

Wednesday, May 31, 14:30

## CONCERT 2

*T/ensor/~ 0.3*

by Dimitris Papageorgiou

*Finger Breath*

by Palle Dahlstedt

*Fluid Flows, Transit, and Symbols*

by Costa Colachis Glass

*Laser Phase Synthesis [XXI VII III I]*

by Derek Holzer and Luke Aron

## Program Notes (Concert 2)

### ***T/ensor/~ 0.3***

by Dimitris Papageorgiou

*T/ensor/~ (version 0.3)* is a work-in-progress prototype of a dynamic performance system developed in MAX that involves adaptive digital signal processing modules and generative processes towards exploring the field and performance practice of human-machine improvisation. The system is the result of a pilot, six-month artistic research study entitled ‘Improvisation Technologies and Creative Machines: The Performer-Instrument Relational Milieu’ (ITCM) funded by the UK’s AHRC Creative Industries Clusters Programme project: Creative Informatics · Data Driven Innovation for the Creative Industries (Small Research Grants 2022).

The practice-led, artistic research design of the ITCM project and the framework that led to the development of *T/ensor/~* involved the tracing of relevant theoretical and practical understandings that explore the technicity of musical improvisation while building upon the author’s prior research on the fields of free improvisation, contemporary music notation, and electro-instrumental music. The project also invited performers/improvisers — Christos Michalakos (drum kit), Francisco Sánchez Díaz (saxophone), Richard Craig (flute) — to test and to play with the developed system and explored via its practice-led research methodology whether the HCI performance setting promotes a dialogic and co-produced improvisational musical space.

## ***Finger Breath***

by Palle Dahlstedt

***Finger Breath***, for performer, live electronics, and zither, was originally commissioned by the Arts Council, and premiered in January 2023 as a headphone performance in the belly of a small passenger ferry. The main concepts behind the work are three: First, the intimate sounds from the musicians breathing, and from his fingers on the strings of an ancient zither. Second, the idea that the live breathing and the musician's sounds played by finger movements are the only sources of gestural control and expression in the piece. Breathing and finger movements form the basis of many musical expressions throughout the world, as they are our most intimate physiological and gestural bodily mechanisms. Third, the combination of the first two into a situation of "entangled musicianship", where each action has triple consequences: as a sound source to be heard live, as a sound source being fed to various buffers for later manipulation and playback, but also as a source of gestural control, affecting a variety of playback mechanisms for the buffered sounds. It is thus impossible to play something without also altering the conditions for future playing. Hence the entanglement.

# Fluid Flows, Transit, and Symbols

by Costa Colachis Glass

**Fluid Flows, Transit, and Symbols** is a composed interpretation of fluid flow within a pipe; actualized through live vocalizations, granular synthesis, FM-synthesis, and sampling. The synthesizers, sound design, and sequences are all built completely through code. The composition is accompanied by a granular synthesized poem (Fig 1); The poem's subject and form is inspired by fluid mechanics, transit, symbols, and the composer's grandmother. During the performance, the performer reads the poem while simultaneously structuring the organization and timing of the coded composition

