

Collaboration and Recursion: reflections on calligraphy and feedback

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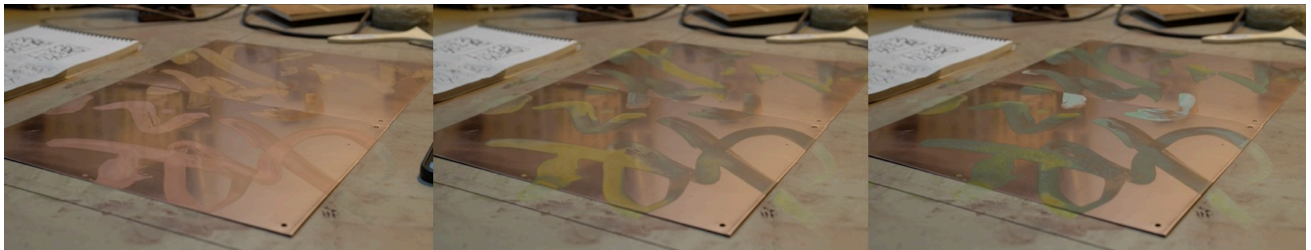


Figure 1: Transformation of the written characters

Abstract

This paper offers reflections on the collaboration between a sound artist and an artist specializing in Chinese calligraphy, which resulted in the creation of a sound installation combining contemporary Chinese calligraphy with electroacoustic feedback. Adopting the “reflection-on-action” approach, the authors engaged in an in-depth discussion, revisiting the details of the creative process based on the extensive documentation compiled in the form of a visual diary. The paper highlights three orders of recursivity that are either physically present in the work (electroacoustic feedback), defined the creative process (collaboration) or served as an analytical tool (ecology) to discuss the dynamics of collaboration and cultural influences in NIME practice.

Keywords

Chinese calligraphy, collaboration, ecology, feedback, sound installation

1 Introduction

The importance of collaborative (co)-creation has been widely acknowledged in the DMI literature[31]. A look at the current NIME corpus gives a taste of a wide variety of possible collaborations: cross-cultural [5, 14], cross-disciplinary [4, 29, 37] and even more-than-human [23, 36, 49].

Perhaps one of the biggest merits of collaborative undertakings is that they tend to resist insularity (on different scales from personal to disciplinary), infusing a healthy degree of contingency into what might otherwise be seen as a self-contained system – individual practice, community or a discipline. This paper, presents our attempt to disentangle the messy reality of a NIME

collaboration by following along with the recursive movement of material, ideas, work and cultural influences. In doing so, we hope to contribute to the discussion of collaborative NIME creation, especially those involving cross-cultural elements.

To this end, we present reflections on collaboration between a sound artist and a visual artist trained in Chinese calligraphy (later referred to as the calligrapher). Over the course of three months the authors have worked together on a sound installation titled *Reverse Movement* that combines novel (for lack of a better word) approach to Chinese calligraphy and feedback-based generative sound in a portable format [Fig. 2]. The work was a submission for the TEI art gallery, commemorating Marcel Duchamp’s series of “exhibitions in a suitcase” *La Boîte-en-valise*.¹ In the meantime, the work has also been on display in other venues in China. Video documentation of the piece is available here <https://vimeo.com/1037811492>.

In our previous work, we have made steps towards developing an approach to culturally specific DMI-building rooted in the notion of locality, emphasizing deeper engagement with contemporary artistic and technical practices specific to the region [26]. The present work is a continuation of this line of thinking, albeit from a slightly different angle, more appropriate for a collaborative effort. Conceptual and practical considerations that might work for a solitary artist or instrument builder stockpiling tools, materials, techniques, theories and cultural influences, tend to function differently or not function at all when faced with a particular, highly idiosyncratic practice and a person behind it, which, in our case was the calligrapher’s approach to his art. Navigating between constraints imposed by what each side brings into collaboration combined with the infusion of new knowledge is what makes collaboration especially compelling as an object of research.

Since our main interlocutor is a form of Chinese calligraphy, we have followed certain loosely defined guidelines in our work. We a) refrained from using calligraphy as an “input” to the



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¹https://tei.acm.org/2025/program/accepted_arts



Figure 2: Installation view.

computational system and b) emphasized the heterogeneous and dynamic state of this art form, a living practice as opposed to cultural heritage, which could imply a monolithic or essentialist designation of Chinese calligraphy. While there is nothing wrong with either approach and they are indeed quite common, we felt that the aspects that these approaches tend to prioritize would not fit our work.

Over the time we spent working on the piece, we thoroughly documented the process and organized it in a form of visual catalog available here: https://rev-mov.github.io/reverse_movement_diary/. This catalog (or diary) guided the discussion that took place some time after the completion of the piece, which presented an opportunity to re-examine the process and delve deeper into its finer details. While the work was a close collaboration between the first and second authors, the third author directed the discussion and devised an interactive scenario for this work, which went unused in the current version but was required by the original submission. Deferred, *aposteriori* nature of the reflection-on-action approach encouraged us to embrace divergent and conflicting perspectives, as well as gaps and inconsistencies in memory and documentation that guided the flow of the discussion.

While this work is neither an instrument nor an interactive piece in the strict sense of the term, we draw on sources related to DMI building practices. Conceptually, this paper adheres to the ecosystemic (or ecological) approach to DMI design and analysis as proposed by Waters [19] and has since been adopted by many NIME researchers, who have adapted ecosystemic thought to a variety of contexts [35, 41]. By positing that at the core of ecological thought there is always a recursion (loosely synonymous to feedback), which we interpret as the capacity of a complex system to accommodate accidents and irregularity as it loops back on itself, we attempt to examine other forms of recursion that informed this collaborative undertaking.

We further discuss the insights with the ultimate aim of highlighting how recursive negotiations between material, sound, form and subject matter can steer the collaborative creative process. We consider these observations to be a contribution to the growing body of work related to interdisciplinary collaboration in arts, collaborative NIME design and culturally situated practices in NIME, more specifically, those related to Chinese calligraphy.

2 Background

2.1 Authors' Positionality

Before delving into the details of the work, it seems necessary to address potentially problematic points regarding the authors' backgrounds. While we consider this work as belonging to the continuum of contemporary Chinese calligraphy, none of the

three authors are of Chinese origin, however, the two principal collaborators have developed their respective practices in the institutional and artistic contexts of mainland China over an extended period of time (10+ years). With that in mind, it seems necessary to provide a brief outline of research related to sonic arts (including DMI building) in this region. Specifically, we limit the scope of references to works pertaining to mainland China, omitting other Sinophone regions.

