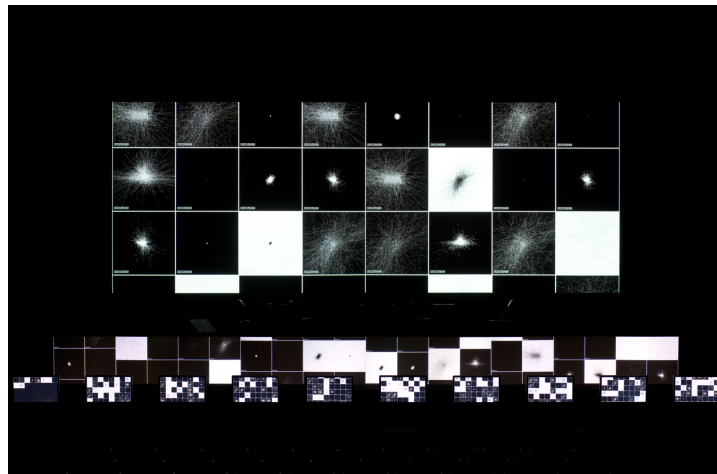


RYOJI IKEDA

superposition



A LONG-TERM PROJECT BY RYOJI IKEDA

superposition looks into how we understand the reality of nature on an atomic scale. This project was inspired by the mathematical ideas and notions of quantum field that deals with this particular characteristic of nature: one cannot fully describe the behaviour of a single particle, but in terms of probabilities. To describe a particle, one must list all possible states a particle can be found in alongside probability of the particle being in that state.

superposition questions the boundaries between music, visual arts and performing arts, while exploring in depth the intersection between art and science.

superposition [performance] is Ryoji Ikeda's performance piece which was created in November 2012 in Paris.

For the first time in his work, other performers appear on stage as operator / conductor / observer / examinee to complement a wide range of video images and other innovative technologies. All material used on stage are shown in a state of superposition -sound, visuals, physical phenomena, mathematical concepts, human behaviour and randomness- and are simultaneously arranged and re-arranged in a single performance piece.

The exhibition *supersymmetry* created in April 2014 is an artistic re-orchestration of Ikeda's performance piece *superposition* (2012-). This exhibition version consists of 2 spaces and conceptually deconstructs and re-composes its original elements — transformations, visualizations and sonifications of a vast amount of scientific data set, mathematical operations and real-time information from the installation works themselves at the exhibition.

Ikeda and his team employ real-time program computations and data scanning/processing to create a further abstraction of the original performance version of *superposition*. The technical dynamics, such as extremely fast frame rates and variable bit depths, continue to challenge and explore the thresholds of our perceptions.

ARTIST STATEMENT

superposition explores a new notion of information: quantum information.

The language of classical information is BIT (binary digits) — 0 *or* 1, which is the most fundamental building block of our judgement and logical thoughts.

The language of quantum information is QUBIT (quantum binary digits) — 0 *and* 1 superposed at the same time, which is a new way for us to capture the truth of nature at an extremely small sub-atomic scale — such as behaviors of photons or electrons.

When we try to observe a sub-atomic particle we cannot know both its position and its speed at the same time.

Once we observe the position, we understand the information of the position but lose that of the speed. Before we observed the position, the single sub-atomic particle was actually located at all possible positions simultaneously, which is the so-called "superposition state".

In short, our observation fixes the position. It is unbelievably counterintuitive and is beyond our human comprehension.

No one can know the very nature of nature. On such an extremely small scale, we can know only a single value of a single parameter from the infinite facets of nature.

BIT is digital. QUBIT is analog — analogous to nature.

BIT is discrete. QUBIT is continuous — a continuum.

Quantum computing is to read how sub-atomic particles behave by means of the language of QUBIT; i.e. Nature computes. We decipher it.

Nature is always here and there. We forcefully try to understand and demystify the nature of nature by means of our scientific knowledge, but we're also part of nature, nature is unthinkably vast — from an atom to the universe. Some esoteric codes will remain secret and beyond human comprehension, perhaps forever.

superposition is inspired by all these thoughts and is foolhardily and quixotically aiming to explore the new kind of information through art.

