

SCREAM FESTIVAL: THE KARMETIK MACHINE ORCHESTRA

JANUARY 27, 2010 | 8:30 PM

presented by

REDCAT

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California Institute of the Arts

CALARTS



SOUTHERN CALIFORNIA RESOURCE FOR ELECTRO-ACOUSTIC MUSIC (SCREAM) FESTIVAL

WEDNESDAY, JANUARY 27, 2009 | 8:30PM

The KarmetiK Machine Orchestra

Music Director, Co-Creator: Ajay Kapur

Production Director, Co-Creator: Michael Darling

Guest Electronic Artists: Curtis Bahn, Perry Cook

World Music Performers: Ustad Aashish Khan, Pak Djoko Walujo, I Nyoman Wenten

Multimedia Performer-Composers: Charlie Burgin, Dimitri Diakopoulos, Jordan Hochenbaum, Jim Murphy,
Owen Vallis, Meason Wiley, Tyler Yamin

Visual Design: Jeremiah Thies

Lighting Design: Tiffany Williams

Dancers: Raakhi Sinha, Kieran Heralall

Sound Design: John Baffa

Production: Lauren Pratt

PROGRAM

Digital Sankirna

Ajay Kapur, ESitar; Curtis Bahn, EDilruba

Voices

Perry Cook, SqueezeVox; Curtis Bahn, ESitar; Ajay Kapur, ESitar, Charlie Burgin, electronics; Jim Murphy, Helio;
Meason Wiley, MLGI

Mechanique

Perry Cook, SqueezeVox; Curtis Bahn, Encoder Controller; Ajay Kapur, ESitar; Charlie Burgin, electronics; Jim
Murphy, Helio; Jordan Hochenbaum, Owen Vallis, Arduinome; Meason Wiley, MLGI

Sitka Chant

Ajay Kapur, ESitar; Curtis Bahn, Edilruba; Perry Cook, DigitalDoo; Charlie Burgin, electronics; Dimitri Diakopoulos,
electronics; Jim Murphy, Helio; Jordan Hochenbaum, organ; Owen Vallis, Arduinome; Meason Wiley, MLGI, piano

Twilight

Ajay Kapur, ESitar; Perry Cook, SqueezeVox, DigitalDoo; Curtis Bahn, ESitar; Charlie Burgin, Dimitri Diakopoulos,
electronics; Jim Murphy, Helio; Jordan Hochenbaum, Owen Vallis, Arduinome; Meason Wiley, organ and piano.
Robot-inspired contemporary Indian Dance by Raakhi Sinha and Kieran Heralall

Shiva

Ustad Aashish Kahn, sarod; Curtis Bahn, Edilruba; Ajay Kapur, Robots; Charlie Burgin, electronics;
Jordan Hochenbaum, organ; Meason Wiley, MLGI and piano

Tari Topeng Dalem Arsa Wijaya

Gamelan Performers: I Nyoman Wenten, Djoko Walujo, Nanik Wenten, Hiroataka Inuzuka, Anna Robinson, Jessica
Ross, Joe Santa Maria, Adrian Tenney, Tyler Yamin, Ajay Kapur; Charlie Burgin, electronics

PROGRAM NOTES

Digital Sankirna

Digital Sankirna is an introduction to the Machine Orchestra in two movements. Ajay Kapur directs movement one with his ESitar, while movement two is led by Curtis Bahn and his EDilruba. Both performers interact and improvise directly with the robotic ensemble through their modified digital instruments.

Voices

Voices showcases the musical interfaces used in the Machine Orchestra with an emphasis on vocal synthesis techniques.

Mechanique

This piece explores the ability to pair many different types of musical interfaces with the robotic ensemble. Performers are in direct control of approximately 5 to 6 different systems across Tammy, the MahaDeviBot, and the GanaPatiBot. Musically, this piece uses the robotics to create an industrial texture.

Sitka Chant

Influenced by the Indian raga Yamen, *Sitka Chant* features the entire Machine Orchestra.

Twilight

Twilight is another full Orchestra song based on the Indian raga Bharivi.

Shiva

Set in Indian raga Shivranjani.

