

# Jason W. Bohland, Ph.D.

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## **Positions:**

- Sep 2009 – Present      *Assistant Professor of Health Sciences*  
*Faculty Member, Graduate Program for Neuroscience (GPN), Center of Excellence For Learning in Education, Science and Technology (CELEST), Center for Computational Neuroscience and Neural Technology (CompNet)*  
*Boston University, Boston, MA*  
Director of the Quantitative Neuroscience Laboratory, which focuses on understanding the structural and functional architecture of neural systems in the human brain, with emphasis on those that support speech and language processes. We employ an integrative approach that combines computational, informatics, behavioral, and brain imaging methods.
- June 2007 – Aug 2009      *Postdoctoral Fellow / Scientific Informatics Manager, Brain Architecture Project*  
*Cold Spring Harbor Laboratory, Cold Spring Harbor, NY*  
Worked initially as postdoctoral fellow, then as lead scientist/manager for the Brain Architecture Project (Partha P. Mitra, PI), a neuroinformatic and experimental effort to understand the brain's basic structure, with emphasis on connectivity patterns.
- May 2001 – Feb 2007      *Research Assistant, Speech Laboratory (Frank H. Guenther, PI)*  
*Department of Cognitive & Neural Systems, Boston University, Boston, MA*  
Designed and conducted functional magnetic resonance imaging (fMRI), magnetoencephalography (MEG), and psychophysical experiments in human subjects and implemented computational neural models of the speech system.
- Sep 1998 – May 2000      *Research Assistant, Complex Adaptive Systems Laboratory (Ali A. Minai, PI)*  
*Department of Electrical and Computer Engineering, University of Cincinnati*  
Explored the effects of network topology and connectivity on the performance and dynamics of associative memory neural networks.

## **Education:**

- Sep 2000 – Jan 2007      Ph.D. Cognitive & Neural Systems, Boston University, Boston, MA  
Dissertation: Neuroimaging and computational modeling of syllable sequence production.
- Sep 1998 – Jun 2000      M.S. Electrical Engineering (*Honors*), University of Cincinnati, Cincinnati, OH  
Thesis: Associative memory on small-world networks.
- Sep 1994 – Jun 1998      B.S. Computer Engineering (*Cum Laude*), University of Cincinnati, Cincinnati, OH

## **Teaching and Mentorship:**

- Spring 2009 – Courses taught or developed at Boston University:  
*Computational neuroscience of speech, language, & hearing (Fall 2010, Fall 2011)*  
*Introduction to health professions (Spring 2009, Spring 2012)*  
*Guest Lecture: Topics in Computational Biology (Spring 2011)*
- Summer 2010-2011 *Faculty, Workshop on Circuit and Molecular Architecture of the Vertebrate Brain*  
Cold Spring Harbor Laboratory, Cold Spring Harbor, NY  
Topics: Computational neuroanatomy, image processing
- Summer 2007-2011 *Faculty, Neuroinformatics Summer Course*  
Marine Biological Laboratory, Woods Hole, MA  
Topics: Human Brain Atlases, fMRI Time Series Analysis I and II, Databases and web programming, image processing
- Spring 2002, 2003 *Teaching Assistant, Department of Cognitive and Neural Systems*  
Boston University, Boston, MA  
Courses: Principles and Methods of Cognitive and Neural Modeling II and Neural and Computational Models of Recognition, Memory and Attention
- Sep 1999 – Jun 2000 *Instructor, College of Engineering and College of Continuing Education*  
University of Cincinnati, Cincinnati, OH  
Developed and presented lecture and laboratory materials for courses in a new graduate-level certificate program for continuing education students.  
Courses: Introduction to C++, Introduction to Java and Web Programming, Data Structures and Discrete Math, and Computer Architecture and Organization.
- Sep 1998 – Aug 1999 *Teaching Assistant, Department of Electrical and Computer Engineering*  
University of Cincinnati, Cincinnati, OH  
Courses: Measurements Lab, Electronics Lab, Intro to UNIX, Compiler Theory.

