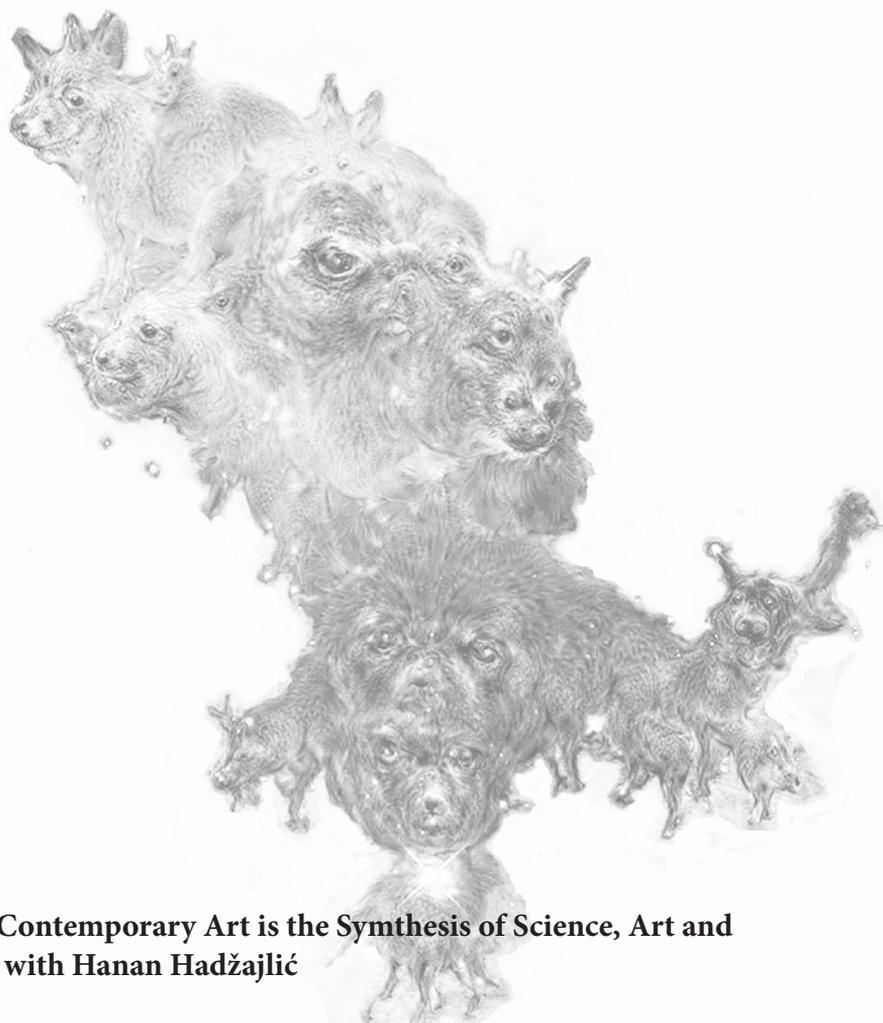


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"THE BASIC PRINCIPLE OF CONTEMPORARY ART IS THE SYNTHESIS OF SCIENCE, ART AND TECHNOLOGY": Interview with Hanan Hadžajlić

Hanan Hadžajlić (1991) is a composer, flutist and transdisciplinary researcher. She completed DMA in flute performance at the Faculty of Music Arts in Belgrade (mentor: prof. Ljubiša Jovanović, co-mentor: Dr. Vesna Mikić). Currently she is a PhD candidate in art theory – transdisciplinary studies of contemporary art and media at the Faculty of Media and Communication in Belgrade (mentor: Dr. Andrija Filipović, co-mentor: Dr. Miodrag Šuvaković). She completed MA and BA in composition (mentor: prof. Ališer Sijarić, co-mentor: Dr. Amila Ramović) and MA and BA in flute performance (mentor: prof. Sakib Lačević, co-mentor: Dr. Ivan Čavlović) at the Music Academy of the University of Sarajevo.



Since 2018 she has been employed as a Teaching Assistant at the Department of Composition at the Music Academy of the University of Sarajevo. She is a co-founder and

director of the Institute for Contemporary Artistic Music (INSAM Sarajevo, 2015). Since 2012 she is a member of the ensemble SONEMUS.

