treat tool-building as a means of sustaining musical creativity and artistic exploration beyond demonstration of technical proficiency. This musical work resists demo-driven narratives common in NIME by prioritizing long-form continuity, relational listening, and collaboration over novelty or interface legibility. Musical form is shaped through an extended, process based in development in the performance space itself, that combines stable, long-term instruments (the pressure-sensitive Floors, an augmented contrabass, the CAVIAR control system) with provisional and reconfigurable objects (bows, mallets, contact microphones, a prototype soundcatcher, spring reverb). These elements remain available for re-interpretation across rehearsal and performance. We frame

the artwork through the thesis that musical agency is distributed across body, instrument, space, and relationship; the goals of this work unfold through development. In *Solstice*, acoustics is treated as an active creative agent. Agency is experienced relationally, distributed across bodies, instruments, space. This paper reflects on how such relational practices can support coherent long-form performance within NIME contexts, and how resisting demo-driven teleologies may open space for works where sound, duration, and vulnerability of performers in open engagement with the audience remain central.

## Keywords

digital instruments; augmented instruments; distributed agency; virtual acoustics; performance

## 1 Introduction

The authors met the year prior to creating *Solstice*, working collaboratively as performers in other compositions. From this shared performance experience, we wanted to create a concert-length work that foregrounded us as musicians first and creative technologists second. Both authors come from interdisciplinary backgrounds and perform within different musical traditions. Sanadzadeh has focused in recent years on developing and performing with a single NIME, the pressure-sensitive Floors (hereon



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The Floors)[30]. Valentin, while recently working in virtual acoustics, has over a decade of conservatory training in double bass and extensive experience performing across styles. Our creative practices have developed along different strands and move across multiple communities centered on musical and non-musical activities. For Valentin, long-term spelunking practice and work in virtual acoustics are interrelated; for Sanadzadeh, experimental composition and performance have served as vehicles for interdisciplinary collaboration. In both cases, we found that musical agency, creativity, and personal excitement were not always foregrounded in the spaces where we worked [19]. Our aim was to reclaim musicality as a primary focus within our NIME practices.

In this work, our aim was to free ourselves from separating out elements of our musical lives into what we wanted to fit the NIME sphere. We wanted to find a way to joyfully make music without the weight of disciplinary expectations limiting the expressive output. This practice-led research work asked: How could we consider musical agency distributed across body, instrument, space, and relationship, as an element that unfolds over time within the performance? [22, 25, 36] Three interrelated themes emerged and now structure this paper: tools as agents of interaction [22]; reclamation and letting go of instrumental ideas and connection [2]; and prioritizing expressive goals over demonstration.

## 1.1 Core Concepts

Terminology around ideas of music, instrument, interface, artistry, use of the space with movement, performance and musical form are complex and widely ranging. In lieu of a breadth study, for the purposes of clarity, we present the following working definitions for these terms as we apply them in the paper and as they informed *Solstice*:

- Musical activity: an activity with the intention of focusing on sound. Creating, manipulating and redirecting energy to a shared focus on the navigation of sound and its absence between performer and audience. This activity is distributed among all parties, and situated in time, place and context for reception.
- Musical form: the sonic, thematic, gestural and narrative elements of a work as are perceived in performance from the start to the end of the performance.
- Musical instrument: anything the musician engages with in performance that affects sound and their ability to make and manipulate sound.
- Musical agency: the ability to affect outcomes of a musical moment, by virtue of specific features of one's presence or action. Objects having musical agency and facilitating the explicit exploration of an object's agency in the interaction of performance follows. Objectifying the body, both from a social and performative lens [36], and reversing that objectification helps us to see what we already assume about 'objectness': willing and being will-ed upon ([15], p.130, p.p.135-137). Companion-thinking, as offered in musical contexts by [22], shapes allowing for 'response-ability' and presence from our companions in this work, expanding their agential presence in the room, giving them and us an open-ended working definition of musical agency.