2.2 Experimental music and sound art in China

The diversity of contemporary sonic practices in China has attracted significant attention in recent years. In addition to the two edited volumes: Routledge's *Research Companion to Electronic Music and Electroacoustic Music in East Asia* [2, 13], the 2022 special issue of *Organised Sound* focused on experimental and electroacoustic music in China. [3]. Elsewhere, studies of cross-cultural appropriation of music technology [51] and experimental music communities [10, 38] have provided valuable insights into the sonic cultures of contemporary China.

NIME research focusing on China remains somewhat limited but has been growing in recent years, with work on culturally-situated NIME design [5, 18, 40] ethnographic accounts of China's NIME community [46] and a comparative study of music platforms in China and the UK [6] being among the examples. In addition to academic texts, several performances and installation pieces engaging with Chinese culture were featured in NIME events [8, 25].

In other academic venues, a number of works concerning sound art in China have been published over the years. While this art-form in China has developed later than in the West and followed a different trajectory, its terminological ambiguity is also addressed by its practitioners in China, whether as a distrust towards the term [24, 47] or attempts to redefine it in the context of local cultures. For example, in Yao Dajun's curatorial project *Revolutions per Minute* [48] he emphasizes the deep link between Sinophone sound culture and languages, dialects and writing systems of China – something that his own sound practice revolves around [19].

Hangzhou-based researcher Adel Jing Wang has extensively covered the topic of sound art, experimental music and auditory cultures in China [43, 44] focusing on the diversity of practice rather than a singular definition. For example, Wang's investigation of sonic arts in China through the lens of China's philosophical legacy, ranging from the use of sound in contemporary visual art to the role of sound technologies in the diverse sonic landscape of today's China [45].

2.3 Modern and Contemporary calligraphy in China

Chinese calligraphy *shufa* (书法) is an ancient and distinct art form that reflects the history, philosophy, aesthetics and politics of the region. The English translation of the word does not quite reflect the complexity of this artform that goes beyond orthographic perfection that the English term connotes, and later in the article we use the terms *calligraphy* and simply *writing* interchangeably. The history of calligraphy in China spans many centuries and is far beyond the scope of this article. We should, nevertheless, give a brief overview of its contemporary counterpart relevant to the present work. However, it should be noted

that the relationship between traditional and contemporary calligraphy in China is rarely antagonistic, with many contemporary artists being classically trained.

Traditionally calligraphic training in China involves mastering certain constraints: working with a relatively fixed set of tools, scripts and canonical pieces. As Cheng argues in her paper on the work of contemporary artist Qiu Zhijie, calligraphic training instills two epistemological tendencies in its practitioners: favoring consistent methodology over style and perceiving the world through the prism of different calligraphic scripts [9].

While there is a consistency between traditional and modern or contemporary calligraphy, it does not mean that it is not open to radical experiments as evidenced in the post-1980s works by artists such as Wu Shanzhuan, Gu Wenda, Wang Dongling and Xu Bing, to name a few [17]. Numerous contemporary works explore different approaches to media and scale, as well as performative and semantic dimensions of calligraphy. Whereas these elements and the relations between them change over time just as art and language do, certain elements remain, for example, as observed by the famed Yuan artist-scholar Zhao Mengfu, brushwork remains the fundamental immutable element of calligraphy that ensures the consistency (and identity) of the practice.

Chinese calligraphy is not unknown to NIME, which is evident from several projects leveraging the expressive and performative aspects of calligraphy in the design of interactive sound systems [25, 40]. Similarly, a 2024 NIME performance by Chuang and Weixler put a significant emphasis on the choreography of calligrapher's movement as a compositional tool. In addition, another 2024 NIME performance by Cheng et al. connected choreography and AI-powered audio visual system with Chinese calligraphy [8].

The work described in this article draws extensively on the aforementioned sources, and while it shares certain similarities with other works combining calligraphy and technology, we tried to focus on the particularities of our respective approaches, without relying too much on the inertia of established practice. For this reason, qualities like interactivity and performativity, which are often featured or emphasized in such works, are arguably intrinsic to calligraphy as a whole and readily lend themselves to inclusion in computational systems, became of less importance to us as the collaboration progressed. The final artifact can be seen as first and foremost the documentation of the collaborative process, which in this case was more akin to a private conversation, biased, partial and reductive as it may be.

2.4 Recursivity in NIME

One of the assumptions that this paper is built upon is the analogous relationship between (musical) ecosystems, electroacoustic feedback and collaboration – the three recursive phenomena central to this work. Our understanding of recursivity is primarily informed by the writings of the Hong Kong philosopher of technology Yuk Hui and his precursors from the cybernetic tradition and philosophy of organicism [20]. Recursion (often synonymous to feedback) refers to a capacity of a system to loop back into itself for problem solving and course correction. It is one of the foundational principles of computation technology and can be observed in many natural phenomena. In philosophy of technology, the recursive mode of operation is contrasted with the linear logic of mechanicism. What we find particularly interesting is not the circular movement of recursion

per se, but its capacity to accommodate contingencies and irregularities, disruptions, mistakes and happy accidents alike. We find this quality to be crucial to the often error-prone process of artistic collaboration and as our work went on, this became more explicit, to the point of being quite literally inscribed in the piece.

It could be argued that ecological (or ecosystemic) thinking in NIME research also has its roots in the cybernetic tradition, based on the notion of multiple feedback loops between agents and environments. In recent years, it has gained significant praise due to the way it assists researchers and designers in understanding musical (in the broadest sense of the word) activities and complex relations among their numerous actors. Examples of works leveraging the ecological approach are numerous and include interactive system design [37], analysis of performative pieces [34, 35], participatory design [41] as well as development of analytical frameworks to study the said ecologies [33].

Feedback (and, by extension, recursion) is an intrinsic part of a functioning (eco)system, musical or otherwise, as suggested by Gregory Bateson [16]. It seems fitting to apply ecological thought to analysis of feedback in sonic arts, given their shared lineage. Several works engaging with this tradition in relation to sound has been published in NIME and other outlets [11, 12, 28, 30].

