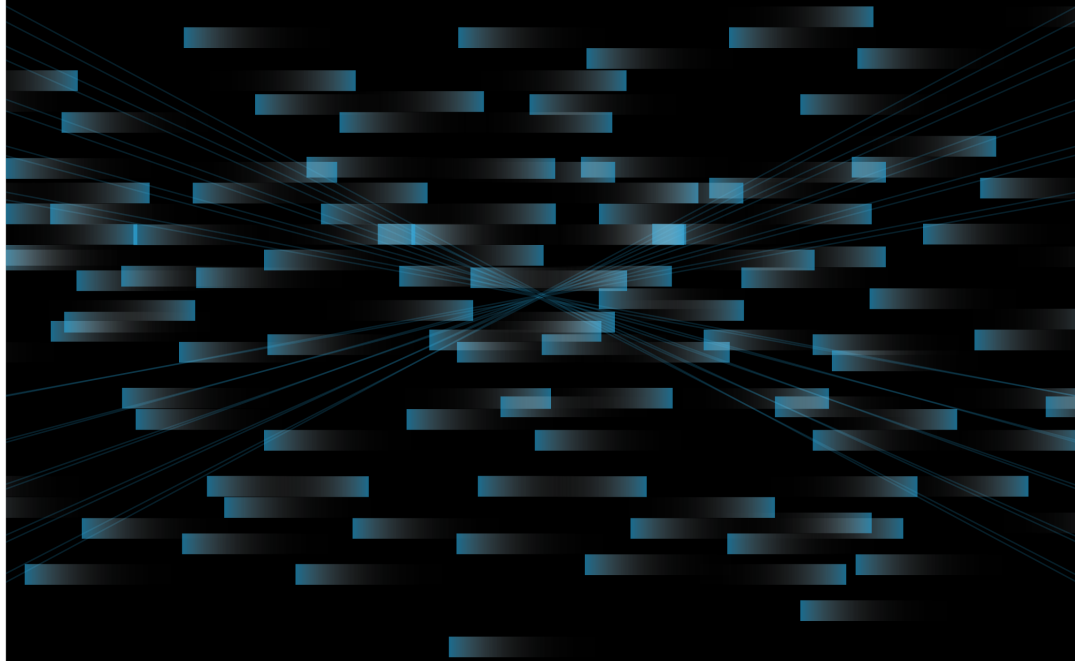# NOWNET ARTS

2018 CONFERENCE

NETWORK MUSIC:
ARTISTIC & TECHNOLOGICAL
STRATEGIES FOR PUBLIC &
PRIVATE NETWORKS

APRIL 19 - 22, 2018
www.nownetarts/conference

INSTITUTE FOR ADVANCED COMPUTATUONAL SCIENCE
STONY BROOK UNIVERSITY

With sponsorship from
Consortium for Digital Arts, Culture, and Technology (cDACT) and
New York State Education and Research Network (NYSERNet)

NOWNET ARTS CONFERENCE 2018
Network Music: Artistic and Technological Strategies for Public and Private Networks
April 19-22, 2018

Institute for Advanced Computational Science (IACS), Stony Brook University, New York USA

WITH REMOTE PRESENTATIONS FROM SITES:
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KEYNOTE SPEAKER
Ann Doyle, Community Engagement Manager, Higher Education and Cultural Programs, Internet2

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info@nownetarts.org
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NOWNET ARTS CONFERENCE 2018
Network Music: Artistic and Technological Strategies for Public and Private Networks
April 19-22, 2018

NARRATIVE

Network Music utilizes the internet as a contemporary artistic medium for musicians on both localized networks and geographically spatialized networks. Network Music has proliferated in recent decades in forms for live performance such as telematic ensembles, laptop ensembles, virtual world collaborations, and multidisciplinary work. Artists and technologists in this medium have utilized Internet2 and its international partner networks to achieve live concert-quality productions locally and globally, especially requiring the high-bandwidth and quality of service provided by these networks. Internet2 and its partners are largely available at large research universities so the medium has remained mostly in this research sphere. With the rise of availability of high-bandwidth public networks, Network Music is at a juncture where the medium can become more accessible to the public through a wider range of universities and contemporary arts venues, while the advancements of Internet2 and its partners continue to provide state-of-the-art opportunities to artists and technologists. "Network Music: Artistic and Technological Strategies for Public and Private Networks" aims to identify artistic and technological strategies for various degrees of these networks in order to determine tiers of Network Music capacities based on factors such as bandwidth, quality of service, system configuration, venue space, and location. The host site IACS provides an exceptional hub for this topic with a 100Gbps Internet2 network, while the event will connect with remote sites of wide-ranging networks. The conference will feature in-person and remote presenters for research papers, workshops, presentations, and concert demonstrations.

NOTES:

NOWNET ARTS CONFERENCE 2018
Network Music: Artistic and Technological Strategies for Public and Private Networks
April 19-22, 2018

DAILY SCHEDULE

THURSDAY APRIL 19

12:00PM Registration

12:30PM Welcome Session

1:00PM Presentation: Exploring interactive music production over public and private networks

Presenters: Trond Engum, Otto J Wittner

2:00PM Workshop: Strategies for exploiting unstable networks

Concert Presentation: Phase Not Phase II for two contrabasses

Presenter: Rebekah Wilson

3:00PM Paper: Through a Window: A networked music composition for 4-6 instruments and electronics

Presenter: Naithan Bosse

3:30PM-6:00PM Break

6:00PM Concert Demonstration: SpinStack

Presenter: Michael Richison

7:00PM Presentation: Evaluation of Network Music Technology on Public and Private Networks

Presenters: Chris Chafe, Trevor Henthorn, Sarah Weaver

Remote from Center for Computer Research in Music and Acoustics at Stanford University, Individual Location in Tokyo, and Onsite

8:00PM-10:00PM Presentation: "Spirits of Water" and the Maneuvering of Time/Space Divergence in Internet

Performance

Presentation: Networking and Korean Music across the Globe

Presenters: Yoon Jeong Heo, Hilary Finchum-Sung

Remote from Seoul National University, College of Music, Department of Korean Music

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FRIDAY APRIL 20

9:30AM Paper: Preparing for Performance in Cyberspace via LoLa

Presenters: Tania Lisboa, Pétur Jónasson

Remote from Royal College of Music, London; Belle Shenkman Studios

10:00AM Paper: Jamming in the 3rd Room: Experiences of remote 'virtual' real-time recording sessions

Presenters: Paul Ferguson, Zack Moir, Gareth Dylan Smith, Joe Bennett

Remote from Edinburgh Napier University, Scotland

11:00AM Presentation: Music Without Borders and MIRCO

Presenters: Maria Minaricova, Paolo Girol, Kristina Lillemets

With Hrachya Astsatryan, Aram Mirzoyan, Simon Hunanyan

Remote from National Academy of Sciences of the Republic of Armenia

Innar Järva, *Remote from Estonian Academy of Music and Theatre*

12:00PM-2:00PM Lunch sponsored by NYSERNet

2:00PM Keynote Presentation

Ann Doyle, Community Engagement Manager, Higher Education and Cultural Programs, Internet2, *Remote from Internet2 Offices at Ann Arbor Michigan*

3:00PM Presentation: Online Jamming and Concert Technology, an Online Course

Presenter: Chris Chafe, *Remote from Center for Computer Research in Music and Acoustics at Stanford University*

4:00PM Presentation: Staging Networked Music Performance: Visualization, Scenography, and Dramaturgy

Presenter: Ian Biscoe, *Remote from Individual Location in Miami*

5:00PM-8:00PM Break

8:00PM Concert Demonstration: Tünin, for actuated instrument, animated score and network ensemble

Presenters: Rob Hamilton, John Granzow

Remote from University of Michigan and Onsite

9:00PM Concert Demonstration: Endangered Sound: Improvisation on Internet2

Presentation: Soundmesh Update - Internet2 Improvisation with RTcmix

Presenter: Mara Helmuth

Remote from University of Cincinnati and Onsite

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April 19-22, 2018

SATURDAY APRIL 21

10:00AM-2:00PM Reflections on collaborative telematic music performance and research: A series of presentations, concert demonstrations, and panel discussion
Presenters: Michael Dessen, Mark Dresser, Sarah Weaver, Matthias Ziegler, with Benjamin Burger, Joel De Giovanni, Roman Haefeli, Patrick Müller, Johannes Schütt, Bojan Milosevic, Ernesto Coba
Remote from Zurich University of the Arts and Onsite

2:00PM-4:00PM Break

4:00PM-5:00PM Concert Demonstration: Goldstream Variations (2012)
Presenter: Scott Deal
Remote from Tavel Arts Technology Lab, Indiana University-Purdue University Indianapolis and Onsite

5:00PM-6:00PM Panel: A Greener and More Inclusive Musical Community Through Network Technology
Presenters: Judith Bowman, Scott Deal, Chris Chafe, Scott Miller
Remote from Mary Pappert School of Music at Duquesne University, Tavel Arts Technology Lab at Indiana University-Purdue University Indianapolis, Center for Computer Research in Music and Acoustics at Stanford University, Music Department at St. Cloud State University Minnesota