She was a scholarship holder of the Lucerne Festival Academy – Composer Seminar 2017 and Science Underground Academy 2016. Her composition *Freezing Moon* is included in the book *The 21st Century Voice: Contemporary and Traditional Extra-normal Voice* by Michael Edward Edgerton. Her music was performed in many European countries, Israel and USA.

How would you define the term 'Artificial Musical Intelligence'?

Artificial musical intelligence (hereinafter referred to as AMI) is the ability to establish a compositional process in real time and adapt the behavior/process redirection to changes in the environment (such as external information) by a modular system. In the context of my DMA research (flute performance, theme: *Flute as a 'metainterface' of modular systems in contemporary electroacoustic music*), this system refers to the '*TransFlute*' Modular System (TFMS).

The consistency of the process (which implies multi-processuality) is the most abstract concept of a musical composition, and in fact, it is the ultimate concept of achievement in music for composers. It refers to consistency in terms of permanence, firmness, and self-determination. Each analysis of process consistency, whether or not it is displayed numerically or verbally, is a descriptive analysis that starts from a certain thesis - the idea of relationships between individual contexts (processes) within the global context (process), where the reference is the compositional material and the possibilities of its development. The idea of mathematical concepts as an experience of nature, taken from the Antiquity and the Middle Ages, is presented in the composition by the construction of abstract models that, through mediation of proportions and analogies, allow the creation of links between completely different contexts.

The characteristic that allows a particular system to adapt its behavior to change of environment, is *the placement*, a concept that comes from cognitive science, and the reflexive reaction of the system is determined by means of its interpretation. The modularity of the concept of *placement* defines and enables the adaptation of a certain system to change of environment. Its reflex reaction, which relates to the localization of a certain occurrence (initiator of action) and the establishment of the direction of motion, determines the means of interpretation, that is, the initiator. Sound modulations are abstract self-modulating dynamic systems with the ability to adapt to the change of environment (which depends on the actions of individual modules within the general process) that arise from the physical modules connection system.

The theory of AMI first requires a summation of *basic points* of the domain of artificial and musical intelligence. The concept of artificial intelligence is based on Robert Sternberg's intelligence models, i.e. practical, creative, and analytical

intelligence (component, experiential, and contextual). Intelligence is an abstract law, an entity that has the ability to solve problems in specific circumstances and use specialized intelligence in a unique way, as well as the ability to learn from its environment. The adaptive control theory, that deals with the design of machines capable of behaving in unpredictable conditions, and the control theory, which deals with the development of a particular concept of behavior of complex machines, actually determine the contexts in terms of simplified as well as unpredictable conditions and environments and accordingly define and build specific platforms enabling the potential of intelligent machine behavior. The musical intelligence base, according to Howard Gardner, refers to musical competencies, while the production or composition of music represents the highest level of musical intelligence.

The scientific-artistic potential of the field of development of general artificial intelligence synthesizes three aspects: *techne*, *poiesis*, and *mimesis*, with the intention of simulating a modular system based on a human brain model that is not deterministic; and the ontological and epistemological link represents an interface in which the two principles meet but have the possibility of separation. The concept of AMI is based on an exemplary metaphor "model and meta model of the interface," modeled on the programming of general artificial intelligence, and at the same time the point of interaction between man and machine, where man is a code maker and the machine a creator of potential artwork.

How is Artificial Musical Intelligence represented in contemporary music?

Examples of AMI are reflected in projects such as *Kurzweil Music Systems* by Ray Kurzweil, *EMI* by David Cope, or *Impromptu* by Andrew Sorensen, based on software technologies. However, although the aforementioned programs contain the basics of musical compositions achieved by specific algorithms and computer models of perception of music, they are based on the use of digital acoustic instruments and the contextualization of the musical composition as a process of algorithms that use cultural models of classical music for reference.