Similar to many other domains of knowledge, the use of feedback in sound can be traced back to the post-WWII rise of cybernetics, although earlier examples exist as well. One of the early examples of this influence to the exhibition *Cybernetic serendipity*, which, in addition to pioneering works in media art, came with a companion record² containing sound works often based on principles of cybernetics [30]. Many other examples are featured in a special issue *Echo magazine* (No.3) extensively covering the use feedback in sonic arts and musical cybernetics³ and showcasing the creative and philosophical implications of feedback and recursivity. Moreover, initiatives such as *Feedback Musicianship' Network*⁴ indicate the interest in documenting and expanding the field of feedback-based musicking and research.

While collaborative processes in NIME have not been described as being explicitly recursive, connecting collaboration to the ecology and feedback does not seem like a far stretch. Given how the ecologically-minded frameworks are featured in the variety of NIME scholarship: with categories spanning activities all the way from cross-cultural [5, 14], cross-disciplinary [4, 29, 37] to interspecies and more-than-human [23, 36, 49].

The connection between these three areas became apparent while analyzing the discussion between the collaborators that forms the crux of this paper. For example, the intuitive and metaphorical understanding of looping motion and the richness and variety of its visual representations helped the calligrapher to better understand and become more involved with the sound design of the work.

3 Methodology

Methodologically, this work falls within the tradition of practice-based research in NIME [15]. Throughout the process of discussing, designing, and building the artwork, we collected documentation from different sources, including chat logs, screenshots, photo and video documentation compiled into a browser-based visual

²<https://ubu.com/sound/cybernetic.html>

³<https://echo.orpheusinstituut.be/issue/3-feedback>

⁴<https://feedback-musicianship.pubpub.org/>

diary. The diary consisted of thematically organized slideshows laid out on the same screen presenting main phases of the work and allowing us to combine and juxtapose documentation from different sources and formats.

After the completion of the piece, we performed a reflection-on-action, a methodology proposed by Schön [42] that has been used in NIME and other venues concerned with art and technology [7]. Reflection-on-action is defined as a research activity that “takes place after the activity and enables the exploration of what happened and why in order to develop questions, ideas, and examples about the activities and practices in focus” [42].

To support this self-reflective process, two months after the completion of the piece, the authors sat down for an hour-long conversation about the work. The conversation loosely followed the structure of the diary to revisit the timeline of collaboration and retrace our creative thoughts and decisions. The conversation was recorded for further reference and served as the main source of reflections discussed in this paper.

4 Process

This section presents a rough timeline of our work supported by the diary and the conversation. The aim here is not to narrate the process in all accuracy, but to present the evolution of ideas concurrent with the material development of the artwork.

The collaboration was kicked off by an exhibition call for portable artworks, prompting us to create a scaled-down version of the installation the authors have planned for years but have not been able to realize for a variety of reasons.

Apart from the first author’s work on sound sculpture and installation pieces, he has been sporadically active in the noise scenes of Hangzhou and Guangzhou focusing on handmade electronic music and self-built instruments, many of which feature feedback-based sound. Many of these techniques are well explored in NIME literature in one capacity or another and therefore cannot be considered particularly novel. However, the writing technique of using acid on metal plates is peculiar to the calligrapher’s practice and requires further elaboration.

As a formally educated calligrapher, currently pursuing a practice-based PhD in calligraphy at China Academy of Art the second author has been trained in traditional calligraphy, which involves meticulously copying historical inscriptions, before developing a more experimental approach, inspired by mid-20th century autodestructive art and his previous academic background in paper-based artwork restoration and conservation.

In his practice, the traditional paper-ink coupling is replaced with a combination of metal alloys and corrosive fluids, essentially etching the text onto the solid medium with traditional ink brush using the corresponding brushwork and scripts. He uses both positive (writing with corrosive reagent) and negative (writing with masking fluid) approaches to etching, and the present work features the positive process [Fig. 1]. To accelerate corrosion, the metal medium is sanded, and the chemical reaction is left to run indefinitely until (if necessary) interrupted by applying nikawa bone glue with an airbrush [Fig. 3].

4.1 Prototyping

Since the format was somewhat predefined by the exhibition call we began by collecting possible references. The most immediate response was to look at religious objects (mostly from the Christian tradition): shrines, reliquaries, foldable icons, diptychs, triptychs and other “foldable media”: suitcases of various forms and



Figure 3: Growth of patina, 2 minutes after applying the acid.

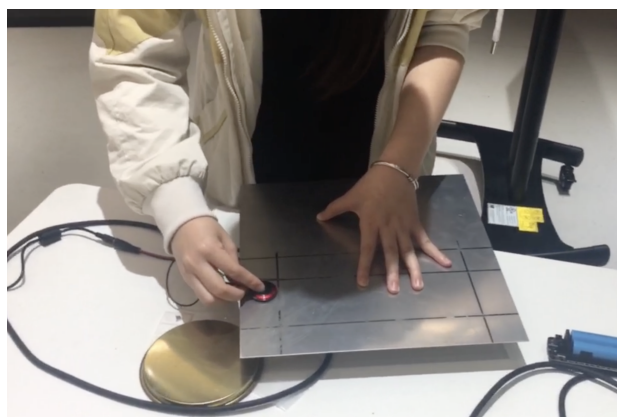


Figure 4: Tangible prototype.

designs, partition screens, folding mirrors etc. These were soon discarded along with the idea of housing a piece in a readymade object, as we realized these references were disconnected from the authors’ respective practices and seemed either superficial or distracting.

In preparation for the work, the first author experimented with simple handheld and desktop feedback prototypes [Fig. 4] using various metal plates in a direct piezo element–amplifier–transducer loop. The goal was to get a sense of the timbral and dynamic ranges of the setup. Through these interactions, we noticed how bending, squeezing, dampening and adjusting the relative positions of transducer and pickup affects pitch, timbre and amplitude. This stage proved to be important later as the work began to shape up to be a non-interactive, contemplative piece, too fragile to allow hands-on manipulation, which directly clashed with the desired sonic effect that the authors discovered during these highly tangible encounters with the material.

The first collaborative prototyping session resulted in a cardboard shoebox with metal plates suspended with copper tape [Fig. 3]. With it we tested cross-feedback between the plates without the intermediary of software. Due to the imperfections in design and sympathetic resonance of the box, the swinging metal plates produced a pleasant modulation effect that we attempted to replicate later with the use of bandpass filters and low-frequency oscillators (LFOs) in Pure Data (PD).

