

## Heather Ames

### Work Experience

2009-present                      **Boston University**                      Boston, MA

#### **Postdoctoral Researcher**

**Behavioral and modeling work on speech motor control of aphasics.** In this project, I am coordinating with Boston University, the VA hospital, and Northeastern University to perform a behavioral study investigating the speech motor control of patients with aphasia. In addition, computational modeling work is being undertaken to better understand how speech sounds are represented in the brain. My responsibilities include computational modeling, being the interface with IRBs at both the VA and BU, overseeing study design, patient recruitment, data analysis, obtaining consent from patients, writing grants, and writing papers for submission to a peer reviewed journal.

**Neuromorphic technology development.** I am working with a team of graduate students and postdocs in developing models for the DARPA SyNAPSE (Systems of Neuromorphic Adaptive Plastic Scalable Electronics) program with Hewlett Packard. My responsibilities include generating a novel approach to implementing learning algorithms in memristive devices, studies of stability within neural network systems, facilitating project coordination, and preparing deliverables.

**Co-Director of Technology outreach.** I am co-leading an effort to create a centralized resource for transferring technology developed within the NSF-funded CELEST Science of Learning Center to industrial partners, the CELEST Catalyst. Responsibilities include creating a web portal for resources, bridging communication between academia and industry, presenting CELEST research portfolios to potential industry partners, assisting CELEST researchers in writing grants or commercialization proposals, provide a direct line of communication between CELEST researchers and BU technology transfer resources, facilitating sponsored research agreements between CELEST researchers and industrial partners, advising CELEST researchers on technology transfer options for their research, and hosting events to encourage entrepreneurship for graduate students and postdocs.

**Member of CELEST governing board.** I am a member of the CELEST governing board specifically representing interests in Technology outreach and development. Responsibilities include attending Governing Board meetings, planning and executing center-wide activities, participating in NSF site visits, assist PIs in preparation of reports and planning documents.

2006-present                      **Neurala LLC**                      Boston, MA

#### **Co-Founder**

Participate in gunshot detection and classification project for defense related contract with Biomimetic Systems.

Assisted in designing a system for used for determining slope length of fields for calculation of soil erosion.

Assist development of business goals and product design and grant writing.

2004-2009                      **Boston University**                      Boston, MA

#### **Research Assistant**

**Neural network modeling of speaker normalization.** This research aimed to determine how the human brain creates a speaker and rate invariant representation of speech sounds and how the brain learns to recognize those signs and categorize them with their associated meaning.

**Behavioral and modeling work on speech motor control of aphasics.** In this project, I coordinated with Boston University, the VA hospital, and Northeastern University to perform a behavioral study investigating the speech motor control of patients with aphasia. My responsibilities included computational modeling, being the interface with IRBs at both the VA and BU, overseeing study design, patient recruitment, data analysis, obtaining consent from patients, and writing a book chapter and paper for submission to a peer reviewed journal.

**Hi-tech software development project.** I co-lead a team of seven CNS graduate students and post docs in a project aimed at developing an innovative software platform for advanced neural modeling. The software, the KDE Integrated NeuroSimulation Software (KInNeSS, [www.kinness.org](http://www.kinness.org)), has become the primary tool in many departmental research projects in the design and testing of complex neural systems.

2000-2003                      **Barons Jewelers**                      San Leandro, CA

**Corporate Office Manager and Systems Administrator**

Managed office employees at four locations in both day to day operations and sales and accounting issues involving customers, business clients, other employees, and the computer system.

Co-authored a business plan which successfully received multi-million dollar financing.

Managed company LAN hardware and data transfer.

Helped facilitate conversion to a computerized point of sales system.

Conducted employee training sessions and meetings.

Attained accounts receivable experience in billing and maintaining in-house finances.

1998-2000                      **University of California, Berkeley**                      Berkeley, CA

**Lab Assistant**

Work study position in a water ecology laboratory.

Identified taxonomy of aquatic insects through sample analysis and processing.

Organized data into spreadsheets.

