

About SLOrk

The Stanford Laptop Orchestra (SLOrk) is a large-scale, computer-mediated ensemble that explores cutting-edge technology in combination with conventional musical contexts – while radically transforming both. Founded in 2008 by director Ge Wang and students, faculty, and staff at Stanford University's Center for Computer Research in Music and Acoustics (CCRMA), SLOrk consists of more than 20 laptops, human performers, controllers, and custom multi-channel speaker arrays designed to provide each computer meta-instrument with its own identity and presence. The orchestra fuses a powerful sea of sound with the immediacy of human music-making, capturing the irreplaceable energy of a live ensemble performance and its sonic intimacy. At the same time, the orchestra makes use of the computer's precision, possibilities for new sounds and interactions to experiment with instrument design and musical expression.

Offstage, the ensemble serves as a unique classroom that explores music, computer science, interaction design, composition, and live performance in a naturally interdisciplinary way. (It's also a cross-listed course in Music and Computer Science). SLOrk uses the Chuck programming language as its primary software platform for sound synthesis/analysis, instrument design, performance, and education.

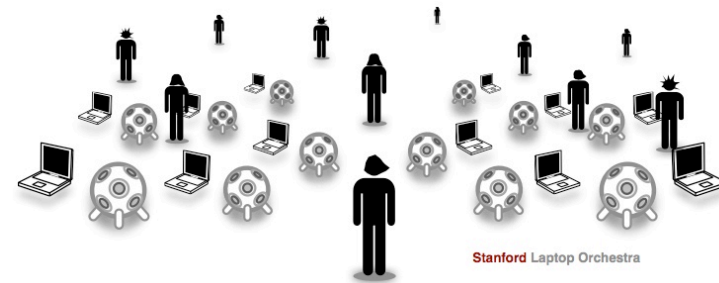
<http://slork.stanford.edu/>

Stanford Laptop Orchestra (SLOrk)

presents

SLOrk in the Bing

June 2, 2016, Thursday 7:30 p.m.
Bing Concert Hall, Stanford University



Stanford Laptop Orchestra (SLOrk)

Ensemble

Jack Atherton | Paul Batchelor | Arushi Jain | Sanjay Kannan
Giuliano Kornberg | Trijeet Mukhopadhyay | Tim O'Brien
Alison Rush | Kitty Shi | Chryssie Nanou | Ludwig Schubert
Nathan Tindall | Ge Wang | Ben Williams | Matt Wright

Ge Wang, Director

Matt Wright and Tim O'Brien, Co-Directors

Music
AT STANFORD



Center for Computer Research in Music and Acoustics,
Department of Music, Stanford University

Program

- Laptop Accordion II: Return of the Laptop Accordion**
Sanjay Kannan and Kitty Shi
- Nosferatu**..... Ben Williams and Paul Batchelor
- Include Children When Baking Cookies**
Ludwig Schubert, Nathan Tindall, Ben Williams
- Converge (2010-2016)** Jieun Oh and Ge Wang
- rehearsal** Chryssie Nanou and Sanjay Kannan
- Traum** Jack Atherton, Giuliano Kornberg, and Alison Rush
- packets** Nathan Tindall
- Hello?** Arushi Jain, Kitty Shi, Ludwig Schubert
- Big Ensemble Feedback Network** Matt Wright
- Nomadic Hues** Nathan Tindall and Trijeet Mukhopadhyay
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Laptop Accordion II: Return of the Laptop Accordion

Sanjay Kannan and Kitty Shi

This time, the joke's gone way too far. Just when you thought one accordion was ridiculous, wait until you see two people contorting their laptops beyond a mechanical engineer's worst nightmare, and quite possibly producing some palatable sounds in the process.

Nosferatu

Ben Williams and Paul Batchelor

*"One dreams deeply in this desolate castle,
but don't let that frighten you."*

Nosferatu is a live orchestration of a series of clips taken from the 1922 silent film *Nosferatu: A Symphony of Horror*, telling the story of Thomas Hutter's encounter with the diabolical vampire Count Orlok. Haunting strains of melody, the scurrying of creatures hidden in the shadows, sinister brass swells, and the echoes of dripping blood come together to provide a unique soundtrack to this classic tale.

Include Children When Baking Cookies

Ludwig Schubert, Nathan Tindall, Ben Williams

Inspired by newspaper headlines that have been shortened to a degree where they become ambiguous, this piece presents a careful exploration of a single 10 second Sitar sample.

The three players control granular synthesis in pitch, time, and volume-space, interpreting and re-interpreting the sample to generate a wide, evolving range of sonic situations. It focuses on a delicate interplay arising at the border of the intentional and the unintentional.

