

## Interactive Music with Intelligent Instruments – A New, *Propositional Music*?

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An insatiable desire exists among creative musicians to enable the tools of musical realization to traverse the terrain of musical possibilities as easily and flexibly as the conceiving powers of the human mind. Elsewhere, I have discussed the notion of paradigm shift, invoking parallels between our fundamental re-conception of the universe and artistic production, (1). I herein propose that the idea of intelligent musical instruments - made possible by recent technological progress - indicates such a shift. The thought that a musical instrument can be implanted with the motivation to construct and transform, thereby entering the domain of composing beyond the mere production of low-level musical events (e.g. notes) - requires entirely new thinking about composition, performance and man's interaction with his tools. For several decades now, we have lived with McLuhan's notion of human extension - not man the thinker (*homo sapiens*) or man the maker (*homo faciens*), but man the extender (*homo extendere*). This caused us to verbalize an understanding of media and technology as an extension of human facility and, thus, the computer music system as an extension of the mind and nervous system of the musician. It is a notion that works, to some degree. But now, we have passed the stage of infant birth and early exploration, into the realm of fully realized tools that not only extend that musical nervous system, but turn and return the gaze - looking back at those interacting - or should we still use the words, *playing* with them. (See references 2 and 3 for additional discussion about the development of intelligent instruments.)

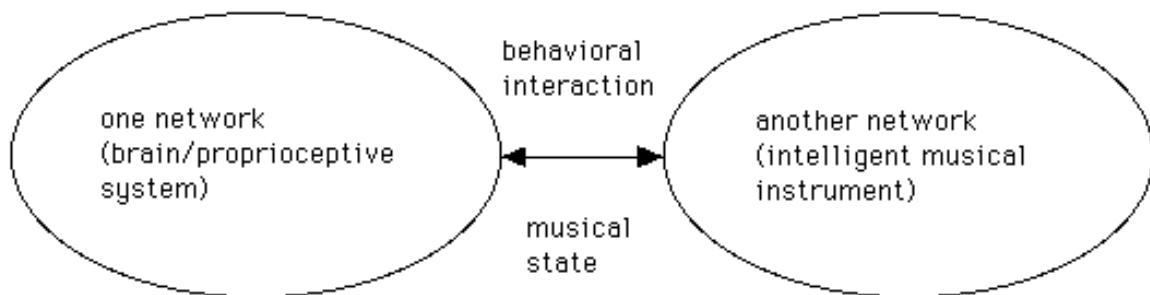
A glance in the dictionary reveals many definitions for the word, *play*. The most familiar for music, of course, is: *to perform on a musical instrument*, or, *to give out musical sounds: said of an instrument*. The most familiar to the child is: *to have fun; amuse oneself; take part in a game or sport; engage in recreation*. Consider the last phrase, *to engage in recreation*, and think of *recreation* as *re-creation*. Perhaps the new medium of interactive, intelligent musical instruments invokes the more *playful* of these definitions with particular emphasis on the phrase, *to engage in re-creation*. The primary difference now is that the instrument, as well, is engaged in *play*. Another definition of *play* refers to the instrument directly: *to lend itself to performance: as, the new piano plays well*. We might now say, "That interactive, real-time, compositional algorithm *plays* well". What have we really said? What do we really mean?

Most of us feel some confidence that we have a basis in our minds, however ineffable and unverbalizable, of how to ascribe the term, *musical*, to something as an innate quality. Even though we can't adequately describe what it is, we feel quite secure in

making value judgments based on it. What does it mean, then, to say, "That is a particularly *musical* algorithm?"

To adequately answer these questions we must engage in further practice of our craft, not the least of which involves re-conceiving musical education. We have various, carefully conceived ideas about what constitutes good music education. But, do we have a notion of what constitutes a good, musical education that is appropriate for our age of global communications and interacting cultures? Luis Valdez, of El Teatro Campesino, has drawn an analogy between the interacting components on a microchip and the interacting components in our evolving cultural heterogeneity, producing a global whole that must be able to function and process cultural creation effectively.

Since roughly the mid-Twentieth Century, a musical art form has been emerging in which it is intended that the direct focus of attention be placed on the interactions among multiple entities in what may be termed, a *complex adaptive system*. This may include composing frameworks for interaction among performers, as well as constructing the means for interaction between performers and intelligent musical instruments. In the latter case, one may view the system as two complex networks, one the brain and proprioceptive systems of the performer, another the hardware and software of the musical instrument, (see Figure 1). In both, musical tracings follow adaptive behaviors of the entities interacting with each other. A musical *state* in such a system may refer to a particular *schema* for interactive behavior. These *schemas* may evolve and change, articulating the landmarks of musical form.