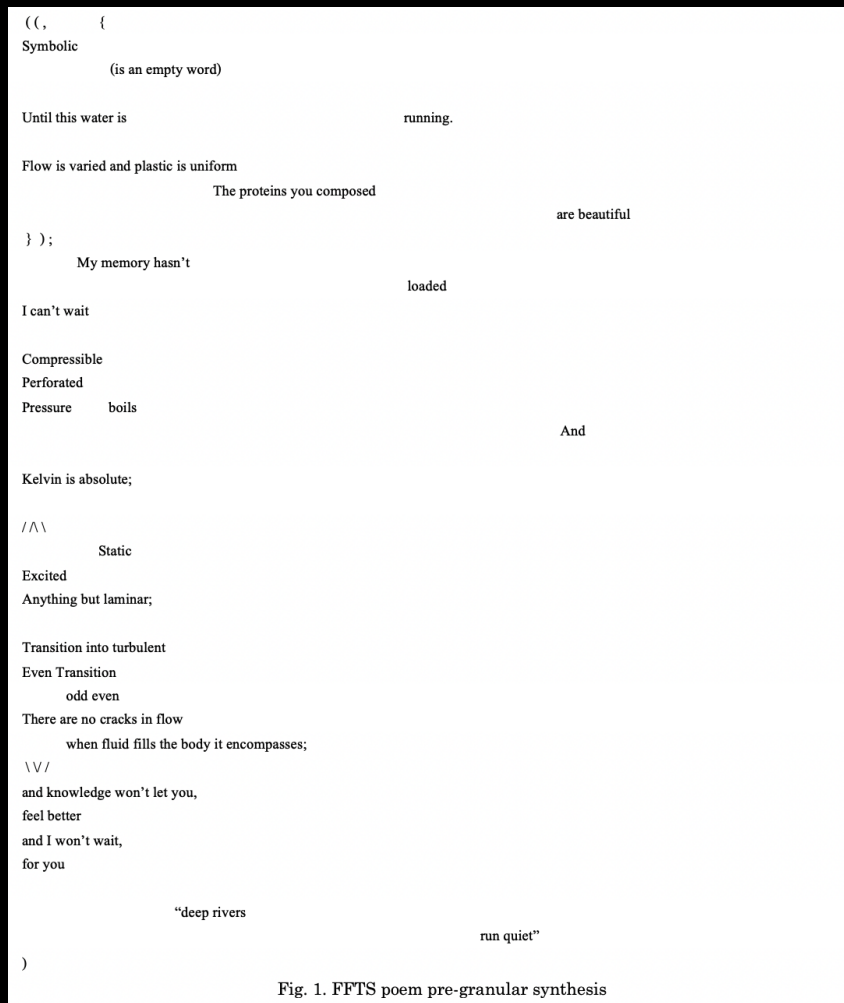


Fig. 1. FFTS poem pre-granular synthesis

## ***Laser Phase Synthesis [XXI VII III I]***

by Derek Holzer and Luka Aron

***Laser Phase Synthesis [XXI VII III I]*** is a light and sound performance by audiovisual artist Derek Holzer and electroacoustic composer Luka Aron. It is informed by the historical Audio/Video/Laser system developed by Lowell Cross and Carson Jeffries for use by David Tudor and Experiments in Arts and Technology (E.A.T.) at the 1970 Japan World Exposition in Osaka, Japan. Our current project employs digital audio synthesis, modern laser display technology, and a close collaboration between sound and image composition to illustrate the harmonic progression of a musical work.

A laser display functions by deflecting the beam of a laser with a pair of mirrors mounted on galvanometers to create repeating patterns from two input signals, X and Y, at a given frequency in Hz. In our work, these deflection signals are sent from a digital audio interface controlled by the Pure Data application. Composing sounds for the laser display requires careful control of the frequency, amplitude, and phase relationships between two or more channels of audio, since interesting sounds do not always produce interesting laser visuals. These concerns can add quite an additional burden to the creative process of a musical composer, instrumentalist, or vocalist, particularly if they are not familiar with techniques for creating XY vector graphics. The Laser Phase Synthesis instrument, written in Pure Data and used in our performance, simplifies these requirements to the simple harmonic relationship of a monophonic audio channel to the laser's deflection frequency. This direct relationship between sound and image in a single electronic instrument creates a feedback loop in the interaction process, within which sounds are crafted specifically for their visual effect alongside their musical expressiveness.

The musical composition used in the piece is based on extended just intonation. Just intonation is based on the harmonic series and subharmonic series, where the harmonic series consists of integer multiples of the fundamental frequency (1/1, 2/1, 3/1, 4/1, 5/1. . . .) and the subharmonic series comprises integer submultiples of the fundamental frequency (1/1, 1/2, 1/3, 1/4, 1/5....). It is a system derived from the observation of certain auditory and acoustic phenomena, such as difference tones and (non)-beating, as well as the periodicity of composite sound waves.

During the performance of the piece, the drawing frequency of the laser remains matched to the 1/1 fundamental frequency of the partials, even as this fundamental changes through the musical composition. This allows for a wide range of movement, both visually and audibly, while maintaining a close harmonic alignment. The primary timbres used as sonic material for ***Laser Phase Synthesis [XXI VII III I]*** are sine waves, along with samples of several gongs and bells. While the sine waves were tuned to precision in the Pure Data environment, they interact with the inharmonic spectra of the percussion instruments, resulting in rich interference patterns apparent in both sound and image.