Set on a free-time score, this study of "ambiguous news" develops through gestures between the players, from the introduction of the instrument through various expressions to a calm, 7 octave spanning glide: when all uncertainty resolves into a single, unambiguous pitch.

Converge (2010-2016)

Jieun Oh and Ge Wang

By sheer volume, *most of life* is lived not at the extremes of happiness or despair and sadness – but somewhere in the middle. *Converge* is a *celebration* of the "mundane middle" and "ordinary" moments of life. It's not to say these are without value – in fact quite the opposite: there is a beauty to these moments... because they *are* life.

Converge is an "omni-biographical" composition that began as an invitation in 2010 for participants to record everyday moments, each consisting of a photograph, a short audio recording, and a brief text description. These are collected using a simple mobile app that also recorded the time and location, and uploaded to a central repository. This source material is reinterpreted through the "audiovisual blender" of the computer. The swirling visual and sonic fragments are literally and metaphorically cut from the cloth of these ordinary moments, speaking to the impermanence and fragility of memory in time. The specific memories that coalesce are marked in time relative to here (Bing Concert Hall) and now, reminding us that these moments are constantly moving away from us. In a way, we can all relate to them, even if they are not our own. Hence we call this as an "omni-biographical" work.

When we first performed this piece in 2010, no moments were older than a few weeks. Those same moments are now 6 years old (and counting), as new material has since been added.

rehearsal

Chryssie Nanou and Sanjay Kannan

A conductor and 11 players set up to rehearse a piece on their laptops. Luciano Berio's *wasserklavier* excerpt (1965) of *6 encores pour piano*, has been pre-recorded and re-arranged to be able to play back the MIDI data through the laptop ensemble.

Traum

Jack Atherton, Giuliano Kornberg, Alison Rush

This piece turns a classic nursery rhyme on its head. Solo instruments serve as the bedrock, presenting each phrase of the song as the piece travels through four movements. Background instruments provide additional chaos with ethereal echoes, while two accompanists produce percussive sounds with guiding gestures. These elements distort this nostalgic childhood memory into something strange. Can you guess the tune?

packets

Nathan James Tindall

Travelling from one endpoint to another on the Internet, packets of data take a number of hops through the network through routers, switches, and other "middleboxes." The profiling tool `traceroute` exposes the amount of delay that exists between the client endpoint and each middlebox. In this piece, network data from one laptop is captured and then sonified on an instrument for laptop ensemble constructed of virtual strings whose tunings are mutated by the amount of delay between the host and each hop in the network. The network topologies corresponding to several different endpoints are explored throughout the piece, creating sonic changes in the instrument.

Hello?

Arushi Jain, Kitty Shi, Ludwig Schubert

Hello? explores sonic elements of the communication age; sounds which are designed to grab attention and which engulf us in a constructed social fabric of telecommunication technology. In order of historical development we explore Morse code, impulse dial, dual tone modulated frequency, and modern IM in a reverberating soundscape of "connecting" and "engaging" noise.

Big Ensemble Feedback Network

Matt Wright

Ensemble Feedback Networks is a structured musical improvisation, where a variable number of players excite and control a sparsely-connected feedback delay network. This idea, the technology behind it, and a series of performances of realizations of this idea were the result of 2+ years of development by the CREATE Ensemble at UC Santa Barbara that Matt Wright founded and directed, and were presented to the public via a paper and well-received performance at the 2015 New Interfaces for Musical Expression conference in Baton Rouge, LA.

Each of our potentially unique personal instruments manipulates a received audio input, and incorporates it into the output. Our default instrument is a simple delay line that echoes what it "hears," with keyboard-controllable slewing changes to the delay time that introduce pitch and spectral shifts.

A digital patching matrix creates various connection topologies among the ensemble by mixing the instruments' outputs to form each instrument's input. Towards transparency, we present visualization of connection topologies and of each instrument's input/output (including spectrogram and estimates of I/O volume differential for quick and smooth timescales) to the audience.

Topologies with loops create feedback and can seem like a single group instrument whose behavior vitally depends on each performer's actions. This raises several issues: How do humans cybernetically adapt to these dynamic topologies? How to adapt our personal dynamics to the radical democratization of everybody's sound going through everybody's instruments and each member having a vital role with (some) total control at all times? What is the relationship between managing a complex system versus being managed by the system? How much control can we have over a densely-connected system? How do these challenges affect our musicianship?

Tonight's 13-person instantiation of this idea will be the largest so far.