Ryoji Ikeda

MORE ABOUT THE PRINCIPLE OF SUPERPOSITION

Quantum superposition is a principle of quantum theory that describes a challenging concept about the nature and behavior of matter and forces at the sub-atomic level. The principle of superposition claims that while we do not know what the state of any object is, it is actually in all possible states simultaneously. According to Erwin's Schrödinger equation, which is linear, a solution that takes into account all possible states will be a linear combination of the solutions for each individual state.

The principle of superposition claims that if the world can be in any configuration, i.e. any possible arrangement of particles or fields, but can also be in another configuration, then the world can be found in a state of superposition of the two configurations, where the amount of each configuration in the superposition is specified by a complex number.

Quantum computing enables us to understand the quantum behaviors of nature on an atomic scale. The language of quantum computing is Quantum Bit = Qubit.

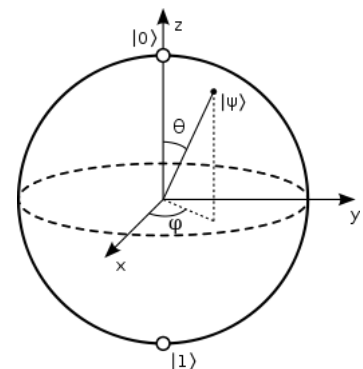
Bit is the basic unit of information in computing and telecommunications information.

Bit equals 0 or 1, true or false, on or off.

In quantum computing, a quantum bit is a quantum system that can exist in superposition of two bit values: 0 and 1, true and false, on and off. Once we measure the position or speed of an atomic particle, all superposed states are reduced to a specific state. In other words, one cannot assign exact simultaneous values to the position and speed of an atomic particle. This is called the Uncertainty Principle. Quantum computing uses this principle alongside quantum entanglement and superposition.

After almost a decade of research on the discrete and the continuous, mathematical beauty and sublimation, Ryoji Ikeda has finally found a space where all mathematical concepts find an explanation in the notion of qubit, an infinite grey area between 0 and 1 in which probability and uncertainty coexist. As opposed to the arithmetical continuum of real numbers, the grey area of qubit expands to the notion of complex projective line in projective geometry.

(In quantum mechanics, the Bloch sphere is a geometrical representation of the pure state space of a two-level quantum mechanical system. The points on the surface of the sphere represent the pure states of a single qubit, the interior of the sphere represents the mixed states.)



CREDITS

Ryoji Ikeda	concept, direction and music
Stéphane Garin, Amélie Grould	performers
Tomonaga Tokuyama, Norimichi Hirakawa, Yoshito Onishi	programming, graphics and computer system
Norimichi Hirakawa	optical devices
Thomas Leblanc	stage manager
Tomonaga Tokuyama	technical manager

Preview: 5 August 2012, ZKM (Karlsruhe, DE)

World Première: 14, 15, 16 November 2012, Centre Pompidou / Festival d'Automne à Paris (FR)

Commissioned by Festival d'Automne à Paris for the musical part

Created and developed at EPPGH La Villette (Paris, FR), Yamaguchi Center for Arts and media [YCAM] (JP) and ZKM (Karlsruhe, DE)

