

Christopher J. DiMattina, Ph.D.

CONTACT INFORMATION	Electrical Engineering & Computer Science Case Western Reserve University 10900 Euclid Avenue Glennan Room 321 Cleveland, OH 44106 USA	<i>Cell:</i> (410) 913-7644 <i>Fax:</i> (216) 368-6888 <i>E-mail:</i> cjd74@case.edu <i>WWW:</i> www.chrisdimattina.net
OBJECTIVE	A faculty position in Cognitive Science, Neuroscience or Computer Science	
CITIZENSHIP	USA	
RESEARCH INTERESTS	Computational Neuroscience, Visual Psychophysics, Sensory Neuroscience, Machine Learning, Machine Vision, Numerical and Scientific Computing	
POSTDOCTORAL EXPERIENCE	Case Western Reserve University , Cleveland, OH USA Research Associate in Computer Science, August 2009–present <ul style="list-style-type: none">• Department of Electrical Engineering & Computer Science• Advisor: Michael S. Lewicki, Ph.D.	
EDUCATION	The Johns Hopkins University School of Medicine , Baltimore, MD USA Ph.D., Neuroscience (Computational Neuroscience), September 2000–July 2009 <ul style="list-style-type: none">• Thesis: <i>Neural network analysis of sensory processing and active data collection</i>• Advisor: Kechen Zhang, Ph.D., Biomedical Engineering (2005-2009)• Previous Advisor: Xiaoqin Wang, Ph.D., Biomedical Engineering (2001-2005) Cornell University , Ithaca, NY USA B.A., Mathematics, Psychology & College Scholar, August 1994–August 1998 <ul style="list-style-type: none">• Phi Beta Kappa• <i>Magna cum Laude</i> with distinction in all subjects• Concentrations in Cognitive Studies & Biological Psychology• Upper-division coursework in Computer Science, Physics & Neurobiology Binghamton University , Binghamton, NY USA Non-degree student concurrent with high school, May 1993–August 1994 <ul style="list-style-type: none">• 11 Courses in Math, Computer Science and Physics• Math through Complex Analysis and Differential Equations	
SCIENTIFIC COURSES	Woods Hole Marine Biological Laboratory , Woods Hole, MA USA Methods in Computational Neuroscience, August 2003 University of California at Berkeley , Berkeley, CA USA Mining and Modeling of Neuroscience Data, July 2011	

- ACADEMIC HONORS
- Cornell University
- *Magna cum Laude*, 1998
 - Phi Beta Kappa, 1998
 - Pauline and Irving Tanner Dean's Scholar, 1994–1998
 - College Scholar Program, 1995–1998
- OTHER HONORS
- Boy Scouts of America
- Eagle Scout, 1990
 - Order of the Arrow, 1992
- Marquis Who's Who
- Who's Who in America, 2011
- RESEARCH AWARDS
- National Institutes of Health
- National Research Service Award (Predoctoral) F31-DC05892, 2002–2005
 - Title: *Neural encoding of primate vocalizations in auditory cortex*
- Cornell University
- Dean's Scholar Summer Research Award, 1997
- TRAVEL AWARDS
- Gordon Research Conferences
- Sensory Coding and the Natural Environment, Bates College ME, 2010
- TEACHING EXPERIENCE
- Case Western Reserve University**, Cleveland, OH USA
- EECS New Course: Computer Vision, Spring 2012
- Instructor: Michael S. Lewicki, Ph.D.
 - Will be teaching assistant for a new course on Computer Vision
- EECS 600: Computational Perception, Spring 2011
- Instructor: Michael S. Lewicki, Ph.D.
 - Guest lecture on invariant representation in natural images
 - Guest lecture on visual search
- EECS 600: Computational Perception, Spring 2010
- Instructor: Michael S. Lewicki, Ph.D.
 - Teaching assistant for a graduate level course on Computational Perception
 - Graded homework programming assignments and final project
 - Assisted students with homework assignments
 - Guest lecture on Bayesian perception
- EECS Computational Perception Journal Club, 2011-present
- Organized Computational Perception Journal Club
 - Helped with selection of papers and schedule

The Johns Hopkins University School of Medicine, Baltimore, MD USA

440.800: Neuroscience A, Spring 2008

- Course Director: Jay Baraban, M.D./Ph.D.
- Discussion Leader: Eric D. Young, Ph.D.
- Teaching assistant for a core first-year medical school Neuroscience course
- Lead a discussion section of about 15 medical students together with Dr. Young
- Reviewed problem answers with students and discussed basic neuroscience
- Wrote up solutions to problem sets which were incorporated by Dr. Baraban as official course materials