Within this framing, acoustics (particularly virtual and mediated reverberant conditions) are treated not as contextualising elements for performance or effect added onto sound, but as agents that constrain gesture, shape timing and density, and

demand adaptive listening in performance. Second, the paper documents and reflects on the development of a long-form NIME performance that resists demonstration-driven narratives [19]). This approach combines stable, long-term instruments with provisional objects and spatial constraints, allowing musical form to emerge through vulnerable engagement with the performance task, negotiation, and iteration. Inspiring performances within and outside of NIME, such as the work of Patricia Cadavid, Chloe Sobek, Jeff Snyder, Jean-Philippe Gross, keeps us focused on the musicality we want to engage with. Third, through a detailed account of staging, tool use, and performer interaction in *Solstice*, the paper offers practical insights into how spatial design, audience configuration, and tool-as-agent thinking [22] can support coherent, music-forward works that bridge performance, improvisation, and NIME practices. Together, these contributions argue for NIME practices that foreground musicking [9], community [16], and expressive and creative risk [4, 11] as central modes of inquiry alongside tool building.

## 1.2 Starting Premise

We are members of the NIME community who recognise a limited ability to fully articulate or realize our musical goals both within and beyond NIME contexts: we have felt the need to bring our technical selves to NIME, and struggle to share those elements with the broader community; simultaneously, we cannot explore our musical ideas with openness within NIME from the pressure we perceive to foreground the technical requirements leading our works. We wanted to create a work that meaningfully employed new interfaces and technologies and engaged our technical skills, while also sustaining a coherent, concert-length musical form. Crucially, this meant resisting approaches that prioritize technical demonstration at the expense of musical identity [19]. The project sought to foreground the musicality that can emerge from new instruments when they are iterated upon and integrated into long-term practice [6]. In doing so, it directly engages with recurring issues surrounding underutilized or short-lived instruments [3]. Neal [17] identifies the risk of objects becoming fads when they are not developed or established within an artist's ongoing musical practice, noting that such processes can ultimately undermine the music itself. As Neal observes, "[t]he music is an excuse, not a reason, for the objects' existence ... The thrill of the chase [...] is the most important part of the practice. Finding a way to use the objects in a compelling musical context is frequently secondary" ([17], p.15).

The creation of *Solstice* began with mapping out our interests widely, and loosening hierarchies between our tools. This included removing the definitions attached to various objects and roles, and the expectations that derived from them. Tools were used in unusual ways. The room, the audience, the sun's motion and the time of the day, our instruments new and old, and our bodies, were considered co-present agents in the performance [22].

## 1.3 Tools and Context for the Development

The tools available at the outset of development included the CCRMA Stage and its associated infrastructure, Valentin's augmented double bass, and Sanadzadeh's pressure-sensitive Floors, as well as various sonic objects. The stage's most notable technical affordance was the CAVIAR virtual acoustics system enabled by its multichannel loudspeaker array. The broader context and motivation for the development were rooted in a mutual desire

for a more musically forward NIME practice that removed hierarchy between tools, musical materials, and the varied elements that make up a moment of music in live performance (audience, space, performer): to come together as a community to make art, to work beyond disciplinary expectations, and to bring the full range of our creative practices into a single long-form work. In this case, the instrumentality of music [2] was extended to considering every presence agential, instrumental and response-able [22].

**1.3.1 Stage as a performance tool.** The development and premiere of *Solstice* took place on the CCRMA Stage, a performance and research space designed to support spatial audio, live electronics, and hybrid performance practices. The Stage is equipped with a semi-dome shaped multichannel loudspeaker array, room microphones, projection infrastructure, and flexible routing between acoustic sources, electronic processing, and spatial rendering systems. These features made it possible to treat the room as an active component of the work's sonic and performative ecology, beyond its presence as the container for the performance. The Stage's architectural characteristics introduced constraints that directly shaped the piece. The room has a rectangular geometry, floor-to-ceiling windows along its long walls, and fixed technical stations for sound and video control. The development process embraced these features as compositional parameters. The presence of windows, in particular, influenced both the temporal framing of the work and the orientation of the audience, as the performance was timed to coincide with the setting of the sun on the summer solstice. The spatial configuration of the Stage also shaped listening relationships. While the loudspeaker system enabled immersive spatial processing through CAVIAR, the audience was intentionally distributed across a range of listening positions around the performers rather than being placed at an acoustically "ideal" point. This decision prioritized a shared experience of being together in a room over uniform spatial reproduction, reinforcing the work's emphasis on relational listening. The spring reverb (made by Celeste Betancur Gutierrez), 'soundcatcher' and ropes, connected disparate elements of the lab, room and prototyping processes into the room's presence for this development.

