# Troy S. Rogers
## Curriculum Vitae

## EDUCATION

**University of Virginia**. PhD candidate, Composition and Computing Technologies. Advisor: Ted Coffey. Dissertation: Expressive Machines: Creating and composing for inventive robotic musical instruments [Working Title]. Expected graduation: May 2015.

**University of Oregon**. M.M. in Intermedia Music Technology. Terminal Creative Project: PercusBot: creation of a computer-controlled robotic percussion ensemble and composition of a concert work for this ensemble. Supervising professor: Jeffrey Stolet (2001-5).

**St. Cloud State University**. B.A. in Music Composition and Theory. Advisor: Scott L. Miller (1995-2000).

## TEACHING EXPERIENCE

**Lecturer in Music**, School of Architecture, University of Virginia. Co-taught Listening to the Lawn with Karen Van Lengen. Funded by a grant from the Jefferson Trust Foundation, this studio-based interdisciplinary seminar included students from Architecture, Music and Computer Science. The course participants creatively interpreted the aural characteristics of the Thomas Jefferson's Academical Village at the University of Virginia, which for the past 200 years has been primarily celebrated and documented as a visual achievement. The aural character of this special place reveals a complex set of communicative spaces that support a diversity of relations, between nature and culture, between the public and private realms and between the various institutional partners at the University.
http://soundscape.iath.virginia.edu/ListeningToTheLawn

**Lecturer in Music**, Music Department, University of Virginia. Taught Introduction to Music and Computers, an introductory, composition-focused undergraduate course, supervising one graduate teaching assistant (Spring 2013).

**Instructor**, Music Department, University of Virginia. Served as sole instructor for summer courses: Basic Musical Skills (2007, 2009) and Introduction to Computers in Music (2008).

**Graduate Teaching Assistant and Instructor**, Music Department, University of Virginia. Ran labs and discussion sections and assisted professors for courses including: Musicianship, Introduction to Computer Music, American Musical Mavericks, Technosonics, Computer Sound Generation and Spatial Processing, and Interactive Media (2006-2009).

**Teaching Assistant**, Robotic Ecologies, a UVa School of Architecture seminar taught by Jason Johnson in collaboration with Matthew Burtner's 'Emergence' graduate music seminar. Held workshops on physical computing and electronics and assisted students with collaborative projects. http://robotic-ecologies.blogspot.com (Spring 2008).

**Graduate Teaching Fellow**, School of Music, University of Oregon. Taught beginning electronic music techniques courses covering fundamentals of electroacoustic music and MIDI, using software including Max, Kyma, and ProTools (2003-5).

## ARTISTIC and RESEARCH EXPERIENCE

**Instrument designer, composer, and managing partner**, Expressive Machines Musical Instruments, LLC. Lead instrument designer for MARIE (Monochord-Aerophone Robotic Instrument Ensemble), TAPI (Transportable Automatic Percussion Instrument), MADI (Multi-mallet Automatic Drumming Instrument), and PAM (Poly-tangent Automatic (multi-

)Monochord). Composition of numerous pieces for the ensemble, public presentation, and organizational management. http://www.expressivemachines.com (2007-present).

**Composer and audio analysis and visualization consultant**, Institute for Advanced Technology in the Humanities, University of Virginia. Analysis, visualization, and transformation of digital audio recordings from various architectural spaces in conjunction with IATH Resident Fellow Karen Van Lengen's *Soundscape Architecture* project. (2012-2013). http://soundscape.iath.virginia.edu

**Designer,** Cardboard Safari, Charlottesville Virginia. 2D and 3D design, prototyping, and maintenance of laser cut 3D puzzles/home furnishings from cardboard and other materials, utilizing various software tools including Autocad, Rhino, Grasshopper, Corel Draw, Adobe Creative Suite, and others. (2012-2014). www.cardboardsafari.com

**Fulbright Research Fellow**, Logos Foundation, Ghent, Belgium. Composition, instrument design, and instrument construction for one of the world's oldest and largest robot orchestras, under the direction of Godfried-Willem Raes. Composed pieces for instruments of the Man & Machine Robot Orchestra. Assisted in the design, construction, and maintenance of new and existing robotic instruments. Designed a novel robotic instrument: Stemmetje (Dutch for 'little voice'), a singing, speaking robot based on automated tunable Helmholtz resonators (2009-10). www.logosfoundation.org

**Programmer and consultant**. Projects for artists and researchers, including a port of Judith Shatin's composition *Kairos* for flute and interactive electronics to Cycling74's Max/MSP environment, and an analysis application for Bobby Parmar to analyze pitch and other attributes of original audio recordings from the Milgram experiment on obedience to authority figures. (2006-present).