## **Additional Experience:**

- 1999 – 2001 *Partner, InsideCorner.com, LLC, Cincinnati, OH*  
Conceived and developed an internet site offering online statistical sports games to over 20,000 users. Responsible for creative and technological development, business planning, and marketing. Co-developed a custom client-server engine in Java for coordinating real-time interactions amongst users.
- 1996 – 1997 *Software Engineer Co-op, Structural Dynamics Research Corp, Milford, OH*  
Performed a total of 12 months of co-operative education employment with computer-aided engineering software firm. Wrote and tested C code, and participated in the creation of object-oriented design strategies and development guidelines for a large software development team.

## **Honors and Awards:**

- 2010 Boston University Neuroscience Commencement Speaker (student elected)  
2004 Organization for Human Brain Mapping Student Travel Award  
2000 Presidential University Graduate Fellowship, Boston University

2000 Electrical Engineering Special Service Award, University of Cincinnati  
1998 – 2000 M.S. Honors Program, Electrical Engineering, University of Cincinnati  
1994 – 1998 University Honors Scholarship, University of Cincinnati

### **Funding:**

R01 MH084802-01: *The Online Brain Atlas Reconciliation Tool*, PI: Partha P. Mitra (Cold Spring Harbor Laboratory), 08/01/2010 – 05/31/2013. The goal of this project is to deploy a set of web-based tools to enable quantitative comparison of multiple existing human brain atlases and, enabling reconciliation of disparate nomenclature systems. Role: Co-investigator (subcontract to Boston University).

NSF SBE-0354378: *CELEST: A Center of Excellence for Learning in Education, Science, and Technology*, PI: Ennio Mingolla (Boston University), 10/01/2004 – 09/30/2011. Prof. Bohland is a faculty member in this NSF Science of Learning Center, and receives salary support for graduate students and additional support for costs related to the sponsored project “Multivariate investigation of neural systems supporting phonological representations.” Role: Faculty.

### **Technical Expertise:**

Data analysis, functional magnetic resonance imaging, magnetoencephalography, biological modeling, neural networks, neuroinformatics, digital signal processing, image processing and analysis, speech analysis, text analytics, pattern recognition, graph theory, software engineering, database management systems.

### **Programming and Computer Skills:**

Advanced programming abilities in MATLAB, C, C++, and Java; strong web-development background with HTML, Perl, Javascript, PHP; experience with Python/Django; database schema design and deployment, including spatial database systems; knowledge of 3-D graphics programming and scientific visualization; advanced user and system administration experience with Windows and Linux/UNIX.

### **Professional Memberships and Service:**

North American Book Review Editor, *Neural Networks*

Member Institute for Electrical and Electronics Engineers (IEEE), Society for Neuroscience (SFN), Organization for Human Brain Mapping (HBM), Society for the Neurobiology of Language (SNL).

Ad hoc reviewer for *NeuroImage*, *Human Brain Mapping*, *Frontiers in Systems Neuroscience*, *Frontiers in Neuroinformatics*, *Bioinformatics*, *Neural Networks*, *IEEE Transactions on Neural Networks*, *Journal of Neural Engineering*

### **Articles:**

Golfinopoulos E, Tourville JA, Bohland JW, Ghosh SS, Nieto-Castanon A, Guenther FH (in press). fMRI investigation of unexpected somatosensory feedback perturbation during speech. *NeuroImage*. PMID: 21195191.

Bohland JW, Bokil H, Pathak SD, Lee CK, Ng L, Lau C, Kuan C, Hawrylycz M, Mitra PP (2010). Clustering of spatial gene expression patterns in the mouse brain and comparison with classical neuroanatomy. *Methods*, 50(2), 105-112. PMID: 19733241.

Bohland JW, Bullock D, Guenther FH (2010). Neural representations and mechanisms for the performance of simple speech sequences. *Journal of Cognitive Neuroscience*, 22(7), 1504-1529. PMID: 19583476.

Bohland JW, Bokil H, Allen CB, Mitra PP (2009). The brain atlas concordance problem: quantitative comparison of anatomical parcellations. *PLoS ONE*, 4(9), e7200. PMID: 19787067.