**1.3.2 Floors and Objects.** The Floors are a set of wooden platforms, each fitted with an aluminium bar and a load-cell, that register the flexion of the wood [27]. The flexion of the wood is then translated to a MIDI CC signal, which is used to control parameters of sound using Max/MSP for routing and mapping and Ableton Live for sound design. The Max/MSP patch allows for rerouting the floors depending on the number of Floors engaged in a performance. Between 1 and 7 Floors can be combined in a modular fashion, with the patch optimising routing for the number of inputs available. In performance, multiple Floors together make up one system, to allow for enough controls to be sonically varied in the response. Through a 10-year development period, the Floors have become a robust, stable and malleable instrument for performance, instrumentalized by the gestural language that accompanies the multiple Floors in use [27].

In recent years, objects, mallets and contact microphones on the Floors themselves for live sound control have been added [28, 29]. Resonant objects make up a strong part of the current sonic practice with the Floors, and using mallets, a language that blends acoustical sound and electronic sound with the Floors is created. Upon arriving to develop *Solstice*, two pressure-sensitive Floors, resonant objects, and mallets were the starting point for this

instrument's inclusion; normally using more Floors, Sanadzadeh considered this reduced configuration a challenge to test the system's instrumental capacity. Sanadzadeh intended to use the objects in a larger capacity to fill a gap presumed to exist from having fewer individual controls.

**1.3.3 Augmented Contrabass.** Valentin performed on Theresa, an augmented electric-acoustic double bass integrating piezoelectric and electromagnetic pickups into its body ([10], pp. 2929–2937). This instrument preserves conventional contrabass playing techniques while extending the sonic output into electronic and spatial domains, enabling both acoustic resonance and electronically mediated sound shaping within a single expressive body. In *Solstice*, Theresa was offering a site for re-negotiating instrumental agency, blending traditional physical gesture, mediated resonance, and spatial interaction in ways that contributed to the work's emergent form.

**1.3.4 CAVIAR.** CAVIAR is a real-time, convolution-based virtual acoustics system developed at CCRMA and maintained by the Virtual Acoustics team. It enables live auralization using standard room microphones and loudspeakers, relying on adaptive feedback cancellation to operate without close or contact microphones. This feedback suppression approach is conceptually related to adaptive noise cancellation methods developed by Widrow, allowing stable convolution reverberation in live acoustic environments ([5] pp. 1–7). In *Solstice*, activating CAVIAR routed all sound in the room through the system, situating performers and audience within a shared, mediated acoustic condition rather than applying reverberation to individual sources. Acoustic instruments, found objects, electronic sounds, and audience noise were all captured and processed collectively. CAVIAR also affords for live manipulation of the virtual acoustics field: reverb gain control, change of environment, fading between environments, and scripting of environment changes. The reverb is produced through convolution with impulse responses (IRs). The IRs used in the performance were designed by Valentin as part of ongoing research into artificial impulse response design for musical and perceptual flexibility. Rather than reconstructing specific architectural spaces, these responses were conceived as perceptually grounded and musically malleable environments. The design incorporates statistically independent, perceptually identical (SIPI) impulse response variants to reduce spatial interference artifacts in multichannel convolution, supporting stable spatial perception during performance ([33] pp. 6519–6523). This method also allows for spatial/geometric shaping. CAVIAR was controlled live via a tablet interface using Mira Frame within Max/MSP, allowing acoustic parameters to be controlled in real time by the performers. Virtual acoustics functioned not as a static backdrop or source-specific effect, but as an active agent within the performance ecology. Changes in acoustic response required adaptive listening and reshaped performance strategies, constraining certain actions while enabling others.

## 2 Situated Exploration

This work was first conceptualised by surveying the spatial performance elements of the room, the tools of the work as instruments, and the musical interactions as the subjects of the musical form. To create the work, we took the final duration and the changing light, along with a stage setup 'vision board' as a starting point. The idea of the sound catcher emerged to allow for interaction by looking up at hanging objects. With that, using



**Figure 2: Stage setting through *Solstice*, with instruments, stage windows and changing light.**

ropes, which is a core tool in spelunking, became involved. New props and staging methods for sounding objects and improvisation followed, arriving at a narrative point and expanded through full-length run-throughs. Reviewing rehearsal footage and input from outside eyes helped to refine pacing of the materials, which arrived as a concert at the end of a week-long development. To create the work, we took the final length and a stage setup ‘vision board’ as a starting point.

## 2.1 Performance space considerations

When we first approached the space and its defining features, we examined how to depart from conventional staging and how to merge the performance area shared by performers and audience. We then considered the narrative trajectory of the piece and the placement of movement within it. The spatial arrangement of performance elements was determined first. These elements responded both in space and sonically, and their final configuration emerged through improvisation, which established the connective tissue between them. Figure 1 shows the stage layout, with performers engaging the soundcatcher, Floors, and double bass (top), and the starting position suspended by ropes (bottom).