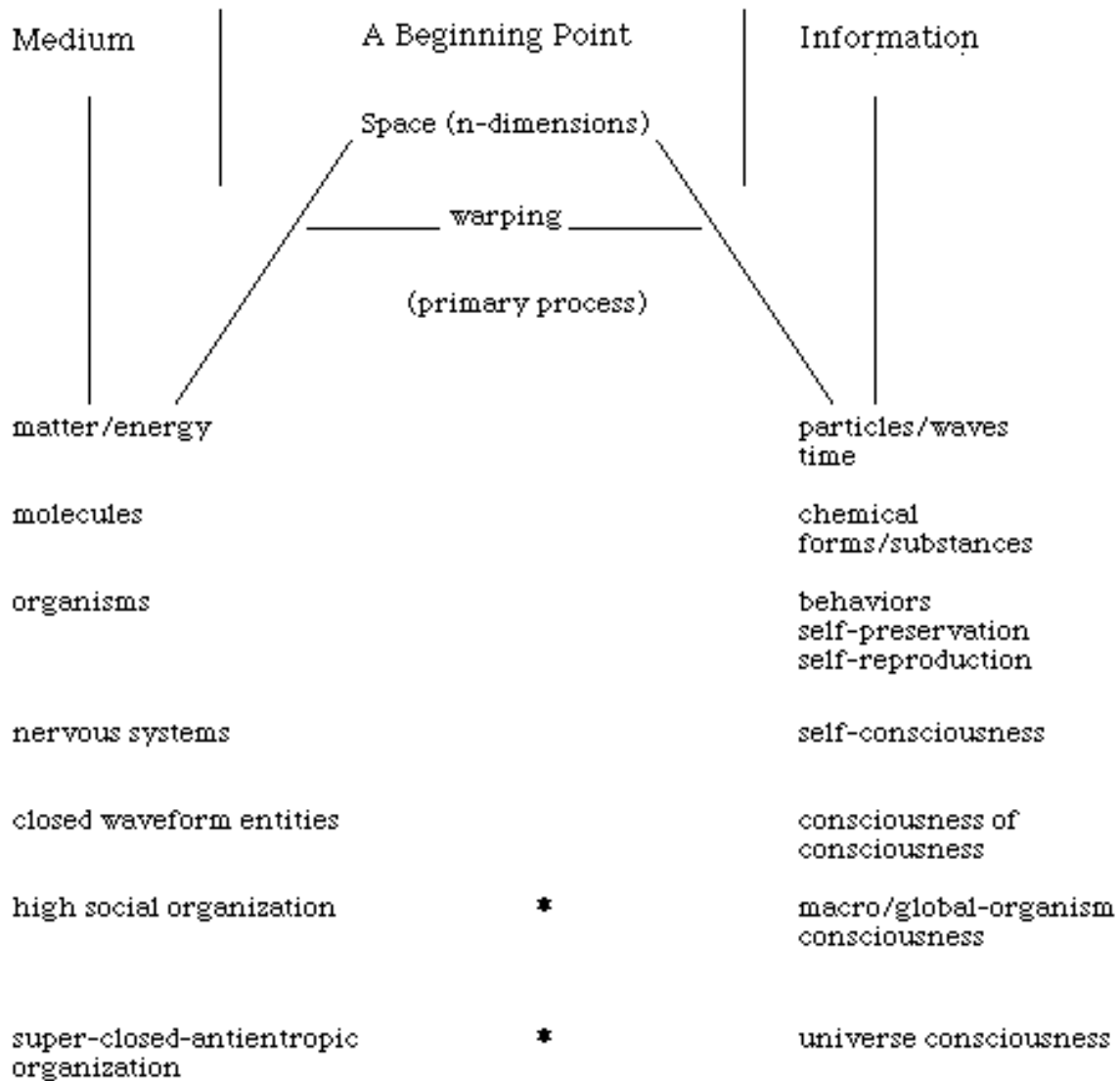
Has this state of affairs - the development of intelligent musical instruments - produced new art forms for us? After much consideration, I believe the answer is yes? If so, what do we listen for in this music? What constitutes a musical event or element in this art form? We will ponder these questions for some time to come. However, some things are clear now.

As we experience the music of *complex adaptive systems*, we are listening to *evolution* itself. We hear the formation of ordered relationships and patterns, we follow tendencies of behavior and attractions to particular kinds of stability and we hear the drama of conflict and resolution associated with bifurcations in paths of development, often spinning off into uncharted territory. All of this may infect us with a feeling associated with the driving forces of evolution, particularly since the experience it is unfolding spontaneously anew before our very ears.

As we explore this new listening territory, we may be drawn to observe the emergence of *global properties*. This may lead us to our new definition of the *musical event*. The natural processes of perception drive us to extract descriptions enabling us to generalize across events and to group them into identifiable, broad categories.