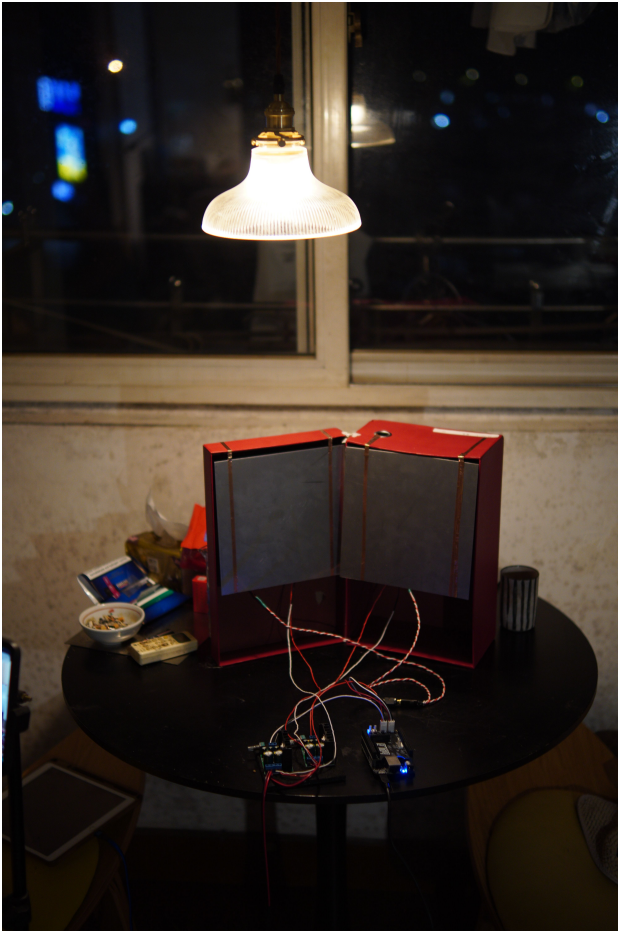


Figure 5: Shoebox prototype.

These prototyping steps, while not changing the previous idea of the overall structural settings, played a central role in determining the general mood of the piece. The resonant properties of the material and the recognizable sound of feedback naturally created a rather austere aural aesthetic that could not be ignored while considering other elements of the piece. This, in turn, made us think about the dimensions of the piece, its proximity to the viewer, and question the need for interactivity, which we considered implementing prior to that.

4.2 Build

Building the box took a significant amount of time, as we had to step outside of our respective areas of expertise and work together as two amateur carpenters. The process took about four days, as we made daily trips to the wood shop to work on the box, discovering new tools and techniques along the way: from preparing the materials and building the cabinet to working with wood finish and veneer. Perhaps as a result of this, the box we produced did not look new but weathered, bearing marks of inexperience and reminiscent of vintage speaker cabinets or well-worn cases for plein air painting, the effect we were quite satisfied with [Fig. 6].

Partially due to our inexperience and loosely defined goals, working outside of the comfort zone coupled with the enthusiasm of trying out new techniques and seeing what the other

side can contribute was the moment of most symmetry and cohesion in our collaboration. For example, the calligrapher brought to the table techniques and tools he has learned during his paper restoration days, which proved to be critical when applying the veneer finish, while the sound artist contributed his experience of building enclosures for electronic instruments (e.g. synthesizers), designing the suspension system for the plates, and implementing connections and wiring that allowed for different modes of presentation and transportation. These and many other elements, both positive and negative were quickly absorbed into the process of explorative, recursive collaboration that defined this project.

4.3 Sound

The sounding part of the piece relies on a rather simple technical setup with digital sound processing done in PD⁵ and deployed on a Bela board⁶. Suspended copper plates act as both pickups and speakers in a cross-feedback setup. This is achieved by attaching piezo elements and surface transducers to the back of each plate and routed through PD and line-in/out pins of Bela so that the vibration of one plate is picked up and reproduced through another plate and vice versa.

For a non-interactive piece, our experience with the tactile manipulation of the plates at the early prototyping stage significantly influenced the final outcome as we tried to recreate some of the sounds we have heard before. For example, dampening and variation in pitch and amplitude easily achievable with a handheld prototype were approximated with a series of variable-frequency bandpass filters synced to the main frequency further divided by even integers so we had control over which harmonics were allowed to self-oscillate.

Another effect we were after was the slight modulation caused by the plates freely swinging inside a shoebox prototype. It was recreated and expanded upon in PD by setting up a series of very slow sinusoidal LFOs modulating input gain of bandpass filters. The LFOs were set up to slowly go out of phase with each other to add variation and unpredictability to the piece if it were to run for an extended duration of time.

Finally, we gave the sound some forward motion by setting random target frequencies along the audible spectrum, the main integer determining the frequencies of filters would slowly increment or decrement to reach the target, at which point another target number would be set. This simplistic algorithm combined with slow overlapping modulations and the cross-feedback between two plates resulted in a sound that we both authors found rather compelling, unlike some of the previous experiments with a more involved approach to audio processing.

4.4 Text

As the focal point of the piece, calligraphy was the final element we worked on as other elements of the work continued to unfold and develop. Throughout the previous stages, we kept on discussing possible source texts, ranging from the Chinese classics, to vernacular or nonsensical phrases – another hallmark of contemporary calligraphy – without settling upon a suitable text, until the moment when we felt the rest of the work was in a stable state.

Searching for an inscription that would reflect and articulate the reciprocity we experienced in the preceding stages of the

⁵puredata.org

⁶bela.io

work led us to a passage from *Dao De Jing* (道德经) – *fan zhe dao zhi dong* (反者道之动) which can be translated as “reversal is the movement of Dao [50]” and, according to Hui, represents the recursive “oppositional continuity” at the center of Daoist thinking – a philosophical tradition that predates the development of organicist philosophy in the West [21]. This quote served as the namesake of the piece – *Reverse Movement*, and in our view, summarized both the technical and conceptual origins of the work and our experience of collaborative artistic creation.

We settled on using a cursive script *cao shu* (草书) largely because it is one of the scripts the second author specializes in. The calligrapher was interested in experimenting with the compositional possibilities, since (unlike a scroll, for example) the plates would be separated after writing, breaking up the composition in an interesting way. As mentioned in the background section, the importance of mastering historically established scripts in traditional Chinese calligraphy is paramount, to the point that, echoing Qiu Zhijie’s statement, seeing the world through scripts becomes part of a calligrapher’s identity. The author’s decision to explore the compositional openness and dynamism of *cao shu* also reminded us of an obscure ethico-orthographic debate among Han literati where *cao shu* was considered detrimental to the spiritual and ethical value of calligraphy [27].