**Assistant Director**, MICE (Mobile Interactive Computer Ensemble), an ensemble that has grown into a 200-500 person human/computer orchestra under the direction of Matthew Burtner. http://ccrma.stanford.edu/~mburtner/MICE.html (2008).

**Instrument designer and fabricator**, Alvin Lucier Festival, McIntire Department of Music, University of Virginia. Led and coordinated the design and construction of instruments for the realization of Alvin Lucier's "Music for Solo Performer" and "Music on a Long Thin Wire" during his residency at the University of Virginia (2006).

**Composer/Researcher**, Computer and Information Sciences, University of Oregon. Worked with Anthony Hornof in the Cognitive Modeling and Eye Tracking Lab on the EyeMusic project. Programmed and composed sonifications of eye movement data and a real-time audio-visual eye-tracking composition in Cycling74's Max/MSP/Jitter software environment, research supported by the National Science Foundation (2005).

## ORGANIZATIONAL EXPERIENCE

**Concert Curator**, 9th Sound and Music Computing Conference, Aalborg University Copenhagen. With EMMI. Solicited and selected proposals from composers for new works for robotic musical instruments created by EMMI, provided technical assistance to composers in creating new works, developed composers' guide manual for instruments, produced concert of the resulting new works.

**President,** Friends of Brad Memorial Foundation. Director of a non-profit group organized for charitable and educational purposes, to celebrate and cultivate young musicians in Minnesota. Direction, grant-writing, program design and administration, community relations. (2010-present).

**Artistic Director,** BradFest. Artist curation, stage management, spokesperson, fundraising, grounds management, and co-direction of an annual weekend-length music festival that brings local and national musicians from a variety of genres together at a non-profit festival in northeastern Minnesota and raises funds to support programs for young musicians in the state. (2010-present).

**Student Colloquium Representative** for the UVa McIntire Department of Music's colloquium series. Assisting with the planning and organization of visits by guest composers (2008-9).

**Computer Lab Consultant**, Kammerer Computer Lab, School of Music, University of Oregon. Answered hardware and software questions, solved technical problems, performed routine computer maintenance (2001-2).

**Co-founder,** Eugene Composers' Collective. Helped to form this group of composers, and organized two successful concerts (both sold-out, standing-room-only crowds) in the Eugene community (2004-5).

**On-Air Personality**, 88.1 FM KVSC. Created, hosted, and produced the *Sonic Buffet*, a weekly program dedicated to contemporary music, both acoustic and electronic. Interviewed student and local composers and performers, solicited relevant recordings from record labels, and produced educational episodes on various topics, such as the history of electroacoustic music. Served as assistant music director for one year (1997-2001).

## PUBLICATIONS

Maes, L., Raes, G.W., and Rogers, T. (2011). "The Man and Machine Robot Orchestra at Logos." *Computer Music Journal*, Winter 2011, Vol. 35, no. 4 (forthcoming).

Expressive Machines Musical Instruments (EMMI). (2010). "Drum Circle" for robot ensemble in a Virginia forest. *Agents Against Agency*. EcoSono, 2011.

Rogers, Troy. "Study #8.2 for <HAT>." *Lonely Robots*. Logos Public Domain, vol. 19. August, 2010.

Johnson, J. K., Gattegno, N., and Rogers, T. "Vivisys." *acadia>08: Silicon+Skin>Exhibition*. Exhibition Catalog of the 28th Annual Conference of the Association for Computer Aided Design in Architecture. pp. 26-9.

Hornof, A., Rogers, T., Stolet, J., & Halverson, T. (2008). Bringing to Life the Musical Properties of the Eyes. Department of CIS Technical Report 08-05, University of Oregon. Ten pages.

Hornof, A. J., Rogers, T., & Halverson, T. (2007). EyeMusic: Performing live music and multimedia compositions with eye movements. Poster presented at *NIME 2007: Conference on New Interfaces for Musical Expression*. In proceedings on pp. 299-300.

Rogers, Troy. (2004). "Dubh Bringloid." *Music from SEAMUS volume 15*. EAM-2006.

## SELECTED GUEST LECTURES, PRESENTATIONS, AND WORKSHOPS

Featured guest composer: MN Made Festival, St. Cloud State University. Gave opening presentation on musical robotics, directed multi-day workshop in which students created a new robotic percussion instrument and composed new music for the instrument, and presented a concert featuring robotic instruments with faculty and students. Feb. 27-Mar. 1, 2014. https://www.facebook.com/MNMadeFestival

Performance, Touch Tomorrow: A Festival of Science, Technology, and Robots at WPI, Worcester Polytechnic Institute, Massachusetts. With EMMI. June 8, 2013.

Artist talk and performance: Expressive Machines' robotic instruments and music. Machine Project, Los Angeles, CA. March 12, 2013.

Workshop: "Making and sensing sound and motion." Presented to Lucia Phinney's Soft Surfaces graduate seminar. School of Architecture, University of Virginia. Octoboter 20, 2011.

Presentation: EMMI's robotic musical instruments. STEIM Hotpot Lab #12. Amsterdam, Netherlands. April 12, 2011.

Presentation: EMMI's robotic musical instruments. EMMI and EAR Duo Residency at Brandeis University. Eric Chasalow's graduate composition seminar. March 31, 2011.

Guest lecture: EMMI's robotic musical instruments. EMMI and EAR Duo Residency at MIT. Peter Whincop's computer music seminar, Massachusetts Institute of Technology, Cambridge, MA. March 30, 2011.

Guest lecture: EMMI's robotic musical instruments. Lou Bunk's Music in Our World seminar. Franklin Pierce University, Rindge, NH. March 29, 2011.

Presentation: Robots for music, music for robots. First Monday New Media Series, St. Cloud State University, St. Cloud, MN. Nov. 11, 2010.

Presentation: 'Stemmetje' project. Dorkbot. Timelab. Ghent, Belgium. May 26, 2010.

Presentation: 'Stemmetje' project. IPEM (Institute for Psycho-acoustics and Electronic Music) Think Tank. Ghent, Belgium. Oct. 2, 2009.

Keynote speech: "Not either/or but both/and: compositional and performative gestures in the spaces between complementary domains." St. Coud State University Student Research Colloquium. St. Cloud, MN. April 18, 2006.

## GRANTS, AWARDS, AND OTHER RECOGNITION

Jefferson Trust Award Grant (with Karen van Lengen). $25,600 for **Creative Listening at the Academical Village**, a cross-disciplinary course between the School of Architecture and the McIntire Department of Music in the College of Arts & Sciences, that brings awareness and creative interpretation to the aural qualities of Jefferson's "Lawn." Students developed their own edited aurally focused explorations of the Academical Village. Course offered Spring Term of 2014. Taught by Professor Karen Van Lengen and Troy Rogers, the projects creatively demonstrate the rich aural environment of the Academical Village as a counterpoint to the well-known visual studies already familiar to the general public (2013).

Finalist, Georgia Tech's Margaret Guthman Musical Instrument Competition, Atlanta, GA. EMMI's Monochord-Aerophone Robotic Instrument Ensemble (MARIE), 2012.

Nijmegen Residency, with EAR Duo and Anne La Berge. Nijmegen, Netherlands. April 18-21, 2011.

STEIM Residency, with EMMI and EAR Duo. Amsterdam, Netherlands. April 10-13, 2011.

Meet the Composer MetLife Creative Connections Award, EMMI and EAR Duo tour, 2011.

Fulbright Research Grant, carried out at the Logos Foundation, Ghent, Belgium. 2009-10.

Award for Excellence in Scholarship in the Humanities & Social Sciences. Recognizing excellence in original scholarship by Ph.D. students at the University of Virginia. 2009.

*PercusBot Study No. 1* selected by jury for performance at NIME 2007 conference held June, 2007 in New York City.

*EyeMusic v1.0* selected by jury for performance at NIME 2007 conference held June, 2007 in New York City.

*PercusBot Study No. 1* selected by jury for performance at 2006 International Computer Music Conference held November, 2006 in New Orleans, LA.

*EyeMusic v1.0* selected by jury for performance at the 2006 SEAMUS National Conference at the University of Oregon, Eugene, OR.

Named University Outstanding Scholar in Music and recognized for Outstanding Work in Music Technology by the University of Oregon's School of Music and Dance, 2005.

*Dubh Bringloid (Black Dream)* selected by jury for performance at the 2005 International Computer Music Conference held September 5-9. 2005 in Barcelona, Spain.

*Dubh Bringloid (Black Dream)* selected for inclusion on SEAMUS volume 15 CD (voted by attendees of the 2005 National Conference as one of top pieces of the conference).

*Dubh Bringloid (Black Dream)* selected by jury for performance at the 2005 Society for Electro-Acoustic Music in the US (SEAMUS) National Conference at Ball State University, Muncie, IN.

Awarded a University of Oregon School of Music Graduate Research Award to assist with completion of terminal creative project for the IMT degree at the University of Oregon.

*La Flama* selected by jury for presentation at the 2004 International Computer Music Conference (Digital Jukebox). University of Miami in Coral Gables, FL.

Awarded a University of Oregon School of Music Graduate Research Award to complete a month-long composer's residency at Simon Fraser University's Sonic Research Studio under the direction of Barry Truax. Residency completed July-August 2003.

*Machine Study No. 1* selected as Finalist in the 2002 Musica Nova Prague international electroacoustic composition competition.

*La Flama* selected by jury for performance at the 2003 Society for Electro-Acoustic Music in the US (SEAMUS) National Conference at ASU in Tempe, AZ.

Ruth Close Musical Fellowship and UO General University Scholarship (2002)

Received the Alice Barg Meinz Most Outstanding Music Student Award, given to the most outstanding graduating senior as voted on by music faculty of SCSU (2000).

Named Minnesota Collegiate Composer With the Most Potential in the Minnesota Music Educators' Association Collegiate Composition Contest (2000).

## ORIGINAL COMPOSITIONS

***the Zeitgeist Experiment*** (45') for vocal robot (Stemmetje), string robot (AMI), clarinet robot (CARI), and percussion robot (MADI). (2014) performance: The Zeitgeist Experiments, Teatro Zuccone, Duluth, MN, 10/30/2014.

***for Ziola*** (8') for robot ensemble and belly dancer. With Ziola. (2013) performance: Duluth Homegrown Music Festival, Teatro Zuccone, Duluth, MN, April 2014.

***Neocybernetic Carols*** (180') A site-specific interactive performance created with dancer/choreographer Kathryn Schetlick, for dancer, robotic musical instruments, robot wrangler, and audience. (2013) performance: "Let There Be Light," Piedmont Virginia Community College, Dec. 13, 2013.

***Site/Sounds NYC Suite*** (5') for stereo digital audio. Five compositions based upon field recordings of Grand Central Station, the Guggenheim Museum, NY Public Library, Rockefeller Center, and the Seagram Building, exploring the sonic and acoustic character of each space. Soundscape Architecture Project with Karen Van Lengen and Worthy Martin (2013). Available online at http://soundscape.iath.virginia.edu

***Phantom Variations*** (7') for AMI, CARI, and TAPI (three musical robots created by EMMI). (2012). Performance: Sound and Music Computing Conference, Aalborg University Copenhagen, 7/14/2012.

***Study No. 3b*** (7') for AMI, CARI, and MADI. With EMMI. (2012).

***MARIE Explorations*** (6') for MARIE. Study of the novel capabilities of Monochord-Aerophone Robotic Instrument Ensemble (MARIE). (2011).

***Improvisation #5*** (10') for AMI (Automated Monochord Instrument) and solo percussion. (2011). performance: percussionist Terry Vermillion, BradFest 2011, Two Harbors, MN. 8/6/2011.

***AMI and CARI go East*** (75') for AMI, CARI, saxophone, bassoon, and flute, with Anne La Berge and the EAR Duo (2011). performance: Lindenberg Productiehuis, Nijmegen, NL. With Anne La Berge, Michael Straus, and Dana Jessen. 4/21/2011.

***Improvisation #4*** (8') for AMI, CARI (Cylindrical Aerophone Robotic Instrument), saxophone, and bassoon (2011). performance: Logos Foundation, Ghent, Belgium. With Michael Straus and Dana Jessen. 4/14/2011.

***Improvisation #3*** (10') for AMI, CARI, saxophone, and bassoon (2011). performance: Logos Foundation, Ghent, Belgium. With Michael Staus and Dana Jessen. 4/14/2011.

***Improvisation #2*** (30') for AMI, CARI, flute, saxophone, bassoon, bass, and percussion (2011). performance: OT301, Amsterdam, Netherlands. 4/13/2011.

***Improvisation #1*** (25') for PAM, CARI, and saxophone trio (2011). performance: Opensound Series, Somerville, MA. 4/2/2011.

***Duo*** (20' v.1, 10' v.2) for <Korn>, <Thunderwood>, and bass (2010). Performances (with Manolo Cabras, bass): Jazz & Sounds Festival, Muziekcentrum De Bijloke, Ghent, BE, 3/29/2010. M&M Hyperpolyphony, Logos Foundation, Ghent, BE, 5/20/2010.

***Amadinda Variations*** (8') for the M&M Robot Orchestra (2010). performance: M&M Exotica, Logos Foundation, Ghent, BE, 3/25/2010.

***Improvisation for human and machine winds*** (10') for saxophone, bassoon, and the automated monophonic wind instruments of the Logos M&M Robot Orchestra (2010). performance: Logos Foundation, Ghent, BE, with Michael Straus and Dana Jessen, 3/17/2010.

***In F*** (6') for <Harmo>, an automated harmonium (2009). performance: M&M Winter, Logos Foundation, Ghent, BE, 12/17/2009.

***Study #8.2 for <HAT>*** (3.5') for 'Hit AnyThing' percussion robot (2009). performance: M&M Kreatie, Logos Foundation, Ghent, BE, 10/15/2009.

***Study No. 3 for PAM and MADI*** (2009). With EMMI. performance: New Interfaces for Musical Expression (NIME), Carnegie Melon University, Pittsburgh, PA, 6/4/2009.

***Study No. 2 for PAM and MADI*** (2009). With EMMI.

***Lux Brevis*** (2') [with Ted Coffey] collective performance piece for light-activated sound-emitting spinning tops (2008). performances: 2nd Annual Let There Be Light Festival, PVCC, Charlottesville, VA, 12/12/2008. Mills College, Oakland, CA, 2/9/2009.

***Study No. 1 for PAM and MADI*** (6') for computer controlled snare drum and plucked string instruments. With Scott Barton and Steven Kemper (2008).
performances: various dates on 2008 Virginia Center for Computer Music tour.

***Northern Lake Nocturne v.2*** (7') for stereo digital audio media (2008).

***PAM Study No. 1*** (6') for computer-controlled plucked string instrument. Collaboratively composed with Scott Barton and Steven Kemper (2007-8).
performances: Noise in the System III, McGuffey Arts Center, Charlottesville, VA 11/02/07. Audio January, the Bridge Progressive Arts Initiative, Charlottesville VA 1/2007. 12 Nights, Harold Golen Gallery, Miami, FL 2/17/08.

***Constant Pulse*** (6') for twelve channel digital audio media (2007).
performance: Digitalis and the New Music Ensemble Under the Stars, South Lawn, University of Virginia, 5/1/2007.

***13 spliced scenes of disaster, delight and despair for computer-(un)controlled human performers*** (12') for mixed ensemble and live digital audio (2006).
performance: UVa Composers Concert featuring the NOW Ensemble, Garrett Hall, University of Virginia, 3/30/07.

***Ascension Study*** (5') for distance sensors, lights, and digital audio (2006).
performances: Alvin Lucier and Friends Concert, Old Cabell Hall, University of Virginia, 9/15/06. Gravity Lounge, Charlottesville, VA, 5/2006.

***EyeMusic v1.0*** (7') for ocularist, eye-tracking system, and computer audio and video. Collaboration with Anthony Hornof and Tim Halverson (2005).
performances: NIME 2007, NYU, NYC, NY, June 2007. SEAMUS National Conference, University of Oregon, Eugene, OR, March 31, 2005.

***PercusBot Study No. 1*** (10') for computer-controlled mechanical percussion ensemble, custom lighting, and computer (2005).
performance: Future Music Oregon Concert, University of Oregon, May 21, 2005. NIME 2007, NYU, NYC, NY, 6/2007. 12 Nights, Harold Golen Gallery, Miami, FL 2/17/08.

***Dubh Bringloid (Black Dream)*** (10') for Scottish Highland bagpipes and computer. Collaboratively composed with composer/piper Ben Hunter. Quadraphonic and stereo versions available (2004).
performances: 2005 Society for Electro-Acoustic Music in the US (SEAMUS) National Conference, Ball State University, Muncie IN, April 2005. Electronic Artists' Concert, University of Oregon, May 2004. Eugene Composers' Collective concert, Sam Bonds Garage, Eugene, OR, June 13, 2004.

***Nominally Primed Hum*** (10') for 8-channel digital audio media. Quadraphonic and stereo versions also available (2004).
performance: Future Music Oregon Concert, University of Oregon, March 6, 2004.

***Northern Lake Nocturne, v.1*** (10') for stereo digital audio media. Poetry by Philippe Costaglioli, used by permission. Composed while in residency at Simon Fraser University's Sonic Research Studio, completed in FMO studios (2003). Major revision in progress.

***A Butterfly in Tokyo...*** (series of 8' realizations) for Yamaha Disklavier, Max interactive environment, and Kyma (2003)
performances: Future Music Oregon concert, University of Oregon, May 31, 2003 (one realization), 13th Annual Florida electroacoustic Music Festival, Gainesville, FL, April 2004 (one realization)

***Cascade*** (8') for orchestra (2003)

***Tale of Two*** (18') solo for multi-percussion (2003)
commissioned by and dedicated to Brad Rozman
performance: Brad Rozman, University of Illinois, May 4, 2003

***Disklavier Study No. 1*** (series of 6' realizations) for Yamaha Disklavier and Max interactive environment (2002)
performance: Future Music Oregon concert, University of Oregon, November 23, 2002 (one realization)

***Machine Study No. 1*** (5') for stereo digital audio media (2002)
performance: Future Music Oregon concert, University of Oregon, June 1, 2002
Finalist: Musica Nova Prague 2002 international electroacoustic music composition competition.

***With Regret...*** (6') for Bb clarinet, violin, cello, and piano (2002)
reading by Third Angle new music ensemble of Portland, Oregon, April 2002

***Three Short Studies*** (7') for solo piano (2001)

***La Flama*** (21' or 8') for stereo digital audio media, poem by Philippe Costaglioli (2001)
performance: 2002 Totally Huge New Music Festival's Sound Spaces, Perth, Australia April 12-21;
2003 Society for Electro-Acoustic Music in the US (SEAMUS) National Conference at ASU in Tempe, Arizona.

***Sink or Sizzle*** (4') for stereo digital audio media (2001)
winner of Online Track competition, 2001, based in Osaka, Japan, URL: <http://www4.ocn.ne.jp/~aaa.3/>
performance: Southern Minnesota Chapter of American Composers' Forum concert, St. Cloud State University, MN, April 13, 2001

***Untitled*** (8') for trumpet and stereo digital audio media (2000)
performance: Pat Thorn, St. Cloud State University, MN, May 4, 2000 and Southern Minnesota Chapter of American Composers' Forum concert, St. Cloud State University, MN, April 13, 2001

***Going Back Home*** (8') for baritone voice and stereo digital audio media, poetry by Philippe Costaglioli (2000)
performances: Tim Tharaldson, St. Cloud State University, MN, May 4, 2000 and Southern Minnesota Chapter of American Composers' Forum concert, St. Cloud State University, MN, April 13, 2001

***Waterforms II*** (6') for stereo digital audio media (2000)
performances: Composers Forum concert, March 9, 2002, University of Oregon
St. Cloud State University, May 4, 2000

***Waterforms*** (7') for flute, violin, vibraphone, and trombone (1999)
Second place, Division V (instrumental ensemble), Minnesota Music Educators Association (MMEA) Fifth Annual Collegiate Composition Contest
performances: Composers Forum concert, March 9, 2002, University of Oregon;
St. Cloud State University, May 4, 2000; MMEA Collegiate Composition Competition Concert, February 17, 2000

## ORIGINAL INSTRUMENTS

**ELMRbot ("Extremely Loud Musical Robot")** (2014). With students in the robotic musical instrument workshop at MN Made Festival, St. Cloud State University, Feb. 27-Mar. 1, 2014.

**Stemmetje: 'the little voice,' aka Vox** (2009-present). With Godfried-Willem Raes. A set of two automated tunable acoustic Helmholtz resonators, with ranges typical of the lowest two human vocal formants, each driven by an audio-rate compression driver coupled via an acoustic impedance converter to the resonator.

**TAPI: Transportable Automatic Percussion Instrument** (2012). With EMMI. A briefcase-housed small percussion ensemble featuring two cowbells, chime bar, two woodblocks, and additional slots for outboard instruments,

**AMI: Automatic Monochord Instrument** (2010-present). With EMMI. An updated version of PAM, featuring seventeen chromatic fretting 'fingers;' a moving bridge allowing for pitch bends, microtonal inflections, vibrato, etc.; a damping mechanism; a picking

mechanism; an electromagnetic bowing mechanism; a contact pickup; a MIDI-controlled onboard analog mixing circuit allowing for control of envelope, feedback, tremolo, etc.; a MIDI-controlled octave-fuzz effect circuit offering automated control of various parameters; on-board amplification and small speaker; and a MIDI-controllable RGB LED light strip.

**CARI: Cylindrical Aerophone Robotic Instrument** (2010-present). With EMMI. A clarinet-like robotic instrument featuring clear polycarbonate cylindrical bore, nineteen solenoid-activated tone hole valves, two in-bore microphones, an audio-rate compression driver, a MIDI-controlled analog mixing circuit allowing for level and feedback control, and a MIDI-controllable RGB LED strip.

**MARIE: Monochord-Aerophone Robotic Instrument Ensemble** (2010-present). With EMMI. A single AMI and CARI can be connected and controlled in tandem, creating a hybrid instrument with expanded tonal capabilities: a 'Modular Electro-Acoustic Robotic Instrument System' (MEARIS). Since each individual module has both an acoustic sound generator and a tunable acoustic filter (AMI's string and CARI's air column), the signal from an AMI can be played through a CARI to create a bowed or plucked air column sound, or CARI can be played through AMI to create a 'blown string' sound. Intra- and inter-module feedback and level controls further extend the timbral palette.

**CADI: Configurable Automatic Drumming Instrument** (2009-10). With EMMI. A scalable set of up to nineteen striking arms with various beater types (hard, soft, brushes), capable of being positioned to strike a variety of percussive instruments.

**MADI: Multi-mallet Automatic Drumming Instrument** (2008-9). With EMMI. A snare drum outfitted with fifteen individually controllable striking arms with various beater types (hard, soft, brushes), arranged to strike various locations on the drum, from rim to center. Also equipped with automated snare-switching mechanism.

**Chirpers** and **Screamers** (2008). With Ted Coffey. Two varieties of amplitude-modulated circuits, enclosed in spinning tops, whose character is determined by a combination of tunable resistance and light, measured by two photo-resistors per instrument. After spinning the tops, players change the light conditions received by the tops with flashlights, strobes, lunar eclipses, or other means. The tops affect one another, too. Quantity of light determines the frequency of carrier oscillation, duration of grains of sound—from sub-audio rate pulses to audio rate AM; and pulses to each top's LED.

**PAM: Poly-tangent Automatic (multi-)Monochord** (2007-8). With EMMI. An electric monochord with two octave-tuned strings, with seventeen adjustable pitch-altering tangents, a damping mechanism, a picking mechanism, and a hand-wound hum-bucking electromagnetic pickup.

**PercusBot** (2003-7). A robotic percussion ensemble consisting of six tuned drums and eight bells, each struck by a dedicated electro-mechanical 'finger.' Outfitted with embedded microphones and mixing circuit, and automated halogen and LED lights.

## INSTALLATIONS

***Sonic Thicket*** (proposed), a habitable, MIDI-programmable resident robotic musical instrument ensemble and kinetic, responsive, climate gradient producing architectural structure for MoMA PS1's courtyard. Invited proposal, Phinney-Dripps Studio and Expressive Machines Musical Instruments (EMMI) for the MoMA PS1 Young Architects Program (proposed: November, 2011).

***Vivisys***, an experimental double-curved acrylic lattice vault that plays host to an extraordinary cluster of rapidly prototyped metallic barnacles. A robotic soundscape and

networked auroras of electron emitting cold cathode tubes respond to interactions from their environment. Vivisys synthesizes patterns of the organic and the manufactured into a new creative paradigm for energy, form, and matter. Collaboration with Future Cities Lab architects Jason Johnson and Nataly Gattegno. Exhibited at the Extension Gallery for Architecture in Chicago (11/07 to 2/08).

***The Gift***, an intermedia, interdisciplinary collaboration in the Laverne-Krause gallery, University of Oregon. Created an interactive digital audio installation for this event (March 2002).

***La Flama***, an installation in the Washburn Gallery on the University of Oregon campus. Acoustic redesign of the space, visual design, an autonomous digital audio composition (*La Flama*), and live poetry performance by Minnesota poet Philippe Costaglioli (January 2003).

***Walking Sp$^{l}_{a}$$^{i}$ces***, an installation in the Laverne Krause Gallery at the University of Oregon. Binaural soundscape composition and sculptural listening station. Visual design by David Noreen (March 2003).

## OTHER COLLABORATIVE PROJECTS

***Soundscape Architecture***, an Institute for Advanced Technology in the Humanities (IATH, at UVA) sponsored project created by Karen Van Lengen. A web site that showcases the aural character of iconic architectural spaces. The site includes the presentation of audio recordings of significant architectural spaces, complimented by both visual and musical interpretations of the soundscapes, as well as visual analysis of the auditory, and material aspects of architectural spaces. With Karen Van Lengen, Worthy Martin, and Jim Welty. (2012-2014)

**Stan Winston Arts Festival of the Moving Creature**, an interdisciplinary seminar and festival engaging students from the School of Architecture and from the College of Arts & Sciences' departments of studio art and drama in a collaborative workshop to research, design and construct "creatures" for the Stan Winston Festival of the Moving Creature. Winston was one of U.Va.'s most successful arts alumni, becoming one of Hollywood's greatest masters of creature design and fabrication. The project honored his legacy by engaging 70-plus students during the spring, building four to seven larger-than-life creatures. My role was to create portable sound systems for the creatures, coordinate and supervise groups of students from my Intro to Music and Computers seminar to create creature soundscapes and compositions for the creatures, and create an interactive, mobile phone controlled soundscape of my own for one of the creatures. (2013)

***RAVESpace***, prototype for a kinetic/responsive building/instrument. Collaboration with architecture students at University of Virginia. Software, hardware, sound, and interaction design. More information at http://robotic-ecologies.blogspot.com (Spring 2007)

***I Never Said I*** (9') for digital audio and dance octet (2006). Collaboration with Walter Kennedy. performances: Dougherty Dance Theatre, University of Oregon, Feb. 2006. Randolf-Macon Women's College, Lynchburg, VA, April 2006.

***In Between***, for three dancers, wireless accelerometers, and computer. Collaboration with choreographer Dominique Chartrand and dancers Amanda Herman, Melena Bronson, and Mercedes Rathswohl as part of Chartrand's MFA concert, *A recherche de je ne sais quoi! In Search of!* (2004-5).
performances: Dougherty Dance Theatre, University of Oregon, May 27 & 28, 2005.

***Locate*** (composed with Josh Humphrey)**,** music for *Levels*, Sarah Nemecek's MFA concert at the Dougherty Dance Theatre, University of Oregon. (Feb. 2005).

performances: Dougherty Dance Theatre, University of Oregon, Feb. 25 & 26, 2005.

***La terre d'ici*** (12') for stereo digital audio media. Collaboration with choreographer Dominique Chartrand (2004).
performance: Winter Loft, University of Oregon Dance Theatre, March 12, 2004

***Meet the Thunder***, music for computer animation feature by Saritdikhun Somasa (2003)

***Tornado***, soundscape for University Theatre production of Lanford Wilson's *Book of Days* in the Robinson Theatre (Jan-Feb 2003).

## Contact Information

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