Each of the projects contains the concept of music competence, i.e. the ability of the program to recognize certain models and engage in further modification through the entered algorithms, resulting in a certain compositional process. In this way, in relation to the theory of interface from computer science, the programming language is a model and algorithms are the specific meta model, which would mean that the contextualization of information – both the type of sound and the initial compositional model - represents metainterface. It contains the model syntax, but it can also be viewed separately out of context, that is, as a process of algorithms. However, the AMI of these projects, based on software technology and information strictly referring to the culture of classical music, is only one of the possibilities of the application of the concept of AMI.

The field of contemporary artistic music composition strives to overcome

cultural references, avoiding the use of cultural codes and finding their own models of material creation and control.

What is the 'TransFlute' Modular System, what does it consist of, how does it work, and in what way do the modular system and flute relate?

The 'TransFlute' Modular System (hereinafter *TFMS*) is a system of physically connected specific analog modules (sound processors) whose metainterface is represented through a modular system – with modular programming of parameters and sound modulations as a compositional system.

The modular architecture of the *TFMS* means that the placement or position of modules, both physically and parametrically, plays a significant role in the predetermination of the process. Individual modules can be integrated and even isolated from the system, however, as part of the modular system, they represent the interconnection seen in the modules of one organism/system. Interdependence is reflected in the internal multi-processuality of the modular system, which implies a general process within which simultaneous multiple processes or modulation cycles occur. The cycle refers to the complementary activity of the modules, that is, the construction or reduction of the signal dimensionality, or the amplitude, frequency, phase modulation and demodulation, and self-isolation of a particular signal, single module cycle, or complete sound, i.e. all present cycles. Digital modulation can be included if there is a specific digital module in the system.

The metainterface of modular systems refers to the medium of certain architectural compositions that control the processes of all involved so – agents of the entire system. Composition architecture, that is, a composition, is an information system that is primarily partly deterministic, and its realization depends on the perception of its media by the modular system, the modulation, or the artificial music intelligence. Reflective agent metainterface, in the context of my research, refers to the flute as a medium and as an information system for the perspective of composition. The flute is the starting point of the modulation process as well as the environment of the modular system.

What about the relation between the instrument as 'external information' and the modular system? Are they equals in the composing process?

The flute as a metainterface of modular systems refers to the flute as an external initiator of the modular system process, a separate entity whose characteristics are also altered (regardless of whether the flute signal has previously passed through the digital effect). In this way, the flute and modular system relationship is bidirectional, which means that the flute influences the modulation of the analog signal – or the modular system, and the same relationship also affects the changes in the sound characteristics of the flute.

How could Artificial Musical Intelligence of the 'TransFlute' Modular System be applied to contemporary composition?

Contemporary artistic composition implies the establishment of autoreferential systems based on autoreferential material. The autoreferential system represents a separate entity, a language that functions exclusively in its own context and represents a certain law. However, compositional logic starts from the mimesis of natural laws, which means that it essentially contains an analytic aspect carried out in contextualization, though with certain references, in a musical language. Thus, according to Gardner's theory of composition as the highest instance of musical intelligence, it contains the potential of mimesis of the intelligence phenomenon, defining its own material and means of abstraction of cognitive function.

Thus, the mimesis of intelligence by compositional logic, by specific methods and techniques, becomes a composition. It is necessary to state that it is only functional in the media of its interpretation, through the analysis and musical interpretation of the symbolic system, which is the form of certain materialization of the composition. The distinction between intentional mimesis and materialization of the composition as a separate entity is its functionality in the specific circumstances defined by the medium itself. One of the axioms of this theory of artificial music intelligence is that cognitive function develops through the establishment of new synaptic connections, which means that it passes through a constant modulation process, in accordance to reactions to the specific circumstances it encounters.

TFMS has the ability to react to external information and can become a user interface for composers. With regard to the musical intelligence (process setup and ability of process redirection) of this modular system, but also to the impossibility of absolute determination of modulation by the composer, contemporary electroacoustic music for flute with the analog sound processors that make this modular system is only a hypothesis, a concept, which primary purpose is exploring the potential of intelligent music machines. Therefore, contemporary electroacoustic music for flute as the metainterface of modular systems refers primarily to transdisciplinary research of artificial music intelligence based on the synthesis of artistic and scientific perspectives.

Concerning the composition based on 'TransFlute' Modular System, is the interpreter also the composer too? Does this kind of interpretation provide the possibility of improvisation?