5 Self-Reflections on process

We organized the reflections along the three axes: writing, sound and craft noting the differences and similarities in our perspectives, as is often the case in other collaboration-centric papers presented at NIME [37].

5.1 Writing

Writing is the main area of expertise of the calligrapher. As we discussed different references along with different possible source texts over the duration of our work, many themes and possible inscriptions were discarded, e.g. those that had religious motives or undertones in them (somewhat unconsciously returning to our earliest references). Although the calligrapher expected the text to be settled upon early on, ongoing discussions and emerging sonic and visual aesthetics contributed to postponing the writing as our work on the build and sound of the piece kept us in a state of flux and committing to a specific inscription seemed to require a degree of fixity that would only manifest later on.

This went somewhat contrary to the expectations of the calligrapher, as it is his main area of expertise and would logically be the part he felt most confident about. Constant communication with the sound artist, and the dynamically evolving work turned out to be somewhat disruptive to the part of the work he had the most experience in.

Being relatively fluent in Mandarin but largely unfamiliar with the intricacies of calligraphy, the author found it difficult to reconcile the linguistic and artistic perspectives. Due to the limited knowledge of Chinese calligraphy, its history, aesthetics and technicalities, it required a significant suspension of judgment to look past the text as a conveyor of meaning. This put him in the position where he had to trust the collaborator’s sensibility and skills, which contributed to a sense of cohesive creation. However, this linguistic disposition ensured that the author had strong opinions of what the final text should *not* be. Which introduced some tension in the dynamic of collaboration but was

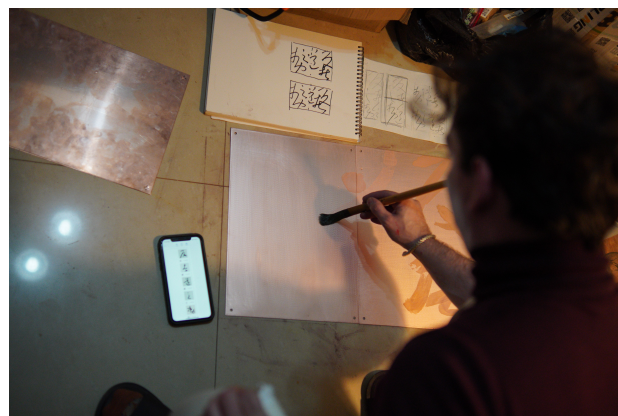


Figure 6: Writing.

ultimately resolved, when the other elements of the piece fell into place.

5.2 Sound

As a general observation, the sound proved to have a significant capacity to change the perspective on writing on both the fundamental level (text, script) and more specific aesthetic decisions (rhythm, composition) to a degree that was not expected by the author.

In the years preceding the collaboration, the calligrapher has been very enthusiastic about the sonic properties of metal plates he has been working with, often sharing short audio clips of sounds he found particularly interesting with the sound artist. However, communicating finer points of sound design presented some challenges.

Having experience with similar technical setups, the author entered the collaboration with certain preconceptions in mind. Particularly, combined with the author’s previous work with handmade electronic music, the embodied experience of physically playing and manipulating the first prototype set the expectations and steered the direction of sound design of the piece, an observation similar to other literature on embodied music practice in NIME [32]. These considerations ranging from aesthetic to technical had to be communicated to the collaborator who was largely unfamiliar with them. This is where the concept of feedback came into play once more. While the exact technical setup, especially with the addition of digital processing was difficult for the calligrapher to understand, the metaphor of a sound feeding back into itself was grasped (both visually and sonically) rather intuitively, reinforced by the author’s experience of everyday life: common sound objects such as runaway microphone feedback, malfunctioning PA and other were referenced.

This is the quality of feedback or any recursive process that the author considers to be both frustrating and fascinating: one one hand (similar to an observation made by the Dutch media theorist Geert Lovink [22]) the metaphor of feedback often overwhelms and impedes thinking, as sometimes it is hard to escape the fractal vision of loop within a loop within a loop. At the same time, visual and sonic feedback have an immediate intuitive appeal and (for some people more than others) rarely gets boring even in its most basic forms.

Introducing software processing at a later stage proved to be a rather disruptive process. The calligrapher felt unsure that



Figure 7: The Box.

the natural sound of metal he has gotten used to, was less pronounced now, and the increasing complexity of the technical setup resulted in more rigid, lifeless sound. The calligrapher appeared to favor more “natural” sounding patches, which usually involved less signal processing over the more “electronic” ones and complimented the final version of the PD patch as sounding similar to *shakuhachi* flute.

5.3 Craft

As we have mentioned above, despite being the most logistically and technically challenging part of the process, building the box was the moment of the most cohesion between the authors, as compared to the parts that drew more on our respective expertise. Tensions caused by the asymmetry in knowledge seem to dissipate when the authors felt equally inexperienced and had to rely more on each others’ support, suspending criticism of each others’ shortcomings to ensure the remaining work went smoothly.

We find this shared perspective similar to what Armitage and McPherson observed in their reflections on collaborative NIME-craft: the situation where the rigid division of labor gives way to a more dynamic form of (self)-organization, where participants’ previous skills and experience are dynamically actualized in response to affordances and constraints of the crafting context [1]. Grund and the colleagues made a similar observation in their reflection on cross-cultural collaboration, noticing how on-site

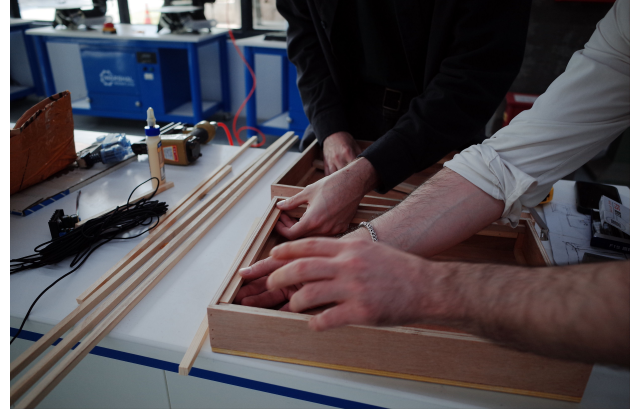


Figure 8: Making the box.

collaboration in close proximity helps to deemphasize the definition of roles [14].