Once the audience seating was set, we placed the ropes at either edge of the middle space, testing the circle’s width when moving connected to the rope, and considering proximity to the audience. This piece has little audience/performer physical separation, and maintaining that intimacy, interacting with technology and listening to the outcome together, was a driving force that was reinforced throughout the work.

## 2.2 Tools as agents in musicking

In this work, tools, including the variable acoustics of the space, were considered active agents in the performance, accompanying the musicking process [22]. Instruments, acoustics, new and old tools, and our own bodies were approached as agents within a shared performance ecology: entities that impose constraints, invite particular gestures, resist certain actions, and shape musical decisions over time. Virtual acoustics, pressure-sensitive Floors, suspended objects, ropes, and instruments all exerted their own logics and limits, requiring the performers to listen, adapt, and negotiate rather than execute predefined behaviors. Musical agency, in this sense, emerged from ongoing interaction between bodies, tools, space, and sound. Tools were neither hidden nor foregrounded for their novelty; instead, they participated

in shaping timing, density, risk, and relational listening. In doing so, *Solstice* positioned musicking itself, not system design or technical proficiency, as the primary site of inquiry [19, 31].

## 2.3 Reclaiming Artistic Pursuits, Letting go of defined roles

We came to *Solstice* with the intention of building on previous work while also creating space to move beyond some of the roles and expectations that had come to shape our respective practices. For Sanadzadeh, this meant easing the pressure to justify musical practice through technical innovation or to ‘instrumentalize’ her interface by the establishment of gestural virtuosity by an extended range of sonic variation [27]. For Valentin, this engagement as an artistic research enquiry involved re-centering the double bass as an expressive collaborator and allowing greater flexibility in how complex tools were integrated into performance. In both cases, the process was less about rejecting prior roles than about loosening them, making room for musical decisions to emerge through listening, interaction, and trust developed over time. Both collaborators had felt that the steps they had taken within the NIME field to have involved negotiating out elements of their musical selves, which they wanted to bring back into this process.

*2.3.1 Valentin, The contrabass, and artistic agency.* My relationship to the contrabass is shaped by a conservatory education, and followed by years of performance across orchestral, improvisational, and experimental contexts. Within academic settings, these performances often carried an implicit demand to demonstrate legitimacy: mastery of genre, technique, or form, and alignment with predefined roles such as classical performer, improviser, or researcher. In *Solstice*, this logic was deliberately set aside and blurred.

The work was not conceived as a space to demonstrate virtuosity, respond to an external prompt, or showcase the full technical capacity of an augmented instrument. Instead, the contrabass was approached as an extension of the expressive body; an additional means of engaging with the world artistically rather than a constraint to be mastered or justified. At one point, I hit the contrabass wolf tone (traditionally considered a limitation in string instruments); rather than correcting it, I shift tonality and timing to emphasize this unstable, ephemeral condition, treating it as a time/context-specific affordance (wolf tone is ambient conditions dependant) to be explored ([32] - timestamp: 37:10). The instrument was underused in a conventional sense: no virtuosic passages, no exhaustive exploration of techniques and electronics affordances. This restraint was deliberate. The performance tried to release from proof-oriented expectations, led by our living practices in music, acoustic and electronic, and composition and performance, arising from the desire to sound ([24, 26]). Rather than striving for technical authority, I approached the work as an offering of presence and poetics, shaped by what was incidental, ephemeral, and shared. This stance was reinforced through collaboration. Sanadzadeh’s parallel process of letting go of technological authority and resisting the Floors as a sole locus of legitimacy created a relational space in which I could also loosen attachments to defined roles. Witnessing her move beyond the instrument as a vessel for artistic authority made it possible for me to re-engage with the contrabass not as a credentialed object, but as one agent among others in an evolving ecology of sound, movement, and listening.

