

inSonic 2018:

symposium, podiumsdiskussionen,
konzerte

festival

algorithmic spaces

7.–8.12.2018

 **zkm karlsruhe**

Stifter des ZKM



Baden-Württemberg

MINISTERIUM FÜR WISSENSCHAFT, FORSCHUNG UND KUNST



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Kooperationspartner

algorithms that matter

Im Rahmen von

interf^{aces}



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program overview

fri 7.12.2018

session I: artist talks

Lecture hall, Admission free

| | | |
|-------|------------------|---|
| 14:00 | Quadrature | Artistic Interpretation of Extraterrestrial Noise using Artificial Intelligence |
| 15:00 | Marco Kempf | Algorithmic nations – and why there is no space for that |
| 15:30 | Damian T. Dziwis | Me against the machine |
| 16:00 | Panel discussion | |

concert |

Cube, Entry 10,-/7,-,
Free Entry for Participating Artists/Speakers

| | | | |
|-------|--------------------|------------------|--|
| 20:00 | Quadrature | LGM#2 | Audiovisual multichannel performance with LEDs |
| | Anemone Actiniaria | Live performance | |
| | Ya-Wen Fu | Alive | Mixed Media installation and performance |
| | Tom Mudd Gutter | synthesis | Live performance |
| | Mark Pilkington | Hidden Forest | Algorithm with live electronics |
| | Florian Hartlieb | Verzweigung | Fixed Media |

sa 8.12.2018

session II:

algorithmic spaces

Lecture hall, Admission free

| | | |
|-------|-------------------|--|
| 10:00 | Tom Mudd | Interacting with nonlinear dynamical agents |
| 10:45 | David Pirrò | Threading time |
| 11:30 | Jonathan Reus | Wordweaving |
| 12:15 | Hanns Holger Rutz | Condensations of Algorithmic Spaces |

installation tour

Admission free

| | | |
|-------|--------------|---|
| 14:00 | Wilfred Amis | Music to Walk Through #1: Euclid's Algorithm |
| | Marco Kempf | DeepWorld |

sa 8.12.2018 session III: hands-on demonstrations

Cube, Admission free

| | | |
|-------|------------------|-------------------------|
| 15:00 | Garth Paine | Future Perfect hands-on |
| 16:00 | Dan Wilcox | Zirkonium hands-on |
| 17:00 | Panel discussion | |

concert II

Cube, Entry 10,-/7,-,
Free Entry for Participating Artists/Speakers

| | | |
|---|-------------|---------------------------------|
| 20:00 | Garth Paine | Future Perfect (2018, Premiere) |
| <u>Interactive performance for immersive ambisonics, smartphones and film</u> | | |

inSonic@night

Music Balcony,
Admission free

| | | |
|-------|---------------------------|-------------------|
| 21:00 | with live performances by | |
| | Slow Reading Club | SUPERDECADENCE |
| | Damian T. Dziwis | The Cargo Cult |
| | Lintu | Live set |
| | VJ: A-li-ce | afterwards DJ-Set |

