Robert Mitchell Parry

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Education

Dec. 2007 **Ph.D. in Computer Science**
Georgia Institute of Technology, Atlanta, GA
Advisor: Irfan Essa
Topic: Audio Signal Separation
Title: Separation and Analysis of Multichannel Signals

May 2006 **M.S. in Computer Science**
Georgia Institute of Technology, Atlanta, GA
Specialization: Graphics and Visualization

May 2000 **B.S. in Computer Science**
University of Virginia, Charlottesville, VA
High Distinction
Minor: Electrical Engineering

Research and Work Experience

Georgia Tech and Emory University - Biomedical Engineering **Atlanta, GA**

Nov. 2007 – present **CCNE Postdoctoral Fellow (Advisor: May Wang)**
Working in bioinformatics including imaging, visualization, biomarker selection and quality control [J1-2,C9-11,A6-7,I2,P1-4,O3-5].

Georgia Institute of Technology - College of Computing **Atlanta, GA**

Jan. 2003 – Oct. 2007 **Graduate Research Assistant (Advisor: Irfan Essa)**
Conducted research on information retrieval, signal processing, pattern recognition, and their application to music and audio analysis [T3,C4-8,S1-2,A4-5,I1].

Aug. 2004 – Dec. 2005 **Guided Research (Advisor: Gil Weinberg in Music Department)**
Contributed computational rhythmic analysis such as stability and similarity for a robotic percussionist [C2-3,O2].

Jan. 2001 – Dec. 2002 **Guided Research (Advisor: Mark Guzdial)**
Explored music visualization, computer music and enhanced the music facilities in Squeak, an open-source implementation of Smalltalk-80 [T2].

Aug. 2000 – Dec. 2001 **Graduate Research Assistant (Advisor: William Ribarsky)**
Worked to incorporate real-time weather and high-resolution 3D city facades into a 3D interactive visualization of the earth (similar to Google Earth) [C1,A1-3,O1].

University of Virginia - Information Technology & Communication **Charlottesville, VA**

Summer 2000 **Student Programmer (Supervisor: Robin Ruggaber)**
Built a Linux driven console switch to provide remote administrative access to 24 network servers.

Publications

Journal Articles

J2 Leonard Nyadong, Glenn A. Harris, Stéphane Balayssac, Asiri S. Galhena, Myriam Malet-Martino, Robert Martino, R. Mitchell Parry, May Dongmei Wang, Facundo M. Fernández, and Véronique Gilard. Combining two-dimensional diffusion-ordered nuclear magnetic resonance spectroscopy, imaging desorption electrospray ionization mass spectrometry, and direct analysis in real-time mass spectrometry for the integral investigation of counterfeit pharmaceuticals. *Analytical Chemistry*, 81(12):4803–4812, 2009. (Research contribution by Parry)

J1 Amy L. Lane, Leonard Nyadong, Asiri Galhena, Elizabeth P. Stout, R. Mitchell Parry, May D. Wang, Mark E. Hay, Facundo M. Fernández, and Julia Kubanek. Desorption electrospray ionization mass spectrometry (DESI-MS) reveals surface-mediated antifungal chemical defense of a tropical seaweed. *Proc Natl Acad Sci USA*, 106(18):7314–7319, 2009. (Research contribution by Parry, cited 2 times)

Full Conference Papers (Refereed)

C11 Teresa H. Sanders, Todd H. Stokes, Richard A. Moffitt, Qaiser Chaudry, R. Mitchell Parry, and May D. Wang. Development of an automatic quantification method for cancer tissue microarray study. In *Proceedings of International Conference of the IEEE Engineering in Medicine and Biology Society*, pages 3665–3668, Minneapolis, MN, September 2009

C10 Peter W. Siy, Richard A. Moffitt, R. Mitchell Parry, Yanfeng Chen, Ying Liu, M. Cameron Sullards, Jr. Alfred H. Merrill, and May D. Wang. Matrix factorization techniques for analysis of imaging mass spectrometry data. In *Proceedings of IEEE International Conference on Bioinformatics and Bioengineering*, pages 1–6, Athens, Greece, October 2008. (Longer version of [A7], Principal research direction by Parry)