In the case of the integration of *TFMS* into a composition, it is not solely based on the compositional processes of the modular system, but on the interaction between the flute and the *TFMS*. Currently, Dino Rešidbegović and I are the only composers who have integrated the *TransFlute Modular System* into their compositions. The

examples of this integration are compositions for flute and *TFMS: Concerto* for flute, processors and electronic tape (2018) and *Wreesky* (2016) by Rešidbegović and my own compositions including: *A-B-R-A-C-A-D-A-B-R-A: B-A-C-H* (2018), *A Thousand Plateause: Hommage a Deleuze & Guattari* (2018), *I Am Composition, My Name Is Politika* (2016), *Artificial Intelligence* (2016).

Rešidbegović uses his own notation systems, ARGN (Approximate Reductionist Graphic Notation) and RMC (Reductional Music Complexity), when writing the *TFMS* activity (parameters) as well as the flute part, through instructions for forming compositional processes in interaction with *TFMS*. Since Rešidbegović's compositional paradigm is based on the strict determination of a minimum of one parameter (most commonly it is a rhythmic construction or instrumental technique), he always leaves the parameter of the tone pitch system as the space for decision making by the performer.

Rešidbegović's compositional paradigm falls into the category of "determined/structured improvisation in reference to particular composition" where the performer has the role of interpreter/composer/improviser. The interdisciplinarity of the mentioned field implies that the improviser is also a professional interpreter and composer. Compositions written for flute and *TFMS* integrate the category of "transmedia and multi-processuality/interactive process of transformation of the fundamental material", where the improviser establishes compositional processes in interaction with *TFMS* processes.

My compositions for flute and *TFMS* represent different categories of free improvisation in the compositions and their combinations: "transmedia and multi-processuality/interactive process of transformation of the fundamental material" strictly determined/structured improvisation in reference to a particular composition; partly determined/structured improvisation in reference to a particular composition. Therefore, as I have already stated, it is an interdisciplinary and interactive approach to the construction realization of compositional processes.

What is the importance and influence of science and technology for creating principles of contemporary art?

I believe that the basic principle of contemporary art is precisely the synthesis of science, art, and technology. So, I am talking about interdisciplinary, transdisciplinary/meta-disciplinary and even post-disciplinary approach. The basic principle is not contemporary, it is timeless and exists/functions from the moment when the first man entered the tertiary aspect of his being and established a creative act, that is, when he came to the creative act of discovery of natural laws.

Contemporary art can be all that is today, that which is contemporary, present, and dictated by the art market; there must also be a space for different aspects of the research process and the process of becoming-of-something. However, my point is that sooner or later there will have to be a differentiation of institutionalized

artistic/scientific practices that represent superficiality, brand, mainstream, instant knowledge, instant spirituality, *circus* and *kitschy* combinations of different perspectives of social, natural science, and artistic approaches, what I call *fun for spiritually poor* – from the essential search for transcultural models in nature, science, art, and technology.

The coexistence of these two *worlds* represents the image of conflict of contemporary political tendencies. The truth cannot be partial, it must cover all its aspects; but it requires a hierarchy. Therefore, when contemporary art as a thinking/action/practice/culture of living encompasses all aspects of the organization of the contemporary world, starting from economic and political, when an artist becomes someone who discovers but also produces, starts to correct his/her own mistakes, finds and invents, destroys and builds, establishes a process and provides resources for its implementation, I believe that eventually a world-wide civilization platform will be found/created. Thus, art and science offer solutions to the establishment of justice and the conditions for individual, and subsequently, the collective development and advancement of civilization. Although often negatively represented in the media, I consider the work of investor, philosopher, political activist, and philanthropist George Soros as an example of trying theoretical and practical implementation of art in the contemporary world (one example is his platform *The Open Society Foundations*).

Finally, I will go back to the initial question and to my first sentence: the basic principle of modern art is the synthesis of science, art, and technology. Art is the basic principle of living and the surviving of humanity. However, if values are expressed solely through numbers as a symbolic system of accumulated capital representation, then this world will not overcome the immoral (which might be our biggest fear today), and could even become amoral. We need to prevent this with our active work.

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