**Education**

2003-2009                      **Boston University**                      Boston, MA

Received PhD degree in Cognitive and Neural Systems, May 2009

Cumulative GPA of 3.9

*Concentration:* Biologically inspired speech perception and production neural network modeling.

*PhD Advisor:* Stephen Grossberg and Frank Guenther

*Dissertation title:* Neural dynamics of speech perception and production: from speaker normalization to apraxia of speech

1998-2003                      **University of California - Berkeley**                      Berkeley, CA

Bachelor of Arts degree received in May 2003.

Received departmental honors and cumulative GPA of 3.52.

Majored in cognitive science with an emphasis in neuroscience.

**Leadership**

Founding member of the inter-Science of Learning Center (iSLC) Governing Board (formed May, 2010)

Member of the CELEST (Center for Excellence in Education, Science, and Technology) Governing Board (Appointed April, 2010).

Co-Director of CELEST (Center for Excellence in Education, Science, and Technology) Technology Outreach (2010).

Co-PI and program chair for the NSF sponsored inter-Science of Learning Center (iSLC) conference to be held in Boston in May 2010.

President of the NSF sponsored CELEST (Center for Excellence in Education, Science, and Technology)

Science of Learning Center Student Organization (2006-2008).

Advisory board member for the NSF sponsored CELEST Science of Learning Center Student Organization (2008-2009).

Co-leader of the NSF sponsored Science of Learning Center (iSLC) meeting and co-author of accepted grant to fund a student and postdoc led conference series (2008 and 2009).

Co-chair of the CELEST student led workshop planning committee for the International Conference on Cognitive and Neural Systems (ICCNS 2008, 2009, and 2010) in Boston, MA.

Committee member for the CELEST student led Career Day organizational and planning committee (2007 & 2008).

**Teaching Experience**

Fall 2004 **Boston University** Boston, MA  
Teaching Fellow for CN 510: Introduction to Neural Network Modeling  
Recipient of 2004-2005 Outstanding Teaching Fellow Award

**Awards Received**

UC Berkeley Undergraduate Grant Recipient  
Donald Schaefer Physical Sciences Scholar  
H. Wollenberg Grant Recipient  
Iowa Byrd Scholar  
RIA Federal Credit Union Scholarship Recipient  
Girl Scout Silver Award  
Ralston Purina Scholarship Recipient

**Membership**

Member of the Acoustical Society of America  
Member of the International Neural Network Society  
Member of the Society for Neuroscience

**Invited Panelist**

Joint Fire Science Program Eastern Risk Roundtable 2007  
RUSLE2 & LiDAR Expert Panel 2008  
RUSLE2 Expert Panel 2009

**Peer Reviewer**

Spatial Vision, Special Issue on Vision Science and Art  
NSF sponsored inter Science of Learning Centers Workshop (2008)  
International Joint Conference on Neural Networks (2008, 2009,2010)  
Neural Networks  
Neuropsychologia  
Speech Communication

**Skills**

Microsoft Word, Excel, and PowerPoint, Adobe Photoshop, PageMaker, and strong internet skills.  
Operating systems: Unix, Linux, Windows 95/98, 2000, ME, XP.  
Programming languages: Matlab, LISP  
Accounts receivable

**Related Coursework**

Computational Methods in Cognitive and Neural Systems  
Principles and Methods of Cognitive and Neural Modeling I  
Neural and Computational Models of Vision  
Neural and Computational Models of Adaptive Movement Planning and Control  
Neural and Computational Models of Recognition, Memory and Attention  
Neural and Computational Models of Speech Perception and Production  
Neural and Computational Models of Conditioning, Reinforcement, Motivation and Rhythm  
Advanced Topics in Neural Modeling  
Neural and Computational Models of Planning and Temporal Structure in Behavior  
Models of Visual Perception  
Topics in Sensory-Motor Control  
Qualitative Theory of Ordinary Differential Equations

**Patents**

Gorchetchnikov A., Ames H.M., Versace M., and Santini F. (2006) Hardware, system and methods for acceleration of massively parallel computations (filed provisional patent application US60/826,892; September 2006).  
Gorchetchnikov A., Ames H.M., Versace M., and Santini F. (2007) Graphic Processor Based Accelerator System and Method (utility patent application US 11/860,254; September 2007).