Configurations of a whole produce entities of form in perception that transcend those suggested by atomistic, bottom-up analyses. Here, we recognize the emergence of entities *as a consequence of organization*. In fact, even consciousness itself may be a consequence of the super-organization of electro-chemical-physiological elements making up the body that could not have been predicted by combining them in an engineering approach. The emergence of formal features at certain levels of organizational complexity among energy-space-time-information entities (like matter) may be a fundamental principle of the universe. Large groups of such organized entities may create a medium for the existence of higher level, global phenomena. (See Figure 2 for a hypothetical scheme for the emergence of these phenomena.)

## A Potential Schema for Emergent, Global Properties in the Universe



\* Speculative levels - may or may not have occurred in  
universe ontogeny

From the wave structures of elementary singularities in quantum mechanics emerge the various global properties of materials. We experience these as the sensory properties of matter with textures, the qualities of building materials, the tactility of moldable stuff like clay, and so forth. Other global properties appear at various levels of organization in the quantum metaphor that can be studied and described. How can we learn to hear global properties in dynamically evolving musical logics?

In hearing the often high-speed peregrinations of a master improviser, one finds pleasure in scanning the implicative power of the player's tonal choices. Are these implied relations based on references to possible syntaxes of music, innate tonal references (i.e. harmonic series), musical semantics (i.e. phrase structure meaning), the morphogenesis of new ideas, or all of these?

When we scan a stochastic cloud of Xenakis or the chance relations contained in a sensory construction of Cage, we enjoy the discovery of relationships among the minutia within, in the same way that we seek empirical findings in nature's phenomena, and are exhilarated by their discovery, or simply merely by making their proposition. When we experience an interactive composition based on complex adaptive systems, we may be thrilled by the chance to observe a proposed model of nature made animate in musical form. What, then, does this kind of experience have to do with language or, more properly, linguistics and its attendant ideas of syntax, transformations, grammar, lexicon, phonetics, and semantics? Is there a musical language? Or is part of the pleasure of composition to be found in the construction and subsequent parsing of possible or propositional languages, each potentially unique, complete, and coherent on its own? What then does this bode for the listener, the composer, music appreciation, and music theory?

I propose the term, *Propositional Music*, to refer to musical thinking that includes the view of composition as the proposition of musical realities, complete cognitive models of music, using propositional musical language accompanied by a propositional language of music theory. This may also be called *speculative music* and *speculative theory* as well, since historical and stylistic associations at this point in music history have distort the term, *experimental music*.

*A central question:* Is music to be considered an autonomous human activity emerging from the brain, body, and the social order, containing its own innate phenomena to be probed, divined, studied and theorized about, until sufficient understanding emerges to allow comprehensive characterizations to be written, revealing for all time its a priori properties?

*Or,* is music to be considered a dynamically evolving domain of potentialities whose boundaries are defined merely by those who consider themselves to be practitioners of something *called* music?

If so, we cannot parallel the linguists travails in attempting to write a description of a thing called musical language unless we restrict ourselves to a very limited domain of what can be called music. Music composition involves the invention of uniquely ordered

musical realities or cognitive models, whether conscious or unconscious. It is a fundamental tenant of propositional, interactive music that it be perceived and *enjoyed* within this frame of mind.

Where will all this lead us in the present cultural context? Hopefully, to expanded means of intelligent hearing, a new kind of musicianship. When I look at the dynamic forms of nature, I see a complex filigree of patterns and relationships and derive great pleasure from the interaction between these forms and those of my own makeup as a human being. And though there is true emotion in this experience, it is not that normally associated with the cadences and neo-romantic formulations of conservative musical consumerism. Yet, these are increasingly demanded by the pressures for audience successes that characterize even avant-garde culture in a world that presents ever increasing economic and environmental tensions - lessening the freedoms encouraging exploration - and heightening the psychology of urgency to produce the short-term gains required by a debtor society. Music has, thus, become focused on production rather than exploration. This mitigates against morphodynamics. If it would help matters, one could easily formulate an argument asserting that exploration may be seen as product. To formulate a stock closing for a short article - that is a subject for another opportunity in discourse.

Finally, to reiterate the title question, is this a new art form? I believe, yes. Will it survive and last? Who knows? Remember, evolution will continue - no matter how hard we try to stop it. To quote Dr. Chao - the inimitable, 400-year-old samurai in George Manupelli's movie, Almost Crying, - who bellowed in an ancient, guttural voice of wisdom - "Everything is temporary, you *must* know that!"

### References

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2. Rosenboom, D: *A Program for the Development of Performance-oriented Electronic Music Instrumentation in the Coming Decades: "What You Conceive Is What You get"*, PERSPECTIVES OF NEW MUSIC, Vol. 25, Nos. 1 & 2, Winter & Summer, 1987.
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### Note

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