A parallel shift occurred in my relationship to CAVIAR. In most contexts, CAVIAR operates in service of a score or pre-determined musical structure, providing a controllable acoustic environment that supports compositional intent. In *Solstice*, this hierarchy was inverted. The evolving acoustic conditions generated by CAVIAR actively shaped musical decisions, becoming a driving force rather than a support. Toward the end of the piece ([32] - timestamp: 41:20), the system is pushed until it reaches its limitation: feedback, a state usually avoided. Feedback is thereon explored and embodied. By exciting marginally unstable frequencies and pushing CAVIAR's parameters toward feedback, I used the contrabass to provoke and play with this behavior, then abruptly cut the microphone inputs ([32] - timestamp: 42:30), allowing the feedback to persist through the remaining reverberant tail. This gesture treated virtual acoustics not as a transparent mediator, but as a responsive and fallible agent with its own thresholds and behaviors.

**2.3.2 Sanadzadeh, challenging legitimacy narratives and letting go of expectations.** The Floors are a flat controller that can respond to being used with any limb, but they are designed to be used by standing on them. Performance with this instrument puts the player in front of the audience, who then look directly at the player as they move. The motion itself is not easy to visually correlate with the sound, because it controls a network of mappings. At the same time, a focus on the spatial presence of the body in performance has been a large part of the feedback from the audience over the years. It seems that this focus on the visual and spatial element comes from a combination of factors: seeing a person move for the duration of a set (often 40–50 minutes), without any object between the player and audience (since the instrument is under the player). I had felt frustrated from playing sonic forms using a new instrument but being often commented on my 'beautiful movement' or the 'dance on the setup'. Movements on the Floors, though more visible than other instruments, are merely larger scale versions of the inherent need for most instruments, whether digital or acoustic, to be excited by some motion or action [12]. Having trialled acousmatic outputs as a method to tackle the audience-performer gap in focusing on sound [28, 29], it seemed necessary to bring movement and the body back into performance. Addressing and analysing elements of performance that continued to trouble us by putting them directly into the work was a reflective part of the ongoing practice-based research component of the work on musical instruments.

**2.3.3 Sanadzadeh: Overcoming internalized legitimacy narratives.** To approach this performance and bring the space into it, I had to accept that I also had a body [21, 35]. I wanted to dive into that element in this piece, without endangering myself as a musician. The need for being professionally recognised stopped me from being able to accept agency in performance. I had felt that talking about the visibility and performativity of this motion, playing with stage and dance, would give in to the feeling of being objectified, and would minimise my output as a musician. I also knew that by facing my fears in music head on, 'undisciplining' my work, I would learn something, and the loop in practice-led research is not complete without honest reflection [8, 9, 13]. From working on the gestural language with the Floors [27], my consideration of it as an instrument directly contradicts Magnusson's assertion that "The functionality of the digital instrument is always explicitly designed and determined." [14]. I had found that by gestural engagement, and attuning to the individual affordances of the interface, its own possibilities for

extending musical range can be discovered, embedded beyond the original design and considerations of functionality by the creator. As an active agent in musicking, the digital controller can be as one that enforces sonic agency by requiring altered gestures to be engaged with; the virtuosity resultant is one that is possible by movement, navigation and action that is responsive to the digital instrument as an instrument to be negotiated with, rather than an interface to control [34]. Attunement to the hexis that underpins our coming together, this view of virtuosity, instrumental agency, and artistic freedom, was co-constituted by both of us from the perspective of our tools not as instrument and gestural controller, but as two players, two primary instruments with agency of their own, and an array of additional collaborative tools. This approach reflects Coessens and Östersjö's discussion of habitus and hexis, whereby "For the musician then, hexis is constitutive of artistic choice, reflection, and action. The artistic virtue that is embodied in the musician's hexis is reflective of a broader aesthetic context and one's (artistic) goals in life and as such is an expression of a critical relation between the two" [7]. We are together with our instruments, responsive to them, and the opposing pulls of artistic research and creative expression happen within the ongoing grounding presence that our instrumental practices on our new and old tools afford us.

**2.3.4 Sanadzadeh: Letting go of instrumentalizing.** A part of the process of establishing the Floors and calling them a musical instrument had been the development of a framework for their performance. Repetition in delivery style, actions, and instrumental layout were done to familiarise the audience with a continuity that tried to emulate acoustic instruments: presented in different contexts but the instrument remaining defined clearly outside of each context. In doing such 'instrumentalizing' I had become attached to the process and had become anxious about changing it, domesticating my creative work [11]. To allow for this work to be about bodies and about sound, I would have to let go of what I needed the Floors to demonstrate in performance. Unwinding these elements required thinking, negotiation and trust, which are a strong backbone of many long-term collaborations in music, but are little discussed in pedagogy in interaction design in institutions. Instead of instrumentalizing my performance on my Floors [2], I had to see them as companions in musicking [22, 31]. I had to reflect on practice, performance and collaboration elements in my work and let go of the baggage that I had picked up in the process.

