

[air>coded] - Between Breath and Code

*An Exploration of the Acoustic Tradition and Digital Technology
Through Solo Saxophone Improvisation*

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Udo Siegfriedt © Grgur Savic, w/ Pitch Shifting live at Ausland, Berlin, February 2025

This project was conceptually initiated in 2023, following the completion of my Master's research, '*Exploration of Graphic Notations in Compositional and Improvisational Contexts in Contemporary Music*', CATALYST Institute for Creative Arts and Technology, Berlin, Germany (degree awarded and graded by Plymouth University, UK).

As a musician operating within the domain of experimental sound, particularly within electro-acoustic contexts, my artistic practice has consistently resided at the intersection of acoustic and electronic performance. Drawing on inspiration from a wide range of electronic musicians and electronic works, I have frequently collaborated within this diverse field. Predominantly performing on the saxophone, a deeply physical, breath-dependent instrument, my current solo practice is rooted in a focused study into the real-time integration of acoustic and electronic sound worlds. The core aim of this research is to develop, test, and critically reflect on a real-time interactive system that positions the performer and the machine in a dynamic co-creative relationship.

Utilizing the Max/MSP programming environment, this project investigates the expanded sonic and performative potential of both the soprano and alto saxophones, specifically when integrated with real-time digital systems. It marks a continuation of my broader research trajectory, one that seeks to interrogate and redefine the boundaries of acoustic instrumentation through the use of today's contemporary technology.

Before addressing the broader process, I wish to foreground recent questions that bring critical and philosophical depth to the project's development.

Human vs. Machine: Psychological & Artistic

- What psychological effects do long-term interaction with generative systems have on a performer's sense of agency, authorship, and intuition?
- How does the performer's inner dialogue shift when the machine becomes a co-creator, no longer a tool but a collaborator with unpredictable behavior?
- Does the presence of a generative system enhance or dilute the performer's emotional expressivity and vulnerability on stage?
- What kind of trust must be developed between a human and a machine, and how does that trust mirror interpersonal or even spiritual dynamics?

Impact on Artistic Identity & Creative Process

- Does this way of working represent a genuine artistic evolution or a necessary escape from perceived stagnation in acoustic performance practices?
- Can reliance on real-time processing and technology lead to a loss of individual sonic identity, or does it open entirely new avenues of self-discovery?
- How do improvisers reconcile the desire for control with the machine's generative autonomy, and what does this tension reveal about contemporary authorship?

The Future of Acoustic Instruments

- Will acoustic instruments lose their cultural and artistic weight as technology becomes increasingly central to performance and composition?
- Is the acoustic instrument being “relegated” to a raw sound source, rather than celebrated as a fully expressive medium in itself?
- Could the erosion of pure acoustic settings reflect a broader societal impatience with slowness, quietness, or subtlety?
- Does the integration of technology ultimately serve to revitalize acoustic instruments by expanding their expressive vocabularies, rather than diminishing them?

Philosophical & Societal Reflections

- What does this hybrid approach tell us about our shifting human condition, our desire to co-create with non-human agents, and to outsource part of our expressive will?
- Does this aesthetic of unpredictability reflect a broader cultural embrace of uncertainty, chaos, and algorithmic logic in the digital age?
- In what ways might human-machine relationships redefine our understanding of creativity, presence, and embodiment?
- Is the performer becoming less a “player” and more a curator or systems navigator, someone who guides rather than generates sound?

Musically, whether in previous purely solo acoustic performances or my more recent endeavors, my central interest lies in constructing a performative sound environment capable of generating a coherent musical narrative. Before writing into technical details, the solo performance is, above all, a dialogue, and at times, a negotiation between myself and the machine. At the heart of this interaction is a central question: Who is leading, and who is listening? For the first time in my solo performance practice, this exchange manifests in moments of play, resistance, and surrender. But what do I mean by these terms?

Play

In this context, *play* signifies the dynamic, impromptu interaction between me and the machine. Both the physicality of the saxophone and the inherent unpredictability of algorithmic processing provide a fertile ground for experimentation and creative freedom. Here, the act of playing extends beyond mere musical execution; it becomes an intimate dialogue with the machine’s continuously unfolding sonic decisions in real-time. Engaging with the system, I explore a wide range of techniques like breathing, vocal whispering, key clicks, slap tonguing, false fingerings, and various manipulations of real-time recorded sound processes, which furthermore generate new evolving sonic textures. This playful exchange leads to unexpected moments, helping me discover new directions and compositional possibilities.

Play, in this setting, constitutes a nonlinear mode of exploration, an open-ended, speculative inquiry that resists fixed structures and embraces uncertainty. It becomes a space of imaginative freedom, where performance may begin with a spontaneous gesture or impulse (“What if I start like this?”) and let myself go into the unfamiliar. This co-creative environment encourages me, as the performer interacting with the system, to allow myself to operate at the boundary of control and intention, seeking a singular outcome shaped not only by the machine's generative behavior but also by my own emotional and physical state at the moment of performance.