- Bohland JW, Wu C, Barbas H, Bokil H, Bota M, Breiter HC, Cline HT, Doyle JC, Freed PJ, Greenspan RJ, Haber SN, Hawrylycz M, Herrera DG, Hilgetag CC, Huang ZJ, Jones A, Jones EG, Karten HJ, Kleinfeld D, Kötter R, Lester HA, Lin JM, Mensh BD, Mikula S, Panksepp J, Price JL, Safdieh J, Saper CB, Schiff ND, Schmahmann JD, Stillman BW, Svoboda K, Swanson LW, Toga AW, Van Essen DC, Watson JD, Mitra PP (2009). A proposal for a coordinated effort for the determination of brainwide neuroanatomical connectivity in model organisms at a mesoscopic scale. *PLoS Computational Biology*, 5(3), e1000334. PMID: 19325892.
- Ng L, Bernard A, Lau C, Overly CC, Dong HW, Kuan C, Pathak S, Sunkin SM, Dang C, Bohland JW, Bokil H, Mitra PP, Puelles L, Hohmann J, Anderson DJ, Lein ES, Jones AR, Hawrylycz M (2009). An anatomic gene expression atlas of the adult mouse brain. *Nature Neuroscience*, 12(3), 356-62. PMID: 19219037.
- Lin JM, Bohland JW, Andrews P, Burns GA, Allen CB, and Mitra PP (2008). An analysis of the abstracts presented at the annual meetings of the Society for Neuroscience from 2001 to 2006. *PLoS ONE*, 3(4), e2052. PMID: 18446237.
- Bohland JW and Guenther FH (2006). An fMRI investigation of syllable sequence production. *NeuroImage*, 32 (2), 821-841. PMID: 16730195.
- Guenther FH and Bohland JW (2002). Learning sound categories: a neural model and supporting experiments. *Acoustical Science and Technology*, 23(4): 213-220.
- Bohland JW and Minai AA (2001). Efficient associative memory using small-world architecture. *Neurocomputing*, 38-40, 489-496.

### **Invited Presentations:**

- “Brain architecture and neuroinformatics: applications for speech and language systems.” Speech Science Featured Lecture, American Speech-Language-Hearing Association Convention, November, 2011.
- “Informatics efforts linking gene expression data to speech / language brain systems.” USC International Workshop on Action, Language, and Neuroinformatics, July, 2011.
- “Large-scale, data driven approaches to understanding brain architecture.” Boston University Program in Neuroscience Seminar Series, December, 2009.
- “An fMRI investigation of syllable sequence production.” Massachusetts Institute of Technology Neurolinguistics Group, Cambridge, MA, April, 2006.
- “Neural substrates for syllable sequence planning and production.” Massachusetts Institute of Technology Speech Communication Group Seminar Series, Cambridge, MA, March, 2006.
- “Modeling the representation of speech sounds in auditory cortical areas.” 145<sup>th</sup> Meeting of the Acoustical Society of America, Nashville, TN, April 29, 2003.

### **Conference posters and presentations:**

- Bohland, JW, Saperstein, S, Kim, E, Zeid, O, Hawrylycz, M (2010). Towards a knowledgebase for the architecture of speech and language brain systems. 2<sup>nd</sup> Annual Neurobiology of Language Conference, San Diego, CA. (oral presentation).
- Wang, H, Grange, P, Bohland, JW, Pinsky, V, Germann, J, Khabbaz, AN, Henkelman, RM, Mitra, PP (2010). A digital reference atlas guiding semi-automated stereotaxic surgery. 40<sup>th</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
- Wang, H, Bohland, JW, Grange, P, Svoboda, K, and Mitra, PP (2010). A digital reference atlas for brainwide connectivity data in mouse. Turning Images to Knowledge, HHMI Janelia Farm Meeting, Ashburn, VA, May 2010.
- Bohland, JW, Bokil, H, Pathak, S, Lin, JM, Lee, CK, Ng, L, Osorio-Duque, F, Lau, C, Herrera, DG, Hawrylycz, M, Mitra, PP (2008). Clustering of spatial gene expression patterns in the mouse brain and comparison with classical neuroanatomy. 38<sup>th</sup> Meeting of the Society for Neuroscience, Washington, DC.
- Bokil, H, Bohland, JW, Pathak, S, Lin, JM, Lee, CK, Ng, L, Osorio-Duque, F, Lau, C, Herrera, DG, Hawrylycz, M, Mitra, PP (2008). Spatial correlation and localization patterns of gene expression in the mouse brain. 38<sup>th</sup> Annual Meeting of the Society for Neuroscience, Washington DC.
- Lin, JM, Bohland, JW, Wu, C, Berwick, RC, Di Sciuillo, AM, Mitra, PP (2008). A literature mining and curation system for neuroscience knowledge discovery. 38<sup>th</sup> Annual Meeting of the Society for Neuroscience, Washington D.C.