Tari Topeng Dalem Arsa Wijaya

Topeng Arsa Wijaya is the dance of the *dalem*, or king character in Topeng, the Balinese masked dance-drama. No matter which story is chosen (usually from the *Babad*, the semi-legendary chronicle of the Balinese kings), this type of character is always present, and is danced in the same way, with the same style of mask. The dance is done in the *halus*, or refined style, as seen in the king's careful movements and his white mask. The music is based on a 64-beat melody that, once begun, keeps repeating for the duration of the piece. However, it is articulated in one of three different speeds. The robot used tonight to express the *reong* part was built by Tyler Yamin with the assistance of Ajay Kapur and the music technology program.

What is the Machine Orchestra?

Global music forms meet the digital surge of the 21st century as the KarmetiK Machine Orchestra, directed by Ajay Kapur, convenes an international lineup of musicmakers, engineers and digital artists who use custom-built robotic instruments and new and expressive interfaces in live music performance. This one-of-a-kind performance features new compositions melding musical tradition with modern engineering.

KarmetiK

KarmetiK is a think tank of artists and engineers exploring a digital renaissance, seeking to question and redefine the boundaries between music, the visual arts, and technology. KarmetiK hosts a collection of hardware and software researchers interested in combining recent advancements in robotics, human computer interaction, artificial intelligence, and embedded computing to create novel products and new works of digital art. Originally a company focused on the musical arts, KarmetiK continues in this vein by releasing and promoting new music by artists who seek to create and use the latest in sonic technology for composition and performance.

INTERFACES

The ESitar

The Electronic Sitar (ESitar) is a new hyperinstrument combining the traditional craft of India with hardware and software that enables a performer to natively interface with a laptop. The ESitar uses variety of custom sensors positioned for traditional Sitar technique, converting human musical gestures to MIDI and OSC which software interprets in real-time. Ajay Kapur and Curtis Bahn are both playing ESitars of their own design.

The EDilruba

Pioneered by Curtis Bahn, the Electronic Dilruba (EDilruba) is a sensor-enabled classical Indian Dilruba that interfaces with a human performer through Max/MSP.

The Arduinome

The Arduinome project is a collaborative effort to create a clone of the popular Monome button-controller using the Arduino microcontroller. At its core, the Arduinome is an 8x8 grid of lighted buttons which react in different ways depending on the user-programmable software it runs. Jordan Hochenbaum and Owen Vallis were responsible for creating the Arduinome, while Brian Crabtree created the original Monome.

The MLGI

The Multi-Laser Gestural Controller (MLGI), developed by Meason Wiley, is a musical controller which uses reflective laser light to send control messages that can be used to control music and sound. The interface is a collection of 6 lasers aiming upwards, with light-sensitive photocells situated next to each laser. The user or performer is able to reflect light from his or her hand from the laser onto the photocell, generating a continuous stream of data.

Hemispherical Speakers

Inspired by the Princeton and Stanford Laptop Orchestras, the speaker pods are hemispherical enclosures with six speakers mounted in each. The Machine Orchestra uses 10 of these speaker pods to create an ensemble of highly spatialized sound.

The SqueezeVox

Developed by Perry Cook, the SqueezeVox Maggie is a musical controller based on an eviscerated Irish concertina. The reeds and buttons of the original accordion were replaced with air pressure sensors, tilt/acceleration sensors, force sensors, linear and rotary potentiometers, a total of 41 buttons and switches, and a micro-controller. The interface controls vocal synthesis models written in the Chuck language, and the sound is projected through the NogginSonix cranial speaker array.

The DigitalDoo

Perry Cook's DigitalDoo augments the ancient aboriginal lip-driven instruments with a sleeve outfitted with tilt and pressure sensors, rotary potentiometers, and switches. The acoustic sound of the DigeriDoo is captured and modified by a variety of signal processing effects, and projected through the SnorkelPhonix speaker array. The sensors on the DigitalDoo sleeve are used to control the signal processing. The sensors also control the robots during *Mechanique*.

Helio Designed by Jim Murphy, The Helio is a series of eight linear touch sensors which allow gestures to be converted into musical information. Its upright playing stance allows for audiences to clearly view control input while its minimalist design results in easily tangible performance paradigms. The Helio interacts with custom-designed computer software.

ROBOTS

Tammy

Tammy is a robotic creation envisioned by students at CalArts under the guidance of the world-famous instrument sculptor Trimpin, Michael Darling, and Ajay Kapur. Students of the Robotic Design class engineered three distinctive instruments making up Tammy's body, including a handcrafted and tuned marimba, a self-plucking drone device, and 5 bells. The marimba was tuned to a D pentatonic scale using custom-machined pieces of rosewood and struck by push solenoids mounted behind each block. The bells were struck using rotary solenoids and re-purposed from parts of aluminum gate posts and the bell from an old rotary phone. The percussive string instrument on Tammy is designed using a fan motor from a broken fan to strum the string, with two push solenoids to change the pitch of the string by intersecting the string in two locations. Built using recycled objects found in the Apex electronics junk yard and classrooms at the Institute, Tammy stands six feet tall with 14 actuators (and counting!).