Resistance

Resistance, within this context, arises from the tensions between human agency and the computational process. As an improviser, I strive to maintain activity within this system, yet I am often confronted with the machine's pre-programmed responses, which may constrain or subvert my intentions. This tension becomes evident when the machine generates sound patterns or feedback loops that I cannot fully control, necessitating my adjustment or counteraction. Resistance manifests as the point at which human intuition clashes with the logic of the algorithm, where I push back against the machine's autonomy. These moments of resistance are not about asserting total control; rather, they represent an ongoing negotiation of boundaries between human expression and technology, where I allow the machine to take its role without it overtaking the performance.

Surrender

Surrender, in this setting, represents a moment of yielding to the unpredictable decisions of the system. It is a process of allowing the technology to lead and reshape the complete music flow. Surrender involves an act of trust, wherein I release the desire to dictate the sonic outcome fully and instead embrace the generative processes of the system, likable to my hearing taste. This moment is essential in deepening the collaborative relationship between us. Surrender permits the organic evolution of sound, with the machine guiding the flow of the piece through its complex algorithms. By surrendering, I experience the performance in a more passive, though strongly active listening role, engaging more intuitively with the emergent sounds rather than controlling them directly. This act also reflects an acceptance of being in the moment, acknowledging both the self and the undefined, and embracing the uncertainty between human performance and computer processing.

Further to this, while the figures I reference here do not serve as direct templates for emulation within my artistic practice, their works resonate deeply with me, reinforcing and shaping my musical preferences and aesthetic sensibilities for more than a decade. Drawing from the aesthetic vocabularies of 20th-century prominent avant-garde composers such as Karlheinz Stockhausen, Luciano Berio, and Iannis Xenakis, in conjunction with contemporary electronic artists like Félicia Atkinson, Yves De Mey, Farben, Frank Bretschneider, Grischa Lichtenberger, and Aoki Takamasa among others, my most recent performances incorporate a personalized sonic language, an ongoing investigation into and creation of diverse, cross-genre sound studies developed through several of my previous solo explorations.

It was precisely through these earlier works, where the electronic component was constituted by pre-composed audio layers onto which I improvised using saxophone and found objects, that the current research trajectory began to take shape. While these performances were effective, they were constrained by their reliance on pre-determined structures. This limitation gave rise to a crucial

question: What if the entire sonic field structure, dynamics, and interaction could emerge in real time?

This question spurred a shift in my performance system, one designed to facilitate real-time composition and processing, merging live acoustic improvisation with reactive digital sound synthesis. The aim is not only to expand the performative potential of the saxophone within an electroacoustic context but also to engender a deeper sense of authorship and immediacy within the creative process.

At this stage, I have condensed the inquiry into six central questions that frame the core theoretical and practical concerns of the research:

- How can real-time digital processing systems function as co-creative agents rather than tools or obstacles in live improvisational contexts?
- What role does performer embodiment play in adapting to a generative system that introduces unpredictability and variability into musical interaction?
- To what extent can extended saxophone techniques serve as reliable and expressive triggers for algorithmic responses in a live setting?
- How can foot-operated interface design (e.g., pedals and switches) be optimized for complex audio navigation without overwhelming the performer cognitively or physically?
- What compositional and performative methodologies emerge when technical failures (e.g., misfires, unintended triggers) are embraced as creative input rather than corrected as errors?
- Can the definition of an acoustic instrument be meaningfully extended through its hybridization with real-time generative systems, and what are the aesthetic implications of such a redefinition?

This body of work challenges traditional binaries in music—acoustic/electronic, performer/composer, control/chaos—and situates itself within a broader investigation of post-human aesthetics, embodied sound-making, and machine agency in creative processes. For me personally, it is both an exploration and a meditation: a search for new meaning in the hybrid space between breath and code.

Technical Framework

The technical framework of this research centers around a real-time recording of sound using the saxophone, which serves as the primary input. The performance system is built within the Max/MSP environment, allowing for multi-channel live recording activated via a footswitch-based interface. The resulting audio streams are routed into a series of processing modules that enable complex sonic transformations, such as granular synthesis, buffer manipulation, pitch modulation, and a “chaos mode,” where parameters intertwine to form a generative, self-organizing system.

This system is further shaped by technical possibilities such as tempo modulation, dynamic variation, and the manual triggering of self-made, pre-recorded sounds and sequences. At times, when the machine “performs,” I am free to adopt the role of a listener; at other moments, I intervene, guiding the musical direction. This interplay offers a systemic form of improvisation, a choreography of control, contingency, and mutual responsiveness, evolving into a real-time compositional process. Despite persistent challenges, this ongoing dialogue continues to clarify both the technical demands and the artistic implications involved. These trials underscore the necessity of continual refinement, not only of the patch itself but also of my performative strategies as I adapt to this new “hybrid” instrument.

This research project was also made possible with the support of my dear friend Franjo, a highly skilled programmer and IT specialist. His technical expertise has been instrumental in translating conceptual ideas into functional real-time systems, significantly contributing to the development of this investigation.



VIDEO: air>coded – short [wrk in pr:gress] studio excerpt, very beginning of the project



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