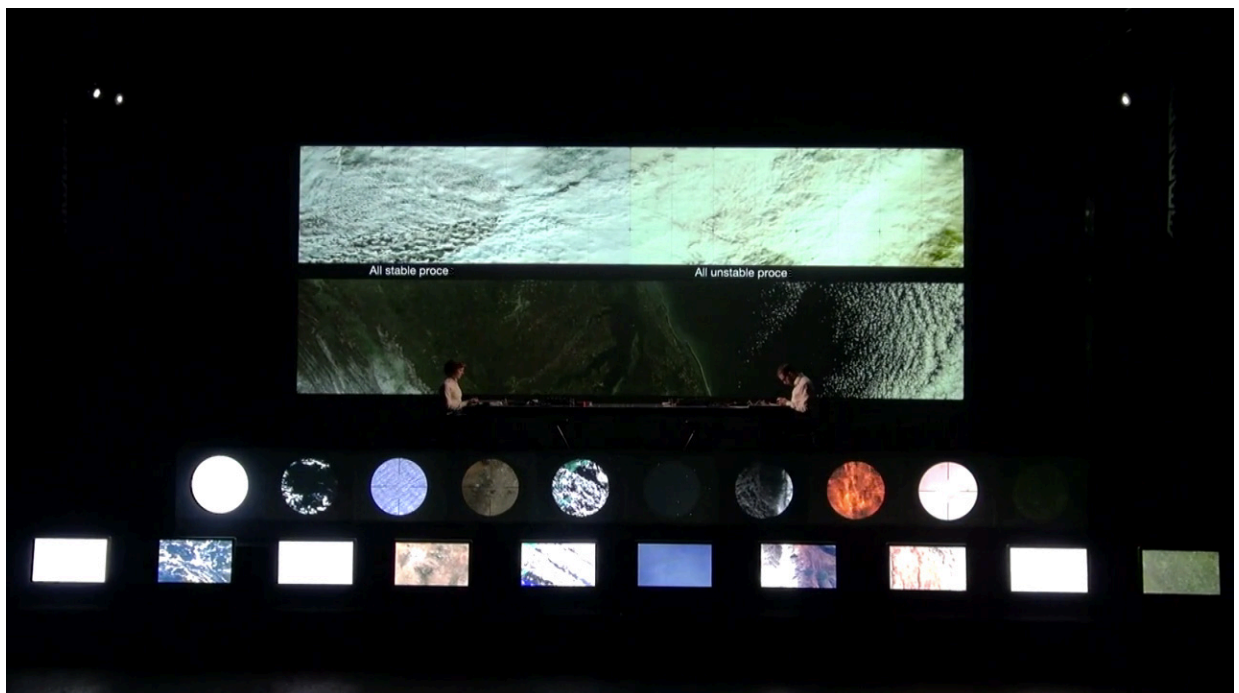
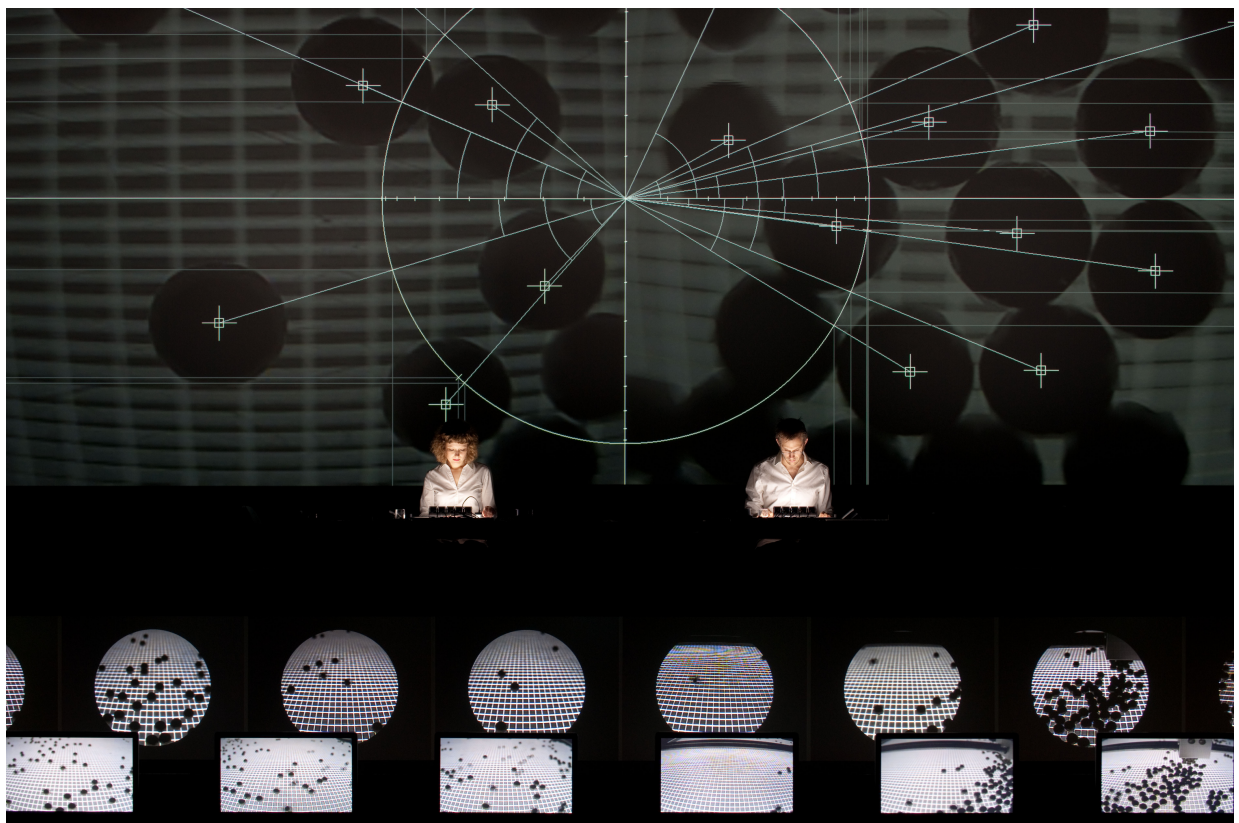
Production: Ryoji Ikeda Studio, Quaternaire (FR) , Forma (UK)