6:00PM-7:00PM Presentation: Distributed Performance at New York University
Presenter: Tom Beyer

7:00PM-9:00PM Break

9:00PM-10:00PM Concert Demonstration: Intersubjective Soundings 2
Presenter: Doug Van Nort
Remote from DisPerSion Lab at York University Toronto and Onsite

10:00PM-11:00PM Concert Demonstration: Global Loop Orchestra
Presenters: Kenneth Fields, Naithan Bosse
Remote from Central Conservatory of Music Beijing, Telemedia Arts Calgary, Individual Location in Toronto, Conservatory of Music at Brooklyn College, University of California Santa Barbara, and Onsite

SUNDAY APRIL 22

10:00AM-11:30AM Concert Demonstration: Double Brain

Paper: Virtual is Real

Presenters: Marek Choloniewski, Franciszek Araszkiewicz

Remote from Electroacoustic Music Studio at Academy of Music in Kraków

11:30AM-1:00PM Break

1:00PM-2:00PM Concert Demonstration: Virtual Cistern Concert

Presenter: Jonas Braasch

Remote from CRAIVE Lab at Rensselaer Polytechnic Institute and Onsite

2:00PM-3:00PM Workshop/Presentation: Toporhythm - A technique for distributed patterns in pulse-based network music performance

Presenter: Ethan Cayko

3:00PM-4:00PM Presentation: Network Music at Harvestworks

Presenter: Carol Parkinson

Remote from Harvestworks Digital Media Arts Center New York

5:00PM-6:00PM Closing Session

NOWNET ARTS CONFERENCE 2018
Network Music: Artistic and Technological Strategies for Public and Private Networks
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FULL SCHEDULE
THURSDAY APRIL 19

12:00PM Registration

12:30PM Welcome
Sarah Weaver, Conference Director
Margaret Schedel, Conference Committee

1:00PM Presentation: Exploring interactive music production over public and private networks
Presenters: Trond Engum, Otto J Wittner

What will happen when several music production partners collaborate in real time by utilizing an interconnected multi-location sound studio?

Trond Engum is a guitarist, composer and professor of music technology at The Norwegian University of Science and Technology (NTNU), Norway. Engum has a background from bands like The 3rd and The Mortal and The Soundbyte, have released numerous international recognized albums and performed at concerts and festivals since the mid 90's. His main instrument is guitar and electronics.

Otto J Wittner, PhD, works with innovation projects at UNINETT, the Norwegian national research IP network provider, and part time as adjunct associate professor at department of InfoSec and ComTech at NTNU, Norway. Since 2009 he has been project manager of innovation activities within multimedia and contributed to research activities at many Norwegian universities.

2:00PM Workshop: Strategies for exploiting unstable networks
Concert Presentation: Phase Not Phase
Presenter: Rebekah Wilson

Public networks are messy affairs; when navigating them we must address latencies, instabilities, technical anxieties, multiple locations, and multiple authors. Performing together over a network while being located at a distance from each other disrupts our ability to achieve precise musical synchronisation, disruptions which are further exacerbated by the absences and fragmentations of the vital information that we traditionally rely on and communicate with each other for musical synchronisation and flow. For these reasons networked music performance is widely assumed to be a future genre, for when network latencies and throughput improves, or one that is in the present-day reserved for the high-end heavily-optimised networks afforded by institutions and not individuals, or one that is primarily reserved for improvisatory or aleatoric composition and performance techniques. Instead, I hold the view that the constraints of the network create an environment in which new approaches to music performance can be reconsidered, where the performative constraints of networked music performance can be manipulated for musical discovery and realisation and the development of technology can make audible the traces of the network. The unstable latency and the uncertain asynchronous arrival of audio data over the public Internet — often seen as problematic — becomes a medium where

networked music performance offers a rich wealth of emerging potential for new aesthetic compositional approaches. During the workshop I will explore these approaches and their origins and present a real-time performance in collaboration with Nicholas and Tommy: an un-rehearsed read through of a work and subsequent discussion.

Performance: Phase Not Phase II for two contrabasses

Phase Not Phase resolves to intertwine the timbres of two contrabasses, arriving as distinct signals from disparate spaces. Rapid iterations of trills and tremolos resonantly merge, unmerge and oscillate, exposing and manipulating network latency to form unexpected harmonies. Performed by Nicholas Feigenbaum (remote) and Tommy Wu (on stage). Duration: c. 12 minutes

A self-taught programmer and composition graduate from the New Zealand School of Music, Wellington New Zealand, Rebekah Wilson developed an international practice of research and performance using instruments, sensors, video and custom software. Her primary engagement is with the aesthetic opportunities and challenges of sound and technology, avenues she has explored as artistic co-director at STEIM (Amsterdam) and co-founder and technical director of networked audio tech company Source Elements (Chicago). While she has embraced the opportunities of networked communications to travel the world, she recently returned to New Zealand to complete her Masters in Composition with a focus on networked music performance over the public Internet, taking advantage of the extreme distance between the hemispheres to explore aesthetics approaches to networked music performance within the scopes of latency and instability.

3:00PM Paper: Through a Window: A networked music composition for 4-6 instruments and electronics.
Presenter: Naithan Bosse

Through a Window explores the nature of presence in a computer-mediated environment. In this work, sound processing and analysis tools are used during performance to enable site-specific arrangements in which musical elements such as harmony and orchestration are realized uniquely at each location. This site-specific approach is only possible in environments where sound is not shared acoustically between the performers but can instead be manipulated by the computer before reaching the speakers at a remote node. A performer may act as a soloist in one location and be processed to act as a spectral ambience in another. The result is a manifold composition in which many elements are shared between the sites but some are unique to each location. This presentation details several compositional techniques that were employed both to take advantage of the networked setting and to aid in maintaining ensemble accuracy between remote musicians.

Naithan Bosse is a composer, guitarist, and educator from British Columbia, Canada. Currently a PhD candidate in composition at the University of Calgary, his doctoral research focuses on networked music performance, interactive musical environments, and computer-assisted composition. Bosse's compositions have been performed by various ensembles including Standing Wave, Saxophilia, Quatuor Bozzini, the Alan Matheson Septet, and the Phoenix Chamber Choir. His research has received national awards including two Joseph Armand Bombardier Canada Graduate Scholarships.

4:00PM-6:00PM Break

6:00PM Concert Demonstration: SpinStack
Presenter: Michael Richison

"Spin Stack" is a hands-on art and music installation. Participants are invited to build tracks and beats by stacking the custom-made projection surfaces. These mini-sculptures interact with a bank of distance-measuring sensors. The shapes of the pieces determine the pattern of the sound. Changes in the sound are registered in the shape, color, and stability of the projected sound wave image. A custom keyboard allows for further customization by adding a pulse and articulating a beat with percussion.

After calling the Detroit, Michigan area home for a number of years, Michael Richison relocated to New Jersey in 2007. He is a professor in the Department of Art and Design at Monmouth University where he teaches motion graphics. He is a multimedia artist who utilizes a variety of media and approaches including graphic design, interactive video, and sculpture. He has exhibited and performed at venues and galleries within the US and internationally.

7:00PM Presentation: Evaluation of Network Music Technology on Public and Private Networks
Presenters: Chris Chafe, Trevor Henthorn, Sarah Weaver
Remote from Center for Computer Research in Music and Acoustics at Stanford University, Individual Location in Tokyo, and Onsite

The presentation will show the results of JackTrip network audio technology tests conducted during the months leading up to the conference on a variety of public and private networks tests and offer strategies for usage. Testing will include attributes such as bandwidth, quality of service, system configuration, latency, and compatibility with network music software and hardware.

Chris Chafe is a composer, improvisor, cellist and music researcher with an interest in computer music composition and interactive performance. He has been a long-term denizen of the Center for Computer Research in Music and Acoustics where he directs the center and teaches computer music courses. Three year-long research periods were spent at IRCAM, Paris, and The Banff Center, composing and developing methods for computer sound synthesis. He is continuing the SoundWIRE experiments for musical collaboration over the Internet. An active performer, he has performed in Europe, the Americas and Asia. Discs of his works are available from Centaur Records. Recently he has performed with Roberto Morales, Simon Rose, Pauline Oliveros, Roscoe Mitchell, Mark Dresser, and Dave Douglas, among others. A sound installation, The End of Winter, was recently featured at the Pasadena Museum of California Art. His doctorate in music composition was completed at Stanford in 1983.

Trevor Henthorn is a trumpet player, percussionist, composer, music and network technologist currently living in San Diego, California. With a background in electrical engineering and psychology, his music explores aspects of hypertechnology and psychoacoustics. His recent explorations emphasize analog and data-driven synthesis with '90s electronic percussion forms. He gains inspiration and ideas from new media concepts and media contradictions with characteristics of industrialized

performances. He is currently teaching at the Art Institute of California, San Diego and working as a programmer within the Department of Music at the University of California, San Diego.