Through the combination of proximity and the sheer amount of time spent of working on the box, we became aware of and were reassured by the way the contingent elements organically became part of the work: for example, a botched experiment with wood varnish forced us to cover the ruined surface of plywood with leftover veneer material we stumbled upon near the wood shop – an important part of the final look of the object. While both authors eventually agreed that the decision to build the box from the scratch was self-indulgent and absorbed much more time and resources than initially planned, it can be argued that the shared experience of craft created a much-needed contrast with author’s respective artistic practices balance making us feasibility against habit, ambition and aesthetic dispositions.

This was also our first foray into an unfamiliar ecology of a wood shop: its staff, machines, tools, materials, safety protocols and the seemingly infinite modularity of technical components. The time spent forming relations with the many agents in this ecology significantly influenced the way we approached the collaboration and contributed to a more productive dynamic throughout the remaining work and the sense of proximity we experienced partially translated into a facilitating more intimate, contemplative relation between the resulting artwork and the audience.

6 Feedback, Ecologies, Collaboration

To reiterate the argument we have been trying to make in this article, we consider three aspects of this project: ecologies, feedback and collaboration to exist in analogous relationship to each other. In the context of this collaboration the figure of feedback loop was not just a means of sound generation, but rather can be seen as a conceptual thread that goes through different yet reciprocally related layers and phases of the work.

On the scale of individual artistic (NIME or otherwise) practice, collaboration is the source of contingency. It introduces unexpected, productive asymmetries that significantly affect the creative process. In case of NIME work, to which we argue the present work still belongs, this resonates with the field’s resistance to monolithic design frameworks [39]. This particular collaboration largely followed a recursive logic and the relationship between three core elements of the work: craft, sound and writing emerged not as a linear succession but as an ecosystemic exchange.

As an illustration of this exchange, is the causality of the artistic process: the work is the calligrapher's personal practice, since it uses metal, a resonant, sonorous material which naturally lends itself to the feedback explorations. The properties of the medium influenced sound and build, e.g. thinner or thicker plates, flex and resistance of the wood, especially when they are all locked in a transductive feedback ecology where each element does not develop in isolation but in reciprocal exchange with its environment.

This particular technical configuration was already leaning towards a certain aural and visual aesthetic. At one point we envisioned the piece as being more lighthearted and playful, to the point of being kitsch. Possible ways the text and script could relay tone were discussed but ultimately abandoned after we heard the first sounds coming from the prototype, to which the calligrapher's immediate response was: "This is not a funny sound". We were reminded of this seemingly off-the-cuff remark when the piece was shaping up to be more serious in tone and look, which in turn influenced the consecutive aesthetic choices.

Similarly, elements of Chinese culture were a major source of contingency in our work that required careful consideration. Although we did not want to make specific references to other artworks (which, given the theme of the exhibition call is quite ironic) none of our creative decisions were completely devoid of any referentiality: from the millenia-long history of Chinese calligraphy, embodied by the trained practitioner, to embodied experience of feedback musicianship, its intellectual history and practices in the region. The recursive nature of the process helped in negotiating certain sonic, visual and linguistic elements while other points remained ambiguous. For example, while we specifically did not want to use overtly Chinese carpentry techniques to avoid certain cultural tropes, we have received unexpected help from an expert in Chinese carpenter. Unfortunately, this encounter was too short to delve deeper in this tension between seemingly neutral or universal technical practices and the ones reflecting local context.

It is worth admitting, that not all of these factors we reconciled by virtue of recursion, and it should not be seen as a cybernetic machine resolving all conflicts. For example, when discussing the idea of the piece with a Chinese contemporary art curator, her first reaction was to challenge the yet another attempt to combine calligraphy and music/sound. This criticism echoes another Qiu Zhijie's statement that "[in China] all other art forms have mutated out of calligraphy" [44] This point made us wonder whether a deeper engagement with this relation was required, which is something we would like to address in the future work.

These and many other considerations fed back and forward into the multi-layered recursive process that this particular collaboration could be described as: from ecological considerations of reciprocity between agent and environment, to constant negotiations and infusion of the uncertain in a collaborative practice, to the positive feedback loop animating the copper plates to be heard, seen and read as text by the observer.

7 Conclusion

As we have presented the reflections on a collaboration that we have paid specific attention to how three orders of recursion, namely: ecology, collaboration and feedback manifest in both the process of collaborative creation and in the discussion of the

said process. As Yuk Hui argues in the book focusing on recursive phenomena in Chinese and Western philosophy [20], the spiral movement of recursive logic always exists in tandem with the unforeseen, contingent elements that energize the system. Be it quirks and peculiarities that individuals bring into collaboration, or elements of grander cultural narratives, discussing how these manifest in NIME creation and how they are recursively absorbed during the creative process, we offer our reflection on these themes, that can, hopefully, contribute to the community's understanding of culturally-situated NIME design on micro and macro levels.

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9 Ethical statement

All of the audio-visual materials were made by the authors. The conversation that formed the basis of the study was recorded with the oral agreement of the participants. Hazardous materials (copper, acid) were used in the creation of the work and the authors took necessary measures to minimize the environmental impact. Recycled materials (scrapwood) were used when possible.