Co-production: Festival d'Automne à Paris (FR), Les Spectacles Vivants-Centre Pompidou (Paris, FR), the Barbican (London, UK), Concertgebouw Brugge (BE), Festival de Marseille (FR), EPPGH La Villette (Paris, FR), Kyoto Experiment (JP), ZKM (Karlsruhe, DE), STRP Art and Technology Festival (Eindhoven, NL), Stereolux / Festival Scopitone / le lieu unique (Nantes, FR)

With the support of the DICRéAM-CNC (FR)

Touring: Epidemic (Richard Castelli, assisted by Florence Berthaud)

photos: Kazuo Fukunaga, courtesy of Kyoto Experiment



DESCRIPTION

The performance version was created for a traditional theatre with a stage, a proscenium and audience seating. Like in other works by Ryoji Ikeda, all elements on the stage – sound, light, video, set – are assembled with the highest precision. They are all integrated and orchestrated into a single powerful audio-visual performance piece.

General

- 2 performers/operators on stage.

Video

- 21 video screens are set on stage; 1 large screen at the back, 10 screens in the middle, 10 displays at the front. These can be considered as a “video ensemble” that is synchronised with the musical composition. The 3 layers of screens are superposed on stage, the combination of these 21 screens can offer up to 5,842,587,018,385,980,000,000,000,000 potential visual permutations.

Sound

- A multi-channel sound system is installed on the proscenium and on the ceiling (or walls) of the auditorium. This system delivers a spatial sound field across the entire theatre.

Performers

- The artist composed for non-musical instruments such as tuning forks, metronomes, telegraph keys, typewriters etc. Performers play those instruments on stage. The score is both musical and mathematical but is also influenced by various other creative forms such as information theory, semiotics and choreography.
- Throughout the composition, performers generate both movement and sound (performance and music).
- These actions generate visual elements (i.e. words, numbers, type-written phrases) on all 21 screens. These movements are also translated in real-time into computer data codes and are then rescreened on stage alongside various other graphical material (converted data from the performers’ actions) or real images (e.g. close-ups of performers’ handwriting or typewriting) via a video camera based on stage.

Duration

65 minutes.

