

# JOHN F. WOODRUFF

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## EDUCATION

Ph.D. and M.Sc. – Computer Science and Engineering, projected 2011  
The Ohio State University, Columbus, Ohio

- Research Interests: Computational models of binaural hearing and auditory selective attention, signal processing, psychoacoustics and perception
- Major: Artificial Intelligence
- Minors: Signal Processing, Statistical Learning

M.Mus. – Music Technology, June 2006  
Northwestern University, Evanston, Illinois

- Thesis: Active source estimation for improved source separation

B.Sc. – Mathematics, May 2004  
The University of Michigan, Ann Arbor, Michigan

B.F.A. – Performing Arts and Technology, May 2002  
The University of Michigan, Ann Arbor, Michigan

## TEACHING

Tutor, August 2007 – Present  
Independently and with Tutoring in Your Home, LLC

- Tutored students in Calculus I, Calculus II, Algebra I, Algebra II

Lecturer – Computer Assisted Problem Solving, Fall 2007  
The Ohio State University, Department of Computer Science and Engineering

- Taught weekly lectures of 40 students, held weekly office hours, developed and graded course materials

Laboratory Instructor – Computer Assisted Problem Solving for Business, Fall 2006, Winter 2007, Spring 2007  
The Ohio State University, Department of Computer Science and Engineering

- Taught weekly laboratory section of 80 students, tutored students in weekly office hours, graded course materials

Teaching Assistant – Digital Sound Synthesis, Spring 2006  
Northwestern University, School of Music

- Tutored students, assisted with lecture preparation and development of course content

Teaching Assistant – Music Programming, Winter 2006  
Northwestern University, School of Music

- Tutored students, assisted with lecture preparation

Teaching Assistant – Introduction to Max/MSP, Fall 2006  
Northwestern University, School of Music

- Tutored students, assisted with lecture preparation, gave guest lectures

Laboratory Instructor – Sound Recording I, Fall 2002, Fall 2003  
The University of Michigan, School of Music

- Created lesson plans, in-class activities and projects for four weekly laboratory sections of 4-6 students

Laboratory Instructor – Sound Recording II, Winter 2002, Winter 2003, Winter 2004  
The University of Michigan, School of Music

- Created lesson plans, in-class activities and projects for four weekly laboratory sections of 4-6 students

## RESEARCH

Research Assistant – The Perception and Neurodynamics Laboratory, September 2006 – Present  
The Ohio State University, Department of Computer Science and Engineering

- Led experimental and literature research on the utilization of binaural auditory cues for sound source segregation of reverberant recordings.
- Collaborated on experimental research on monaural musical sound separation.

Research Assistant – The Interactive Audio Laboratory, June 2005 – August 2006

Northwestern University, Department of Electrical Engineering and Computer Science

- Led experimental and literature research on the development of audio processing algorithms for degenerate blind source segregation of music signals.
- Assisted in experimental and literature research on the functional relation between existing sound similarity metrics and human perception of sound similarity.

Research Assistant, August 2004 – December 2004

Northwestern University, School of Music

- Assisted with literature research for the book *Producer as Composer*, by Virgil Moorefield.

Research Assistant, June 2000 – August 2000

Adapted Wave Technologies

- Assisted with research on commercial applications of novel audio processing algorithms.

### Publications

- J. Woodruff and D.L. Wang, "Sequential organization of speech in reverberant environments by integrating monaural grouping and binaural localization," submitted to *IEEE Trans. on Audio, Speech Lang. Proc.*
- J. Woodruff and D.L. Wang, "Integrating monaural and binaural analysis for localizing multiple reverberant sound sources," submitted to ICASSP 2010.
- Y. Li, J. Woodruff and D.L. Wang, "Monaural musical sound separation using pitch and common amplitude modulation," in *IEEE Trans. Audio, Speech Lang. Proc.*, vol. 17, no. 7, pp. 1361-1371, 2009.
- J. Woodruff and D.L. Wang, "On the role of localization cues in binaural segregation of reverberant speech," in *Proc. ICASSP*, 2009.
- J. Woodruff, Y. Li and D.L. Wang, "Resolving overlapping harmonics for monaural musical sound separation using pitch and common amplitude modulation," in *Proc. ISMIR*, 2008.
- J. Woodruff and B. Pardo, "Using pitch, amplitude modulation and spatial cues for separation of harmonic instruments from stereo music recordings," in *EURASIP J. on Adv. Signal Proc.*, vol. 2007.
- A.D. Shamma, B. Pardo and J. Woodruff, "MusicStory: an Autonomous, Personalized Music Video Creator," in *Intelligent Music Information Systems: Tools and Methodologies*, Eds. J. Shen, J. Shepherd, B. Cui, L. Liu, Idea Group Reference, 2007.
- J. Woodruff, B. Pardo and R. Dannenberg, "Remixing stereo music with score-informed source separation," in *Proc. ISMIR*, 2006.
- J. Woodruff and B. Pardo, "Active source estimation for improved source separation," Technical Report, Northwestern University, Dept. of Electrical Engineering and Computer Science, NWU-EECS-06-01, 2006.