080.621: Theoretical and Computational Neuroscience, Spring 2007

- Course Director: Ernst Niebur, Ph.D.
- Gave a series of two guest lectures on the statistics of natural visual scenes

440.800: Neuroscience A, Spring 2006

- Course Director: Jay Baraban, M.D./Ph.D.
- Discussion Leader: Mark F. Walker, M.D.
- Teaching assistant for a core first-year medical school Neuroscience course
- Lead a discussion section of about 19 medical students together with Dr. Walker
- Reviewed problem answers with students and discussed basic neuroscience
- Wrote up solutions to problem sets

080.621: Theoretical and Computational Neuroscience, Spring 2005

- Course Director: Ernst Niebur, Ph.D.
- Gave a series of three guest lectures on reverse correlation methods

440.770: Physiology of the Central Nervous System, Spring 2002

- Course Director: Steven S. Hsiao, Ph.D.
- Teaching assistant for a core graduate-level systems neuroscience course
- Assisted students with presentations and final grant proposal projects

Binghamton University, Binghamton, NY USA

CS 140: Introduction to Computer Programming, Summer 1994

- Instructor: Stan Reks
- Teaching assistant for an introductory undergraduate programming course
- Instructed a weekly laboratory and assisted students with assignments

RESEARCH
MENTORING

Case Western Reserve University, Cleveland, OH USA

Fall 2010: 5 undergraduate research assistants collecting a database of images whose contours and texture regions are hand-labeled

- William Griffith, BME major, Class of 2013
- Jianing Zhou (China), BME major, Class of 2012
- Sean Fox, EECS major, Class of 2013
- Chanel Williams, EECS and Biology major, Class of 2012
- CJ Mosure, Business major, Class of 2014

2010-2011: 1 undergraduate research assistant performing software development

- Sean Fox, EECS major, Class of 2013
Sean developed software in Java for labeling texture regions in natural images, as well as MATLAB software for visualizing the activities of sets of filters applied to edges in natural images.

Summer 2011: 1 undergraduate research assistant helping with programming and data analysis

- Tracy Egbas (Nigera), CS major, Fisk College Class of 2014
Tracy helped write software for labeling figure-ground polarity of contour edges and applied it to collect database of edges with known figure-ground polarity.

TEACHING

QUALIFICATIONS

Neuroscience and Psychology Courses

- Introduction to Neuroscience, Introduction to Cognitive Science, Sensory Systems, Cognitive Neuroscience, Sensation and Perception, Statistics, Advanced Statistics, Neurobiology of Learning and Memory

Interdisciplinary Courses

- Computational Perception, Computational Neuroscience

PUBLICATIONS

DiMattina, C., & Zhang, K. (2011). Active data collection for efficient estimation and comparison of nonlinear neural models. *Neural Computation* 23(9): 2242-2288.

DiMattina, C., & Zhang, K. (2010). How to modify a neural network gradually without changing its input-output functionality. *Neural Computation* 22(1):1-47.

DiMattina, C., & Zhang, K. (2008). How optimal stimuli for sensory neurons are constrained by network architecture. *Neural Computation* 20(3):668-708.

DiMattina, C., & Wang, X. (2006). Virtual vocalization stimuli for investigating neural representations of species-specific vocalizations. *Journal of Neurophysiology* 95(2):1244-1262.

Kotak, V.C., **DiMattina, C.**, & Sanes, D.H. (2001). GABA(B) and Trk receptor signalling mediates long-lasting inhibitory synaptic depression. *Journal of Neurophysiology* 86(1):536-540.

ARTICLES IN

PREPARATION

DiMattina, C., Anderson, M., Young, E.D., & Zhang, K. (2011). Optimal and invariant stimuli in hierarchical sensory networks: A quadratic analysis. *In preparation.*

DiMattina, C. & Zhang, K. (2011). Adaptive stimulus optimization in sensory neuroscience. *In preparation.*

Tam, W., Dekel, E. **DiMattina, C.**, Young, E.D. & Zhang, K. (2011). Using optimal experimental design for capturing parameters of neural networks in the inferior colliculus of the common marmosets. *In preparation*

DiMattina, C. & Lewicki, M.S. (2011). Effects of natural image ensemble on optimal linear receptive field properties *In preparation.*

DiMattina, C. & Lewicki, M.S. (2011). Detection of natural occlusion boundaries by human and ideal observers and relationship to natural image statistics. *In preparation.*