TOURS

JUN 16-17, 2021	The Diaghilev Festival, Perm State Opera and Ballet Theatre, Shpagin Plant / D1, Perm, RU
SEP 25-26, 2020	Musica Festival, Maillon, Théâtre de Strasbourg, FR
MAY 02-03, 2017	Teatro Colsubsidio, Bogota, CO
NOV 18-19, 2016	New Vision Arts Festival, Sha Tin Town Hall, Hong Kong, CN
NOV 14, 2015	Teatro San Martin, Buenos Aires, AR
SEP 29-30, 2015	OzAsia, Adelaide, AU
SEP 23-26, 2015	Carriageworks, Sydney, AU
DEC 02, 2014	Le 106, Rouen, FR
NOV 07, 2014	Royce Hall at UCLA - Center for the Arts of Performance, Los Angeles, US
OCT 31-NOV 01, 2014	Power Center at UMS (University Musical Society), Ann Arbor, Michigan, US
OCT 24-25, 2014	Walker Art Center, Minneapolis, US
OCT 17-18, 2014	The Metropolitan Museum (MET) and Crossing the Line Festival, New York, US
OCT 11, 2014	Musée d'art contemporain de Montreal, Quebec, CA
SEP 15, 2014	STEREOLUX - Festival Scopitone, Nantes, FR
APR 08-09, 2014	Onassis Cultural Center, Onassis, GR
OCT 25-26, 2013	Kyoto Experiment, Kyoto, JP
SEP 13, 2013	Muziekgebouw, Amsterdam, NL
JUN 22, 2013	Festival de Marseille, FR
APR 10, 2013	Concertgebouw Brugge, BE
MAR 27-28, 2013	The Barbican, London, UK
MAR 15, 2013	La Faïencerie, Creil, FR
MAR 08-09, 2013	STRP Biennial, Eindhoven, NL
DEC 07-08, 2012	Festival Nemo - Le Cent Quatre, Paris, FR
NOV 14-16, 2012	Festival d'Automne, Centre Pompidou, Paris, FR *world première

BIOGRAPHIES

Ryoji Ikeda

Born in 1966 in Gifu, Japan.

Lives and works in Paris, France and Kyoto, Japan.

Japan's leading electronic composer and visual artist Ryoji Ikeda focuses on the essential characteristics of sound itself and that of visuals as light by means of both mathematical precision and mathematical aesthetics. Ikeda has gained a reputation as one of the few international artists working convincingly across both visual and sonic media. He elaborately orchestrates sound, visuals, materials, physical phenomena and mathematical notions into immersive live performances and installations.

Alongside of pure musical activity, Ikeda has been working on long-term projects through live performances, installations, books and CD's such as *datamatics* (2006-), *test pattern* (2008-), *spectra* (2001-), *cyclo.* a collaborative project with Carsten Nicolai, *superposition* (2012-), *supersymmetry* (2014), *micro | macro* (2015-) and more recently *data.verse* (2019).

His albums +/- (1996), *0°C* (1998), *matrix* (2000), *dataplex* (2005), *test pattern* (2008) and *supercodex* (2013) pioneered a new minimal world of electronic music through his razor-sharp techniques and aesthetics. *The Solar System* (2016) and *technicolors* (2020) as limited edition vinyl and *music for percussion* (2017) was released by The Vinyl Factory.

In 2018, he established his online source as *codex | edition* and released *music for percussion* [cd+booklet], then *music for installations vol.1* [cd+booklet] in 2021.

He performs and exhibits worldwide at spaces such as Ars Electronica Center Linz, Elektra Festival Montreal, Grec and Sonar Festivals Barcelona, The Royal Concertgebouw and Eye Film Museum Amsterdam, Festival d'Automne à Paris, The MET, Crossing the Line Festival New York as well as Kyoto Experiment. He presented solo exhibitions at Park Avenue Armory New York, Museo de Arte Bogota, Hamburger Bahnhof Berlin, DHC/Art Montreal, MONA Museum Hobart – Tasmania, Carriageworks Sydney, HeK Basel, The Vinyl Factory London, Centre Pompidou Paris, Taipei Fine Arts Museum and a major solo exhibition at 180 The Strand London (UK) in 2021 among others.