References

- [1] Jack Armitage and Andrew P. McPherson. 2018. Crafting Digital Musical Instruments: An Exploratory Workshop Study. In *Proceedings of the International Conference on New Interfaces for Musical Expression*, Thomas Martin Luke Dahl, Douglas Bowman (Ed.). Virginia Tech, Blacksburg, Virginia, USA, 281–286. <https://doi.org/10.5281/zenodo.1302583>
- [2] Marc Battier and Kenneth Fields. 2020. *Electroacoustic Music in East Asia*. Routledge.
- [3] Marc Battier, Kenneth Fields, and Annie Yen-Lin Liu. 2022. Editorial: Chinese Electroacoustic Music Today. *Organised Sound* 27, 3 (2022), 273–274. <https://doi.org/10.1017/S135577182200053X>
- [4] Alain Baumann and Rosa Sánchez. 2002. Interdisciplinary Applications of New Instruments. In *Proceedings of the International Conference on New Interfaces for Musical Expression* (24–26 May, 2002). Dublin, Ireland, 5–9. <https://doi.org/10.5281/zenodo.1176390>
- [5] Nick Bryan-Kinns and Zijin Li. 2020. ReImagining: cross-cultural co-creation of a Chinese traditional musical instrument with digital technologies. In *NIME' 20* (2020), 1–6.
- [6] Nick Bryan-Kinns, LI ZIJIN, and Xiaohua Sun. 2020. On Digital Platforms and AI for Music in the UK and China. In *Proceedings of the International Conference on New Interfaces for Musical Expression*, Romain Michon and Franziska Schroeder (Eds.). Birmingham City University, Birmingham, UK, 357–360. <https://doi.org/10.5281/zenodo.4813414>
- [7] Benjamin Carey and Andrew Johnston. 2016. Reflection On Action in NIME Research: Two Complementary Perspectives. In *Proceedings of the International Conference on New Interfaces for Musical Expression*. Queensland Conservatorium Griffith University, Brisbane, Australia, 377–382. <https://doi.org/10.5281/zenodo.1176006>
- [8] Kai He Cheng. 2024. Phantom of utopia. <https://kaheicheng.net/phantom-of-utopia-iii/>. [Accessed 05-02-2025].
- [9] Meiling Cheng. 2009. De/visualizing Calligraphic Archaeology: Qiu Zhijie's Total Art. *TDR/The Drama Review* 53, 2 (202) (06 2009), 17–34. <https://doi.org/10.1162/dram.2009.53.2.17> arXiv:[https://direct.mit.edu/dram/article-pdf/53/2\(202\)/17/1822344/dram.2009.53.2.17.pdf](https://direct.mit.edu/dram/article-pdf/53/2(202)/17/1822344/dram.2009.53.2.17.pdf)
- [10] Gabriele de Seta. 2012. *The noise connection: Experimental music in China as a networked subculture*. 38–44. <https://doi.org/10.13140/2.1.2529.9523>
- [11] Agostino Di Scipio. 2022. A relational ontology of feedback. *ECHO, a journal of music, thought and technology* 3 (Jan. 2022). <https://doi.org/10.47041/TKUL7223>
- [12] Alice Eldridge and Chris Kiefer. 2017. Self-resonating Feedback Cello: Interfacing gestural and generative processes in improvised performance. In *Proceedings of the International Conference on New Interfaces for Musical Expression*. Aalborg University Copenhagen, Copenhagen, Denmark, 25–29. <https://doi.org/10.5281/zenodo.1176157>
- [13] Simon Emmerson. 2018. *The Routledge research companion to electronic music: Reaching out with technology*. Routledge.

