

12-1-2017

# On Improvised Music, Computational Creativity and Human-Becoming

Adam James Wilson

*CUNY New York City College of Technology*

Arto Artinian

*CUNY Borough of Manhattan Community College*

## How does access to this work benefit you? Let us know!

Follow this and additional works at: [https://academicworks.cuny.edu/ny\\_pubs](https://academicworks.cuny.edu/ny_pubs)

 Part of the [Artificial Intelligence and Robotics Commons](#), [Composition Commons](#), [Graphics and Human Computer Interfaces Commons](#), and the [Music Performance Commons](#)

---

### Recommended Citation

Artinian, Arto, and Adam James Wilson. "On Improvised Music, Computational Creativity and Human-Becoming." *Leonardo Music Journal* 27 (2017): 36-39. [https://doi.org/10.1162/LMJ\\_a\\_01006](https://doi.org/10.1162/LMJ_a_01006)

This Article is brought to you for free and open access by the New York City College of Technology at CUNY Academic Works. It has been accepted for inclusion in Publications and Research by an authorized administrator of CUNY Academic Works. For more information, please contact [AcademicWorks@cuny.edu](mailto:AcademicWorks@cuny.edu).

# On Improvised Music, Computational Creativity and Human-Becoming

ARTO ARTINIAN AND ADAM JAMES WILSON

ABSTRACT

Music improvisation is an act of human-becoming: of self-expression—an articulation of histories and memories that have molded its participants—and of exploration—a search for unimagined structures that break with the stale norms of majoritarian culture. Given that the former objective may inhibit the latter, we propose an integration of human musical improvisers and deliberately flawed creative software agents that are designed to catalyze the development of human-ratified minoritarian musical structures.

John Cage criticized improvisation as a practice through which musicians reveal only their “likes and dislikes, and their memory, and . . . don’t arrive at any revelation that they’re unaware of” [1]. Escaping musical systems of historical memory, calibrating new musical materials for congruity with the present—an act of human-becoming—can nonetheless be achieved by integrating computational creativity into the practice of music improvisation.

Computational creativity, the development of which involves programming computers to reproduce aspects of human creativity, is itself a consequence of human creativity. Confronting the nature of human creativity presupposes the question “What is the self; what is a human being, understood as the complex product of historical development, and the transmission, emergence, and destruction of memory?”

Following Georgian-Soviet philosopher Merab Mamardashvili [2], we assert that *human being* denotes a condition of constant effort to become human. In other words, the formation of the self is not a “natural” condition, an outcome of evolution, or some hard-wired, rational kernel that propels the development of a person from the helplessness of infant life to an adulthood that is overdetermined by a condition of rational certitude (in the Cartesian sense of the term). The

quest for such certitude is not to be dismissed, but rather understood as a necessary aspect of the process of human-becoming. Categories of music improvisation that privilege constant redevelopment of most or all the salient features of some incipient form (free jazz, for example) clearly demonstrate this continually unfolding dynamic. The formulation of such music and the formation of the self are conditions of flux [3].

In ancient Greek, *flux* meant a state of civil war, strife or intense existential struggle. Flux is constant becoming—a here-and-now that is ceaselessly created by our acts and thoughts, by affect, through the dynamism of everyday life—and the aleatoric encounters of our socially emergent subjectivities. This also implies that self-expression is always-already social expression, in that it is already influenced/shaped by history and memory—two key attributes of the specific cultural spaces out of which a specific human-becoming emerges. This is to say (by way of Aristotle, Machiavelli, Althusser and Evald Ilyenkov [4–7]) that the formation of the self is a political act, either as the eternal recurrence of the same, to use Nietzsche’s phrase [8], or as a radical break from this repetition, seeking new possibilities—a condition of struggle against a prevailing hegemony.

Hegemony—the internalized logic of the politically dominant parts of social formation and its various ideological and repressive apparatuses deployed across everyday life [9]—produces snapshots of the flux that denotes social formations, themselves formed by innumerable acts of human-becoming. Through its various ideological and repressive apparatuses, hegemony interrupts the processes of self-realization (of becoming) and replaces them with human beings (rather than human-becomings). The creativity latent in the emergence of human subjectivities (a potentially open, uncontrolled political process) becomes a static, well-defined and controlled human subject. It is in this sense that history and memory become inscribed by the logic of the politically dominant into the patterns of everyday life [10]; the capacity for creativity is therefore dulled by the canonization of certain products of human creativity.

---

Arto Artinian (musician, educator), City University of New York, Borough of Manhattan Community College, 199 Chambers Street, New York, NY 10007, U.S.A. Email: <aartinian@bmcc.cuny.edu>. ORCID: 0000-0002-5925-8327.