C9 Matthew Caldwell, Richard A. Moffitt, Jian Liu, R. Mitchell Parry, Yachna Sharma, and May D. Wang. Simple quantification of multiplexed quantum dot staining in clinical tissue samples. In *Proceedings of International Conference of the IEEE Engineering in Medicine and Biology Society*, pages 1907–1910, Vancouver, BC, August 2008. (Mentoring by Parry)

C8 R. Mitchell Parry and Irfan Essa. Phase-aware non-negative spectrogram factorization. In *Independent Component Analysis and Signal Separation*, volume 4666 of *Lecture Notes in Computer Science (LNCS)*, pages 536–543, London, September 2007. Springer. (Principal authorship and research by Parry, presented as a poster, cited 4 times)

C7 R. Mitchell Parry and Irfan Essa. Incorporating phase information for source separation via spectrogram factorization. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing*, volume 2, pages 661–664, Honolulu, Hawaii, April 2007. (Longer version of [A5], Principal authorship and research by Parry, full paper presented as a poster, cited 6 times)

C6 R. Mitchell Parry and Irfan Essa. Source detection using repetitive structure. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing*, volume 4, pages 1093–1096, Toulouse, France, May 2006. (Principal authorship and research by Parry, full paper presented as a poster)

C5 R. Mitchell Parry and Irfan Essa. Estimating the spatial position of spectral components in audio. In *Independent Component Analysis and Blind Signal Separation*, volume 3889 of *Lecture Notes in Computer Science (LNCS)*, pages 666–673, Charleston, SC, March 2006. Springer. (Principal authorship and research by Parry, presented as a talk, cited 6 times)

C4 R. Mitchell Parry and Irfan Essa. Blind source separation using repetitive structure. In *Proceedings of International Conference on Digital Audio Effects*, pages 143–148, Madrid, Spain, September 2005. (Principal authorship and research by Parry, presented as a talk, cited 1 time)

C3 Gil Weinberg, Scott Driscoll, and R. Mitchell Parry. Haile - a perceptual robotic percussionist. In *Proceedings of International Computer Music Conference*, Barcelona, Spain, September 2005. (1/4 authorship and research by Parry, cited 6 times)

C2 Gil Weinberg, Scott Driscoll, and R. Mitchell Parry. Musical interactions with a perceptual robotic percussionist. In *IEEE International Workshop on Robots and Human Interactive Communication*, pages 456–461, Nashville, TN, August 2005. (1/4 authorship and research by Parry, presented as a talk, cited 11 times)

C1 Tian-yue Jiang, William Ribarsky, Tony Wasilewski, Nickolas Faust, Brendan Hannigan, and R. Mitchell Parry. Acquisition and display of real-time atmospheric data on terrain. In *Proceedings of Joint Eurographics-IEEE Symposium on Visualization*, 2001. (Research contribution by Parry)

Short Conference Papers (Refereed)

S2 R. Mitchell Parry and Irfan Essa. Feature weighting for segmentation. In *Proceedings of the International Conference on Music Information Retrieval*, pages 116–119, Barcelona, Spain, October 2004. (Principal authorship and research by Parry, presented as a poster, cited 3 times)

S1 R. Mitchell Parry and Irfan Essa. Rhythmic similarity through elaboration. In *Proceedings of the International Conference on Music Information Retrieval*, pages 251–252, Baltimore, MD, October 2003. (Principal authorship and research by Parry, presented as a poster, cited 2 times)

Research Abstracts (Refereed)

A7 R. Mitchell Parry, Richard A. Moffitt, Peter W. Siy, M. Cameron Sullards, Yanfeng Chen, and May D. Wang. Tissue imaging mass spectrometry. In *Annual Fall Meeting of the Biomedical Engineering Society*, St. Louis, MO, October 2008. (Shorter version of [C10], Principal research direction and authorship by Parry)