- [14] Tim-Tarek Grund, Huệ Trinh Lương, and Alex Hofmann. 2024. Challenges and Prospects in Remote Cross-cultural Musical Interface Design. , Article 65 (September 2024), 5 pages. <https://doi.org/10.5281/zenodo.13904905>
- [15] Michael Gurevich. 2015. Leonardo Special Section: Practice-Based Research and New Interfaces for Musical Expression: Diversity in NIME Research Practices. *Leonardo* 49 (07 2015), 506–507. https://doi.org/10.1162/LEON_a_01120
- [16] PETER HARRIES-JONES. 1995. *A Recursive Vision: Ecological Understanding and Gregory Bateson*. University of Toronto Press. <http://www.jstor.org/stable/10.3138/9781442670440>
- [17] Shao-Lan Hertel. 2016. Lines in Translation: Cross-Cultural Encounters in Modernist Calligraphy, Early 1980s-Early 1990s. *YISHU: Journal of Contemporary Chinese Art* 15, 4 (2016).
- [18] Echo Ho, Alberto de Campo, and Hannes Hoelzl. 2019. The SlowQin: An Interdisciplinary Approach to Reinventing the Guqin. In *NIME*. 256–259.
- [19] Junting Huang. 2022. Phonographing Borders: Writing Acoustic Territories in Sinophone Sound Art. *ASAP/Journal* 7 (01 2022), 61–83. <https://doi.org/10.1353/asa.2022.0011>
- [20] Y. Hui. 2019. *Recursivity and Contingency*. Rowman & Littlefield Publishers. <https://books.google.com.hk/books?id=Y-PaDwAAQBAJ>
- [21] Yuk Hui. 2021. *Art and cosmotechnics*. U of Minnesota Press.
- [22] Yuk Hui and Geert Lovink. 2019. On Recursivity and Contingency: Interview with Yuk Hui by Geert Lovink. *Network Cultures*. <https://networkcultures.org/geert/2019/09/05/on-recursivity-and-contingency-interview-with-yuk-hui-by-geert-lovink/> Accessed: 2023-09-30.
- [23] Alon A Ilisar and Razzy Ilisar. 2024. How Musical Is Dog? - An Interspecies Improvised Musical Collaboration. , Article 29 (September 2024), 7 pages. <https://doi.org/10.5281/zenodo.13904826>
- [24] Yan Jun. [n. d.]. Perhaps I' m (Not) A Sound Artist. By Yan Jun - The Wire — thewire.co.uk. <https://www.thewire.co.uk/in-writing/columns/perhaps-im-not-a-sound-artist-by-yan-jun-ed-edward-sanderson>. [Accessed 06-02-2025].
- [25] Laewoo Kang and Hsin-Yi Chien. 2010. Hé : Calligraphy as a Musical Interface. In *Proceedings of the International Conference on New Interfaces for Musical Expression*. Sydney, Australia, 352–355. <https://doi.org/10.5281/zenodo.1177819>
- [26] Iurii Kuzmin, Zhengyang Ma, and Raul Masu. 2024. Toward Musical Cosmotechnics: the case of zhu nao 竹脑 - a bamboo based instrument. , Article 85 (September 2024), 9 pages. <https://doi.org/10.5281/zenodo.13904957>
- [27] Vincent S. LEUNG. 2017. *Bad writing : cursive calligraphy and the ethics of orthography in the Eastern Han dynasty*. University of Hawaii Press, United States, 106–121.
- [28] Zhengyang Ma, Iurii Kuzmin, Duan Ruilei, and Raul Masu. 2024. Pharosphones: interactive audience participation using light. , Article 70 (September 2024), 6 pages. <https://doi.org/10.5281/zenodo.15016916>
- [29] Vincenzo Madaghiele and Arife Dila Demir. 2024. Pain Creature: interdisciplinary collaboration in the design of an embodied textile instrument for interactive dance. , Article 68 (September 2024), 9 pages. <https://doi.org/10.5281/zenodo.13904917>
- [30] Thor Magnusson, Chris Kiefer, and Halldor Ulfarsson. 2022. Reflexions upon Feedback. In *Proceedings of the International Conference on New Interfaces for Musical Expression*. The University of Auckland, New Zealand, Article 19. <https://doi.org/10.21428/92fbeb44.aa7de712>
- [31] Adnan Marquez-Borbon and Paul Stapleton. 2015. Fourteen Years of NIME: The Value and Meaning of 'Community' in Interactive Music Research. In *Proceedings of the International Conference on New Interfaces for Musical Expression*, Edgar Berdahl and Jesse Allison (Eds.). Louisiana State University, Baton Rouge, Louisiana, USA, 307–312. <https://doi.org/10.5281/zenodo.1179128>
- [32] Juan P Martinez Avila, Vasiliki Tsaknaki, Pavel Karpashevich, Charles Windlin, Niklas Valenti, Kristina Höök, Andrew McPherson, and Steve Benford. 2020. Soma Design for NIME. In *Proceedings of the International Conference on New Interfaces for Musical Expression*, Romain Michon and Franziska Schroeder (Eds.). Birmingham City University, Birmingham, UK, 489–494. <https://doi.org/10.5281/zenodo.4813491>
- [33] Raul Masu, Mela Bettega, Nuno N. Correia, Teresa Romão, and Fabio Morreale. 2020. ARCAA: a Framework to Analyse the Artefact Ecology in Computer Music Performance. In *Proceedings of the 9th International Conference on Digital and Interactive Arts (Braga, Portugal) (ARTECH '19)*. Association for Computing Machinery, New York, NY, USA, Article 25, 9 pages. <https://doi.org/10.1145/3359852.3359870>
- [34] Raul Masu, Nuno N. Correia, Stephan Jurgens, Jochen Feitsch, and Teresa Romão. 2020. Designing interactive sonic artefacts for dance performance: an ecological approach. In *Proceedings of the 15th International Audio Mostly Conference (Graz, Austria) (AM '20)*. Association for Computing Machinery, New York, NY, USA, 122–129. <https://doi.org/10.1145/3411109.3412297>
- [35] Raul Masu and Adam Pultz Melbye. 2022. Discussing Performance Ecologies. *International Conference on New Interfaces for Musical Expression* (jun 27 2022). <https://nime.pubpub.org/pub/teql4hfq>
- [36] Ye Pan, Min-Gyu Kim, and Kenji Suzuki. 2010. A Robot Musician Interacting with a Human Partner through Initiative Exchange. In *Proceedings of the International Conference on New Interfaces for Musical Expression*. Sydney, Australia, 166–169. <https://doi.org/10.5281/zenodo.1177875>
- [37] Francesco Dal Ri, Francesca Zanghellini, and Raul Masu. 2023. Sharing the Same Sound: Reflecting on Interactions between a Live Coder and a Violinist. In *Proceedings of the International Conference on New Interfaces for Musical Expression*, Miguel Ortiz and Adnan Marquez-Borbon (Eds.). Mexico City, Mexico, Article 20, 8 pages. <https://doi.org/10.5281/zenodo.11189135>
- [38] Edward Sanderson. 2021. *An Underground Music Venue in Beijing: FRUITYS-PACE*. 205–223. https://doi.org/10.1007/978-981-15-5913-6_15
- [39] Paul Stapleton and Tom Davis. 2012. Ambiguous Devices. In *Installation Proceedings of the International Conference on New Interfaces for Musical Expression*, Georg Essl, Brent Gillespie, Michael Gurevich, and Sile O'Modhrain (Eds.). Electrical Engineering & Computer Science and Performing Arts Technology, University of Michigan, Ann Arbor, Michigan, U.S.A.
- [40] Will W. W. Tang, Stephen Chan, Grace Ngai, and Hong va Leong. 2013. Computer Assisted Melo-rhythmic Generation of Traditional Chinese Music from Ink Brush Calligraphy. In *Proceedings of the International Conference on New Interfaces for Musical Expression*. Graduate School of Culture Technology, KAIST, Daejeon, Republic of Korea, 84–89. <https://doi.org/10.5281/zenodo.1178668>
- [41] João Tragtenberg, Filipe Calegario, Marcelo Wanderley, and Virginia Pereira Cavalcanti. 2024. Designing DMLs with(in) a Music Culture: A Participatory Design Process with the Xambá Quilombola Community. , Article 54 (September 2024), 10 pages. <https://doi.org/10.5281/zenodo.13904882>
- [42] Willemien Visser. 2010. Schön: Design as a reflective practice. *Collection 2* (2010), 21–25.
- [43] Jing Wang. 2012. Affective listening: China ' s experimental music and sound art practice. *Journal of Sonic Studies* 2, 1 (2012).
- [44] Jing Wang. 2016. To Make Sounds inside a “Big Can” : Proposing a Proper Space for Works of Sound Art. *Leonardo* 49, 1 (02 2016), 38–47. https://doi.org/10.1162/LEON_a_00895 arXiv:https://direct.mit.edu/leon/article-pdf/49/1/38/1576831/leon_a_00895.pdf
- [45] Jing Wang. 2021. *Half Sound, Half Philosophy: Aesthetics, Politics, and History of China's Sound Art*. Bloomsbury Publishing USA.
- [46] Jiayue Cecilia Wu. 2022. Today and Yesterday: Two Case Studies of China's NIME Community. In *NIME 2022*. PubPub.
- [47] interviewed by Edward Sanderson Yan Jun. [n. d.]. Sound Transmission from Japan to China in the Early 2000s — blog.escdotdot.com. <https://blog.escdotdot.com/2017/11/07/sound-transmission-from-japan-to-china-in-the-early-2000s/>. [Accessed 06-02-2025].
- [48] Dajun Yao. 2013. RPM: Sound Art China — revolutionsperminutefest.org. <http://revolutionsperminutefest.org/SoundArtChina/#Essays>. [Accessed 06-02-2025].
- [49] Yixiao Zhang, Gus Xia, Mark Levy, and Simon Dixon. 2021. COSMIC: A Conversational Interface for Human-AI Music Co-Creation. In *Proceedings of the International Conference on New Interfaces for Musical Expression*. Shanghai, China, Article 41. <https://doi.org/10.21428/92fbeb44.110a7a32>
- [50] Lao Zi. [n. d.]. Dao De Jing - Chinese Text Project — ctext.org. <https://ctext.org/dao-de-jing>. [Accessed 10-12-2024].
- [51] Basile Zimmermann. 2015. *Waves and forms: electronic music devices and computer encodings in China*. MIT Press.