Adam James Wilson (musician, software engineer, educator), City University of New York, New York City College of Technology, 300 Jay Street, Brooklyn, NY 11201, U.S.A. Email: <awilson@citytech.cuny.edu>. ORCID: 0000-0001-6134-0525.

See <[www.mitpressjournals.org/toc/lmj/-/27](http://www.mitpressjournals.org/toc/lmj/-/27)> for supplemental files associated with this issue.

---

We borrow the concept of the majoritarian from Deleuze and Guattari [11] and use it here to denote the effects of cultural hegemony through the inscription of dominant discourses of history and memory. The majoritarian moment is the cultural space of domination, of “stopped time,” whereby the social struggles and formations of the past are presented as those of the unchangeable present. Memory thus emerges as stored points—ideas and practices that have become generalized, as the music of today. This is especially evident when “innovation” is projected by contemporary dominant cultural formations, whereby the repackaging of past musical moments (jazz fusion is once again hip, according to the *Wall Street Journal* [12]) acts as a foreclosure of attempts to articulate what could actually be the music of the present moment.

This foreclosure of majoritarian societies, where memory and history are constantly subject to management, is what warrants the need to escape memory and history (or revalue and redefine it) and re-engage with the creative process of self-expression. The necessity is political but understood, in its cultural register, as a way to harness the processes of becoming—the unrelenting human energy that resists containment or foreclosure (whether by forces of capital accumulation or repressive ideological apparatuses of the state).

We have ample examples of this dynamic. Bebop emerged through the need to establish a field of musical freedom, to assert black musicians’ self-expression and their human-becoming. This was an essential radical act in a racist society, which had succeeded in foreclosing the spaces that had been opened by a previous iteration of jazz. In a different creative register, the difficulties presented in the texts of Theodor Adorno or Jacques Derrida [13,14] were calculated acts of self-expression as a form of political resistance; one could read them as ways of resisting easy appropriation and incorporation into dominant historical narratives.

We agree with Jean-François Lyotard that “culture is inscribed transmission” [15] and also with Mamardashvili in understanding culture to be “an effort and simultaneously an ability to practice the complexity and diversity of life” [16]. However, we assert that their positions are insufficient today precisely because of the specific configurations of the cultural spaces conditioned by majoritarian political effects. There are various, equally apt, descriptions of such effects: Deleuze’s societies of control [17], Bernard Stiegler’s discussion of generalized proletarianization [18] and Lyotard’s delineation of the logic of positivist neoliberalism [19]. Practicing the complexity and diversity of life is not a problem in today’s majoritarian cultural formation. Contemporary American music, for instance, is more diverse and complex in stylistic and performative dimensions than American music of 70 years ago. But this does not make it conducive to human-becoming because it remains a space of management. Memory and history are well-formed “narratives”—discourses and sets of expectations and definitions, backed and reproduced by coercive political forces.

We borrow Deleuze’s and Guattari’s concepts of minoritarian discourses [20] (radically different from the majoritarian present) as our starting point in articulating opposition to

the foreclosure of the self-as-becoming. This creative process demands the act of forgetting (as Nietzsche [21] would also argue) to interrupt the flows of hegemony, including the histories it inscribes, with the intent to manage and control. A minoritarian intervention in music is a process of becoming; it seeks the new and the as of yet not well-formed. It is an act of creative improvisation that deliberately seeks to escape the weight of memory and history, to filter them out in order to discover what is “outside” that which is managed and controlled.

To succeed, the process of creativity must escape or force itself through the boundaries—or “territories”—established by memory and history. John Gilmore, renowned tenor saxophonist of the Sun Ra Arkestra, was repeatedly asked why he left “jazz” (meaning the well-defined territory that was jazz in the late 1960s), the then-majoritarian cultural field of bebop. Gilmore’s answer was that he was in search of “new chords,” and that meant joining the Sun Ra Arkestra, where a major focus was harmonic invention [22]. His example is illustrative and inspiring: Forgo the easy, well-marked path to “fitting in” and becoming “famous” (well rewarded, but under the direct management of others); freedom (a prerequisite for creative thought, for becoming) thus replaces control (experienced by those subject to control as a degree of material and symbolic comfort—an important encapsulation of the logic of control active in majoritarian fields today).

In improvisation, the creative process aims to *detrterritorialize* that which is essentially an artifact of the social/cultural past in favor of affirming what is understood and felt to be the music of the present. To put it differently, the radical, self-expressing musical moment means to be “indifferent to questions of a future and a past . . . [since] it passes between the two” [23]. The process of becoming is about the present—the “middle” of the line [24].

The challenge in moving away from “settled states” into the “newness” of the present moment entails overcoming the inertia of all those internalized, well-practiced memories. The weight of history, in its deliberately stunted and managed presentation, must be detrterritorialized—though without jettisoning cultural moments that marked previous spaces of detrterritorialized radical creativity; to imagine a new direction in improvised music does not require forgetting Sun Ra!