preface

From 7.–8.12.2018 the third edition of the festival inSonic will take place at the ZKM. inSonic is a showcase for genre-overlapping artistic discussions with new media technologies and innovative artistic concepts, which will be elaborated within the framework of lectures, hands-on demonstrations, concerts and live performances. Machine-learning algorithms in space- and time-based media, data sonification and visualization as well as algorithmic processes for spatial sound generation: In 2018, the festival inSonic will negotiate and critically discuss the topics of algorithms and big data, to what extent algorithms have long since penetrated both socially relevant everyday processes and the media arts above and below the public radar. The new audiovisual performance LMG#2 by the artist collective Quadrature (Juliane Götz & Sebastian Neitsch) was created during a three-year #bebeethoven scholarship at the ZKM and works with parameters based on the data of rotating neutron stars, so-called pulsars. The algorithmic improvisation duo Anemone Actinaria (Hanns Holger Rutz & David Pirrò), which works with coupled computer systems and semi-autonomous agents, presents a new live performance. In the run-up to inSonic 2018: Algorithmic Spaces, the ZKM in cooperation with the research project Algorithms that Matter (ALMAT) at the IEM Graz have called for submission of works dealing with the spatiality of computational processes. As a result of the Open Call, fixed media compositions and live performances by Ya-Wen Fu, Tom Mudd, Mark Pilkington and Florian Hartlieb will be performed, all of which use generative processes to create space. A highlight of inSonic 2018: Algorithmic Spaces is the world premiere of Future Perfect, which will be presented on the second event evening in the ZKM Cube. Garth Paine, media artist and sound researcher, was a guest artist at the IRCAM (Institut de Recherche et Coordination Acoustique/Musique) in Paris and at the ZKM in 2018 and developed Future Perfect, an immersive 3D video performance for High Order Ambisonics and Virtual Reality for smartphones. Paine's newly developed performance system can also be tried out by festival visitors in a hands-on demonstration on Saturday afternoon. At the end of the festival, live performances by Slow Reading Club, Lintu, Damian T. Dziwis, Alexandra Cárdenas and A-li-ce will be presented on the ZKM Music Balcony. The festival will be accompanied by a two-day symposium during which the positions of the participating artists will be discussed, as well as new artistic-scientific debates on the subject of algorithms and spatial sound.

fr 7.12.

session I
artist talks ^{Lecture Hall}

Data recorded by radio astronomers is traditionally reproduced acoustically rather than purely visually. The generated sounds are some of the oldest sources we'll ever hear. For example, the noise of the cosmic background radiation is only slightly younger than our universe itself. They are also among the strangest of all sounds, whose origins are not from our world. Nevertheless, their acoustic reproduction is based on the same regularities as all sound generation and can therefore be described and investigated with the same categories. How will contemporary methods of data handling respond to these extraterrestrial frequencies? Will neural networks recognize familiar elements in the unknown? Machine learning and artificial intelligence search for human patterns or communication signals in these foreign, archaic frequencies.



Space is usually defined by its boundaries and creative processes are often accompanied by the crossing of boundaries. The application of neural networks often raises the question of how boundaries have been defined and the status quo of the data set. DeepWorld is a collection of “artificial countries” generated by neural networks that use data from around 195 existing countries to generate new anthems, flags, and other national descriptors. The results of this process will reflect on our relationship to national identities and examine the patterns and issues that emerge today from broad processes of algorithmic generalization. With this project we are also investigating the human and social biases that are invisibly passed and re-encoded in artificial networks. But by moving within these limits of bias and the “borders” of understanding, we may be in danger of overlooking creative solutions. Is it possible to create new perspectives based on real data? Is it possible to project a kind of new utopia, or do we run the risk of being forced into submission by economic efficiency and statistical models? In his lecture, Kempf will discuss such questions and talk about his installation DeepWorld.



15:30 Damian T. Dziwis Me against the machine

Even though all kinds of algorithms, machine learning and neural networks have been used in artistic practice for years, we are still claiming the “threshold of originality” for ourselves. Although even highly developed artificial intelligence algorithms are still limited in terms of creativity and, of course, their free will yet – being used in art projects they are responsible for many important decisions and having a large influence on the final results. Damian T. Dziwis, composer and engineer, talks about his practice using algorithms and the constant fight to keep the upper hand in the collaboration or leaving it all to the machine.

Afterwards: Open Panel Discussion



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sa 8.12.

session II
algorithmic spaces^{Lecture Hall}

session III
hands-on^{Cube}

10:00

Tom Mudd

Interacting with nonlinear dynamical agents

Interactions with musical instruments can be viewed through the lens of nonlinear dynamical systems. Musical interactions can be thought of as the governance of trajectories through the specific phase space instantiated by a particular system. In this talk, Tom Mudd will look at these processes at play in interactions with acoustic instruments such as violins or clarinets, and in his own digital synthesis work implemented in the Gutter Synthesis project, to be performed as part of the Friday concert program. Examining interaction in terms of the specific materiality of algorithms (whether physical or digital) helps to make a solid connection across the divides between the material nature of musical tools, the affordances, capacities and tendencies of these tools, and the specific manifestations of interactions in musical practices.