### 3 Outcome: performance and emergence of music

As developed earlier in this paper, the process of creation was iterative: erecting a form from improvisation, shaped by a combination of our skills, our vulnerabilities and our artistic goals. The 40-minute performance work was the result of a week-long development process and presented at sunset on the summer solstice. *Solstice* was performed on the summer solstice in the northern hemisphere in 2025, which coincides with la fête de la musique in France. The work was conceived as a celebration of being present, and of making music together using both long-standing instruments and newly developed tools. In *Solstice*, the work brings in a narrative in which instruments and players, as well as the room, entangle, and through a continuous struggle and facing limitations, acted out through the two players, a sonic clarity is formed. The sonic form of this piece introduced sounds

through incidental presentation of short sounds, variations of which are developed and mixed together.

The piece featured two characters embodied by the performers as their own musical selves. These characters moved through exchanges of solos, accompaniment, and shared improvisation, forming a narrative shaped through interaction rather than scripted roles. Instrumental skill, experimental approaches, and custom tools were not separated but blended through use, without privileging one mode of expertise over another. The musical form followed a narrative arc of character development, in which props gradually transformed into tools and instruments, allowing form to remain fluid. The timing of the performance, aligned with the diminishing daylight, became an integral component of this unfolding structure; the audience faced the windows, positioned well to bring the sunset to their attention.

All objects in the work (the soundcatcher, the Floors, and the contrabass) functioned simultaneously as props and musical agents, with roles that evolved through interaction. The soundcatcher first appeared as a sculptural object ([32] - timestamp: 0:00), later becoming an active musical tool ([32] - timestamp: 21:00). The Floors were initially approached tentatively by Valentin ([32] - timestamp: 03:00), then played by Sanadzadeh ([32] - timestamp: 14:15), reconfigured through physical repositioning by Valentin ([32] - timestamp: 22:15), and eventually used to accompany a contrabass solo through textural and spatial effects ([32] - timestamp: 35:35). The contrabass itself entered the piece as a prop, handed to Valentin by Sanadzadeh ([32] - timestamp: 06:30 & 35:00), before being enlivened as an instrument. Throughout the performance, movement (such as manipulating ropes, applying the lightest touch to the bass, or engaging the Floors with a pointed toe) generated sound through subtle, embodied gestures rather than forceful action or display.

A central outcome of *Solstice* was a reframing of acoustics from context to agency. Virtual acoustics systems such as CAVIAR are typically developed and evaluated either as analytical tools for studying sound in space or as representational models of material environments. Changes in reverberant conditions altered what actions were possible ([32] - timestamp: 10:40 & 40:00), desirable, or risky at any given moment. In this sense, acoustics became something to negotiate with rather than deploy. Virtual acoustics was used away from algorithmic fidelity toward musical malleability, becoming a co-performer whose behavior influenced musical form as it unfolded.

### 3.1 Expansion of playing through props and tools

The sound catcher and the rope suspension were initially introduced to foreground bodily presence and action, but they also expanded the sonic affordances of the instruments. For the Floors, the contrabass, and the various objects in the space, suspension altered how body weight related to sound production. By redistributing weight through the ropes, the performers' physical relationship to instruments was displaced, opening new ranges of pressure, balance, and control. Rope suspension significantly altered the relationship between weight, pressure, and placement on the Floors. By supporting Sanadzadeh's body, the suspension made it possible to apply greater force without risking imbalance, extending the lower dynamic range of the Floors. At the same time, it enabled an opposite extreme: placing nearly all body weight into the rope while lightly touching the Floor with the

foot, producing a suspended, delicate mode of interaction that was previously inaccessible.

The Floors also function acoustically. The contact microphone attached to the platform captures sounds produced by the foot, which are usually constrained by the need to support body weight [29]. When weight is redistributed elsewhere, the foot is freed to act with greater range and intention, functioning more like a mallet than a support. While similar displacement can sometimes be achieved using other limbs, rope suspension made the full force of the body available as a controllable parameter, allowing smooth navigation across pressure levels and sonic intensities. In this configuration, bodily balance, acoustic sound, and digital control became tightly coupled.