He presented a drone symphony, *A [for 100 cars]*, commissioned by Red Bull Music Academy Festival Los Angeles. Ryoji Ikeda was commissioned by the LA Philharmonic for Fluxus Festival where he presented a new acoustic composition titled *100 cymbals*, and collaborated with Hiroshi Sugimoto on a commission by the Ballet de l'Opera de Paris *At the Hawk's well*.

In 2020, Ikeda performed at Berlin Philharmonie - STROM festival, Asia TOPA Melbourne and more. He was portrayed at Festival Musica Strasbourg, and collaborated with choreographer Pontus Lidberg and the Danish Dance Theatre on his new piece *Centaur*.

In 2021, he presents *superposition* at International Diaghilev Festival Perm under the Artistic direction of Teodor Currentzis and premiere a commission project with Les Percussions de Strasbourg at KunstFestSpiele in Hannover.

He is the award winner of the Prix Ars Electronica Collide@CERN 2014.

Ryoji Ikeda is represented by Almine Rech Gallery (Bruxelles, Paris, London, New York), and Taro Nasu Gallery (Tokyo).

www.ryojiikedas.com

www.epidemic.net/fr/art/ryoji_ikeda

STEPHANE GARIN

Born in 1974 in Bayonne, France, lives in France.

Interpretation, improvisation, composition, curation... Because a 21st century musician has to be able to work in all these fields, Stéphane Garin has chosen not to choose.

When he is not playing with Dedalus ensemble, then maybe he is alongside with some major electronic artist (Ryoji Ikeda), some maverick singer (Claire Diterzi), or in Detroit, Michigan, for a one-off performance (Shua Group).

But more probably it's because he is somewhere with ensemble 0 (www.ensemble0.com), the ensemble he has co-founded in 2004 and still runs with Sylvain Chauveau. 0 is a collective with a rotating cast of members (geographically spread) that performs american artists such as Moondog, John Cage, Julius Eastman, Arthur Russell, Tristan Perich or Michael Pisaro, as well as their own compositions.

Since 2017 he also plays with Jean-Philippe Gross (Dénombrement). Strongly nomadic, Stéphane Garin's course - which brought him from the Variations festival in Nantes to Amsterdam's Muziekgebouw, from Kyoto experiment festival to Bogota, Colombia - is nevertheless deeply anchored in an enlarged territory, which even manages to reconcile Basque country (where the ensemble 0 members are from) and Béarn (where, every year at La Centrifugeuse, he runs the nuit#couchée festival - nightly, collective listening sessions of radiophonic creations, as a heartfelly promoter through the podcasts he commissions every month to a large network of artists).

Nomadic also in time, as in his phonographic work with visual artist Sylvestre Gobart, from Drancy (France) to Sobibor (Poland) and Ukraine, seeking for the sound traces of the Holocaust.

In all those different activities, like the listening sessions he loves to give, it's not really about diffusion in the corporate meaning, but more about sharing, in a brotherly sense. From moments of collective, deep listening, sonic experiences in short or planetary distances, from circulations - between traditions (written or oral) or between generations, between high and low culture, instrumental work and phonography, acoustic and electronic, yesterday and today - which are the best guarantees for a true exchange. An enhanced conception of musicality.

AMELIE GROULD

Born in 1984, France.

Born in 1984, Amélie Grould studied the recorder from the age of 6 near Paris. Nine years later she began to study the percussion with Béatrice Répecaud and Jean Geoffroy. She graduated in 2006 (analysis, chamber music, percussion) - and also studied the history of music, the piano and jazz music. Then she entered the conservatory of Rueil-Malmaison (the class of Eve Payeur), graduated in 2007, and increased her knowledge of the contemporary repertoire and musical theater - it is to promote this music that she created, in 2009, the Troïka Trio with Rose Devas and Bénédicte Albanhac.

