Outline of Approach to Artistic Research Michael Winter

Artistic research has always been and continues to be an integral component of my creative activities. My approach to artistic research is typically inter- and transdisciplinary, collaborative, and explores a spectrum of methodologies from what I call 'arts-motivated research' to 'research-motivated arts'. In arts-motivated research, an artistic practice motivates research that poses or solves questions about cultural, societal, philosophical, and/or scientific phenomena. In research-motivated arts, research into cultural, societal, philosophical, and/or scientific phenomena motivates an artistic practice. I see these two particular methodologies as endpoints of a spectrum that includes a myriad of artistic-research methodologies. For example, research that uses artistic processes to analyze data and/or present findings—what is increasingly becoming referred to as "arts-based research"—lies towards the midpoint of this spectrum. No artistic research methodology is mutually exclusive from any other. Effective artistic research often combines various methodologies such that they resonate with each other. For instance, when a creative work or practice motivates research, that, in turn, results in an act of artistic expression transmitting the knowledge produced through the investigatory process in novel ways.

The innovative approaches to the production and transfer of knowledge developed by artist-researchers have the potential to positively impact society in ways that traditional research methodologies cannot. This potential and the ever-increasing number of artists whose work incorporates a component of research are the primary motivating factors for recent attempts to define "artistic research" and integrate it into academia.

Part of my artistic research leans more towards arts-motivated research. For example, in the creative process, I have posed musical questions whose solutions were both required to complete my compositions and produced novel results in mathematics. My article "Chordal and timbral morphologies using Hamiltonian cycles", published in collaboration with mathematician Azer Akhmedov when I was a graduate student, proved mathematical theorems in graph theory. The proofs demonstrate the existence of cycles in graphs equivalent to a certain class of musical sequences. As a result of this collaborative research, I was able to compute the musical sequences and incorporate them into a set of compositions. These investigations led to my dissertation, *Structural Metrics*; an epistemological survey of the efficacy and viability of different mathematical and algorithmic techniques to compare (musical) structures. Since graduating with a PhD from the University of California Santa Barbara, I have lectured and published extensively on algorithmic and computer-generated music; the connections between music, mathematics, communication theory, and epistemology; art and alternative communities and economies; and the work of my mentors and contemporaries. For example, I co-edited *From Scratch*, the collected theoretical writings of James Tenney. Currently, I am organizing and serving as guest editor for a special issue of the journal *Perspectives of New Music* dedicated to the work and legacy of Larry Polansky. Another recent research endeavor of mine is the extension of a digital phenomenology that I posit in a philosophical treatise titled "Meta+phenomenology: primer towards a phenomenology formally based on algorithmic information theory and metabiology", which was published in *Unravelling Complexity*, a book on complexity, philosophy, mathematics, and information theory. In collaboration with Brazilian mathematician Felipe Abrahão, we are studying experience and subjectivity through algorithmic information theory by proving

mathematical conjectures that can be used to understand how the algorithmization of social, political, and economical relationships function in a digitally mediated society.

While my work leaning towards arts-motivated research has had implications in other domains leading to several transdisciplinary collaborations, it is my work that leans towards research-motivated arts that contributes more so to novel interdisciplinary approaches and presentation formats that could be adopted and extended by researchers and artists, regardless of their focus or medium. For example, my performance-installation *a history of the domino problem* traces the history of an epistemological problem in mathematics by sonifying and visualizing rare aperiodic mosaics. My installation-opera *Remembering Clive Wearing*, which sets journal entries of a man with the worst known case of amnesia, reverently reflects the importance of memory on personal identity. Both these pieces were motivated by and required extensive research: the former into the history of mathematics and a vexing epistemological problem in computation, and the latter into the effect of memory on consciousness. In each case, the research resulted in artistic works that raise awareness of these issues and cast them in a new light accessible to a broader audience.

Another format I find effective is the lecture-performance. In 2016, I was invited to give a lecture about Gottfried Wilhelm Leibniz's music-related writings in a symposium on the 300th anniversary of Leibniz's death. I presented my research showing how Leibniz predicted James Tenney's theory of harmonic distance in harmonic space, followed by a performance of my work *preliminary thoughts*. Inspired by the fact that most of Leibniz's writings were in the form of letters, the piece sets to music the reading of a letter I wrote to my friend, the mathematician Gregory Chaitin, reflecting how many of Leibniz's ideas can impact an artistic discourse. Similar to the aforementioned examples of my arts-motivated research, this piece demonstrates the cumulative effect when multiple artistic research methodologies feed back into one another.

In addition to alternative formats of presentation, social engagement is frequently an important aspect of my research-motivated works. My work *Counterfeiting in Colonial Connecticut* connects colonial practices and accumulated advantage to the murder of George Floyd and the civil unrest that followed. My kinetic sound sculpture *Rockfall* was created in consideration of the social and environmental impact of mining on the local and indigenous communities of Bolivia and Peru. I am currently working on a multimedia project entitled *parpadeando* (English: flickering), which tiles and overlays field recordings of flickering lights with humming electrical cables to create a series of city-specific 'noise portraits'. These noise portraits will demonstrate how societal chaos (or in contrast, order) are reflected visually and sonically through the power grids of various cities with the aim that observers consider how basic resources are distributed within a city as well as the differences of such infrastructures between cities. I am also developing an audiovisual installation called *zero knowledge* that will explore the nature of artificial intelligence algorithms by observing what happens in a completely autonomous, open-ended machine learning system trained on synthetic data as to remove human bias to the extent possible. These pieces exemplify how artistic research can address important existential crises in society and how artist-researchers can shape the research landscape by inspiring new ways of presenting findings beyond the publication of articles and traditional lectures.

One of the most effective ways to understand the ontology of artistic research is to analyze how trends in artistic-research practices incorporate, challenge, and distinguish themselves from trends in other research domains. The Vienna Declaration on Artistic Research aims at a

definition that aligns with the five tenets of research outlined by the Frescati Manual (guidelines for collecting and reporting data on research and experimental development): that the practice is novel, creative, uncertain, systematic, transferable and/or reproducible. These are guidelines that many artists follow naturally. While the research conducted by artists sometimes implements unconventional methods that can be much more open, that in and of itself does not necessarily make it any less rigorous than traditional research. As with any research, the merit of artistic research can and should be evaluated based in part on how the work contributes to society. The novel ways in which it does so should be celebrated and fostered.

I believe it is incumbent upon both artist-researchers and the research community at large to acknowledge that artistic research is a well-established tradition, albeit one that has evolved without explicitly being called research until recently. Artistic research does not need to be coerced to fit a particular mold nor should it be used to justify the academic or scholarly viability of the arts. With a supportive environment, artists have an amplified potential to create a body of radical inter- and transdisciplinary research that unites the arts with digital humanities, mathematics, science, and philosophy. Artists are important agents in the development and maintenance of a more humane and equitable society. When allowed to take the necessary risks, they create works that inspire others to challenge and reconsider the conceptual frameworks within which people understand and relate to the cultural, political, and technological dynamism of our time.