Cage’s previously noted dismissal of improvisation as reflective of established musical systems reveals an implicit preference for the novel or unimagined—a perspective privileging music that exhibits the least connection with history. We can therefore view improvisation—an act in which the inner ear, mind and muscles, when not stimulated in extraordinary ways, may fall back on systems of musical expression that suffuse the mainstream of musical experience—solely as a means of articulating cultural hegemony. The difficulty with this perspective is that it adopts a reactionary stance with respect to history; novelty alone is insufficient for establishing cultural resistance to hegemony. Our selves cannot withstand a complete break from history; non-hegemonic elements—moments of minoritarian detrterritorialization from our cultural history—must play a part in the necessary

and radical act of developing new structures for musical expression. Compositional systems designed to circumvent the auditory imagination (Cage's games with dice, for example) have the potential to break with historical idioms, but novel musical structures must be ratified by the present self or be doomed to cultural irrelevance.

Improvisation can serve as a tool of hegemony or a weapon against it. A radical improviser begins with styles derived from minoritarian influences, which may not be adequately formulated to resist the present hegemony but that provide a basic analogic language for development. The goal is to create new musical materials that reside outside of history and that resonate with present experience. In contrast to Cage's view, improvisation (aided by real-time technology for analysis and "style re-synthesis") provides an ideal medium for fusing musical systems of collective memory with novel, even unimagined, structures. There is potential for revelation, both in reaction to new materials themselves and with respect to the relevance of those materials, to the practitioners' experience of their sociocultural present. Radical improvisation aided by computational creativity is better for producing historically rooted yet revelatory music than algorithmic composition, due to both its incorporation of historical minoritarian influences and the ability of experienced improvisers to immediately evaluate and assimilate novel emergent phenomena.

One goal of computational creativity is to model human creativity. Groundbreaking computer systems for real-time improvisation with human partners include Salvatore Martirano's *Sal Mar Construction* and George Lewis's *Voyager*. Although these systems do not attempt to encode musical style (with the minor exception of *Voyager's* "setphrasebehavior" routine, which includes some notion of imitation [25]), they rely mostly on random processes for filtering or reorganizing the improviser's performance into new structures [26,27]. More recent systems include François Pachet's *Continuator*, which exploits a Markov model of a human improviser's playing to produce stylistically congruent output [28], and various heuristically and analytically determine probability models developed by Gérard Assayag, Shlomo Dubnov and others [29–32] for traversing automata based on factor oracle representations of improvised musical data.

The latter category of improvisation systems, those that attempt to "learn" a musician's style, are of particular interest. When scientists and engineers build such systems, the noble goal is often to achieve parity with human creativity. This goal is at odds with the objectives of improvising musicians,

including the authors, who seek to advance their musical language beyond the limits circumscribed by experience, both personal and historical. We use the word "advance," as opposed to "replace" or "destroy," since the self, as mentioned earlier, is interwoven with regimes of memory and history. A full rejection of *all* modes of musical expression amounts to regressive auto-alienation, breaking with important minoritarian musical efforts of the past. Software systems that incorporate computation agents designed for creativity may be manipulated to produce musical relationships derived from the historically rooted styles of human collaborators. These algorithmically generated musical materials may escape the imagination yet resonate as meaningful to the human participants. Human performers ratify such materials by annexing them to their musical styles (an act of human-becoming). Software agents must be incapable of perfectly modeling input styles because it is necessary for them to introduce "mutations," or non-idiomatic anomalies, into the learned corpus to stimulate the process of becoming.

We propose the following criteria for designing such an agent: (1) The agent must have some way of encoding the features of a musical language. There are many tools for this, including hidden Markov models, probabilistic automata and neural networks [33]. The analytical component of the agent must be able to model—reasonably well but preferably imperfectly—the musical structures presented by the agent's collaborators. The agent must be able to track and incorporate changes to these structures over time. (2) The generative apparatus of the agent must be sufficiently complex to rebuff attempts by collaborating human performers to fully predict relationships between input and output, even if the performers are interacting with a system they programmed themselves. This prevents human musicians from learning to manipulate the agent as an extended instrument, effectively stripping it of its agency. (3) The agent must imperfectly reproduce the input style; perfect apprehension of all stylistic elements precludes the introduction of elements outside the stream of historical memory. This feature allows unimagined structures to arise. Improvisers may ratify such structures by incorporating them into their playing, increasing the frequency of their appearance in the computational model. The participating humans thereby filter the agent-assisted "radical break" from reactionary novelty. Materials selected for congruity with the present are further manipulated by the agent-enhanced creative system, and the process advances recursively, facilitating the collaborating musicians' human-becoming.