10:45 David Pirrò Threading time

The most common narratives relegate algorithms to the role of solution givers; given a problem or a question and while possibly hiding its own operation, an algorithm is equal to the function of an (immediate) answer provider. Still, algorithms need time to perform. They are entities which step through time, traversing and consuming it. Pulling apart the start and end points, between problem and solution a space/time exists in which algorithms act and leave signs of their steps, the marks of their passing. Listening to those stitches and threads means to re-construct the fabric of a space proper to an algorithm's behaviour. In this talk, departing from his own artistic practice, David Pirrò will try to exemplify how such spaces could be made sensible.



A series of horizontal lines for writing or drawing.

11:30 Jonathan Reus Wordweaving

Jonathan Reus will present some traces of his current research as part of Algorithms that Matter. What follows is a lecture-performance of in situ research, enacting work that is in progress and openly improvisatory, exploring a collage of computational speech analysis, live coding, memory and storytelling.



A series of horizontal lines for writing, starting from the pencil icon and extending across the page.

The iterative nature of algorithms, their provisions of repetition and the possibility to rerun them, lead to a straight concept of algorithmic space, as the breadth and organization of all the forms they are able to produce. But with the infinity of this production, we would be rather left with a desert for which a strategy of selection, orientation and inhabitation must still be found. Perhaps then, it would be more useful to look at algorithmic agency as defining another type of a space, where particular ways of condensation occur at the interface between human and machine.



sa 8.12.

session II
algorithmic spaces Lecture Hall

session III
hands-on Cube

**15:00 Garth Paine & Future Perfect hands-on
Benjamin Matuszewsk**

In this workshop Garth Paine will introduce his Future Perfect playground which allows him to compose, perform and spatialize sound across the audiences cell phones. The system includes dynamic updating, triggering of sounds, VBAP spatialization and a granulation engine. Benjamin Matuszewski from IRCAM presents the software framework and then Paine will discuss some of the compositional techniques he has developed for his work Future Perfect using the system and the ability to build up multithreaded polyphony on a single phone. The system is extensible for any number of phones depending on the network capability. The system was developed at IRCAM as part of a research residency in 2018 supported by the Sound Music Movement Interaction research group, IRCAM. The research residency was co-hosted by IRCAM/ZKM.



A series of horizontal lines for writing, starting from the pencil icon and extending across the width of the page.

16:00 Dan Wilcox Zirkonium hands-on

This workshop provides an overview of Zirkonium 3.4, the latest version of ZKM | Hertz-lab’s sound spatialization software environment. A sound server, trajectory editor, and sequencer rolled into in one, Zirkonium abstracts physical speaker layouts and atomically pans sound sources based on their position which can be moved over time, either through automated interpolation or direct control over a network connection. Emphasis will be placed on hands-on use (time permitting), so bring a laptop and some pre-recorded material you would like to try out on ZKM’s 47-channel Sound Dome. 10 participants (although more can watch/listen)
Conducted by Dan Wilcox, artist & ZKM | Hertz-lab Software Developer

Afterwards: Open Panel Discussion



A series of horizontal lines for writing notes.

installations ^{Music balcony}

Wilfred Amis

**Music to Walk Through
#1: Euclid's Algorithm**

In this piece Euclid's algorithm (an early algorithm for determining the greatest common divisor) is sonified as a process in a corridor such that the listener walks through the algorithm. The pairs of integers returned at each step through the algorithm's while-loop are translated into sine tones that are harmonics of a common fundamental (48 Hz). The purely harmonic pitch language is chosen because it is prescribed by universal physical laws rather than Eurocentric conventions. The added result of this choice of pitch language is that the tones blend together to create a seemingly singular tone in the space that is shaped by the listener's movement through the space.