Sarah Weaver is a New York-based contemporary composer, conductor, and technologist working internationally as a specialist in Network Music. Weaver has composed solo, chamber, and large ensemble works for groundbreaking musicians for over twenty years, integrating influences of jazz, contemporary classical, improvisation, computer music, world music, and innovative individual music languages of performers. She is an innovator of Telematic Music since 2006 together with close collaborators encompassing numerous artistic projects and interdisciplinary projects with groups such as NASA Kepler/K2 Mission and United Nations. Weaver is the founding Director of NowNet Arts Inc. (2017), a not-for-profit organization for Network Arts production. She is a Ph.D. Candidate in Music Composition at Stony Brook University.

8:00PM-10:00PM Presentation: "Spirits of Water" and the Maneuvering of Time/Space Divergence in Internet Performance
Presentation: Networking and Korean Music across the Globe
Presenters: Yoon Jeong Heo, Hilary Finchum-Sung
Remote from Seoul National University, College of Music, Department of Korean Music

"Spirits of Water" and the Maneuvering of Time/Space Divergence in Internet Performance

Internet concerts share music in real time beyond the limits of space, and, as performances overcoming the limitations of distance, inherently project a message of cooperation and peace. I composed the piece "Spirits of Water" in 2010 and have performed it with both Korean and American musicians. Korean instrumentalists performed on traditional musical instruments, and performers from the United States performed on a variety of instrumentation including the pipa, the contrabass and percussion. "Spirits of Water" aims to express the aesthetic beauty of Korean traditional music through flowing melodic lines, temporality, variability, and improvisation. For example, the use of a very Korean-style rhythmic unit of 3+2 forms the basis of a groove over which a traditional melody is played. Yet, elements such as tone color and pitch height are left to performer interpretation, maximizing the imaginative input of the performers. When performed over distance via the Internet, the delay can create unexpected discrepancies in performance. Yet, anticipation of such a delay is built in to the performance as the Korean traditional musical instruments surround the delay with a variety of sounds. Delay-conscious music composition and concepts are the starting point for making this and other remote live performances more possible and creating new forms of music.

Networking and Korean Music across the Globe

This presentation carries two rather broad goals: discuss the current networking trends in the world of Korean music and explore the strategies and aesthetics critical in successful and sustainable collaborations with Korean artists. The first part of the presentation will provide a broad introduction to Korean traditional music categories and aesthetic concepts key to understanding Korean instrumental and vocal performance. Here, I will discuss the ways by which music has been a crucial medium for expressing local and national identities and the ways by which these identities are re-articulated in the 21st century. Using Yoon Jeong Heo's work and

the work of other artists as examples, I will discuss performance techniques and musical ideas key to expressing a Korean music identity. The second part of the presentation takes a broader look at current trends in networking and collaborations with Korean music across the globe. Through an overview of performing arts markets and international music festivals, I examine the global music market as a site of cultural production within which hybridizing strategies shape Korean artist image and music aesthetics (Stokes 2004:61). Such a hybridization stimulates renewed imaginings of the music's local significance (Kim 2014: 29; Stokes 2003:306) as it draws on transcultural performance values (Stokes 2004:67) heightening the music's cultural mobility (ibid. 69--something Stokes refers to as the "graspabilty" quotient). As the local becomes the commodifiable component, the emerging product—that born of the 'hybridizing process'—in turn impacts performance aesthetics and reception in the local market.

A master of the Korean 6-string struck zither, geomungo, Yoon Jeong Heo is one of the most prolific contemporary performers Korea. Her talents cut across various musical genres, expanding the possibilities of geomungo and Korean music by bringing together inspiration from traditional Korean folk and court music genres, newly composed works and improvisational performance. Yoon Jeong Heo studied geomungo sanjo (solo instrumental folk performance for geomungo) under the renowned master and human cultural treasure

Gap-deuk Han and she has since been designated an official successor of Intangible Asset #16, Geomungo Sanjo. Heo has held fourteen solo recitals and performed in many different contexts and with many different artists in Korea and abroad. Recent performances have included a duet concert with Stephan Mikus, joint concert with Idan Rachel, performance at the London Jazz Festival, a performance at BT River of Music in London with Arun Ghosh, concert tours in Germany, France and the UK, a tour of New York/Washington DC/ Boston, 2100 WOMAD UK, 2010 WOMAX, Australia/ New Zealand WOMAD, and a performance at Poland's Jazz Topad. Heo is the leader for the renowned Black String which was recently awarded Best Crossover Performance at the 2017 Korean Music Awards.

Hilary Vanessa Finchum-Sung (Ph.D. Indiana University) Associate Professor of Theory and Ethnomusicology in the Department of Korean Music. Finchum-Sung teaches classes in ethnomusicology, world music and Korean music. She has published widely in international academic journals on Korean traditional music performance practice and education, multicultural musical expressivities, national branding, intercultural collaborations in music, Jindo folk performing arts preservation and the role of women in rural traditional music sustainability. Professor Finchum-Sung regularly presents her research at international academic conferences and leads workshops on Korean music in and outside of Korea. She is currently President of the Association for Korean Music Research (Society for Ethnomusicology) and preparing a manuscript on Korean traditional music's 21st century transitions. In avid pursuit of bi-musicality, she regularly practices and performs on the two-string spike fiddle, haegeum.

FRIDAY APRIL 20

9:30am Paper: Preparing for Performance in Cyberspace via LoLa
Presenters: Tania Lisboa, Pétur Jónasson
Remote from Royal College of Music, London; Belle Shenkman Studios

LoLa—a Low Latency Audio and Video Streaming System for high-speed networks—allows musicians today to work remotely with minimum delay and excellent sound and video quality. Research in this field is however still scarce and mostly focused on teaching, with few references to performance. In light of the above we posited the following research questions: How does the technology impact on performers, and how do musicians, who never met before, communicate and interact during rehearsals and performances via LoLa? Our results, which we present here, show that our four participants adapted well to the technology and quickly began developing new strategies for rehearsing and performing remotely. We conclude thus, that LoLa is an innovative and successful way of connecting musicians in the 21st century.

Tania Lisboa is a Research Fellow at the Royal College of Music´s Centre for Performance Science and an honorary Research Fellow at Imperial College London. Her current research focuses on expert memory, performance education, and communication in rehearsal. Tania also manages the RCM's videoconferencing programme. Recent activities in this area include links with international conservatoires and universities in the USA, Europe and Asia. In parallel with her academic research, Tania pursues an active career as a solo cellist. A native of Brazil, where she also trained as a pianist, her concert engagements encompass Europe, Asia, and North and South America.

Pétur Jónasson holds an MSc degree in Performance Science from the Royal College of Music, where he is currently undertaking doctoral studies, focusing on the memorization of complex musical material. As a classical guitarist, Pétur has given numerous solo performances throughout Europe, North America, Australasia and the Far East. He is currently Head of classical guitar studies at the Iceland Academy of the Arts and principal artist for the Icelandic CAPUT contemporary music ensemble and the London-based Riot Ensemble.

10:00AM Paper: Jamming in the 3rd Room: Experiences of remote 'virtual' real-time recording sessions
Presenters: Paul Ferguson, Zack Moir, Gareth Dylan Smith, Joe Bennett
Remote from Edinburgh Napier University, Scotland

The authors, in their capacities as musicians and sound-engineer/producer are currently conducting research into the experience of collaborating musically using LOLA, in combination with (typically, non-real time) cloud-based recording studio workflows, specifically Avid Cloud Collaboration. In doing so, our research pertains to live performance, audio/video immersivity, integration into future approaches to record production, and teaching/education applications. Additionally, we are interested in exploring the limits of this system by way of understanding how it may be better deployed and developed for future use. One of our research outputs is an album of original material recorded using real-time, interactive, network technologies. This paper will report on qualitative studies in which the authors

present autoethnographic accounts of their musical, technical, and performance/production experiences of remote rehearsal (in Edinburgh, London, and the United States), pre-production, and recording using LOLA, and will discuss implications for future use in remote, real-time, interactive record production scenarios.

Paul Ferguson is Associate Professor of Audio Engineering in the Applied Music Research Centre within the School of Arts and Creative Industries at Edinburgh Napier University. Since 2012 his research has focused on the use of high-speed research and education networks to allow artists separated by long distances to perform together in real-time. He is currently under NDA with audio companies AVID, Audinate and Focusrite. Recent remote networked audio research and consultancy projects include the Royal Scottish National Orchestra, Steve Cradock (Ocean Colour Scene), and Paul Weller.

Zack Moir is a Lecturer in Music and a researcher in the Applied Music Research Centre within the School of Arts and Creative Industries at Edinburgh Napier University. His research interests are in popular music and jazz in higher education, popular music composition pedagogy, long-distance real time collaboration, and the teaching and learning of improvisation. He has published on the topics of popular music pedagogy, popular music making and leisure, popular music songwriting/composition, and remote collaboration. Zack is also an active composer and performer with a strong interest in improvisation, data sonification, and music production.