A6 Teresa H. Sanders, Todd H. Stokes, Sovandy Hang, Adeel Yusuf, Richard A. Moffitt, R. Mitchell Parry, and May D. Wang. Tissue microarray quality control: A high throughput IHC classification and scoring system. In *Annual Fall Meeting of the Biomedical Engineering Society*, St. Louis, MO, October 2008. (Mentoring by Parry)

A5 R. Mitchell Parry and Irfan Essa. Spectrogram factorization using phase information. In *Neural Information Processing Systems: Workshop on Advances in Models for Acoustic Processing*, Whistler, Canada, December 2006. (Shorter version of [C7], Principal authorship and research by Parry, presented as a poster)

A4 R. Mitchell Parry. Source separation for multichannel music audio, October 2004. (Research proposal presented as a talk at *International Conference on Music Information Retrieval* graduate school)

A3 R. Mitchell Parry, William Ribarsky, Christopher Shaw, and Nickolas Faust. Organization and simplification of high-resolution 3D city facades. In *Proceedings of SPIE: Aerosense*, volume 4744, 2002. (Also Georgia Tech GVU Center Technical Report GIT-GVU-02-14, 1/4 authorship and research by Parry, cited 1 time)

A2 R. Mitchell Parry, Brendan Hannigan, William Ribarsky, Christopher D. Shaw, and Nickolas L. Faust. Hierarchical storage and visualization of real-time 3D data. In *Proceedings of SPIE: Aerosense*, volume 4368, Orlando, FL, April 2001. (Authorship and research contribution by Parry, cited 3 times)

A1 Christopher D. Shaw, Frank T. Jiang, R. Mitchell Parry, Beth Plale, Anthony A. Wasilewski, William Ribarsky, and Nickolas L. Faust. Real-time weather data on terrain. In *Proceedings of SPIE: Aerosense*, volume 4368, Orlando, FL, April 2001. (Research contribution by Parry, cited 2 times)

Invited Talks

I2 R. Mitchell Parry, Asiri S. Galhena, Facundo M. Fernandez, and May D. Wang. Deblurring molecular images using desorption electrospray ionization mass spectrometry. In *Proceedings of International Conference of the IEEE Engineering in Medicine and Biology Society*, pages 6731–6734, Minneapolis, MN, September 2009. (Principal authorship and research by Parry, presented as a talk.)

I1 R. Mitchell Parry. Blind source separation in music. Invited talk at dorkbot Atlanta (`http://dorkbot.org/dorkbotatl/`), January 2007

Technical Reports and Theses

T3 R. Mitchell Parry. *Separation and Analysis of Multichannel Signals*. PhD thesis, Georgia Institute of Technology, December 2007

T2 R. Mitchell Parry. Musical complexity and top 40 chart performance. Technical Report GIT-GVU-04-04, GVU Center, Georgia Institute of Technology, Atlanta, GA, February 2004. (Principal authorship and research by Parry, cited 5 times)

T1 R. Mitchell Parry. Circuiting Helms theater with simulated annealing. Technical Report (4th-year thesis) CS-200064, Department of Computer Science, University of Virginia, Charlottesville, VA, May 2000

Poster Presentations

P4 Chandrakant Jaybhaye, R. Mitchell Parry, Todd Stokes, Martin Ahrens, Qaiser Chaudry, and May Wang. Adapting a Matlab-based image analysis tool into a grid-enabled analytical service. caBIG® Annual Meeting, July 2009

P3 Asiri Galhena, Leonard Nyadong, R. Mitchell Parry, May D. Wang, and Facundo Fernandez. Imaging desorption electrospray ionization-mass spectrometry and direct analysis in real time mass-spectrometry for the integral investigation of counterfeit antimalarial pharmaceuticals. In *57th ASMS Conference on Mass Spectrometry*, Philadelphia, PA, May 2009