The piece is a static object within the space; each sine tone is static and each speaker is static. The movement is created instead by the listener, who walks through the music at their own pace, creating their own unique structure. The acoustics of the room itself should bring the sounds to life, adding imperfections to an otherwise perfect harmonic sound. If set up as an installation there are five movements that would be cycled through, changing movement every half-hour. These five movements are the results of the five lowest summed pairs to have 9 steps. The first of these is (89,55) a consecutive pair of Fibonacci numbers who return a descending Fibonacci series through the steps through the while-loop. These 9 steps plus the starting position make 10 pairs, therefore 20 speakers.

Marco Kempf

DeepWorld 2018

DeepWorld is a compilation of "artificial countries" generated by neural networks which used data of all existing countries (around 195) to generate new anthems, flags and other descriptors. The project is a hybrid of critical reflection on national identities in combination with practical research in deep learning applications, such as Generative Adversarial Networks (GAN) and Recurrent Neural Networks (RNN). This generated "world model" acts less as utopian alternative to our physical world, than as a view of our world from the "eye" of an alternative intelligence.

concerts program notes

fr 7.12. 20:00
concert I^{Cube}

sa 8.12. 20:00
concert II^{Cube}

sa 8.12. 21:00
inSonic@night^{Music Balcony}

The audiovisual performance LGM#2 is based on an extensive database of pulsars from the Australian National Telescope Facility. The extremely fast rotations and strong gamma rays of these exotic celestial bodies are transformed into clicks, sine waves and light, exploring the rhythms and wavelengths of these pulsating sources of radio emission for aesthetic patterns and harmonies. The minimalistic multi-channel piece follows stringently the specifications of the currently known 2659 pulsars. When discovered in 1967, the precision and apparent artificiality of the received signal led the researchers to nickname the unknown phenomenon LGM 1, for “little green men”. Over three movements, Quadrature’s interpretation builds an increasingly dense space of sound and light in honor of these metronomes of the universe. In collaboration with soundartist Kerim Karaoglu.

LGM#2 was created as part of the #bebeethoven fellowship program, a project by PODIUM Esslingen on the occasion of the Beethoven anniversary 2020, funded by the German Federal Cultural Foundation. ATNF Pulsar Catalogue (www.atnf.csiro.au)

Anemone Actiniaria Algorithmic improvisation performance

Anemone Actiniaria is an algorithmic improvisation duo founded by Hanns Holger Rutz and David Pirrò. In it, they algorithmically couple computer systems and introduce semi-autonomous agents. As artistic research project, the seemingly well-defined concept of algorithm is subject to a new reading based on material agencies. Mutual observation and overwriting is initiated between our systems, Wolkenpumpe (aka Sound Processes) and Rattle, rooted in physical modeling and in the generation of parametric models based on machine learning. This is inspired by the notion of an emergent new machine through “orientation” and “composition” as outlined by Heinz von Foerster and Dirk Baecker, whereby the functions of operators and operands of the formerly separated systems begin to vacillate.

Ya-Wen Fu seeks to discuss the issues about the definition of the human body and the relationship between an individual body and external surroundings in her artworks. As Maurice Merleau-Ponty describes: "The human body inhabits in space; moreover, it itself is an expressive space." In Yan-Wen Fu's opinion, body movement is not like playing a musical instrument. Playing a musical instrument is more like using an object detaching from us. However, by creating movement in a body, we are also having conversations with it, by which we try to hurdle and define our surroundings. Which means that not only are our behaviors in daily life related to time and space or culture and society, they are also connected with the conditions and experiences of our body. In this artwork Fu tried to construct an apparatus with which her body extends itself into the room. Using tension springs and movement she creates an interactive space. The tensioned springs show how the surface of the body extends in different lines. There is no intentionality in her movements. She also did not imagine the appearance of the specific ways the movements and mechanisms would be combined. But her body produces a continuous dialogue between the apparatus and the room.