Gareth Dylan Smith is Manager of Program Effectiveness for Little Kids Rock. Gareth's research interests include identity, music and leisure, eudaimonism, autoethnographic research methods, and embodiment in performance. Gareth is also a drummer, performing with multiple bands in the UK and USA.

Joe Bennett is vice president for academic affairs—strategic initiatives at Berklee. In this role, he leads and coordinates strategic projects relating to curriculum research, technologies including virtual and augmented reality, campus integration, and new program development. His academic research focuses on the creative practice and psychology of songwriters. As an expert witness forensic musicologist, Bennett advises music lawyers, publishers, artists, and songwriters on matters of plagiarism and musical similarity.

11:00AM Presentation: Music Without Borders and MIRCO
Presenters: Maria Minaricova, Paolo Girol, Kristina Lillemets
With Hrachya Astsatryan, Aram Mirzoyan, Simon Hunanyan
Remote from National Academy of Sciences of the Republic of Armenia
Innar Järva
Remote from Estonian Academy of Music and Theatre

Presentation of the initiatives and international collaboration activities in the area of network arts productions using the Research and Education Networks (NRENs) in Europe and the ultra low latency technology, known as LoLa, in the scope of the EaPConnect project. Focus is given to the projects: Music without borders and the project MIRCO.

Maria Minaricova is Senior Program Manager at GEANT, the European Research and Education Networking organization. She is a program manager on large international projects (EaPConnect, Copernicus Data Program Delivery), has worked on new business development & collaboration with key accounts and strategic partners including European Space Agency (ESA), EUMETSAT, ELIXIR, Human Brain Project, PRACE, OpenAIRE. Prior to joining GEANT, Maria worked for Oracle as a program manager and a principal consultant on the delivery and implementation of large scale international projects and technology solutions. Her consulting career includes almost 20 years of engaging with clients and key stakeholders in order to understand their needs, define the scope, goals, strategy on projects of varying size and complexity.

Paolo Girol (1972, Venice, Italy) studied mandolin and classic guitar with Livio Marcolin and attended master classes with Emanuele Segre and Alvaro Pierri and studied Computer Science with Andrea Sgarro at the University of Trieste. He has got two A. A. degrees: "Sound Engineer" and "Sound Recording Techniques for Musicians". He obtained his Bachelor Degree in "Music and New Technologies" from Academy of Music of Trieste and his Master Degree in "Audio Visual Composition" from the same institution. At the moment he is completing his PhD at the Composition Department of Estonian Academy of Music, Tallinn, Estonia. His interest is the hybridization of different artistic languages. His works have been played nationally and internationally, they have been selected to several festivals/conferences and they have been awarded with national and international prizes such as First Prize in "Multimedia & Musical Arts" for Best Italian Digital Composition in Musical Field 2006 and First Prize "Work for multimedia", International Competition of Electroacoustic Music and Sonic Art 2005, IMEB, Bourges, France. He teaches "Sound Design" at the Baltic Film School, Tallinn, Estonia, and "AudioVisual Composition" at the Estonian Academy of Music, Tallinn, Estonia.

Kristina Lillemets is the Director Infrastructure at Information Technology Foundation for Education (HITSA) in Estonia. She is also the Head at the Estonian NREN EENet. Before joining HITSA in 2015 she held a position as Operations Director Baltics at Linxtelecom Estonia which was a subsidiary of a Dutch telecom company. She also has experience in the banking sector, working at the Swedbank IT organization as a project manager.

12:00PM-2:00PM Lunch Sponsored by NYSERNet

2:00PM Keynote Presentation
Presenter: Ann Doyle, Community Engagement Manager, Higher Education and Cultural Programs, Internet2
Remote from Internet2 Offices, Ann Arbor, Michigan

Ann Doyle founded and continues to lead Internet2's cultural initiatives working with U.S. and international partners utilizing advanced networks for collaborative live performances, master classes, and remote auditions in the performing arts. Her goal in joining the 2018 Network Music conference is to build bridges between this conference's innovative community and that of the Networked Performing Arts Production community https://npapws.org – highlighting opportunities for collaboration, and extending the reach of both the broadband and advanced networking communities across the globe. Ann is a recording artist herself and has a Master's degree in Higher Education Administration from the University of Michigan.

3:00PM Presentation: Online Jamming and Concert Technology, an Online Course
Presenter: Chris Chafe
Remote from Center for Computer Research in Music and Acoustics at Stanford University

Today's vast amount of streaming and video conferencing on the Internet lacks one aspect of musical fun and that's what this online course is about: high-quality, near-synchronous musical collaboration. Under the right conditions, the Internet can be used for ultra-low-latency, uncompressed sound transmission. The course teaches open-source (free) techniques for setting up city-to-city studio-to-studio audio links. Distributed rehearsing, production and split ensemble concerts are the goal. Setting up such links and debugging them requires knowledge of network protocols, network audio issues, mics, monitors, and some ear training. The 6-week hands-on online class teaches and practices the basics. Its start date is April 3, 2018. Stanford students will be participating in a class and joining an online world of students the world over. Institutions wishing to join with classes or ensembles are most welcome and should contact the presenter (Chafe).
https://www.kadenze.com/courses/178/info

Chris Chafe is a composer, improvisor, cellist and music researcher with an interest in computer music composition and interactive performance. He has been a long-term denizen of the Center for Computer Research in Music and Acoustics where he directs the center and teaches computer music courses. Three year-long research periods were spent at IRCAM, Paris, and The Banff Center, composing and developing methods for computer sound synthesis. He is continuing the SoundWIRE experiments for musical collaboration over the Internet. An active performer, he has performed in Europe, the Americas and Asia. Discs of his works are available from Centaur Records. Recently he has performed with Roberto Morales, Simon Rose, Pauline Oliveros, Roscoe Mitchell, Mark Dresser, and Dave Douglas, among others. A sound installation, The End of Winter, was recently featured at the Pasadena Museum of California Art. His doctorate in music composition was completed at Stanford in 1983.

4:00PM Presentation: Staging Networked Music Performance: Visualization, Scenography, and Dramaturgy
Presenter: Ian Biscoe
Remote from Individual Location in Miami

The presentation will use examples from the world of networked music performance, including those created and produced by Studio Biscoe, to discuss some of the different approaches that are being employed to visually present remote performers alongside physically present members of the cast. It will also address scenographic and dramaturgical methods that are unique in the context of networked performance. An overview of some of the technical approaches used in creating visual environments, processing and composting live streams for networked performance staging, will also be discussed.

Ian Biscoe is a visual and performance artist with a background which crosses systems engineering, aerospace, mobile communications, multimedia technologies and architecture. As founder of Studio Biscoe http://studiobiscoe.com he has been involved with 10 international networked performance projects over the past four

years, including projects across Europe and North America, collaborating with the likes of the New World Symphony (Miami), the Danish Royal Academy of Music (Copenhagen) and the Royal College of Music (London). In 2016, Ian created and produced Bridge to Everywhere:234 http://bridgetoeverywhere.com the first networked performance between the USA and Cuba, employing the largest outdoor projection screen in the USA as a virtual set in which all of the performers could coexist. Studio Biscoe's networked performance projects employ a diverse range of technologies, taking scenographic and dramaturgical approaches from the worlds of theatre, music and dance to create new structures for networked performance worlds. He is particularly interested in the exploration of networked performance as a unique medium that can embrace all the visual and performing arts, connecting communities, building layers from the local, the remote, the virtual and the augmented, while questioning what lays between the places of physical performance. Ian also has an extensive research portfolio in the field of networked performance, such as The Online Orchestra with Falmouth University, the pan-European video networking Vconect project, published papers and conference presentations, and PhD research in progress addressing Networked Performance.

5:00PM-8:00PM Break

8:00PM Concert Demonstration: Tünin, for actuated instrument, animated score and network ensemble
Presenters: Rob Hamilton, John Granzow
Remote from University of Michigan and Onsite

Actuated musical instruments allow performers the ability to co-inhabit live performance practice, opening the possibilities for new explorations of traditional instrumental techniques. Tünin explores the cohabitation of the Berdahl Resonance Guitar, an electromagnetically prepared electric guitar capable of being driven by audio input while simultaneously being performed upon by a live musician. In Tünin, guitarist Rob Hamilton is accompanied by a networked ensemble led by John Granzow at the University of Michigan, connected to Stony Brook via JackTrip and WAIR. Input from the ensemble themselves following a networked graphical score built in the Unity gaming engine activate the Resonance Guitar, acting as a filter, both mechanical and semantic. The output of the guitar and ensemble are spatialized using an 8channel ambisonic speaker array. Reverberation generated by WAIR reflects the realtime network latency of the ensemble connection. Tünin is being realized as a yearlong collaboration between Rensselaer Polytechnic Institute professor Rob Hamilton and University of Michigan professor John Granzow. The performance at the Stony Brook IACS Network Music conference will serve as the work's premiere.