In parallel, during the rehearsal process, one of the two Floors we started with broke; instead of fixing it, we reoriented to use only one, in now a malleable one to many mapping [23], which challenged Sanadzadeh's conceptualisation of the 'instrumental' Floors to a new level. This process was liberating, and allowed for focusing on the aims of the musical piece at large. By embracing the musical form and the performance as the priority letting go of performance roles became more concrete. Using a single Floor with CAVIAR allowed for a new hybrid instrument to exist for a moment, bringing together a new level of sonic control of feedback. Pairing feedback generation using the EQ on the Floor with CAVIAR augmenting of the changing acoustical space gave a new voice to the exploration of musical uses for feedback.

### 3.2 Solstice and its musical form

The musical and spatial form of *Solstice* reads most clearly as episodic tableaux: a chain of distinct scenes in which the "rules of sounding" keep changing. Each tableau foregrounds a different material relationship: body-to-rope, body-to-floor, hand-to-object (contrabass), string-to-space, object-to-resonator, and lets that relationship determine what counts as phrasing, what counts as intention, and where musical agency sits. Sonic comes less from motif than from a repeated redefinition of instrumenthood: the piece keeps asking, in each new situation, who or what is playing what.

*Solstice* opens in constraint. Both performers are attached to the ceiling by ropes inside a crowded ecology of tools and sounding matter: sensor floors, resonant devices, mallets, electroacoustic objects, and a controllable virtual acoustical environment. Early sound is largely consequence not declaration: friction, contact, swing, impact, the audible residue of effort and limitation ([32] - timestamp: 0-6:30"). Constraint is a compositional condition that makes incidental sound the first voice of the piece ([32] - timestamp: 6:30-9:55). The piece next pivots into a tableau of legibility: an instrumental anchor arrives in simple, spare gestures, briefly establishing "music as played". That anchor provides a point against which the rest of the work can keep destabilising what "instrumental" means (tool extended by addition [32] - timestamp: 9:55"-11:00). The next tableau pushes the anchor into negotiation by making acoustical space an active partner. The environment is responsive and consequential, and it changes the performers' behaviour ([32] - timestamp: 11-13:30). Articulation, density, and gesture become adaptive responses to a space that pushes back, so technique becomes bargaining with conditions rather than expressing through them. Short tapping sounds on the Floors ([32] - timestamp: 3:17") are extended into a varied range of sounds that explore the musical range of friction of fabric on wood, extended by feedback. The Floors is

presented as a primary voice and the body becomes an actuator: weight, stance, contact timing, and movement function as bow, mallet, and fader at once ([32] - timestamp: 15'-16'). Constraint returns as chosen rather than imposed. A voluntary reattachment to the ropes recodes limitation as performable and mutable: an instrument of form ([32] - timestamp: 13':30"; 15':00).

Mid-piece, the tableaux splinter into divergent practices that sonify parallel experiments inside the same world; the introduction of the spring reverb prototype returns the maker of unstable tools as the initiator of new sound worlds to focus ([32] - timestamp: 16'-19'). One character leans into unstable resonance: scraping and striking a resonant device to produce smeared, distant fragments that intermittently cohere into chunky melodic shards ([32] - timestamp: 20'). The work's kaleidoscopic logic becomes explicit: disparate elements (players, objects, resonators, space) rotate in and out of the foreground, and sound behaves like a character shared among them rather than a product owned by any single instrument.

The conflict section that follows in this work, marking the climactic rise to the coda, is presented as a musicking system revealing itself. Competing impulses ([32]- timestamp 22') ordering gestures versus chaos-making gestures ([32] - timestamp: 23') expose what the instrument ecology amplifies, what it refuses, how quickly it runs away, and how it resets. Spill, overload, feedback, refusal, correction come forward as mechanisms ([32] - timestamp: 27'). The conflict is the moment where the work stops pretending its world is stable ([32] - timestamp: 30') and instead shows the seams and the costs of control ([32] - timestamp 35').

After that reveal, the tableaux begin to couple. Previously separated elements start to interpenetrate: acoustic sources route through embodied interfaces; bodily interfaces behave like signal processors; objects become controllers by accident; the environment re-enters as an actor (timestamp 35'). Musical interest shifts toward hybrid causality, where the same action is at once a gesture, sonic trigger, and technical intervention. The penultimate section tightens this coupling into an emergent feedback ecology: Floors, contrabass, percussion, resonance, and virtual acoustics becoming mutually unstable in a way that feels "alive" ([32] - timestamp: 37':00"-41':30"); the piece cuts then to the bass and CAVIAR feedback solo, returning to sounding as a body entangled with resonance and sound decay in space as the physical core that has allowed for the development of music as a medium since our early cave days of early humans ([32] - timestamp: 41':30"-42':56"). Silence lands not as fade-out but as an authored event: the world is switched off decisively.