**Publications***Journal articles*

Versace M., Ames H.M., Leveille J., Fortenberry B., Mhatre H., and Gorchetchnikov A. (2008). Kinness: A modular framework for computational neuroscience. *Neuroinformatics*. 6(4), 291-309.  
Ames H. and Grossberg S. (2008). Speaker normalization using cortical strip maps: A neural model for steady-state vowel categorization. *Journal of the Acoustical Society of America*. 124(6), 3918-3936.

*Conference papers*

Lorenz, S., Ames, H., and Versace, M. (2010). Consciousness and neuromorphic chips: A case for embodiment. BU Interdisciplinary Graduate Conference on Consciousness, Boston, MA (IGCC 2010).

*Abstracts*

Ames H.M. and Grossberg S. (2006). Neural dynamics of auditory streaming, speaker normalization, and speech categorization. Society for Neuroscience Abstracts, Atlanta, GA (SFN 2006).  
Ames H.M. and Grossberg S. (2006). Neural dynamics of auditory streaming, speaker normalization, and speech categorization. NSF SLC PI Meeting Abstracts, Washington, DC (NSF SLC 2006).  
Ames H.M. and Grossberg S. (2007). Speech categorization through auditory cortical interactions. CELEST External Advisory Board Review Abstracts, Boston, MA (EASRB CELEST 2007).

Ames H.M. and Grossberg S. (2007). Cortical maps used in speaker normalization. NSF CELEST Annual Review Abstracts, Boston, MA (NSF CELEST 2007).

Ames H.M. and Grossberg S. (2007). Neural dynamics of speaker normalization used in steady-state vowel identification. International Conference on Cognitive and Neural Systems Abstracts, Boston, MA (ICCNS 2007).

Ames H.M. and Grossberg S. (2007). Speaker normalization during steady state vowel identification. NSF SLC PI Meeting Abstracts, Washington, DC (NSF SLC 2007).

Ames H.M. and Grossberg S. (2007). Speaker normalization using cortical strip maps: A neural model for steady state vowel identification. Computational Cognitive Neuroscience Conference Abstracts, San Diego, CA (CCNC 2007).

Ames H.M. and Grossberg S. (2007). Speaker normalization using cortical strip maps: A neural model for steady state vowel identification. Acoustical Society of America Abstracts, New Orleans, LA (ASA 2007).

Ames H. and Grossberg S. (2008). Speaker normalization using cortical strip maps: A neural model for steady-state vowel identification. NSF sponsored inter-Science of Learning Centers Abstracts, Pittsburgh, PA (NSF iSLC 2008).

Ames H. and Grossberg S. (2008). Speaker normalization using cortical strip maps: A neural model for steady-state vowel identification. CELEST External Advisory Board Review Abstracts, Boston, MA (EASRB CELEST 2008).

Gorchetchnikov A., Ames H., and Versace M. (2008). Simulating biologically realistic neural models on graphic processing units. International Conference on Cognitive and Neural Systems Abstracts, Boston, MA (ICCNS 2008).

Versace M., Ames H., Leveille J., Fortenberry B., Gorchetchnikov A. (2008). KInNeSS: A modular framework for computational neuroscience. International Conference on Cognitive and Neural Systems Abstracts, Boston, MA (ICCNS 2008).

Versace M., Ames H., Leveille J., Fortenberry B., and Gorchetchnikov A. (2008). KInNeSS: A modular framework for computational neuroscience. CELEST Annual Review Abstracts, Boston, MA (NSF CELEST 2008).

Ames H. and Grossberg (2008). Speaker normalization using cortical strip maps: A neural model for steady-state vowel identification. CELEST Annual Review, Abstracts, Boston, MA (NSF CELEST 2008).

Ames H. (2008). Learning technologies: embedding CELEST models in real world applications. NSF SLC PI Meeting Abstracts, Washington, DC (NSF SLC 2008).

Ames H. and Grossberg S. (2008). Speaker normalization using cortical strip maps: A neural model for steady-state vowel identification. Auditory Perception, Cognition, and Action Abstracts, Chicago, IL (APCAM 2008).