Nomadic Hues

Nathan Tindall and Trijeet Mukhopadhyay

Nomadic Hues is an audiovisual odyssey in which souls align to imprint themselves on a new world, discovering meaning through unity and disparity.

I. Discovery	II. Harmony	III. Blossom	IV. Ballet
V. Arpeggio	VI. Glitch	VII. Rebirth	VIII. Rain
IX. Traffic	X. Settle	XI. Civilization	XII. Dust

Stanford Laptop Orchestra 2016

Jack Atherton is an incoming PhD student at CCRMA. His work includes new instrument design, programming language research, and music information retrieval. In his spare time, he enjoys building musical sculptures, riding roller coasters, and practicing his gymnastics skills.

Paul Batchelor likes to make sound.

Arushi Jain is a senior studying computer science. She is interested in governmental and financial uses of technology for social welfare, as well as documentaries on human rights. Arushi has trained vocally in hindustani classical music, and loves that she is now creating music with her laptop.

Sanjay Kannan is an undergraduate studying computer science at Stanford. He likes computers, music, and the German language in no particular order, but preferably at the same time.

Giuliano Kornberg, originally from Minnesota, is a current Master's student in Music, Science, & Technology. He also received his undergraduate degree from Stanford in Music with Honors, with a concentration in Percussion Performance. While at Stanford, he performed in the Stanford Symphony and Philharmonia Orchestras, the Stanford Wind Symphony, the Stanford New Ensemble, and the Stanford Percussion ensemble, and performed recitals and organized chamber music projects, winning numerous awards for his musical excellence and entrepreneurial endeavors. He has had a blast this quarter as a member of SLOrk!

Trijeet Mukhopadhyay is junior at Stanford who loves exploring the intersection of design, technology, and art. He discovered SLOrk in his freshman year, and has been trapped there ever since, questioning what it means to make computer music.

Pianist **Chryssie Nanou** is active as a performer, lecturer, and teacher of piano performance, music technology and contemporary performance practice. Born in Greece, Chryssie's personal and professional aesthetics were formed in Paris and further shaped in the United States with her studies at the Ecole Normale de Musique de Paris / Alfred Cortot and The Peabody Institute of The Johns Hopkins University, and her work at the Stanford University's CCRMA. As a solo artist, chamber musician and lecturer, Chryssie has given performances and lectures around the globe giving special emphasis to the performance practices necessary to perform today's acoustic and electro-acoustic contemporary music.

Tim O'Brien is a Ph.D. candidate at CCRMA. His interests include musical neural networks, signal processing, music information retrieval, and spatial audio.

Alison Rush is a second-year M.S.T. Masters student at CCRMA, a multimedia artist, performer, and instrument maker. She holds a B.A. in Psychology and Linguistics from Columbia and was co-founder of Nyx Records in Merced, CA. Rush is intrigued by the GameTrak's potential to create - and to destroy - thoroughly nonverbal and embodied narratives, and aims in her work to explore the boundaries of chaos and concord .

Ludwig Schubert is a master's student in computer science at Stanford. He usually works in graphical media—code, photography, print, visualization—and is excited to extend his work with computers to the acoustic medium.

Kitty Zhengshan Shi is a PhD candidate at CCRMA. She is a musician and a music technologist. Kitty is interested in interactive sound design, and machine listening.

Nathan James Tindall is a current student at Stanford studying computer music at CCRMA through the Symbolic Systems program. He is also pursuing a master's degree in computer systems. He enjoys puzzles, small utensils, and the vague.

Ge Wang works at the intersection of art, technology, and design. He creates tools, toys, and instruments with computers, with the aim of connecting people to musical expression. Ge is an Assistant Professor at Stanford University's CCRMA and the designer of Chuck music programming language, Ocarina and Magic Piano for mobile phones, and instruments for laptop orchestra. He is the founding director of SLOrk and the Co-founder of Smule, a mobile music startup (reaching over 125 million users). Recipient of a 2016 Guggenheim Fellowship, Ge is currently writing/designing a book on the artful design of technology, to be published by Stanford University Press.

Benjamin Williams is a master's student at CCRMA, specializing in musical human-computer interaction.

Matthew Wright is a media systems designer, improvising composer/musician, computer music researcher, and the Technical Director of CCRMA. His research centers on real-time mapping of musical gestures to sound synthesis along with modeling of the perception of musical rhythm. He was the Research Director of UCSB's Center for Research in Electronic Arts and Technology for eight years, where he taught classes, advised students, founded and directed the CREATE Ensemble dedicated to research and musical creation with technology in a live performance context (which he still directs remotely).