The MahaDeviBot

The MahaDeviBot is a mechanical musical instrument which extends North Indian musical performance scenarios while demonstrating advanced methods of robotic drumming. The development of the MahaDeviBot serves as a paradigm for various types of solenoid-based robotic drumming techniques, striking 12 different percussion instruments gathered from around India, including frame drums, bells, finger cymbals, wood blocks, and gongs. The Bot also has a moving head which, at the performer's request, will bounce to the tempo.

The GanaPatiBot

The GanaPatiBot is a re-engineered successor to the MahaDevi. Each drum has multiple solenoid systems for striking, allowing for a variety of musical textures as well as increasing roll speed. GanaPati also has a series of solenoid-powered noisemakers that enables the bot to play a variety of percussive sonic textures.

The Reyong Bot

The reyong, a musical instrument used in Balinese gamelan, is a series of upside-down metal pots suspended on a wooden frame. Influenced by Eric Singer's Gamelatron, the Reyong Bot is powered by seven solenoids that act in a dual role as beaters and dampers.

Raina

Designed by Michael Darling and Mark Taylor, Raina, our robotic rainstick, stands 8 feet tall and is constructed from a long piece of PVC pipe. The pipe is plugged with over fifty dissecting lateral sticks which rattle sand, lentils, and BB gun pellets as the pipe is slowly turned around by a chained DC motor.

PEOPLE

Curtis Bahn is a composer and improviser who specializes in live interactive electronic performance. Currently he is Associate Professor of Computer Music Composition/ Performance, and Director of the Integrated Electronic Arts (IEAR) Studios at Rensselaer Polytechnic Institute in Troy New York. He received his Ph.D. in music composition from Princeton University. From 1986–1993 he was the Technical Director of the Center for Computer Music of the City University of New York where he worked and studied with composer Charles Dodge.

Charlie Burgin (aka Sahy Uhns) is an electronic music and hip-hop producer. Always on the search for new sounds, his music is composed with the help of his custom designed software, hardware, and modified instruments. A compulsive music-maker, Charlie's hip-hop pulses with organic rhythms combined with complex synthesis and audio

processing while his IDM-influenced sounds evoke nostalgia through their pure melody and intricate rhythms. A multi-instrumentalist, Charlie regularly includes recordings of his own percussion and guitar performances in his tracks. Charlie's attention to detail doesn't stop with his studio tracks: his live performances brim with focused energy, engaging the audience with live electronic drumming, scratching, and multiple music interfaces. He is currently studying at CalArts in the Music Technology program.

Perry Cook is a Professor of Computer Science, cross-appointed in Music, at Princeton University, where he runs the Princeton Sound Lab. A recognized expert in computer audio, Perry co-developed Chuck with Ge Wang (and others) at Princeton. Perry is also the co-founder of PLOrk (the Princeton Laptop Orchestra). Perry received his Ph.D. and M.S. in Electrical Engineering from Stanford University, a B.S. in Electrical Engineering and a B.A. in Music from the University of Missouri in Kansas City.

Michael Darling graduated from the Pacific Northwest College of Art with a degree in sculpture and printmaking. Professionally he has spent the last 16 years working in theater and themed entertainment as a fabricator, technical director and scene designer with such theater artists and groups as Richard Foreman (The Ontological Theater), The Foundry Theater, And How... and The Target Margin. He has worked on productions in New York, Los Angeles and theater festivals worldwide including The Barbican Festival, The Vienna Festival, Zürich Theater Spektakel, The Singapore Theater Festival, The Holland Festival, The Spoleto Festival and most recently The Sydney Theater Festival. Michael Darling has been a faculty member and head of technical direction in the CalArts School of Theater since 2009.

Dimitri Diakopoulos is a designer, programmer, and musician. Using code as a tool for artistic power, his work revolves around designing interactive musical and visual systems. These systems are visible through his work in games, installation pieces, and tools for music performance and production. Strongly influenced by recent work in data visualization, human-computer interaction and user interface design, his work seeks to synthesize these diverse fields into a single, hybrid multimedia aesthetic. He currently resides in the greater L.A. area and is pursuing a Bachelor of Fine Arts in Music Technology at the California Institute of the Arts.