---

## References and Notes

- 1 S. Turner and John Cage, "John Cage's Practical Utopias: John Cage in Conversation with Steve Sweeney Turner," *The Musical Times* 131, No. 1771 (1990) p. 472.
- 2 M. Mamardashvili, *Selections: Classical and Non-Classical Rationality* (Sofia: East-West Publishing House, 2004, compiled by Deyan Deyanov) p. 347.
- 3 Heraclitus, DK22B12, in K. Freeman, *Ancilla to Pre-Socratic Philosophers: A Complete Translation of the Fragments in Diels, Fragmenta der Vorsokratiker* (Cambridge: Harvard Univ. Press, 1983).
- 4 Aristotle, *The Politics* (Oxford: Oxford Univ. Press, 2009).
- 5 N. Machiavelli, *Discourses on Livy* (Oxford: Oxford Univ. Press, 2009).

- 6 L. Althusser, *Philosophy of the Encounter: Later Writings, 1978–1987* (London: Verso, 2006).
- 7 E. Ilyenkov, *Dialectics of the Ideal: Evald Ilyenkov and Creative Soviet Marxism* (Chicago: Historical Materialism Book Series, 2015).
- 8 F. Nietzsche, *The Gay Science* (New York: Vintage Books, 1974) pp. 273–274.
- 9 Althusser [6] pp. 280–288.
- 10 J-F. Lyotard, *The Inhuman: Reflections on Time* (Stanford: Stanford Univ. Press, 1992) p. 51.
- 11 G. Deleuze and F. Guattari, *A Thousand Plateaus* (Minneapolis: University of Minneapolis Press, 1987) p. 291.
- 12 M. Johnson, “The Revival of Jazz-Funk,” *The Wall Street Journal* (28 December 2016) p. A11.
- 13 T. Adorno, *Minima Moralia: Reflections from Damaged Life* (London: Verso, 2006).
- 14 J. Derrida, *Of Grammatology* (Baltimore: The Johns Hopkins Univ. Press, 1977).
- 15 Lyotard [10] p. 148.
- 16 Mamardashvili [2] p. 348.
- 17 G. Deleuze, “Postscript on Societies of Control,” *Negotiations* 50 (1992) pp. 3–7.
- 18 B. Stiegler, *For a New Critique of Political Economy* (Cambridge: Polity, 2010).
- 19 Lyotard [10] pp. 8–23.
- 20 Deleuze and Guattari [11] pp. 291–292.
- 21 F. Nietzsche, *The Will to Power* (New York: Vintage Books, 1968).
- 22 *Sun Ra: A Joyful Noise*, directed by R. Mugge (DVD: Winstar, 1999).
- 23 Deleuze and Guattari [11] p. 292.
- 24 Deleuze and Guattari [11] p. 292.
- 25 G. Lewis, “Too Many Notes: Computers, Complexity and Culture in ‘Voyager,’” *Leonardo Music Journal* 10 (2000) pp. 33–39, p. 35.
- 26 S. Martirano, “Progress Report #1: An Electronic Music Instrument which Combines the Composing Process with Performance in Real Time” (Urbana, IL: University of Illinois Department of Music, Sousa Archives, 1971).
- 27 Lewis [25].
- 28 F. Pachet, “The Continuator: Musical Interaction with Style,” *Proceedings of the International Computer Music Conference* (2002) pp. 211–218.
- 29 A. Cont, G. Assayag and S. Dubnov, “Audio Oracle: A New Algorithm for Fast Learning of Audio Structures,” *Proceedings of the International Computer Music Conference* 2007 (2007) pp. 224–227.
- 30 G. Surges and S. Dubnov, “Feature Selection and Composition Using PyOracle,” *Proceedings of the 2nd International Workshop on Musical Metacreation* (2013).
- 31 S. Dubnov, J. Hsu and C. Wang, “Music Pattern Discovery with Variable Markov Oracle: A Unified Approach to Symbolic and Audio Representations,” *Proceedings of the 16th International Society for Music Information Retrieval Conference* (2015) pp. 176–182.
- 32 A. Wilson, “factorOracle: An Extensible Max External for Investigating Applications of the Factor Oracle Automaton in Real-Time Music Improvisation,” *Proceedings of the 4th International Workshop on Musical Metacreation* (2016).
- 33 J. Fernández and F. Vico, “AI Methods in Algorithmic Composition: A Comprehensive Survey,” *Journal of Artificial Intelligence Research* 48 (2013) pp. 513–582.

---

Manuscript received 2 January 2017.

**ARTO ARTINIAN** is assistant professor of political theory at City University of New York. His research focuses on questions of power, hegemony and the state.

**ADAM JAMES WILSON** is assistant professor of emerging media technology at City University of New York. His research focuses on applications of computational creativity in music.