- Bohland, JW, Bokil, H, Wu, C, Breiter, HC, Makris, N, Kennedy, DN, Allen, CB, and Mitra, PP (2007). Quantitative comparison of anatomical parcellation schemes for MRI. 37<sup>th</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
- Lin, JM, Andrews, PA, Burns, GA, Bohland, JW, Allen, CB, and Mitra, PP (2007). Community structure of neuroscience research: inferences from a co-authorship graph of Society for Neuroscience meeting abstracts. 37<sup>th</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
- Reilly, KJ, Guenther, FH, Tourville, JA, and Bohland, JW (2007). A neuroimaging investigation of auditory-motor learning. *Journal of the Acoustical Society of America* (154<sup>th</sup> Meeting of the Acoustical Society of America, New Orleans), 122 (5 Pt 2): 3087.
- Bohland, JW, Guenther, FH, and Bullock, D (2006). Modeling and imaging of sequencing in speech production. 10<sup>th</sup> International Conference on Cognitive & Neural Systems, Boston (oral presentation).
- Reilly, K.J., Guenther, F.H., Tourville, J.A., and Bohland, J.W. (2006). Brain activations during learning of a novel speech sensorimotor mapping. *Conference on Motor Speech*, Austin, TX.
- Ghosh, SS and Bohland, JW (2005). A speech recording setup for fMRI with online reduction of scanner noise. *NeuroImage* (11<sup>th</sup> Annual Meeting of the Organization for Human Brain Mapping, Toronto), 26 (S1): S42.
- Tourville, JA, Guenther, FH, Ghosh, SS, Reilly, KJ, Bohland, JW, and Nieto-Castanon, A (2005). Effects of acoustic and articulatory perturbation on cortical activity during speech production. *NeuroImage* (11<sup>th</sup> Annual Meeting of the Organization for Human Brain Mapping, Toronto), 26 (S1): S49.
- Tourville, JA, Guenther, FH, Ghosh, SS, and Bohland, JW (2004). Effects of jaw perturbation on cortical activity during speech production. *Journal of the Acoustical Society of America* (75<sup>th</sup> Meeting of the Acoustical Society of America, San Diego), 116 (4): 2631.
- Bohland, JW and Guenther, FH (2004). An fMRI investigation of the neural bases of sequential organization for speech production. *NeuroImage* (10<sup>th</sup> Annual Meeting of the Organization for Human Brain Mapping, Budapest, Hungary), 22 (S1): S41.
- Ghosh, SS, Bohland, JW, and Guenther, FH (2003). Comparisons of brain regions involved in overt production of elementary phonetic units. *NeuroImage* (9<sup>th</sup> Annual Meeting of the Organization for Human Brain Mapping, New York), 19 (2): S57.
- Bohland, JW and Minai, AA (2000). Small-World model of associative memory. *Proceedings of the International Joint Conference on Neural Networks*, 5: 597-604.

### **Other:**

- “PET and fMRI”. In Mitra, PP and Bokil, H (2007). *Observed Brain Dynamics* (2007). Oxford University Press, USA (primary author of book chapter).
- Guenther, FH, Ghosh, SS, Nieto-Castanon, A, Tourville, JA, and Bohland, JW (2002). ‘Holes’ in the brain help us sort out sounds. “Lay language” press release for the 143<sup>rd</sup> Meeting of the Acoustical Society of America, Pittsburgh, PA.