Jordan Hochenbaum is a musician and multi-media artist concerned with the notion of finding meaningful connections between music, art, and technology. Currently, Jordan is pursuing his Ph.D. in Sonic Arts at Victoria University of Wellington, New Zealand. A musician at heart, Jordan's interests involve designing new musical interfaces for live performance, analog and digital electronics, and playing/composing in a wide range of musical genres and instruments. Jordan's work has been featured online and in print, including *Wired* magazine, and at international festivals and conferences including Google I/O and Berlin Open 2009.

Embracing the age of human computer interactivity, **Ajay Kapur** blends classical Indian music theory with a modern electronic, experimental music. Ajay's custom electronics are used to bring melody, harmony, dance and tribal beats into the 21st century. Kapur is currently the director of Music Technology at the California Institute of the Arts. He is also a Lecturer of Sonic Arts at the New Zealand School of Music at Victoria University of Wellington. He received an Interdisciplinary Ph.D. in 2007 from University of Victoria combining computer science, electrical engineering, mechanical engineering, music and psychology with a focus on intelligent music systems and media technology. Ajay graduated with a Bachelor of Science in Engineering and Computer Science from Princeton University in 2002. He has been educated by music technology leaders including Dr. Perry R. Cook, Dr. George Tzanetakis, and Dr. Andrew Schloss, combined with mentorship from robotic musical instrument sculptors Eric Singer and the world-famous Trimpin. A musician at heart, trained on drumset, tabla, sitar and other percussion instruments from around the world, Ajay strives to push the technological barrier in order to explore new sounds, rhythms and melodies.

Aashish Khan is considered among the top handful of India's greatest living sarod players. Initiated into North Indian classical music at the age of five by his grandfather, the legendary Acharya Baba Allauddin Khan, exponent of the "Senia Beenkar" and "Senia Rababiya" Gharana, his talim (training) continued under the guidance of his father Ustad Ali Akbar Khan, and his aunt, Smt. Annapurna Devi, presently the leading exponents of the "Senia Gharana", in the Beenkar and Rababiya anga of the Druvapada style. Aashish gave his first public performance at the age of 13, with his grandfather, on the All Indian Radio "National Program", New Delhi, and in the same year, performed with his father and his grandfather at the "Tansen Music Conference", Calcutta. Besides his virtuosity as a traditional sarodist, Aashish was a pioneer in the establishment of world music genera, as founder of the Indo-American musical group Shanti in 1969/70 and later, the fusion group, The Third Eye; he was the first to compose a Sarod Concerto in "raga" form. In 1989, Aashish was appointed to the prestigious post of the Composer and Conductor for the National Orchestra ("Vadya Vrinda") of All India Radio, New Delhi, succeeding such musical stalwarts as Pandit Ravi Shankar and Pandit Pannalal Ghosh. Aashish has collaborated with such diverse western musicians as John Barham, George Harrison, Ringo Star, Eric Clapton, Charles Lloyd, John Handy, Alice Coltrane, Emil Richards, Dallas Smith, Don Pope, Jorge Strunz, Ardeshir Farah, and the Philadelphia String Quartet. While pursuing a busy career as a concert artist and composer, he teaches students throughout the U.S., Canada, Europe, and Africa, as well as India, and is on the faculty of the Herb Alpert School of Music at CalArts.

Jim Murphy is an audiovisual artist and inventor. His interests include data visualization, generative art, electromechanical sculpture, and sound design. Growing up in New Mexico, Jim seeks to integrate the beauty of the region's desolation and solitude into his work. Jim's longtime fascination with sound synthesis led him to teach himself soldering in order to build a modular analog synthesizer. A desire to accompany his sonic experimentation with fitting visuals led him to explore pre-rendered and realtime music visualizations, often focusing on generative and pseudo-random techniques. A keen interest in electronic hardware has led Jim to build music synthesizers and interfaces that take advantage of the best that electronics of both today and yesteryear have to offer.

Jeremiah Thies is a Video Designer and Technical Director. Projects include: Video Designer, *AH! Opera-No Opera*; Production Supervisor, *Baby It's You*; Production Supervisor, *Back to Bacharach* and *David*; Technical Director, *Pageant of the 4 Seasons—a 99¢ Only Modern Something*; Project Manager, *light/HANGAR*; Technical Director, *Blue Moon*; Set Designer/Technical Director, *American Magic*; Technical Director, *Il Tabarro/Vollo Di Notte*. He is currently the Associate Technical Director at CalArts.