Composer and researcher Rob Hamilton explores the converging spaces between sound, music, and interaction. His creative practice includes mixed reality performance works built within fully rendered, networked game environments, procedural music engines and mobile musical ecosystems. His research focuses on the cognitive implications of sonified musical gesture and motion and the role of perceived space in the creation and enjoyment of sound and music. Dr. Hamilton received his PhD from Stanford University's Center for Computer Research in Music and Acoustics (CCRMA) and currently serves as an Assistant Professor of Music and Media at Rensselaer Polytechnic Institute.

John Granzow applies the latest manufacturing methods to both scientific and musical instrument design. After completing a masters of science in psychoacoustics, he attended Stanford University for his PhD in computer based music theory and acoustics. Granzow started and instructed the 3d Printing for Acoustics workshop at the Centre for Computer Research in Music and Acoustics. He attended residencies at the Banff Centre and the Cite Internationale des Arts in Paris. His research focuses on computer aided design, analysis, and fabrication for new musical interfaces with embedded electronics. He also leverages these tools to investigate acoustics and music perception. Granzow's instruments include a long wire installation for Pauline Oliveros, sonified easels for a large scale installation at La Condition des Soies in Lyon, France, and a hybrid gramophone commissioned by the San Francisco Contemporary Music Players. He is a member of the Acoustics Society of America where he frequently presents his findings. In 2013, Granzow was awarded best paper for his work modeling the vocal tract as it couples to free reeds in musical performance.

9:00PM Concert Demonstration: Endangered Sound: Improvisation on Internet2
Presentation: Soundmesh Update – Internet2 Improvisation with RTcmix
Presenter: Mara Helmuth
Remote from University of Cincinnati and Onsite

Endangered Sound, will be an improvisational performance between Stony Brook University and the University of Cincinnati involving high bandwidth sound interaction and the Soundmesh interface to the RTcmix music programming language. Participants are asked to bring sounds that reference the precarious state of some of the world's species in a changing climate. The goal is to explore our relationship with wildlife locally and globally. Deep listening is a key to a successful performance. Preparation for the event by performers includes installation and compilation of standalone (command-line) RTcmix software, communication about the improvisational structure, and just before the event, exchanging IP addresses. Please contact mara.helmuth@uc.edu if you are interested in participating.

The Soundmesh interface to the RTcmix music programming language allows realtime exchange of uncompressed sound layers between remote hosts on Internet2. It was originally developed in 2000 by Mara Helmuth after collaboration with Brad Garton, and used in a number of performances and other exchanges between Cincinnati and other locations. This new version makes use of the netaudio C++ objects developed by Douglas Scott for RTcmix. Distributed processing allows for a network of participants in various locations to interact, with improvisors at each node experiencing and contributing a unique sonic experience. Because Internet 2 provides the ability to transfer large amounts of data, many layers of full uncompressed audio may be exchanged between each sending and receiving host. Any of the RTcmix synthesis or processing software instruments may be used, including those that play sound captured from a microphone.

Mara Helmuth composes music often involving the computer, focusing recently on environmental issues and wildlife. Her recordings are on Open Space CD 33 Benjamin Boretz 9x9, Lifting the Mask on Sounding Out! (Everglade), Sound Collaborations, (CDCM v.36, Centaur CRC 2903), Implements of Actuation (Electronic Music Foundation EMF 023), and others. Her music has been performed internationally at conferences, festivals and arts spaces. Her research includes software for composition and improvisation has involved granular synthesis, wireless sensor networks, interfaces,

Internet2 performance, and software RTcmix instruments. She is Professor of Composition at the College-Conservatory of Music, University of Cincinnati. She holds a D.M.A. from Columbia University, and earlier degrees from the University of Illinois, Urbana-Champaign. She served on the board of directors for the International Computer Music Association, as Vice President for Conferences, newsletter editor and President.

SATURDAY APRIL 21

10:00AM-2:00PM Reflections on collaborative telematic music performance and research: A series of presentations, concert demonstrations, and panel discussion
Presenters: Michael Dessen, Mark Dresser, Sarah Weaver, Matthias Ziegler, with Benjamin Burger, Joel De Giovanni, Roman Haefeli, Patrick Müller, Johannes Schütt, Bojan Milosevic, Ernesto Coba
Remote from Zurich University of the Arts and Onsite

Aspects of the research project at Zurich University of the Arts
Patrick Müller and Matthias Ziegler
One of the fascinating, but also irritating aspects of telematics is the fact that when we look into the mirror of this strange machinery, it tends to look back slightly displaced, often in a surprising way. Reviewing the by now extensive literature about networked performance, but also reviewing the own practice, it seems revealing that telematics can be interpreted in variant qualities. If regarded as an instrument, the functionality of its parts and their interplay move to the center of attention, and with these questions of coordination and latency. If telematics is understood as a specific space, the interference of the virtual and the real and its effects for embodiment come to the fore. But telematics can also be taken as a medium, in this case it asks how much it disguises or discloses its use and structure. Finally, it confronts us with ethical and political questions and displays of dehierarchization as soon as we see it as a network. Playing in and composing for the telematic space, how do musicians and audiences set the parameters for a successful communication and performance on distance.

TPF tool
Johannes Schüett, Roman Haefeli
Johannes Schuett and Roman Haefeli have developed a tool which allows a basic multichannel audio and video connection between destinations, using a server at Zurich University of the Arts. The tool is in use for the entire presentation between Zurich and Stony Brook.

Synchrony: Past, Present, and Future Work in Network Arts
Sarah Weaver
Since 2006 I have been continuously working in the network arts field as a composer, conductor, technologist, educator, and producer together with a close circle of collaborators. I will give a summary of past work, examples of current projects including Universal Synchrony Music and NowNet Arts, and thoughts on future strategies for public and private networks. Universal Synchrony Music (USM) is a telematic music ensemble project (2013-present) in collaboration with the NASA Kepler/K2 Mission and NASA ArtSpace exploring musical, technological, and metaphorical realizations of synchrony. NowNet Arts Inc. is based in New York City

and works internationally in producing and presenting contemporary network arts works, technologies, education programs, and publications.

Staging the telematic space
Benjamin Burger, Joel de Giovanni
The video artists Benjamin Burger and Joel De Giovanni explore the spatial representation of the telematic space on stage, presenting their current state of research by showing different working setups from static concerts to dynamic dance performances. By demonstrating the potential of video and scenography in a telematic environment they map out their logic in arranging setups for telematic performance spaces.

The Hierarchies of Now - Transcending place but not time zone
Mark Dresser
Reflecting on over a decade of meaningful collaborative telematic music performances. Due to the effectiveness and stability of JackTrip and changing video platforms our ability to pull off artistically rewarding multi-site live concerts continues to evolve. Yet disparities of great distances, i.e. time zone, pose the pragmatic and cultural questions of who has "prime time?" Recent experiments aim to ameliorate these issues. The focus of this presentation will be the shifting away from the singular distributed live music event into a more layered integrated audio and visual form.

Poetics, imperatives and proposals for telematic music
Michael Dessen
Participating in over 30 telematic concerts as well as graduate seminars and other educational activities, I am continually inspired by the diverse ways that my collaborators imagine this medium and create new work and relationships within it. For many of us, telematic music making has become an important site for thinking through the broader nature of telepresence, a phenomenon which is increasingly central to how we navigate the world. In this presentation, I will draw on these experiences to share reflections on telematic music, ranging across its poetic, social and ethical dimensions, and sharing my own frameworks for future research and creative work.