Ames H., Versace M., and Gorchetchnikov A. (2009). How can computational neuroscience benefit real world technological applications? NSF sponsored inter-Science of Learning Centers Abstracts, Seattle, WA (NSF iSLC 2009).

Ames, H., Versace, M., Chandler, B., and Lorenz, S. (2009). Applied brain-based learning models. NSF SIC PI Meeting Abstracts, Washington DC (NSF SLC 2009).

Versace, M., Gorchetchnikov, A., Chandler, B., Kozma, R.T., Ames, H.M., and Mingolla, E. (2010) Neural design for nanochip applications. DARPA SyNAPSE site visit, Palo Alto, CA (DARPA 2010).

Ames, H.M., Versace, M. (2010). Institutionalizing translational research practices with the CELEST Catalyst. NSF CELEST site visit, Boston, MA (NSF CELEST 2010).

Versace, M., Gorchetchnikov, A., Chandler, B., Kozma, R.T., Ames, H.M., and Mingolla, E. (2010) How to build a brain on a nanochip. NSF CELEST site visit, Boston, MA (NSF CELEST 2010).

Versace, M., Ames, H., Chandler, B., and Lorenz, S. (2010). Applied brain-based learning models. International Conference on Cognitive and Neural Systems Abstracts, Boston, MA (ICCNS 2010).

Versace, M., Gorchetchnikov, A., Chandler, B., Kozma, R.T., Ames, H.M., and Mingolla, E. (2010) How to build a brain on a nanochip. NSF sponsored inter-Science of Learning Centers Abstracts, Boston, MA (NSF iSLC 2010).

*Presentations*

Ames H.M. (2007). Recognition through hearing. CELEST Education Summer Workshops.

Ames H.M. and Grossberg S. (2007). Speaker normalization using cortical strip maps: A neural model for steady state vowel identification. Computational Cognitive Neuroscience Conference Abstracts, San Diego, CA (CCNC 2007).

Ames H.M., Booth J.L., Hausmann R.G.M., Lee, T., Roll, I., and Zimmerman H. (2007). SLC student workshop presentation. NSF SLC PI Meeting, Washington, DC (NSF SLC 2007).

Ames H.M., Booth J.L., Hausmann R.G.M., Lee, T., Roll, I., and Zimmerman H. (2008). First Annual iSLC workshop overview presentation. NSF sponsored inter-Science of Learning Centers, Pittsburgh, PA (NSF iSLC 2008).

Ames, H. (2008). CELEST as a science of learning center. NSF sponsored inter-Science of Learning Centers, Pittsburgh, PA (NSF iSLC 2008).

Ames H. and Versace M. (2008). Computing with neural interfaces introduction. International Conference on Cognitive and Neural Systems, Boston, MA (ICCNS 2008).

Ames, H. (2008). How can neural networks help us? RUSLE2 & LiDAR Expert Panel Meeting, Nebraska City, NE (LiDAR 2008).

Ames H., Katak K., and Liederman J. (2008). Diversity activities within CELEST. CELEST Annual Review, Boston, MA (NSF CELEST 2008).

Ames H. (2008). Learning technologies: embedding CELEST models in real world applications. NSF SLC PI Meeting, Washington, DC (NSF SLC 2008).

Ames H. and Grossberg S. (2008). Speaker normalization using cortical strip maps: A neural model for steady-state vowel identification. Auditory Perception, Cognition, and Action, Chicago, IL (APCAM 2008).

Ames H., Versace M. and Chandler B. (2009). Neural networks for concentrated flow identification. RUSLE2 Expert Panel Meeting, Nebraska City, NE (RUSLE2 2009).

Ames, H. and Guenther, F. (2010). Speech motor control in apraxia of speech. International Conference on Cognitive and Neural Systems Abstracts, Boston, MA (ICCNS 2010).

Ames, H. and Guenther, F. (2010). Speech motor control in apraxia of speech. NSF sponsored inter-Science of Learning Centers Abstracts, Boston, MA (NSF iSLC 2010).