Tom Mudd Gutter **synthesis** 2018 Live performance

Gutter synthesis consists of a number of interacting agents, each of which is a resonant nonlinear dynamical system that exhibits its own complex behaviour. Combining multiple voices creates emergent effects as the different systems exert a strong influence on each other, tethering their development so that they cluster around certain frequencies, timbres, and behaviours. Each speaker in the space is an individual synthesis voice, allowing the movement among the voices to be tracked, and the interactions and between neighbouring voices to be heard.

Mark Pilkington **Hidden Forest** 2018
Algorithm with live electronics

Hidden Forest combines algorithmic sound and visuals diffused over a multi-channel speaker array and dual screen. An imaginary forest acts as an ecosystem inhabited by entities whose presence is sensed through the movement of light and sound. Its through an appliance and identity of

movement that allows us to comprehend their embodied existence in a spatial-temporal field. An EMS VCS3 synthesizer provides rich analogue sounds controlled by an algorithmic framework. The synthesizer's unique semi-modular design and wild/chaotic character portrays a disruptive link within the flow of the piece, while its tactile embodiment extends algorithmic space. The performance amplifies our senses to raise awareness of how the coexistence of natural and algorithmic space interacts to bring about social change.

Florian Hartlieb Verzweigung 2018 Fixed Media

The piece *Verzweigung* is the symbiosis of five sound plants, which are in a constant musical movement, represented by the development of concrete sound to abstract sound mixture. If the respective “plants” are still to be assigned individually at the beginning, they grow farther and farther in the course of the piece into a shape. They crawl away, meet and move away, make ramifications and “overgrow” the area. Each sound plant consists of dynamic changing field recordings, divided into 12 delay channels, with different delay times and harmonic frequency shifts. Based on different algorithms, these frequency shifts generate sound spectra, that are different for each plant. This results in an acoustic space, which is in a constant motion and seems to communicate permanently with each other.

concerts program notes

fr 7.12. 20:00
concert I^{Cube}

sa 8.12. 20:00
concert II

sa 8.12. 21:00
inSonic@night^{Music Balcony}

Garth Paine Future Perfect (world premiere)

Interactive performance for immersive ambisonics, smartphones and film

Future Perfect is a 46 minute musical journey. It consists of an immersive 360° ambisonic score composed from field recordings made in urban parks and cities in Paris and Karlsruhe and the baritone voice of Gordon Hawkins, performing the James Joyce poem, All Day I Hear the Noise of Waters. The 46 minute score is augmented by interactive sound performed on the audience's smartphones and a full length film. The work will be released in 2019 as a virtual reality experience. Future Perfect explores notions of the construction of nature and how the urban park exists as a kind of interstitial space, neither city nor nature but simultaneously both. A construction of the city where we appreciate the qualities of nature.

Instructions for Smartphone use: Please place your phone in airplane mode and then turn on WiFi. Log onto the WiFi network FuturePerfect. Open a web browser and type: "fu.tu.re". Tap the welcome screen, mark your seat and submit. Turn up your phones volume to almost full – ensure your phone is not muted. You are now an active loudspeaker in the space.

concerts program notes

fr 7.12. 20:00
concert I^{Cube}

sa 8.12. 20:00
concert II

sa 8.12. 21:00
inSonic@night^{Music Balcony}

Slow Reading Club SUPERDECADENCE 2018

SUPERDECADENCE is to choose everything. A sound, video, and reading format blueprinted by Slow Reading Club. Performing the devouring of two once-separate works: dance piece Indispensable Blue (2016, Bryana Fritz) and sound piece Stanzas or the Law of the Good Neighbour (2017, Henry Andersen). Meetings in supine spaces, encroaching limbs, compulsive graspings, singing flesh. SUPERDECADENCE is an experiment in radical hospitality, a text in practiced deauthorship, burying the edges. Hungdrawn from their hoverplaced on various computer hard drives, these materials become digital remnants of many other possible “finished” works. SUPERDECADENCE my private, ambient materials: spit forth and superimpose. SUPERDECADENCE me a slackening space where excesses flourish in the screening blare.