Michael Dessen is a composer-improviser who performs on the slide trombone and computer. Active in a variety of ensembles as leader or collaborator, he creates music for improvisers and engages new technologies of telepresence and digital networking. His music has been praised by critics in numerous jazz and contemporary music publications, and recorded on labels such as Clean Feed, Cuneiform, and Circumvention. Since 2006, Dessen has been a faculty member at the University of California, Irvine, where he co-founded a new PhD program in Integrated Composition, Improvisation and Technology (ICIT) and is currently chair of the Department of Music. www.mdessen.com

Mark Dresser is a Grammy nominated, internationally renowned bass player, improviser, composer, and interdisciplinary collaborator. At the core of his music is an artistic obsession and commitment to expanding the sonic, musical, and expressive possibilities of the contrabass. He has recorded over one hundred forty CDs including three solo CDs and a DVD. From 1985 to 1994, he was a member of Anthony Braxton's Quartet, which recorded nine CDs and was the subject of Graham Locke's book Forces in

Motion (Da Capo). He has also performed and recorded music of Ray Anderson, Jane Ira Bloom, Tim Berne, Anthony Davis, Dave Douglas, Osvaldo Golijov, Gerry Hemingway, Bob Ostertag, Joe Lovano, Roger Reynolds, Henry Threadgill, Dawn Upshaw, John Zorn. Dresser most recent and internationally acclaimed new music for jazz quintet, Nourishments (2013) his latest CD (Clean Feed) marks his re-immersion as a bandleader. Since 2007 he has been deeply involved in telematic music performance and education. He was awarded a 2015 Shifting Foundation Award and 2015 Doris Duke Impact Award. He is Professor of Music at University of California, San Diego. www.mark-dresser.com

Sarah Weaver is a New York-based contemporary composer, conductor, and technologist working internationally as a specialist in Network Music. Weaver has composed solo, chamber, and large ensemble works for groundbreaking musicians for over twenty years, integrating influences of jazz, contemporary classical, improvisation, computer music, world music, and innovative individual music languages of performers. She is an innovator of Telematic Music since 2006 together with close collaborators encompassing numerous artistic projects and interdisciplinary projects with groups such as NASA Kepler/K2 Mission and United Nations. Weaver is the founding Director of NowNet Arts Inc. (2017), a not-for-profit organization for Network Arts production. She is a Ph.D. Candidate in Music Composition at Stony Brook University. www.sarahweaver.org

Matthias Ziegler is one of the world's most versatile and innovative flutists. He is committed both to the traditional literature for flute as well as to contemporary music Accordingly, his performances take place in a vast range of contexts: he plays principal flute with the Zurich Chamber Orchestra, has toured with the percussionist Pierre Favre and performed with the pianist George Gruntz as well as with the American contrabass player Mark Dresser. He is also a member of Collegium Novum Zurich, where he has worked with Mauricio Kagel, Heinz Holliger and George Crumb. Concert tours have brought him to the US, Japan, Australia, South America and Israel. Many recordings on CD document his inclusive musical interests. Matthias Ziegler currently teaches at the Zurich University of the Arts. Searching for new sounds he enormously broadened the expressive potential of the traditional flute and the electroacoustically amplified contrabass flute. Amplifying the flute allows him to increase the volume of the microsound structures of the flute to an audible level. flute@matthias-ziegler.ch www.matthias-ziegler.ch

Benjamin Burger is a multidisciplinary artist, director and performer. He studied «Ereignis» (how to create situations) at the University of Arts in Zürich. He is the founder of the theatre production Extraleben, exploring audience participation, immersive experiences and speculative future scenarios. The works of Extraleben have been shown in multiple theatres, venues and festivals. He also does solo projects, freelances with other companies and as a live-video-artist (VJ). Lecturer at the University of the Arts Zurich in different contexts programs. As part of the art-research project Telematic Network Performance Format he is responsible for developing a scenographic and performative logic in dealing with the subjects «orientation in a telematic space», «delay», «telepresence» and «tele-movement» (how to project moving performers in three dimensions on stage). www.extraleben.ch www.bildstoerung.ch www.benjaminburger.ch

Joel De Giovanni is a freelance Media designer working with Live Video. He finished his MA ⬚in Design in the Field "Ereignis" (Designing Happenings) at the ZHdK in 2011. He creates & manages complex media installations for companies & organisations. Within the research program for the Network Performance Format (ZHdK), he's focusing on the telepresence of performers through Live Video and its staging in the performance context. Member of the Artists collective Bildstörung. www.bildstoerung.ch

Roman Haefeli (system administrator, media artist, programmer, sound engineer)⬚ Diploma in audio engineering at SAE Zurich in 2003, diploma in media arts at the Zurich University of the Arts in 2008. Works since 2009 as system administrator and SQL developer at the Zurich University of the Arts. Pure Data programmer and author of the collaborative realtime networked music making environment "netpd". Author of sonoplanes, a non-linear audio arrangement application written in Pure Data. Has been exploring the relation between sound and space in his own works (sound installations and concerts). Worked with many artists as programmer for sound and media installations.

Patrick Müller studied musicology, music, literature and cultural management in Zurich. He was, among others, artistic director of the ensemble for contemporary music Collegium Novum Zurich, editor in chief of Dissonance, journal of contemporary music, affiliated fellow at the Collegium Helveticum, a laboratory for transdisciplinarity of the University and ETH Zurich, and director of Connecting Spaces Hong Kong – Zurich, a transcultural study centre in Asia. Since 2008, he is professor for transdisciplinarity at Zurich University of the Arts and founder and head of the Master of Arts in Transdisciplinary Studies. Patrick.mueller@zhdk.ch

Johannes Schüett (Clarinetist, composer, programmer, researcher) Concert recordings for radio, television and sound recordings. Further education in composition with Klaus Cornell, David Angel and computer music with Gerald Bennett at the Hochschule Musik und Theater (HMT) Zurich. Since 1994 member of the Composers Forum of the Swiss Center for Computer Music. Compositions for instrumental ensembles, theater music and experimental films, as well as sound installations, compositions for tape and live electronics. Specialized in composing for Ambisonic – 3D surround sound method. His works have been performed in Switzerland, Korea, Hong Kong, Vietnam, Germany, the Netherlands, at the ICMC, USA and at the International Synthesis Bourges Festival. Since 2005 he works at the Institute for Computer Music and Sound Technology (ICST) Zurich and teaches „new media" at the ZHdK (Schulmusik_MA) as well as studio practice in electronic music for composers, students and artists in residency at the ICST. Listen: https://soundcloud.com/johannes_schuett

2:00PM-4:00PM Break

4:00PM-5:00PM Concert Demonstration: Goldstream Variations (2012)
Presenter: Scott Deal
Remote from Tavel Arts Technology Lab, Indiana University-Purdue University Indianapolis and Onsite
Remote: Erzsébet Gaál Rinne, harp, Scott Deal, vibraphone, Harry Chaubey, electronics
Onsite: QI Mengjie (Maggie), keyboard

Goldstream Variations (2012) creates an interconnected system through live music, electronics, and machine learning algorithms. The variations are scored for one to seven musicians on undetermined acoustic instruments, together with one to seven electronic/computer artists. The selection of this grouping shapes the aural nature of performance space through the arrangement of performers and loudspeakers. Each page of the score constitutes one variation which is performed in heterophonic fashion as an ensemble. The acoustic musician's performances are engaged by various computer artists. The variations are designed for performance in either a single physical space, or distributed telematically between multiple sites on high-bandwidth Internet. Machine Learning (ML) is introduced into the design of the work via a software application as well as through the structural shape of the composition, in which virtuosic musical passages are followed by large rests, which in turn create room for liberal amounts of interactivity. The aesthetic focus of a performance lies in the timing, placement, and juxtaposition of virtual and live sound. Decisions regarding spacing, ensemble, dynamics, crescendo and decrescendos, pacing, and phrasing are left to each group. Goldstream Variations was composed during an extended stay in the Goldstream Valley outside of Fairbanks, Alaska. It was commissioned by Erzsébet Gaál-Rinne and is dedicated to her.

Performer, composer and media artist Scott Deal engages new works of computer interactivity, networked systems, electronics and percussion. His recordings have been described as "soaring, shimmering explorations of resplendent mood and incredible scale"…."sublimely performed", and his recording of Pulitzer Prize/Grammy winner John Luther Adams' Four Thousand Holes, for piano, percussion, and electronics was listed in New Yorker Magazine's 2011 Top Ten Classical Picks. He has performed at Musicacoustica Beijing, Almeida Opera London, Arena Stage Washington, Supercomputing Global, Vancouver New Music Festival, Zerospace, SIGGRAPH, Chicago Calling, IEEE CloudCom, Ingenuity Festival, ICMC, NIME, PASIC and with groups that include ART GRID, Another Language, Digital Worlds Institute, Callithumpian Consort, and the Percussion Group Cincinnati. He is the percussionist for the computer-acoustic trio Big Robot, who have performed to audiences worldwide. In 2011, Deal and composer Matthew Burtner won the coveted Internet2 IDEA Award for their co-creation of Auksalaq, a telematic opera called "an important realization of meaningful opera for today's world". In 2017, Deal released the Computer Media Collection, comprised of six interactive works fusing electronics, media, and algorithmic processes with acoustic percussion.

QI Mengjie (Maggie) is a composer and sound artist. Her works have been performed widely at international festivals, including ICMC (Amsterdam, Shanghai), Audio Arts Festival (Krakow), WOCMAT in Taiwan, CIME General Assembly concerts (North Texas, Moscow,Beijing), International Electronic Music Festival of New York (New York), Society for Electro-Acoustic Music in the United States (Oregon), International Society for Contemporary Music (Beijing), SPLICE Festival (Western Michigan University), Summer Institute for Contemporary Performance Practice at New England Conservatory, and MUSICACOUSTICA-BEIJING. Her works have won awards on noted competitions, such as first prize on MUSICACOUSTICA electronic music composition contest (2011, 2012, 2014), and third prize on the Competition of Oskar Kolberg (2014). She has been commissioned by MUSICACOUSTICA-BEIJING and she is the Composer in Residence of Love for Music Ensemble in Beijing. QI Mengjie is a doctoral candidate at Beijing's Central Conservatory of Music under the guidance of Professor Zhang Xiaofu. She is currently visiting scholar at CUNY- Brooklyn College under the

supervision of Professor Douglas Geers. Her doctoral dissertation is on interactive sound installation. She has a Master's degree from the Central Conservatory of Music as a student of Professor Ping Jin, and a Bachelor's degree in recording and sound design from the National Academy of Chinese Theater Art.