P2 John H. Phan, R. Mitchell Parry, Praveen Krishnaiah, and May D. Wang. omniBioMarker: A bioinformatics application for enabling personalized oncology. caBIG® Annual Meeting, June 2008

P1 Richard Moffitt, Todd Stokes, John Phan, Qiqin Yin-Goen, Jian Liu, James Torrance, Matthew Caldwell, R. Mitchell Parry, Andrew Young, Shuming Nie, and May Wang. caCORRECT: a suite of caBIG® grid services for microarray quality control and assessment. caBIG® Annual Meeting, June 2008

Papers Under Review and to be Resubmitted

R3 R. Mitchell Parry*, Wendell Jones*, Todd H. Stokes*, John H. Phan, Richard A. Moffitt, Hong Fang, Leming Shi, André Oberthuer, Matthias Fischer, Weida Tong, and May D. Wang. K-nearest neighbors (KNN) models for microarray gene-expression analysis and reliable clinical outcome prediction. *The Pharmacogenomics Journal*. (To be resubmitted, *Equal contributing author)

R2 The MicroArray Quality Control (MAQC) Consortium. The MAQC-II project: A comprehensive study of common practices for the development and validation of microarray-based predictive models. *Nature Biotechnology*. (Under review, one of 194 contributing authors)

R1 Todd H. Stokes, John H. Phan, R. Mitchell Parry, Richard A. Moffitt, Martin Ahrens, Chandrakant Jaybhaye, and May D. Wang. Diagnostic biomarker discovery using cabig® grid service workflows. In *AMIA Summit on Translational Bioinformatics*, San Francisco, CA, March 2010. (Under review)

Papers in Preparation

F3 R. Mitchell Parry, Richard A. Moffitt, Andrea B. Barrett, Yanfeng Chen, Ying Liu, M. Cameron Sullards, Alfred H. Merrill Jr., and May D. Wang. Analysis of sphingolipids with computational imaging mass spectrometry. *IEEE Transactions on Computational Biology and Bioinformatics*. (In preparation)

F2 R. Mitchell Parry*, Todd H. Stokes*, Martin P. Ahrens, and May D. Wang. Omnispect: Multispectral unmixing and profiling system for molecular data mining. *Medical Image Analysis*. (In preparation, *Equal contributing authors)

F1 R. Mitchell Parry, James Torrance, Andrew Dicks, and May D. Wang. Non-negative matrix factorization for learning and correcting population stratification in genome-wide association studies. (In preparation)

Other Press

O5 John Toon. Under the sea: New research technique into seaweed could lead to improved drug compounds. The Whistle: Georgia Tech's Faculty/ Staff Newspaper, April 20 2009.
`http://smartech.gatech.edu/bitstream/1853/28064/1/whistle_apr20.pdf`

O4 Abby Vogel. Georgia Tech creates center for bio-imaging mass spectrometry. Georgia Tech Research Horizons, September 2008.
`http://smartech.gatech.edu/bitstream/1853/25899/1/Research-Horizons-Summer2008.pdf`

O3 Quinn Eastman. Training across the alliance: Connecting across disciplines - Emory/GT CCNE's distinguished fellows program. NCI Alliance for Nanotechnology in Cancer Bulletin, Summer 2008.
`http://nano.cancer.gov/news_center/bulletin_pdf/Summer_2008.pdf`

O2 Matt Nagel. Music and technology merge to form a new kind of rhythm. The Whistle: Georgia Tech's Faculty/ Staff Newspaper, November 2005.
`http://www.whistle.gatech.edu/archives/05/nov/14/haile.shtml`

O1 Jane M. Sanders. Seeing 3D in real time: Visualization system could improve severe weather forecasting. Georgia Tech Research News, July 2001.
`http://gtresearchnews.gatech.edu/reshor/rh-f01/weather.html`

Teaching Experience

Mentoring

Aug. 2009 – present Chanchala Kaddi (PhD Student, Biomedical Engineering)
Guided Chanchala in quantitative methods for analyzing tissue imaging mass spectrometry.