Owen Vallis is a multi-media artist interested in exploring tangible methods for direct interaction with digital media. His work has been featured in *Wired* magazine, on Processing.org, and shown at events such as NASA's Yuri's Night, Google I/O, and the Berlin Open conference in 2009. Having graduated from California Institute of the Arts, Owen is currently pursuing his Ph.D. in Sonic Arts at Victoria University of Wellington, New Zealand.

Pak Djoko Walujo studied music at the Indonesian Arts Institute and law at the University of Gajah Mada in Yogyakarta, Java. He has been a music professor at the Indonesian Arts Institute from 1975 until coming to CalArts as a Visiting Artist in 1992. He studied gamelan music from an early age with many well known teachers, including Raden Lurah Dhamowijoyo, Raden Ngabehi Prawira Pangrawit, Raden Mas Handoyo Kusuma, Bapak Harjaswara, Bapak Sunardi Wisnubrata, Bapak Promono, Bapak Hadi Sumarta and K.R.T. Wasitodiningrat, who formerly also taught at CalArts. He has performed widely, composed music for dance and drama and received awards from the Javanese Ministry of Education, Governor of the Special Region of Yogyakarta, The Radio Republic of Indonesia and the governor of Central Java.

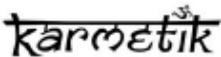
Nyoman Wenten is one of Bali's most accomplished and versatile dancers and musicians, and is celebrated as a teacher and performer. He is known not only for his work in traditional Indonesian music and dance, but also for his creative east-west fusion of composition and performance work. A traditionally-trained Balinese musician-actor-dancer, he was born in Sading village near the Balinese capital of Denpasar, to a family with several generations of musicians and artists. His earliest studies were with his grandfather, who was a master puppeteer, musician and dancer.

Meason Wiley is an electronic musician and visual artist based in Los Angeles. A multi-instrumentalist, he received his B.F.A. in Music Technology from the California Institute of the Arts, where he currently serves as a graduate teaching assistant under the guidance of Ajay Kapur. He received his first publication from the NIME Conference in 2009 for his design of an open source and modular gestural controller called the MLGI. His work focuses on various aspects of music technology including software design, sound design, instrument and interface design, electronic composition and new technologies for multimedia. He is also interested in bridging the world of multimedia technology with environmental sustainability. As a musician, he is currently exploring various computer-based generative and algorithmic processes, but continues to work with both traditional and hybrid interactive musical composition.

Tyler Yamin is a multi-instrumentalist studying World Music at California Institute of the Arts. He primarily studies the music of Bali with Nyoman Wenten, focusing on extending traditional performance practices with the help of the reyong robot.

MADE POSSIBLE BY

This event is supported in part through *Subito*, the quick advancement grant program of the San Francisco Bay Area Chapter of the American Composers Forum; and the Durfee Foundation Artists' Resource for Completion Grant.

The logo for Karmetik, featuring the word "Karmetik" in a stylized, handwritten font with a small decorative flourish above the letter 'i'.The logo for Machine Orchestra, with the word "MACHINE" above "ORCHESTRA" in a bold, sans-serif font, and a solid black circle to the left of the word "ORCHESTRA".

CREDITS

Sound: John Baffa, Steve Rusch, and Peter Gonzales **Cinematography:** Benny Schuetze, Steve Gunther and Leila Navon **Robotic Mentorship:** Trimpin and Eric Singer **Robotic Fabrication:** Matthew Setzer, Mark Taylor, Stephen Rusch, and Jeffrey Lufkin **Laptop Orchestra Mentorship:** Dan Truman, Ge Wang, and Perry Cook. **Special Thanks:** Barry Schrader; Hilary, Sophie and Zuzu Darling; Arun, Meera and Asha Kapur; Amy Raymond; Jeffery Arbuckle; Jordan Woods-Wahl; Daniel Goldenshtein; The CalArts Theater School and the Herb Alpert School of Music at CalArts; The CalArts Sceneshop; Ellen McCartney and Leslie Tamaribuchi; all the students in the CalArts Technical Direction and Music Technology programs; Eric Nolfo; Bill Ballou and the entire REDCAT staff; Lars Jan; Jonney Ahmanson; Matthew Mellinger; and David Rosenboom.