Erzsébet Gaál Rinne is a Hungarian-American harpist, a Kodály pedagogue, and a researcher in physical wellness for musicians. She has given concerts all across Europe and America. She is a recipient of the Pro Artibus Award that she has received from the Artisjus Foundation for promoting Hungarian contemporary music abroad. Dr. Gaál Rinne has received numerous invitations to share her expertise, for example, at the Fifth and the Eighth World Harp Congresses in Copenhagen, Denmark and in Geneva, Switzerland; The American String Teacher Association National Conferences in Columbus, OH, Dallas, TX, and in Kansas City, MO; Third International Conference on Arts and Humanities in Honolulu, Hawaii; The Phenomenon of Singing International Symposium V, in Newfoundland, Canada; and the Seventeenth International Kodály Symposium in Leicester, England. Her professional work can be heard on her solo harp CD recordings Harpa Hungarica and Harpchipelago, and seen on her DVD program Harp Playing for Life. Her articles, appearing in different journals, are available on her web site www.harpahungarica.com. Dr. Gaál Rinne is an honor graduate of the Ferenc Liszt Academy of Music, Budapest, Hungary, holding a Doctor of Music degree from Indiana University, Bloomington, Indiana. She is a member of the faculty at University of Evansville, Evansville, IN, and Meridian Music, Indianapolis, IN.

Harry Chaubey is a sound artist, producer, and instrument designer from Delhi, India. His musical work includes time as one-half of the Delhi-based duo D80, creating French House and Nu-Disco music, and as the audio and production specialist to Los Angeles-based composer Wayne Sharpe. After earning his master's degree in Music Technology at the University College of Dublin, he carried out design and DSP work for PatchBlocks, an Irish synthesizer company specializing in micro-controllers. He currently is a PhD student in the Music and Arts Technology Department at IUPUI, where he is a research assistant for Professor Scott Deal.

5:00PM-6:00PM Panel: A Greener and More Inclusive Musical Community Through Network Technology
Presenters: Judith Bowman, Scott Deal, Chris Chafe, Scott Miller
Remote from Mary Pappert School of Music at Duquesne University, Tavel Arts Technology Lab at Indiana University-Purdue University Indianapolis, Center for Computer Research in Music and Acoustics at Stanford University, Music Department at St. Cloud State University Minnesota

Online conferencing tools have the capability to address two problematic, travel-related issues for academic music and arts events: the carbon footprint, and the monetary expense of a long distance trip. For academic professionals whose career paths require engagement in peer-reviewed conferences, air travel can constitute a large share of their annual personal carbon footprint. Additionally, lack of resources to travel to an international conference can have serious repercussions for graduate students, post-docs, and professors in universities that may only provide limited funding. Both issues are pervasive throughout academia, and the subject of extensive research and discussion. The past three decades have seen the development of formidable teleconferencing tools that enable online individuals to participate as presenters and attendees. This rise in technology, combined with strategic planning

and a re-thinking of conference formatting, could result in dramatically positive results in efforts towards carbon reduction and growth of a more inclusive community. The panel discussion will address topics pertaining to the growth of online presence, as well as positives/negatives pertaining to its expansion in arts events. Additionally, it will seek to illuminate how arts organizations can leverage resources towards a greater online presence, and how can this activity can promote an organization's advancement of their goals.

Discussion Panel: Judith Bowman, Professor, Music Education and Music Technology, Mary Pappert School of Music, Duquesne University Chris Chafe, Professor, Department of Music, Stanford University Scott Deal, Professor, Director, Donald Tavel Arts Technology Center, IUPUI Scott Miller, Professor, Music, St. Cloud State University; Immediate Past President, Society for Electroacoustic Musicians in the United States (SEAMUS)

6:00PM–7:00PM Presentation: Distributed Performance at New York University
Presenter: Tom Beyer

NYU has been doing performances over the internet with other locations around the world since the '90s. They are responsible for the first delivery of a 5.1 internet audio feed, the first Internet2 recording session between five locations, and the first Internet2 Musical with RPI. NYU has used Internet2 to do master classes and concerts with collaborators located at Quilmes Argentina, Kaist Korea, NYU Abu Dhabi, Tromso Norway, Sarc Belfast, Stockholm, Stony Brook, UCI, UCSJ, and Vancover, to name a few. The philosophy that has guided NYU in their explorations has been to explore the artistic side of performance, using multiple cameras and projection surfaces in a desire to create an immersive experience for the audience as opposed to just using a single static camera shot. NYU has additionally presented two workshops as part of AES conventions, one being a sixteen channel WaveField wall with Tromso, Norway and the other being a three way concert/demonstration and panel discussion.

Thomas L. Beyer is a technologist, educator, engineer, composer, instrument builder and percussionist. He studied Classical Percussion, at Manhattan School of Music, continued Jazz and Ethnic music studies with percussion masters and received a Masters Degree in Composition from NYU. He was a founding member of The La Mama Experimental Theater Company, Interactive Multimedia Performing Arts Collaborative Technology Workshop, and International Composers and Interactive Artist as well as currently being on the board of Ear to the Earth, The EMF Institute and New Music World. In addition to being adjunct faculty, for the past 20 years he has been the Chief Systems Engineer for the NYU Music Technology Program and the Network Administrator for the NYU Department of Music & Performing Arts Professions and in those positions he was instrumental in specification and design of the DOLAN performance and research facilities, the recently opened NYU Abu Dhabi campus, and is working on 3 new NYU facilities. He continues his lifelong quest for knowledge to gain a mastery of how to produce, control and capture sounds.

7:00PM–9:00PM Break

9:00PM–10:00PM Concert Demonstration: Intersubjective Soundings 2
Presenter: Doug Van Nort
Remote from DisPerSion Lab at York University Toronto and Onsite

The Intersubjective Soundings project explores collective resonance and senses of intersubjectivity that emerge in collective improvisation in general, in electro/acoustic improvisations in which signal paths are shared between performers in particular, and across sound and movement through the introduction of Soundpainting-based conducting. The project is interested in listening for agency and voice within the sound field as well as the emergent intelligent of group-sound. The need to "listen across" in this work is amplified by working in the telematic medium, with myself as Soundpainter in one location and the ensemble in another. As Soundpainter I wear MYO sensor armbands that sense movements and muscle activity, and machine learning is used to recognize conducting gestures. This activates and connects me to my electronic instrumental system (known as GREIS), allowing me to transform and co-modulate the sounds of ensemble members in a moment of shared resonance. The work thus continually shifts between collective sound/movement improvisation with shared signal transformations, and the structured improvisation of symbolic conducting, organized by palettes.

Doug Van Nort is an artist, researcher, composer and performer. He creates works that integrate improvisation and collective performance with machine agents, interactive systems and experiences of telepresence. Van Nort regularly presents this work internationally, and recent projects have spanned electro/acoustic ensemble pieces (both telematic and co-located), a composition for ancient Chinese Bells commissioned by the Smithsonian's Freer-Sackler Gallery, an interactive dance/music piece for the National Ballet School of Canada's Asembleé Internationale 2017, and an evolving, solar-powered environmental sound work commissioned by the Fieldwork land art site. His work is informed by his background and experiences in Deep Listening, improvisation, electroacoustic and computer music, mathematics, media arts, computational creativity and various forms of ritual. Van Nort is the founder of the DisPerSion Lab at York University where he is Canada Research Chair in Digital Performance and an Assistant Professor, cross-appointed between the departments of Computational Arts and Music.

10:00PM-11:00PM Concert Demonstration: Global Loop Orchestra
Presenters: Kenneth Fields, Naithan Bosse
Remote from Central Conservatory of Music Beijing, Telemedia Arts Calgary, Individual Location in Toronto, Conservatory of Music at Brooklyn College, University of California Santa Barbara, and Onsite

GLO has been experimenting with a simple format in order to achieve scale. We use the software Artsmesh to connect multiple cities and Ableton live to play multiple loops per node. We test the delay between each pair of nodes to derive the optimal ratios of beats per minute on each edge of the mesh. We aim for an interlocking structure that is inspired by the ancient Greek analog computer, the Antikythera Mechanism, that models the complex mechanism of the solar system. Each performance is an iteration of the same GLO process, but using different loops; each performance is a constant refinement toward the goal of a perfected, earth scale, interlocking, sonic loop machine. Syneme Labs (Dir. Ken Fields) has been playing network music for over a decade. The Global Loop Orchestra is part of a project funded by CERNET2 (China Educational Research Network). This performance is the final proof of concept for the grant, which will attempt to scale to 5-6 cities.