Aug. 2009 – present Hussain Raza (PhD Student, Electrical and Computer Engineering)
Guided Hussain in image processing for cancer subtype classification and intra-operative imaging.

May 2009 – present Andrew Dicks (Undergraduate Student, Biomedical Engineering)
Guided Andrew in analyzing the population structure in genome-wide association studies (GWAS).

Aug. 2008 – Dec. 2008 Jeonggyu Lee (Masters Student, Computer Science)
Guided Jeonggyu in the 3D modeling and visualization of a human stomach. This includes segmentation of 2D images slices, registration of adjacent slices, and interpolation into 3D mesh.

Aug. 2008 – May 2009 Andrea Barrett (Undergraduate Student, Biomedical Engineering)
Guided Andrea in developing a user interface for tissue imaging mass spectrometry data supporting region of interest selection, identification of ion co-localization, generation of publication quality images.

Jan. 2008 – Dec. 2008 Peter Siy (Graduate Student, Electrical and Computer Engineering)
Guided Peter in learning about source separation and applying it to tissue imaging mass spectrometry. This resulted in his first publications [C10,A7]. Peter is now an analyst at McKinsey & Company.

Jan. 2006 – May 2006 Andrew Knight (Undergraduate Student, Computer Science)
Guided Andrew's first research experience on a music database visualization project. Andrew received his BS in 2006 and MS in 2007.

Aug. 1999 – May 2000 New Student Mentor, University of Virginia. Point of contact for first-year undergraduate engineering students adjusting to college life.

Instructing

Spring 2009 **Facilitator**
BMED1300: Problems in Biomedical Engineering I
Professor May Wang
Facilitated a group of eight first-year undergraduates twice weekly while they worked on biomedical engineering problems using problem-based learning methodologies.

Spring 2004 **Guest Instructor**
Fall 2004 *MUS3500: Introduction to Synthesized Computer Music*
Professor Gil Weinberg
Developed and presented two lectures titled *Pitch and Rhythm Recognition* and *Spectrum Analysis* based on The Computer Music Tutorial by Curtis Roads. Led tutorial in Max/MSP graphical programming environment.

Assisting

Spring 2002 **Teaching Assistant (three semesters)**
Summer 2002 *CS4451: Computer Graphics*
Fall 2002 *Professor Jarek Rossignac, Professor Norberto Ezquerra and Instructor David Krum*
Coauthored and graded programming assignments. Developed grading criteria and evaluated open-ended assignments and group projects. Gave lectures on OpenGL programming. Provided individual student assistance during office hours for class sizes of approximately 40 students per semester.

Spring 1998 **Teaching Assistant (two semesters)**
Spring 2000 *CS101, Introduction to Computer Science*
Provided one-on-one C++ programming help to students in office hours and labs.

Fall 1998 **Teaching Assistant**
CS201, Software Development Methods
Helped manage lab sessions and graded object-oriented programming assignments.

Professional Activities

2009 Reviewer for IEEE International Conference of the Engineering in Medicine and Biology Society (EMBS 2009).

2009 Reviewer for International Computer Music Conference (ICMC 2009).

2008 –present FDA MicroArray Quality Control (MAQC) project participant.

2008 –present NCI cancer Biomedical Informatics Grid (caBIG®) project participant.

2005 Reviewer for IEEE Transactions on Speech and Audio Processing, Vol. 13, Issue 6, Nov. 2005.

Honors

Nov. 2007 – present NIH CCNE Postdoctoral Fellowship

2006 Travel Award, International Conference on Independent Component Analysis and Blind Signal Separation [C5]

Memberships

Member: Association for Computing Machinery (ACM)
Member: Institute of Electrical and Electronics Engineers (IEEE)
Member: IEEE Biomedical Engineering Society (BMES)

Contact Info

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