

Mark A. Bartsch

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I. EXPERIENCE

Research Engineer

September 2004 – present

ATK Mission Research, Beavercreek, OH

Supported US Government research and development contracts focusing on radar signal processing, automatic target recognition (ATR), and feature-aided tracking systems.

- Developed feature extraction, classification, tracking, and sensor resource management algorithms for ATR and feature-aided tracking systems
- Provided technical analysis and support for customer programs
- Experience with various RF processing algorithms including target detection and chipping, single and multi-channel clutter suppression, target focusing, HRR range profile extraction, and SAR image formation

National Science Foundation Graduate Research Fellow

September 2000 – June 2004

University of Michigan, Department of Electrical Engineering and Computer Science, Ann Arbor, Michigan

Engaged in audio signal processing research under the direction of Dr. Gregory H. Wakefield. Projects included:

- Time-frequency analysis of music with applications to automatic source separation in multi-source mixtures
- Spectral analysis of the singing voice and automated singer identification using a variety of traditional classifier architectures
- Musical information retrieval, including “query-by-humming” systems and audio summarization techniques
- Computer-aided evaluation of dysphonic severity in patients with spasmodic dysphonia

Graduate Student Instructor/Staff Assistant

September 2001 – August 2002

University of Michigan, Department of Electrical Engineering and Computer Science, Ann Arbor, Michigan

Assisted in the development and teaching of the new course EECS 206 - Signals and Systems I over the course of three semesters.

- Developed a semester-long sequence of weekly MATLAB-based laboratory experiments to demonstrate practical applications of basic DSP techniques.
- Wrote extensive background material for each laboratory in addition to problem design and supplemental MATLAB coding.
- Taught one section of the EECS 206 laboratory, with duties that included one recitation per week, office hours, and grading of laboratory reports.

Research Engineer

May 1999 – August 2000

Qualia Computing, Inc., Beavercreek, Ohio

Member of the research and development team for SecondLook, a computer aided diagnosis system for breast cancer.

- Developed image processing and machine learning algorithms in MATLAB and C++ to improve system detection performance.
- Established MATLAB software infrastructure to streamline the development and evaluation of new algorithms.

Student Research Assistant

May 1997 – August 1998

Southern Ohio Council of Higher Education Student Research Program

Wright Labs/AFRL Materials Directorate, AFRL/MLPJ, Wright Patterson Air Force Base

Served as a researcher in an infrared laser laboratory.

- Developed algorithms in LabVIEW to automate various material characterization experiments.
- Performed a variety of characterization experiments, including studies of the nonlinear transmission and damage resistance properties of various materials.

II. EDUCATION

Doctor of Philosophy, Electrical Engineering – Systems

July 2004

Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, Michigan

Thesis title: *Automatic Singer Identification in Polyphonic Music*

Advisor: Dr. Gregory H. Wakefield

Master of Science in Engineering, Electrical Engineering – Systems

April 2002

Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, Michigan

GPA: 3.94 (Equivalent)

Bachelor of Electrical Engineering, *summa cum laude*

May 2000

Department of Electrical and Computer Engineering, University of Dayton, Dayton, Ohio

GPA: 3.98

III. PUBLICATIONS

Peer Reviewed Journal Articles

- Mark A. Bartsch and Gregory H. Wakefield, "Audio thumbnailing of popular music using chroma-based representations," *IEEE Transactions on Multimedia*, vol. 7, no. 1, pp. 96–104, 2005.
- Mark A. Bartsch and Gregory H. Wakefield, "Singing voice identification using spectral envelope estimation," *IEEE Transactions on Speech and Audio Processing*, vol. 12, no. 2, 2004.
- Maureen Mellody, Mark A. Bartsch, and Gregory H. Wakefield, "Analysis of vowels in sung queries for a music information retrieval system," *Journal of Intelligent Information Systems*, vol. 21, no. 1, pp. 35–52, 2003.

Published Conference Papers

- Norman H. Adams, Mark A. Bartsch, and Gregory H. Wakefield, "Coding of sung queries for music information retrieval," in *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics*, New Paltz, NY, 2003.
- Gregory H. Wakefield and Mark A. Bartsch, "Where's Caruso? Singer identification by listener and machine," in *Cambridge Music Processing Colloquium*, Cambridge, England, 2003.
- Mark A. Bartsch and Gregory H. Wakefield, "To catch a chorus: Using chroma-based representations for audio thumbnailing," in *Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics*, New Paltz, NY, 2001.
- William P. Birmingham, Roger D. Dannenberg, Gregory H. Wakefield, Mark A. Bartsch, David Bykowski, Dominic Mazzoni, Colin Meek, Maureen Mellody, and Bill Rand, "MUSART: Music retrieval via aural queries," in *ISMIR 2001: 2nd Annual International Symposium on Music Information Retrieval*, Bloomington, Indiana University, 2001, pp. 73–82.
- Shekhar Guha, Mark A. Bartsch, Frank K. Hopkins, Michael P. Eaton, Scott D. Setzler, Peter G. Schunemann, and Thomas M. Pollak, "Nonlinear absorption and laser damage threshold measurements of doped ZnGeP₂," in *SPIE: Operational Characteristics and Crystal Growth of Nonlinear Optical Materials*, Denver, CO, 1999, vol. 3793, pp. 9–12.

Conference Abstracts

- Mark A. Bartsch, Gregory H. Wakefield, M. Melissa Gross, Michael Turnblom, and George I. Shirley, "Singer, hear thyself: Matching of acoustic targets in a singers own voice," in *32th Annual Voice Foundation Symposium*, Philadelphia, PA, 2003.
- Gregory H. Wakefield and Mark A. Bartsch, "Surveying the SingerScape: Visualization tools for characterizing the singing voice," in *31st Annual Voice Foundation Symposium*, Philadelphia, PA, 2002.
- Gregory H. Wakefield and Mark A. Bartsch, "Finding formants, fixed or otherwise," in *31st Annual Voice Foundation Symposium*, Philadelphia, PA, 2002.
- Maureen Mellody, Mark A. Bartsch, Freda Herseth, George I. Shirley, and Gregory H. Wakefield, "Vowel representation and synthesis of singer identity," *Journal of the Acoustical Society of America*, vol. 109, pp. 2400, 2001.
- Gregory H. Wakefield, Mark A. Bartsch, and George I. Shirley, "On the present sound of ones future voice: Lessons from a case study of the tenor voice," in *30th Annual Voice Foundation Symposium*, Philadelphia, PA, 2001.
- Mark A. Bartsch, "A hybrid waveguide model of the transverse flute," *Journal of the Acoustical Society of America*, vol. 106, pp. 2142, 1999.

Theses and Technical Reports

- Mark A. Bartsch, *Automatic Singer Identification in Polyphonic Music*, Ph.d., University of Michigan, 2004.
- Mark A. Bartsch, "Automatic assesment of the spasmodic voice," Tech. Rep. 339, Communications and Signal Processing Laboratory (CSPL), Dept. EECS, University of Michigan, 2003.
- Mark A. Bartsch, *Modeling the Tuning of the Transverse Flute Using Digital Waveguide Synthesis Techniques*, Undergraduate honors thesis, University of Dayton, 2000.