NOWNET ARTS CONFERENCE 2018
Network Music: Artistic and Technological Strategies for Public and Private Networks
April 19-22, 2018

Dr. Kenneth Fields is currently a Professor of Network and Electronic Music at the Central Conservatory of Music in Beijing, China. Previously, Ken held the position of Canada Research Chair in Telemedia Arts, investigating all aspects of artistic and musical performance over high-speed networks. Ken has been developing Artsmesh since 2008, a network enabled presence platform for the World Live Web.

Naithan Bosse is a composer, creative coder, guitarist, and educator from British Columbia, Canada. His doctoral research focuses on networked music performance, interactive musical environments, and computer-assisted composition.

SUNDAY APRIL 22

10:00AM-11:30AM Concert Demonstration: Double Brain
Paper: Virtual is Real
Presenters: Marek Choloniewski, Franciszek Araszkiewicz
Remote from Electroacoustic Music Studio at Academy of Music in Kraków

Double Brain (2016) is a multi-net- art composition performed live by a duo of composers/performers in a distance of several thousands kilometers. Data streams from the brain waves of both performers are crosstransmitted live between two far locations. The host performer mixes his own brain waves stream transformed live to a multilayer sound structures mixed with the images from microscopes of both performers. Mega and micro scales are the frame structure of the composition. During several performances the host performer was located at the concert hall while the second performer sent his brainwaves data from hidden locations in US and Europe.

Virtual is real is a thesis, where cognitive processes with special dedication to sound space with its visual attributes is a main reference. During presentation sound space kinetics becomes the main subject presenting selected forms of interactive art. The paper is presented in a form of gradually releasing loops with repeated material monitored by biofeedback system.

Two references are significant part of the presentation:
- GPS-Art, large scale macro urban network installation involving many locations all over the world: in Poland Kraków, Warsaw, Wroclaw and abroad: Chicago, Louisville, Pecs, Luxembourg
- biofeedback, brainwaves, micro-scale biological network projects: Cymatic Brain, Waves, Double Brain

Marek Choloniewski (born 1953, in Krakow). Composer, sound artist, performer and teacher. Head of Electroacoustic Music Studios at the Academy of Music in Krakow. Founder and President of Muzyka Centrum Art Society and Polish Society for Electroacoustic Music. Since 2011 President of International Confederation of Electroacoustic Music. Director of Audio Art Festival in Krakow. Founder of many groups and ensembles, among others Freight Train, ch&k&k, dizzy kinetics. He is author of many art projects, instrumental and electroacoustic music, sound and video installations, interactive, space/environment, audiovisual and net-art projects. He received Honorable Award of the Polish Composers Union, Award of the Ministry of Culture and National Heritage, as well as the Independent Project grant of the CEC ArtsLink in New York.

Franciszek Araszkiewicz creates instrumental, vocal-instrumental, electroacoustic and audio- visual compositions as well as interactive installations, in addition to conceptual art and film music. Studied composition at the Academy of Music in Krakow (2009-2013 under direction of Krzysztof Knittel, 2013-2015 in class of Marcel Chyrzyński). Currently continues his PhD studies in field of composition at Academy of Music in Krakow. His works have been performed at, among other, International Electroacoustic Music Festival Musica Electronica Nova 2015, the 27th 26th International Festival of Kraków Composers (2015,2014), Festival Audio Art (2015, 2014, 2011), AXES Triduum Muzyki Nowej (2012), Festival Kultura 2012 in Warsaw as well as Athens Video Art Festival 2013 (with Anna Petelenz). His interactive performance Matchpoint: Sound of Brain was presented in Munich as part of artist-in-residence in Villa Waldberta program in 2015. He is a laureate of several composers competitions (1st prize ex aequo during the 11th Tadeusz Ochlewski Competition organized by PWM Edition in 2013, for a piece Monster Group Number for soprano and electronics; 1st prize at the international Concorso di Composizione Pianistica 2014 Giorgio e Aurora Giovanni Fondazione for his work Study of Chaos for piano for four hands et al.). His awards for compositions include Avenir Grant bestowed by Arnold Schönberg Centre in Vienna, Creative Scholarship of the City of Kraków for music 2014, the Award of the Minister of Culture and National Heritage for students of arts universities for outstanding achievements in artistic creations 2014 and composer-in-residence Kulturkontakt Vienna 2016.

11:30AM-1:00PM Break

1:00PM-2:00PM Concert Demonstration: Virtual Cistern Concert
Presenter: Jonas Braasch
Remote from CRAIVE Lab at Rensselaer Polytechnic Institute and Onsite

Concert demonstration linking the conference venue and the CRAIVE-Lab at RPI to simulate the sound of the Dan Harpole cistern between both spaces. I simulated the Dan Harpole Cistern a few years ago for Pauline Oliveros and we have been using the system in many concerts and recordings. A clip of the simulation can be found here: https://youtu.be/c-vsSsFqHc8

The Fort Worden Cistern, since renamed the Dan Harpole Cistern, is a cavernous cylinder built in 1907 on a former Army base in Port Townsend, Wash. The cistern is 186 feet in diameter, made of reinforced concrete, with more pillars per square yard than a skyscraper. It was built to hold two million gallons of water and to withstand bombing.

The Collaborative-Research Augmented Immersive Virtual Environment Laboratory (CRAIVE-Lab) is a large-scale VR system with a usable floor area of 10 x 12 square meters, with a screen height of 4.3 m – see Fig. 3 and full-page diagram on Page 6. The characteristic features and combined quality of visual and audio fidelity for a collaborative system like this is unique. Unlike a traditional "cave," the system uses a front projection video system consisting of eight video projectors to produce a seamless 360-deg image. Using the front-projection design allows us to use a micro-perforated screen material that minimizes acoustical reflections off the screen, providing a superior acoustic profile. The micro-perforation also allows the placement of 128 loudspeakers behind the screen at ear height. The result is acoustical quality, with correspondingly high visual quality, that distinguishes the

CRAIVE lab from typical large-scale audio/visual virtual environments, which emphasize visual quality at the cost of acoustics. This makes the laboratory an ideal test-bed for interactive auditory models.

Jonas Braasch is an Associate Professor at the School of Architecture at Rensselaer Polytechnic Institute and teaches in the Graduate Program in Architectural Acoustics. His research interests span collaborative virtual reality systems, binaural hearing, auditory modeling, multimodal integration, sensory substitution devices, aural architecture and creative processes in music improvisation. For his work, he has received funding from the National Science Foundation, Natural Sciences and Engineering Research Council of Canada, DFG (German Science Foundation), the European Research Council, New York State Council on the Arts, the Christopher and Dana Reeve and Craig H. Neilsen Foundations. He obtained a master's degree from Dortmund University (Germany, 1998) in Physics and two Ph.D. degrees from Ruhr-University Bochum, Germany (2001, 2004) in Electrical Engineering/Information Science and Musicology. As a soprano saxophonist, he has worked with Curtis Bahn, Chris Chafe, Stuart Dempster, Mark Dresser, Zach Layton, Francisco Lopez, Pauline Oliveros, and Doug van Nort – among others. Within his saxophone practice, Jonas Braasch developed his horn of sounds concept, which is the first method for wind instruments to use different sound generators to create a palette of sounds and styles using one main instrument to achieve an enhanced awareness of internal diversity.

2:00PM–3:00PM Workshop/Presentation: Toporhythm - A technique for distributed patterns in pulse-based network music performance
Presenter: Ethan Cayko

Today's fiber optic infrastructure transmits data close to the speed of light, but even at light speed, our acuteness to sounds in time makes synchronous planetary-scale music performance a physical impossibility. This research proposes a method that calibrates latency to a rhythmic unit of time, which allows for novel restructuring of pulse-based network music. The technique, called toporhythm, creates a rhythmic topology between performers that can be utilized to compose distributed patterns. Because these patterns are heard unfolding in different orders in each local performance space, the result can be thought of as a manifold music.

Ethan Cayko is a percussionist, producer, sonic artist, and part-time farmer from Montana. He recently completed a MMus in Sonic Art at the University of Calgary studying under Laurie Radford and David Eagle. There his work focused on multichannel sound-based music and network music performance. His research in network music has been performed internationally between Canada, China, and USA and was demonstrated at the International Computer Music Conference.

3:00PM–4:00PM Presentation: Network Music at Harvestworks
Presenter: Carol Parkinson
Remote from Harvestworks Digital Media Arts Center New York

A short history of networked music experiments and productions from the Harvestworks Archives including excerpts from "The Technophobe and the Madman", the first Internet2 distributed musical.

NOWNET ARTS CONFERENCE 2018
Network Music: Artistic and Technological Strategies for Public and Private Networks
April 19-22, 2018

Presented by Carol Parkinson, Executive Director of Harvestworks and the Executive Producer of the New York Electronic Art Festival. Since 1987, she has supported the development of new technological tools for art-making and the cultivation of a new aesthetic involving sound and image in the electronic arts.

5:00PM Closing Session

NOTES: