

## Academic and Research Experience

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### Education

#### **PhD in Electrical and Computer Engineering**, August 2008

The University of Texas at Austin

Dissertation Title: *Human-Based Percussion and Self-Similarity Detection in Electroacoustic Music*

Advisors: Elmer L. Hixson, Michael F. Becker

Committee: Brian L. Evans, Mark F. Hamilton, Dennis McFadden, Russell F. Pinkston

Dissertation Summary:

The goal was to create an algorithm that identifies instants in pieces of music that humans would also identify as percussive. I first collected human judgments about percussive sounds to acquire sound-event dimensions that humans use as percussive cues. I then designed a percussivity-profile algorithm using a time-domain, channel-based approach and psychoacoustic models, and tuned the input parameters to maximally match the human choices. I also used a similarity matrix combined with the percussivity-profile algorithm to find structural characteristics in the percussive sounds of electroacoustic music.

Other Research Experience:

- Conducted an intelligibility study of an auditorium classroom

Related Coursework:

- Fundamentals of Physical Acoustics
- Nonlinear Acoustics
- Psychoacoustics
- Wavelets

#### **MS in Acoustics**, August 1997

The Pennsylvania State University

Thesis Title: *Sensitivity of a Computational Version of the Kirchhoff Integral Theorem to Surface Discretization*

Advisor: Donald E. Thompson

Committee: Victor W. Sparrow, Philip J. Morris, Jiri Tichy

Research Experience:

- Designed, implemented, validated, and determined the error associated with the surface discretization of a computational version of the Kirchhoff Integral Theorem for sound propagation from a jet engine
- Worked as a team member with Aerospace Engineering researchers to integrate results from computational-fluid-dynamics software

Related Coursework:

- Fundamentals of Acoustics
- Acoustic Data Measurement and Analysis
- Acoustics of Fluid Media
- Electro-acoustic Transducers
- Computational Acoustics
- Building Acoustics
- Techniques in Experimental Acoustics
- Mathematical Methods in Engineering

#### **BS in Computer Engineering**, August 1992

Clemson University

Technical Area: Software Engineering

## Academic Awards

- Acoustical Society of America Student Paper Award in Musical Acoustics, 2004 and 2007
- George J. Heuer Fellowship, 2003
- Arthur H. Hausman Endowed Graduate Fellowship in Engineering, 1999–2001
- University of Texas Thrust Fellowship, 1998
- BS graduation cum laude with Departmental Honors, 1992
- South Carolina Palmetto Fellow Scholarship, 1988–1992
- Clemson University Honors Program, 1988–1992
- Clemson University Athletic Academic Scholarship, 1988–1990
- Marvin J. Geddings Scholarship, 1988–1990

## Professional Affiliations

- International Society on Music Information Retrieval, 2008  
Conferences:
  - 2008, Philadelphia, Pennsylvania
- Acoustical Society of America, member 1992–current  
Conferences:
  - 2007, Salt Lake City, Utah [presented]
  - 2006, Providence, Rhode Island [presented]
  - 2005, Vancouver, British Columbia, Canada [presented]
  - 2004, New York, New York [presented]
  - 2003, Austin, Texas
  - 1998, Norfolk, Virginia
  - 1997, State College, Pennsylvania
  - 1994, Cambridge, Massachusetts
- Audio Engineering Society, member 1993–current  
Vice-Chair of the Central Pennsylvania Chapter, 1994–1995  
Conferences:
  - 1997, New York, New York

## Publications and Presentations

### Published Conference Proceedings

- J. A. Mills III and R. Coelho de Souza, “Gestural Sounds by Means of Wave Terrain Synthesis,” in *Anais do XIX Congresso Nacional da Sociedade Brasileira de Computação 1999*, Rio de Janeiro, Brazil, July 19, 1999.

### Invited Presentations

- J. A. Mills III, “The application of cochlear modeling techniques to percussion in electroacoustic music,” in the Acoustics Seminar Series at The University of Texas at Austin, October 7, 2005.
- J. A. Mills III, “Sensitivity of a computational version of the Kirchhoff integral theorem to surface discretization,” in the Acoustics Seminar Series at The University of Texas at Austin, October 2, 1998.

## Presentations

- J. A. Mills III, “The application of psychoacoustic audio analysis techniques to electroacoustic music for the purpose of visualization (human judgment collection),” in 153rd meeting of the Acoustical Society of America, June 5, 2007.
- J. A. Mills III, “The application of psychoacoustic audio analysis techniques to electroacoustic music for the purpose of visualization (percussion onset detection),” in 151st meeting of the Acoustical Society of America, June 6, 2006.
- J. A. Mills III, “The application of cochlear modeling techniques to electroacoustic music for the purpose of visualization,” in the 147th Meeting of the Acoustics Society of America, May 25, 2004.

## Engineering, Computer, and Management Experience

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### Related Experience in the Academic Environment

- Designed and implemented a rudimentary graphical-score system for electroacoustic music
- Designed a real-time, HRTF-based auralization system for a virtual-reality system
- Implemented a head-tracking system for a virtual-reality system
- Designed and implemented a data-sonification system to accompany a computer-visualization system
- Expert subject for company that tested hearing protectors
- Group Design Project: Model Car Control (microprocessor specialist)
- Individual Design Project: Digital Signal Processing for Sound Synthesis on a NeXT Computer
- Coursework:
  - Data Structures in C++
  - Digital Signal Processing
  - Operating System Programming
  - Microprocessor Programming
  - Hardware Description Language
  - Knowledge Engineering

### Computer, Laboratory, and Other Skills

- Operating Systems: Linux, Mac OS X, and Windows
- Current Computer Languages: C/C++, Matlab, Fortran, L<sup>A</sup>T<sub>E</sub>X, PHP, CSS, HTML, bash
- Music Programming Languages: Csound, ChuckK, Max/MSP, Pure Data
- Programming Styles: procedural, object-oriented, dataflow
- Other Computer Languages: Lisp, Ada, M4, Verilog, Pascal, 8088 assembly, Cobol, Basic
- Workshop Skills: wood and metal tools; table, power, and hand tools; circuit layout, breadboarding, circuit-board etching, and soldering

### System Administrator of High Performance Computing Linux Cluster, 2004–2008

Mechanical Engineering Department, The University of Texas at Austin

- Managed a 37-computer Linux cluster including eight external servers for authentication, home directory, email, mailing list, printing, web, license manager, and backup services
- Transitioned the cluster from a desktop-accessible lab to a rack-based, remotely accessible resource (This process included hardware purchase, installation, and configuration of the new hardware. I also designed and implemented a transition plan to retire the old hardware.)
- Managed the external mailing lists for the ME Department

**Workstation Administrator, 1998**

C3 Communications, Austin, TX

- Managed 75 daily-use personal computers using the Windows operating system for this telecommunications company
- Implemented remote access to data-collection centers via ISDN modems

**Software Developer, 1997–1998**

Mills Electric Co., Inc., Sumter, SC

- Designed and implemented an electrical-construction estimating system and material-costing system
- Designed and implemented a business system including work orders and a customer database

**System Administrator, 1994–1997**

The Graduate Program in Acoustics, The Pennsylvania State University

- Managed approximately 100 faculty, staff, and student computers using Unix, Apple, and Windows operating systems

**Assistant Estimator, 1992**

Mills Electric Co., Inc., Sumter, SC

- Created initial estimates for electrical-construction bidding projects

**Undergraduate Summer Intern, 1988–1991**

Sun Data, Norcross, GA

- Ordered, configured, prepared, and repaired IBM midrange and personal computers
- Team-managed 70 daily-use personal computers using the Windows operating system for this secondary-market computer-reselling company
- Technical Producer for a 100-employee, national conference

**Disc Jockey, 1988-1992; Promotions Director, 1990–1991; Production Director, 1989–1990**

WSBF-FM, Clemson University, Clemson, SC

- As Disc Jockey:
  - Selected and played three to six hours of programming each week
  - Spoke on-air as necessary for public service announcements, station identifications, music description, and interviews
- As Promotions Director:
  - Managed 30 students working on all promotional work at the radio station
  - Redefined the promotions director position to be “concerned with the improvement of the internal and external attitude toward the radio station”
- As Production Director:
  - Managed 20 students in order to provide all station identifications, public service announcements, and audio promotional material for on-air broadcast
  - Technical Director for Tigerama, a theatrical event with an audience of 30,000

## Teaching Experience

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**Teaching Assistant for Senior Design Laboratory**, Spring and Summer Semesters, 2000–2004  
Electrical and Computer Engineering Department, The University of Texas at Austin

- Instructed, graded, and guided students through the design, implementation, documentation, and presentation of senior design projects
- Mentored groups based on their interest in acoustics and audio, but I also instructed groups focused on DSP, power, software, microprocessor control, antennas, user-interface design, control systems, and hardware reliability
- During the last two years of this position, I was assigned groups who formed larger teams with Mechanical Engineering senior design groups to construct cross-disciplinary projects with broader scope
- Semester Enrollment: 10–17 senior ECE undergraduates

**Instructor, *Acoustics for Musicians and Recording Engineers***, Fall Semesters, 1999–2001  
Mechanical Engineering Department, The University of Texas at Austin

- Designed, taught, and graded this general-elective class
- Guided class tours of research, performance, and recording spaces around Austin, Texas
- Created animation and images to help students understand acoustics
- Student evaluation scores were extremely good (average of 4.7 out of 5.0)
- Semester Enrollment: 18–30 undergraduate students of all majors and levels of technical ability

## Teaching Experience in the Professional Environment

- Designed and taught classes in acoustics software
- Designed and taught classes in general software and computer use
- Designed and taught classes in building computers from parts

## Music, Dance, and Performance Experience

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- Musical background and performances in electronic music, 1991–2005; hand drum, 1995–2007; musical theater, 2004; and guitar, 1984–current
- Dance background through coursework; individual performances, 1995–2005; and as member of the Juwonka Dance Group, 1993–2000
- Designed Audio for student theatre: *Blind Horses*, 1999; and *Marisol*, 2000
- Co-curator of *Series 28*, a monthly performance art exhibition at Movements Art Gallery, Austin, Texas, 1997–1999
- Undergraduate Individual Design Project: Sound Design for Film
- Related Coursework:
  - Computer Music
  - Music in the Western World
  - West African Drumming
  - Modern Dance
  - Improvisational Dance
  - Electronic Media Projects
  - Film

## Other Interests

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- Fluent in Esperanto and active member in the Universal Esperanto Association, Esperanto-USA, and Texas Esperantists, 2003–current
- Go enthusiast and active member of the American Go Association, 1999–current
- Physical fitness through dance, bicycling, running, soccer, and yoga.