Lintu Live set

Lintu is an electronic sound artist whose music is defined by electric glitches and ritualistic repetition. On cosmic waves, cold voices seem to be singing, humming and moaning in subdued melancholia. Tribal percussion often builds the backbone of Lintu’s performances that lead listeners into hypnotic trance.

Damian T. Dziwis The Cargo Cult 2018

During the Second World War, the natives of Melanesia developed a religious cult based on their observations of the American soldiers stationed there; which received food, clothing and all sorts of goods from cargo planes – a religious cult in which they imitated the behaviour of air traffic controllers and radio operators after the withdrawal of the military, functionless and senseless imitations of runways, towers, signal fires and seen objects; always in the hope that the new gods would continue to reward them with precious gifts. Thus “cargo cult” became a metaphor for questionable symbolic actions without a conscious causal connection to expected results. In our digital world, the “cargo cults” are omnipresent in symbolic actions towards big data networks, search engines or social media algorithms; in the hope that the new “digital gods” will reward one with more reach, likes, better rankings or scores – be it through (independently) acquired behaviour patterns or following the prophecies of social media and SEO gurus. The Cargo Cult stag-

es this seemingly spiritual dialogue as an interaction with an independently programming artificial intelligence, resulting in a live coding performance with auditory and visual artifacts.

VJ: A-li-ce

Im Anschluss: DJ-Set

biographies

Amis, Wilfred

Composer studying at The Royal Conservatory in the Hague, after a BSc in Maths & Music at the University of Leeds. Especially interested in minimal and experimental electronic music, working in computer music, analogue synth music, field recording and plunderphonics, as well as writing chamber and orchestral music.

Dziwis, Damian T.

Damian T. Dziwis was born 1986 in Chorzów (Poland). The Düsseldorf based composer and engineer creates the majority of his transmedial work with generative algorithms and artificial intelligence. He began his artistic education in instrumental composition under David Graham, followed by electronic composition under Christian Banasik and finalized it with his master studies in electronic composition under Michael Beil in Cologne. Damian's compositions were played at various festivals, for example the Music Tech Fest Stockholm, the CTM Festival in Berlin, Beethoven Fest Bonn, the ACHT BRÜCKEN festival in Cologne or the die digitale festival in Düsseldorf. Beside his musical works he's doing a PhD in virtual acoustics and develops applications for art expression which were published at conferences like ICMI – “innovative computer-based musical interfaces” and TEI – “tangible, embedded, and embodied interaction”.

Fristot, Claire // A-li-ce

A-li-ce (Berlin – FR) works as a video artist and as a VJ since 2005. Interested in identities and memory issues, she uses different techniques such as drawing, animation and video in order to create her hybrid live collages in motion. A-li-ce has showcased her work on the international scene (Mira Festival (ES), RoBOt Festival (IT), Mapping Festival (CH), B-Seite (DE), CAMP Visual Music Festival (DE) among others. She works currently with the music composer Robot Koch (DE) and with Ensemble/Parallax (USA). Engaged in transmission, she teaches in art institutions and universities across Europe, leading courses

about live video creation processes. In Berlin, she is part of the art curation team Scope Sessions, and co-founded in 2017 the VJ Open Lab community which offers a monthly meeting to the media artists in the audiovisual art space Spektrum. She also runs there the Women VJ Program to bring more female artists into the visual performing field.

Fu, Ya-Wen

Ya-Wen Fu was born in 1980 in Taiwan. The central point of her work states the relationship of body and space. This relationship is grasped by Ya-Wen not only through the description of a subject and its surroundings, but by a differentiated conception and critical analysis of the subject in space. She poses questions about the space in which you feel and act, the space in which the self that perceives exists and likewise where this self begins in its surroundings. In her performances, Ya-Wen Fu acts as a real person presenting themselves in a showroom. When other performers might present their subjects by completely exposing their bodies while also exposing the vulnerability of their egos, Ya-Wen Fu covers herself with and is held by a protective construction. These constructions are extended gadgets that function clearly as expansions derived from the human body. These figures presented in her performances demonstrate seemingly half-human sculptures. At first glance, these gadgets appear like protection mantles or armour. With a closer look, this first impression inverts itself into its opposite. Ya-Wen Fu demonstrates the idea in her animated sculpture, that, from her point of view, your own body is never free from social imprint and constrains.

Hartlieb, Florian

Florian Hartlieb born 1982, is a german composer and multimedia artist, based in Bochum/Germany. He explores the concept of multi-dimensional sonic spaces, which leads to the aesthetic goal of a sculptural music. Hartlieb studied composition at the Folkwang University of the Arts in Essen and at the University of Music

and Performing Arts Vienna. He was awarded with first prizes at the international composition competitions *Jeu de Temps/Times Play* (JTTP 2009) and European Erasmus Composition competition (2013). His works have been played on festivals and conferences worldwide. Since 2013, Hartlieb is the leader of the Master Programme “Professional Media Creation (M.A.)”, offered by the Folkwang University of the Arts in cooperation with SAE Institute.

Kempf, Marco

Marco Kempf works at the interface of physical computing, creative coding and electroacoustic composition in the field of spatial sound. He graduated from the Department of Media Arts and Sciences at the Darmstadt University of Applied Sciences with a thesis on the artistic use of brain-computer interfaces. Kempf studies media art at Karlsruhe University of Arts and Design and is an active member of the research group on Artificial Intelligence and Media Philosophy (KIM).

Lintu // Naumtsik, Julia

Lintu is based in Karlsruhe and born in the former Soviet Union. She started to absorb music after she got in touch with several electronic producers and musicians. Lintu was part of the previous Interfaces event *Next City Sounds* in 2018 where she performed together with Røyk. Other appearances include *Algorave 2017* and *NIL #5*. She is also a member of the noise project *Ligne Claire* with whom she played several shows in the past years.

Mudd, Tom

Tom Mudd is a musician and programmer interested in relationships between software, composition and improvisation. He is a lecturer in creative audio programming and computer music systems at the University of Edinburgh.

Paine, Garth

Dr. Garth Paine (AU/USA) is a composer, performer and scholar. He created interac-

tive responsive environments where the inhabitant generates a soundfield through presence and behavior and composed many music scores for dance, generated through realtime video and bio-sensing. He has received numerous awards for his music and research. Garth is a researcher-artist in residence at IRCAM/ZKM, developing the performance work, *Future Perfect* for spatial audio, smartphones and VR. Garth established the VIPRe lab and is internationally regarded as an innovator in interactive performance. He gave the NIME2016 keynote outlining a framework for digital music instrument design and a keynote at 2014 *Ecomusicologies*. Dr. Paine is a Professor of Digital Sound and Interactive Media at Arizona State University.

Pilkington, Mark

Dr. Mark Pilkington is a composer and performer of electroacoustic music. His practice encapsulates both sound and image as a means to extend spatial imaginings between real and virtual space. The coupling of sound and image are applied to electroacoustic music, installation and screen-based works. His practice especially focuses on audio-visual composition using real and virtual entities as a means to explore time and space. He has performed and screened his work at ICMC, ARS Electronica, ZKM | Karlsruhe, xCoAx, MANTIS festival and the Open Circuit Festival.

Pirró, David

David Pirró is a sound artist and researcher based in Graz, Austria. His works include interactive compositions and sound installations as well as audiovisual and electroacoustic pieces in which aspects of performance and spatialisation of sound are central. Departing from a radical inclusive point of view, he seeks ways of composing by which the work of art is constructed through mutual interaction of all agents involved in its performance. Since 2007 David works as lecturer and researcher at the IEM (Institute of Electronic Music and Acoustics) in Graz, Austria. He has been part of scientific and artistic research projects on

sonification, sound spatialisation and interaction design. He holds a PhD in Computer Music from the University of Music and Performing Arts Graz. Currently he is one of the principal investigators of the artistic research project Algorithms that Matter.

**Quadrature // Götz, Juliane
Neitsch, Sebastian**

Quadrature has been dealing with the methods people use to explore the cosmos for quite some years now. The universe serves the duo as an intangible but real space that evokes both the most basic emotions and the most advanced scientific theories. The works of the Berlin based artists include audiovisual performances as well as kinetic installations and prints. They received several awards and scholarships for their artistic work, including honorary mentions with the Prix Ars Electronica, scholarships from Kunstfond Bonn and Akademie Schloss Solitude. Their works are presented internationally at festivals, galleries and museums, such as the Ars Electronica Museum Linz and Künstlerhaus Wien in Austria, PERMM in Russia, the Modern Art Museum Santralistanbul Istanbul or BIAN Montréal.

Reus, Jonathan

Jonathan Reus (US/NL) is an electronic musician and artist-engineer who uses an archeo-folk (archeological-folkloric) approach to new music and media performance. His work is cross-disciplinary and research-based, remixing concepts and cultural objects from multiple fields of music, mathematics, scientific epistemology and fantasy into open-ended retellings and musical frameworks. Jonathan is co-founder of the instrument inventors initiative (iii) in The Hague, and is active as a curator (STEIM, Transmediale, Stroom Den Haag). He received a W. J. Fulbright fellowship for his research into new digital instruments for music, and has developed art-humanities curricula on themes such as live coding, hardware design-as-composition, computational ontology and software studies.

Rutz, Hanns Holger

Hanns Holger Rutz, born 1977 in Germany, is a sound artist, composer, performer, researcher and software developer in electronic art. His work is comprised of sound and intermedia installation, live improvisation and electroacoustic composition, in all of which the development and research on software and algorithms plays an important role. Rutz lives and works as a freelance artist and researcher in Graz, Austria. He currently runs, conjointly with David Pirrò, the artistic research project Algorithms that Matter (FWF PEEK).

**Slow Reading Club | xSRC // Andersen, Henry
Fritz, Bryana**

Slow Reading Club (SRC) is a semi-fictional reading group initiated by Bryana Fritz and Henry Andersen in late 2016. The group deals in constructed situations for collective reading. SRC looks at, probes, and interrupts “readership” as a way to stimulate the contact zones between reader and text, text and text, reader and reader. Slow Reading Club premiered at kunstenfestival-desarts 2017, in Brussels as part of an evening titled “Before the Codes”. Since then they have presented work in a number of performance, art, and discursive contexts: How Do Buildings Care? (La Loge, Brussels), Bâtard Festival 2017 (Beurschouwburg, Brussels & Veem House for Performance, Amsterdam), Whose Organs Were Those of a Leopard (Louise Dany, Oslo), The Tyranny of Distance (ESBA TALM, Angers), Reframing the House of Dust (CalArts, California), and Horizon Sucker (as part of “Montez Radio”, MOMA PS1, New York). The group is currently in residence with the Art by Translation postgraduate program. They split their time between Brussels and its various elsewhere.

Wilcox, Dan

Dan Wilcox is an artist, engineer, musician, performer who combines live musical performance techniques with experimental electronics and software for the exploration of new ex-

pression, often through themes of science fiction, space travel, cyborgification, and far futurism. His father was an aerospace engineer, he grew up in the “Rocket City”, and has performed in Europe and around the US with his one-man band cyborg performance project, robotcowboy. Dan currently lives in Karlsruhe, Germany and is a software developer & artist for the Hertz-Lab (former Institute for Music & Acoustics) at ZKM.

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Brochure

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