

## Circle Keys - project description

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An interactive composition/systemic improvisation for keyboard and live electronics.

### Performances

Tällberg Forum 2013, Opening Session, June 13<sup>th</sup>, Main Tent, Tällberg, Sweden

Tällberg Forum 2013, as part of the *Bryt upp, bryt upp (Breaking times)* concert installation, June 14<sup>th</sup>, Tällberg, Sweden

Vetenskapsrådets Symposium om Konstnärlig Forskning och Utvecklingsarbete, Konstfack (University College of Arts, Craft & Design), Nov 28, 2013, Stockholm, Sweden

3:e Våningen, Lindblads Ande concert series, Dec 10th, 2013, Göteborg, Sweden

Circle Keys is composed and programmed by Palle Dahlstedt. All performances by Palle Dahlstedt on klavier and electronics.

### Description

I have previously worked extensively with generative music, where complex musical material is created from software in non-realtime. In my research and performances over the last 7 years, I have concentrated on performance technologies for improvisation, with direct control over the sound to achieve freedom of expression in an improvisation context.

However, I also wanted to combine the structural complexity of generative algorithms and complex systems with the gestural control and phrasing of real-time performance.

So, as a continuation of my development of mappings for realtime control of synthesis and sound processing, I developed a way of controlling the parameters of complex generative algorithms in realtime, in two different ways. First, through an array of 16 pressure sensors, allowing everything from fingertip nuances to brute force to be mirrored in the musical output. Second, through actual playing on the keys of the Disklavier, where each key both produces the normal piano sound and affects the workings of the underlying complex system.

The input from the sensors or keys is mapped through a dynamic vectorization algorithm to a set of parameters in the generative system. This allows the huge space of theoretical possibilities to be explored in a controlled way by ear. Minute variations and wild explorations are possible, and if interesting regions are found, the mechanism can be shifted there, for further exploration.

The pressure sensors are played live, as a meta-improvisation in the search space of the generative system. Dynamic expression is mapped directly from the total finger pressure, allowing very organic phrasing. The playing technique is not unlike the polyphonic touch sensitivity of the clavichord, which I studied a number of years ago. This has been a seminal inspiration.

Dynamics and phrasing are directly mapped to pressure and key velocity, which means that the generative system is controlled directly through physical gestures, resulting in a complex but very organic output.

The generative live algorithm is simple in structure but complex in results. It consists of a simulation of four virtual musicians, each listening to its neighbors. From what the neighbor is playing, it deduces next musical interval, dynamics, articulation, and duration. Since all four virtual musicians are connected in a circle (hence the title), complex patterns can emerge from data feedback. Such systems are notoriously difficult to control, but since this is played by ear, I can respond immediately, and change or enforce the current direction, and alter it with great precision when needed.

With its predefined rule system, infinite variety, fingertip control and organic phrasing, it is truly a hybrid of performance, composition and improvisation. As a pianist and electronic musician, I think it is a very interesting combination of the two.

The performance is an improvisation, but since the system is quite complex, and difficult to predict in the long run, the interaction between my way of playing and the system's way of responding results in a very characteristic music. Details are never the same, but the music is nevertheless recognizable, and it is more a composition - a work - than a universal performance system.

## Two variations

The above described system exists in two variations. The first, Circle Squared, controlled through an array of pressure sensors (utilizing the Keith MacMillen QuNeo interface), through the special mapping algorithm, was developed in 2011, and had its premiere by the composer at a Disklavier concert at the Royal College of Music in Stockholm. It has since been performed several times in different places in Sweden. Sometimes with a Disklavier, sometimes utilizing a digital piano. The project was accepted by the program committee of the Interactive Keyboard Symposium 2012 at Goldsmiths, but since I got several projects accepted and could only perform one of them, I chose not to include it there.

The second version, Circle Keys, controlling the generative complex system through playing on the very piano keyboard, was developed in early 2013 and premiered at the major concert of the multidisciplinary globalization forum Tällberg Forum in Sweden, June 2013, in front of an audience of 700-1000 people from 50 different nations, with great success. It was also used in the opening session of the Tällberg Forum 2013. It has since then also been performed at an artistic research conference arranged by the Swedish Research Council, Nov 2013 in Stockholm.

The idea of developing these two related versions is that it clearly demonstrates different ways of controlling the same generative system, highlighting the influence of the interface and underlying mapping. In Circle Squared, it is played from the pressure interface, placed on top of the piano. Then, I sit down and continue playing on the same system from the keys, and at the same time interacting with it musically through the keys I play (as opposed to the keys the system plays).

## Sound and video examples

Circle Keys was performed as an accompaniment to the opening presentation by Bo Ekman at Tällberg Forum 2013. This was filmed by Swedish Television (SVT), and was broadcast at UR channel (Utbildningsradion, the educational channel), September 7<sup>th</sup>.

During this performance, Tällberg Foundation Chairman and Founder, Bo Ekman, gives a presentation about the world being a complex system, impossible to predict, and we have to be very attentive and reactive. At the same time, I accompany his speech by improvising on a dynamic system, impossible to predict. And I have to listen very carefully, and react to every little shift in the behavior, to be able to perform on it...

<http://urplay.se/Produkter/177936-UR-Samtiden-Tallberg-Forum-2013-Inledning>

Two video demos of Circle Keys can be found below. They were recorded with a digital piano, since I did not have access to a Disklavier then. But you see what I actually play, and hear this combined with what the system plays (in realtime on the same piano).

[https://www.youtube.com/watch?v=E5sMRIY\\_D5o](https://www.youtube.com/watch?v=E5sMRIY_D5o)

<https://www.youtube.com/watch?v=wkTi8PfkFhY>