For a few years, she has been carrying out an important work on chamber music (Luciano Berio, Steve Reich, Georges Aperghis, Maurice Ohana ...) often in direct collaboration with composers (Ivo Malec, Yann Maresz, Philippe Hurel, Bruno Giner, François Paris, Martin Matalon, Thierry De Mey, Philippe Leroux ...). She plays in different orchestras (Radio France conducted by Jun Märkl, Rungis conducted by Laurent Gossaert...) and ensembles including Court Circuit (*Metropolis* by Martin Matalon for the Fritz Lang's movie at the Vilnius Theater), Arcema (creation of *Nahi* by Isabel Urrutia), 2e2m, Ensemble C Barré or the Ensemble Links.

She has been a member of Aum Grand Ensemble since 2010 - 15 musicians performing a repertoire closer to new improvised music and contemporary jazz. <http://www.grandsformats.com/Membres/aum/>.

In 2013, she created the Phonochrome with saxophonist Safia Azzoug - an association which aims to promote contemporary and experimental arts - and the duo Les Discordantes with which they commission new pieces to composers (*Chrysalis* by Dominique Lemaître, *Mer d'Adieux* by Jean-Paul Buisson, *De temps et d'eau* by Julien Pontvianne, *Zodiaques 1* by Augustin Belliot).

Attracted by multidisciplinary, she expands her field by collaborating with the contemporary dancer Céline Quédeville and the company the Theater of the impossible or by accompanying contemporary and modern jazz dance classes. She created in 2019, with Les Discordantes and the electroacoustic composer Hubert Michel, a performance mixing acoustic concrete and electronic music, Sound Memory of Industries, as part of the Reynold Arnould exhibition at the Modern Art Museum of Le Havre and in partnership with high school students.

Since 2012 she has been playing in *superposition*, by Ryoji Ikeda, a unique sensory experience mixing sounds, images, physical phenomena, mathematical concepts, human behavior and random characters (world premiere in November 2012 at the Center Pompidou). In 2016, she joined the Ensemble 0 - a variable-geometry band created in 2004 whose permanent members are Sylvain Chauveau, Stéphane Garin & Joël Merah - with which she performs pieces by American composers such as Moondog (ELPMAS) Julius Eastman (Feminine) or Arthur Russel (Tower of meaning - recreation commissioned by the Nantes national performing arts Centre, Le Lieu Unique - Variations festival).

<http://www.muraillesmusic.com/artistes/ensemble-0-joue-elpmas/>

After having taught for 6 years at Le Havre conservatory, she's now teaching percussion in Chelles, near Paris.

TOMONAGA TOKUYAMA

Born in 1984 in Tokyo, lives and works in Paris and Tokyo.

Tokuyama is a self-taught programmer and has been involved in art, audiovisual, and architectural projects. He's received a scholarship from Fabrice Benetton's Communications Research Center, and held residency by European Network for Contemporary Audiovisual Creation at Le Lieu Unique.

YOSHITO ONISHI

Born in 1986 in Shiga, Japan, lives in Tokyo.

Software and hardware developer.

He has been making minute paintings and digital sculptures using computers.

Even those works are quite complicated, minuteness and photo realistic, he depicts them at close intervals as he is taking real time procedural approach.

He has also collaborated with other famous contemporary artists, dancers and musicians.

He won the Award of Distinction of the Hybrid Art of Prix Ars Electronica 2015 with ARTSAT Project.

NORIMICHI HIRAKAWA

Born in 1982 in Shimane, Japan, lives in Tokyo.

Norimichi Hirakawa's interest lies in the most primitive of technologies, calculation. His work is focused on installations that use either mathematical processing itself as conducted through computer programming or the results of that processing. In 2016, he began creating the series datum at a residency at The Kavli Institute for the Physics and Mathematics of the Universe (Kavli IPMU), and datum was shown at the Toyota Municipal Museum of Art and at a pre-event of the Sapporo International Art Festival. In 2017, he created one of the works in that series through a residency at the ALMA telescope, located at Chile's highest point of approximately 5000 meters and it's awarded as Excellence Award in Art Division of the 22nd Japan Media Arts Festival. He has also participated in creating the work of Japanese artists, such as Ryoji Ikeda and Seiko Mikami, and is the artistic director for ARTSAT: Art and Satellite Project.