- DISSERTATION **DiMattina, C.** (2009). Neural network analysis of sensory processing and active data collection. Unpublished PhD Thesis, The Johns Hopkins University School of Medicine.
- CONFERENCE PUBLICATIONS **DiMattina, C.** & Wang, X. (2002). Virtual Vocalization Stimuli for Systematic Investigation of Cortical Coding of Vocal Communication Sounds. *Association for Research in Otolaryngology*, Poster Abstract 455.
- DiMattina, C.** & Wang, X. (2004). Virtual vocalization stimuli for investigating neural representations of species-specific primate vocalizations. *Society for Neuroscience*, Poster Abstract 650.14.
- DiMattina, C.** & Zhang, K. (2008). Adaptive experimental design for online model comparison. *Society for Neuroscience*, Poster Abstract 798.15.
- DiMattina, C.** & Zhang, K. (2009). Active data collection for efficient estimation and comparison of sensory processing models. *Society for Neuroscience*, Poster Abstract 290.13.
- DiMattina, C.** & Zhang, K. (2010). Identifiability of nonlinear receptive field models from sensory neurophysiology data. *Frontiers in Neuroscience. Conference Abstract: Computational and Systems Neuroscience*.
- DiMattina, C.**, Tam, W., Young, E.D., & Zhang, K. (2010). Adaptive design of stimuli for efficient characterization of nonlinear sensory responses. *Collaborative Research in Computational Neuroscience* (PI Meeting), Poster Abstract C15.
- DiMattina, C.**, & Lewicki, M.S. (2010). Effects of database and fixations on receptive fields learned by a sparse coding model of natural images. *Gordon Research Conferences: Sensory Coding in the Natural Environment*, Bates College, ME.
- Tam, W., Dekel, E. **DiMattina, C.**, Young, E.D. & Zhang, K. (2011). Using optimal experimental design for capturing parameters of neural networks in the inferior colliculus of the common marmosets. *Society for Neuroscience*, Poster Abstract 480.10.
- DiMattina, C.** & Lewicki, M.S. (2011). Representation of natural occlusion boundaries by human and ideal observers and relationship to natural image statistics. *Society for Neuroscience*, Poster Abstract 799.03.
- INVITED TALKS Departmental Seminars
- *Estimation and comparison of sensory processing models using active data collection*. Mathematical Life Sciences Seminar, CWRU Math Department, 9/10/2010.
 - *A machine learning approach to neuroscience by adaptive estimation and comparison of nonlinear models*. Computing Seminar, CWRU EECS Department, 9/27/2010.
- RESEARCH PROTOCOLS Visual Psychophysics Protocols
- CWRU 20101216: *Detection of natural occlusion boundaries by human observers*.
 - CWRU 20101218: *Human eye movements during analysis of complex images*.
- PROFESSIONAL SOCIETIES Current or Past Memberships
- Society for Neuroscience
 - Association for Research in Otolaryngology
 - Vision Science Society
 - IEEE (Computational Intelligence Society)

- International Society for Neural Networks

REFEREE SERVICE Manuscript Review

- Neural Computation
- Journal of Computational Neuroscience
- IEEE/INNS International Joint Conference on Neural Networks

PROFESSIONAL EXPERIENCE

Johns Hopkins Center for Imaging Science, Baltimore, MD USA

Computer Programmer

September 1998 to April 1999

- Developed software in C/C++ for the segmentation of FMRI images into gray matter and white matter regions

New York University, New York, NY USA

Computer Programmer

May 1999 to December 1999

- NYU Center for Neural Science in the laboratory of Wendy Suzuki, Ph.D.
- Helped to develop data acquisition system for primate behavioral experiments. Wrote code in C and CORTEX.

Research Computer Programmer

September 1999 to September 2000

- NYU Center for Neural Science in the laboratory of Daniel H. Sanes, Ph.D.
- Developed a data acquisition and analysis package in IGOR for brain slice neurophysiology experiments.
- Software is available at http://www.cns.nyu.edu/~sanes/slice_software/

COMPUTER EXPERIENCE

Extensive experience in scientific computing, numerical optimization, data analysis and development of scientific data acquisition systems

Operating Systems: Mac OS X, Microsoft Windows Family, Linux, UNIX

General Programming: C, C++, Java, Python

Scientific Programming: MATLAB, IGOR, CORTEX

Supercomputing: GPU Computing (Case High Performance Computing Cluster)

Web Development: HTML, XHTML, CSS

Document Typesetting: L^AT_EX

REFERENCES

Kechen Zhang, Ph.D.

Departments of Biomedical Engineering & Neuroscience

The Johns Hopkins University School of Medicine

kechen@bme.jhu.edu

Charles E. Connor, Ph.D.

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Daniel H. Sanes, Ph.D.
Center for Neural Science & Department of Biology
New York University
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TEACHING
REFERENCES

Jay Baraban, M.D., Ph.D.
Department of Neuroscience
The Johns Hopkins University School of Medicine
jay.baraban@gmail.com

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Department of Neuroscience
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