## RECORDING AND SOUND DESIGN

Freelance Recording Engineer

Ann Arbor, MI, Chicago, IL and Columbus, OH, January 2000 – Present

- Worked independently with clients as audio recording, mixing and mastering engineer.
- Produced demos and full-length albums for classical composers, university ensembles, jazz combos, folk singers and rock bands.

Audio Facilities Management

The University of Michigan, Duderstadt Center, September 2001 – July 2004

- Coordinated certification program and trained students in two electronic music studios and 48-track audio recording studio.
- Recorded, mixed and mastered student and faculty recordings.
- Maintained hardware and software in recording studios.

## Recording Engineer

Perfect Balance and Solid Sound Studios, Ann Arbor, MI, May 2000 – December 2001

- Worked in two facilities capable of analog and digital multi-track recording as recording, mixing and mastering engineer.

## Live Sound Reinforcement

Ann Arbor, MI, Chicago, IL, September 2001 – June 2006

- Worked as live mixing engineer and sound designer at the Media Union, the Duderstadt Center, McCormick Hall, Annie Mae Swift Hall, the Canterbury House, Bill's Blues, the Heidelberg, the Blue Martini, Leopold Brothers, the Ark and Norris University Center.

## RELATED EXPERIENCE

### Talks and Presentations

- May 1, 2009, The Ohio State University, COGFEST, The Center for Cognitive Sciences, "Localization-based sequential organization of speech in reverberant environments."
- April 21, 2009, The International Conference on Acoustics, Speech and Signal Processing, Taipei, Taiwan, "On the role of localization cues in binaural segregation of reverberant speech."
- December 5, 2008, The Ohio State University, Artificial Intelligence Research Group, "Monaural musical sound separation."
- September 16, 2008, The International Conference on Music Information Retrieval, Philadelphia, PA, "Resolving overlapping harmonics for monaural musical sound separation using pitch and common amplitude modulation."
- May 2, 2008, The Ohio State University, COGFEST, The Center for Cognitive Sciences, "Resolving overlapping harmonics monaural musical sound separation."
- October 11, 2006, The International Conference on Music Information Retrieval, Victoria, B.C., "Remixing stereo music with score-informed source separation."
- May 14, 2006, Northwestern University, Guest lecture in Machine Perception of Music, "Introduction to blind source separation."
- March 22, 2006, Northwestern University, Phonatics Research Group, "Active source estimation for improved source separation."

### Audio Software and Hardware Platforms

- Pro Tools, Digital Performer, Logic, Nuendo, Cubase, Sonar, Live, Reason, Peak
- SSL, Euphonix, Yamaha, Mackie, Fairlight, Soundcraft

### Programming Languages/Environments

- Matlab, Max/MSP, SuperCollider, Java, C-Sound, C++, LISP, HTML

### Algorithm and Software Development

- Developed and published algorithms for signal separation of music and speech signals.
- Developed software for the University of Michigan School of Art and Architecture and the City of Ann Arbor for an interactive art piece installed in a downtown Ann Arbor location.
- Developed an algorithm to alter the perceived distance of sounds for use in audio production software.
- Developed an interpreter for the LISP programming language in JAVA.
- Developed audio effects and audio synthesis and sampling tools for live electroacoustic music performance.
- Developed software for interactive sound installations.

### Creative Work

- Wrote, performed and produced the album *Places*, independently released.
- Wrote, performed and produced the album *Definition*, released on October 8, 2002 by 482 Music.
- Performed on guitar, synthesizer and laptop with musical groups *Audima*, *Video Babble* and *Mephi*.
- Worked as sound designer and composer for film, video and theatre