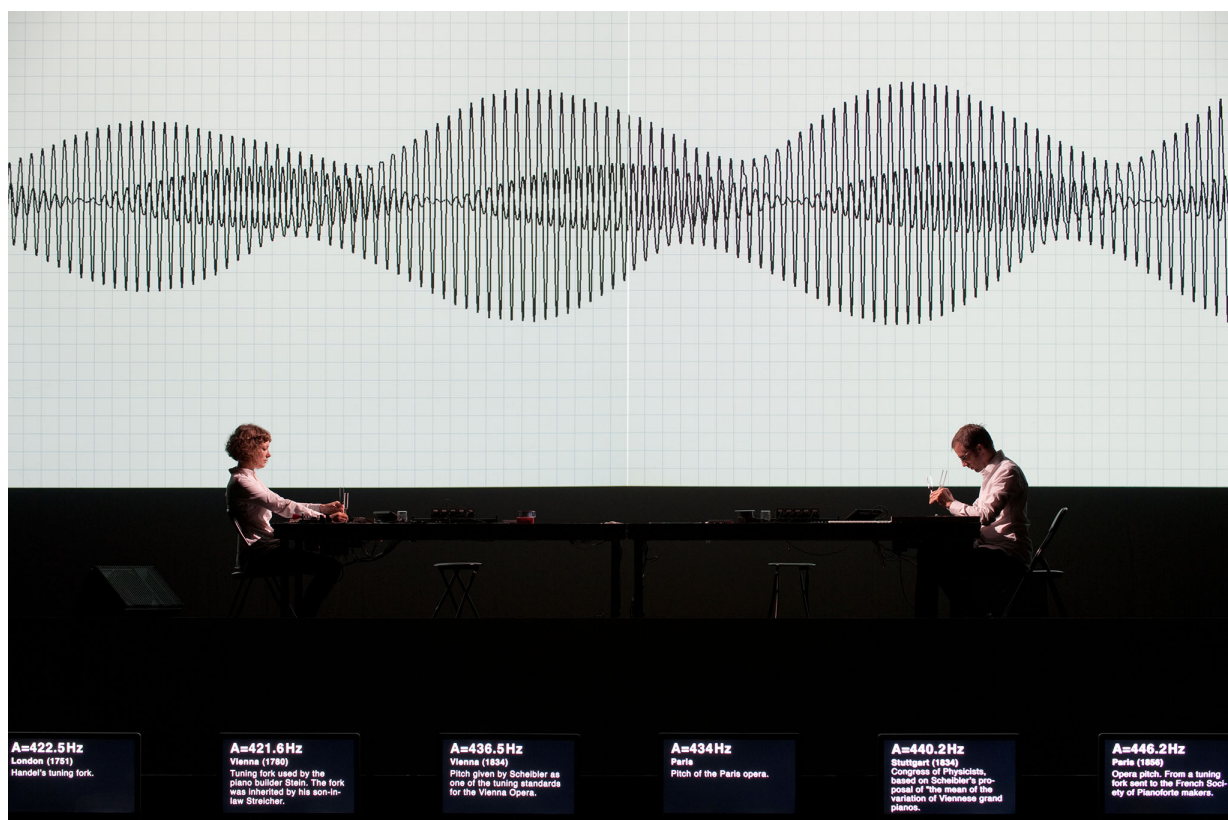
<http://counteraktiv.com/>

SIMON MACCOLL

Born in Kirkcaldy, Fife, Scotland; based in London as a freelance production manager.

MacColl started doing lighting for school concerts at the age of 15, and played in bands from the age of 17. He studied Theatre Studies at college in Nottinghamshire, and moved in to theatre work in 1993.

He is production manager for Ryuichi Sakamoto and Ryoji Ikeda and has worked on several tours with Ólafur Arnalds, Grace Jones among others, as well as for the Green Man Festival, London International Festival of Theatre, Inbetween Time Festival, Bristol, International Dance Festival Birmingham and Frieze Art Fair Projects 2013.



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