The form develops sonically and spatially in parallel. The movement of the players within the space becomes an illustration of the concepts of sound we navigate, and the sonic development of the form is introspective through improvised sections; space and sound are co-constitutive in this work [36]. In the narrative arc, sound functions as the viewer looking into the kaleidoscope of the work: the performers and tools are the turning elements, and sound is the shared axis that keeps reconfiguring what the audience thinks they are hearing and why it is happening.

## 4 Conclusions

This exploration resulted in a vulnerable show-length piece that combined all these elements into a musical form. We wanted to perform a work that would be what we would make even if we were not members of the NIME or academic communities; we aimed for a work that did not aim to showcase our musical

expertise on our instruments as the reason behind the sounded choices we made. The individual sections were not as connected as in some other musical works. Evaluation of a musical piece, especially one that presents tools or materials that are new or newly changed in their role, is hard to do with any meaning. Evaluation of new circumstances or tools with older models can be reductive, and evaluation of a new work using criteria derived specifically for the work itself can be void of showing us useful insights.

This work required us renegotiating with elements of performance we had shied away from (such as the spatial engagement with the room), using our tools in new ways, and relating to institutional spaces in new ways. To do so earnestly was challenging, and to write about it in an academic context with common materials of conference proceedings writing is another challenge. This paper aims to bring the process and outcomes of this work to the fore so that the conversation can be stretched further: if we are to tackle performance, community and musicking more broadly, we hope to make room for different registers of reflection within proceedings writing.

*Solstice* allowed us to step outside disciplinary obligations by confronting vulnerabilities around authorship, legitimacy, and artistic identity. Reclaiming the contrabass, loosening attachment to the Floors, welcoming extra-sonic gesture, engaging freely with objects, and musically negotiating with CAVIAR entangled us with these tools in ways that were expressive rather than justificatory [1, 21]. Through this process, the musical and interpersonal motivations that first drew us to music-making became integral to our NIME practices, and our abilities in musically responding, and 'knowing when', came to the fore [18]. In bringing our full selves into the work, distinctions between new and old instruments became less salient. Narrative functioned as a structural support without overtaking musical form. This made it possible to combine highly tuned acoustic instruments, stabilized NIMEs, provisional objects, feedback, and virtual acoustics within a single musical ecology. Rather than emphasizing novelty or individual authorship, the work foregrounded musical continuity and relational emergence.

Attending more closely to the musical life of a work, by allowing it to develop, recur, and exceed individual identity, offers a way for NIME to orient itself toward music [20, 26]. *Solstice* felt more like a performance we facilitated from the desire to play; it is not an ownership-driven composition [24]. Through it, we were able to relate to our tools and to one another anew, and to find community through musicking together [31].

### 4.1 Limitations

The work's first iteration was inherently site-specific, shaped by the technical infrastructure and extended access afforded by the CCRMA Stage. While this context supported deep exploration, it limited the work's immediate portability and its ability to reach audiences beyond academic and NIME-centered spaces. Restaging *Solstice* requires institutional support, both technically and logistically. As with many NIME-based works, further musical maturation depends on iterative performance and rehearsal. Creating a repertoire of robust, repeatable works requires time, re-staging, and sustained practice. This first iteration was developed intensively over one week, following approximately eight months of planning; without such preparation and access, the work would not have been possible. On a broader level, the personal commitment required to develop works of this nature is

high, while opportunities for low-stakes, local presentation remain limited. Outside of specialist contexts such as NIME, few musical spaces readily accommodate works that sit between performance, instrument-building, and narrative. As a result, a gap persists between experimental musical communities and the broader ecosystems in which long-form works can evolve.

The development of *Solstice* was both challenging and liberating. Negotiating with tools as collaborators strengthened our musical resilience and expressivity. Expression emerged through sustained presence and shared practice, with music, not technology. Working more slowly and prioritizing repertoire-building has allowed the work to deepen over time. In this sense, *Solstice* has propelled us further into musicking with NIME, not as tool builders, but as collaborators in expression.

## 5 Ethical Standards

There are no unique ethical considerations associated with this work. The performance does not involve human subjects beyond the performers, animal participation, or sensitive data. This submission adheres to the NIME ethical code of conduct.

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