

HEATHER AMES, PHD

Neuromorphics Lab
Center for Computational Neuroscience and Neural Technology (CompNet)
Boston University
677 Beacon Street, Boston, MA 02215
Tel: (617)353-6174
Web: <http://www.heather-ames.com>

OBJECTIVE

To pursue activities in technology development, project management, and applied research in robotics with a specific focus on learning, speech and communication, and cooperation between humans and robots.

EDUCATION

2003-2009 **PhD** **Boston University** **Boston, MA** **Cognitive and Neural Systems**
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 **BA** **University of California** **Berkeley, CA** **Cognitive Science**
Berkeley
Received departmental honors.

PROFESSIONAL EXPERIENCE

2012-present **Research Assistant Professor**
Center for Computational Neuroscience and Neural Technology (CompNet)
Boston University; Boston, MA

2011-present **Project Manager**
Neuromorphics Lab
Center for Computational Neuroscience and Neural Technology (CompNet)
Boston University; Boston, MA

2011-2012 **Research Scientist**
Center for Computational Neuroscience and Neural Technology (CompNet)
Boston University; Boston, MA

2010-present **Director of Technology Outreach**
Center of Excellence for Learning in Education, Science, and Technology (CELEST)
NSF-funded, multi-institutional Science of Learning Center
Hosted at Boston University; Boston, MA

2010-present **Co-Director CELEST Catalyst**

CELEST
Boston University; Boston, MA

2009-2011 **Research Scientist**
Department of Cognitive and Neural Systems
Boston University; Boston, MA

2004-2009 **Research Assistant**
Department of Cognitive and Neural Systems
Boston University; Boston, MA

ENTREPRENEURSHIP AND CONSULTING

2006-present **Co-Founder**
Neurala LLC; Boston, MA

2010 **Research Consultant**
BAE Systems; Burlington, MA

LEADERSHIP

2010-present Member of the CELEST Governing Board
2009-2010 Co-PI and program chair for the NSF sponsored inter-Science of Learning Center (iSLC) conference held in Boston, MA in May 2010
2008-2009 Advisory board member for the CELEST Student and Postdoc Organization
2006-2008 President of the CELEST Student and Postdoc Organization
2007-2009 Co-leader of NSF iSLC conferences and co-author of accepted conference grants for conferences in Pittsburgh, PA (February, 2008) and Seattle, WA (February, 2009)

AWARDS AND HONORS

BU Outstanding Teaching Fellow, 2005
UC Berkeley Undergraduate Grant Recipient, 1998
Donald Schaefer Physical Sciences Scholar, 1998-2002
H. Wollenberg Grant Recipient, 1998
Iowa Byrd Scholar, 1998
RIA Federal Credit Union Scholarship Recipient, 1998
Ralston Purina Scholarship Recipient, 1998
Girl Scout Silver Award, 1995

PROFESSIONAL ACTIVITIES AND SERVICE

Committee Membership

2012 Lead judge for CELEST awards at the Boston University Science Day
2011-present Member of the Boston University Research Faculty task force
2011-present Member of the BICA (Biologically Inspired Cognitive Architectures) Program Committee Washington DC (2011) and Palermo, Italy (2012)
2012 Workshop chair for Autonomous Robotics Workshop for the International Conference on

2008-2010 Cognitive and Neural Systems (ICCNS 2012) in Boston, MA
Workshop co-chair for ICCNS (2008, 2009, and 2010) in Boston, MA.
2007-2008 Committee member for the CELEST student led Career Day

Professional Society Membership

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

Reviewer

Biologically-Inspired Cognitive Architectures (BICA) – journal, conference
Reviews in Biomedical Engineering - journal
Spatial Vision, Special Issue on Vision Science and Art - journal
NSF sponsored inter Science of Learning Centers Workshop - conference
International Joint Conference on Neural Networks - conference
Neural Networks - journal
Neuropsychologia - journal
Speech Communication - journal

TEACHING

Spring 2011, 2012 **Neural and Computational Models of Recognition, Memory and Attention**
CN 550; Boston University; Boston, MA

Fall 2004 **Teaching Fellow for Introduction to Neural Network Modeling**
CN 510; Boston University; Boston, MA

GRANTS

Awarded

2012-2014 Adaptive Laminar Computing
Versace(PI)
Co-author of technical description, contract negotiation, and budget preparation
Air Force Research Lab (AFRL)
Contract #FA8750-12-C-0123
Total Award: \$794,967

2012-2013 Adaptive Bio-Inspired Navigation for Planetary Exploration
Gorchetchnikov(PI)
Co-author of technical description and budget preparation
National Aeronautics and Space Administration (NASA) STTR
Contract #NNX12CG32P
Total Award: \$124,998

2012-2013 Adaptive Bio-Inspired Navigation for Planetary Exploration

Mingolla(PI)/Versace(co-PI)
Budget preparation
Air Force Office of Scientific Research (AFOSR)
Total Award: \$481,505

2012 Neuromorphic Solutions for UAS Collision Avoidance
Versace(PI)/Joshi(co-PI)
Co-author of technical description and budget preparation
National Aeronautics and Space Administration (NASA) Center Innovation Fund
Grant #NNX12AH31G
Total Award: \$59,455

2012 Whole Brain Modeling with Cog Ex Machina Applied to an Unmanned Helicopter
Versace(PI)/Mingolla(co-PI)
Negotiation of sponsored research agreement and budget preparation
Hewlett-Packard (HP)
Total Award: \$325,000

2010 Third Annual iSLC Student/Postdoctoral Scholar Conference
Mingolla(PI)/Ames(co-PI)
National Science Foundation (NSF)
Total Award: \$99,991

Under review

2012 Center for Adaptive Neuromorphic Agents (CANA)
Mingolla(PI)/Versace(co-PI)/Etienne-Cummings(co-PI)/Krichmar(co-PI)/Yamauchi(co-PI)
Co-author of technical description, budget preparation, proposed managing director
National Science Foundation (NSF) Science and Technology Center (STC)
Total Award: \$50,000,000 over 10 years

2012 BIANCA: A Biologically-Inspired Autonomous Neuromorphic Cobot Assistant
Versace (PI)/Mingolla(co-PI)/Snider(co-PI)/Yamauchi(co-PI)
Co-author of technical description and budget preparation
National Science Foundation (NSF) National Robotics Initiative (NRI)
Total Award: \$3,976,376 over 5 years

PUBLICATIONS

Journal articles

1. Snider G., Amerson R., Carter D., Abdalla H., Qureshi S., Leveille J., Versace M., **Ames H.**, Patrick S., Chandler B., Gorchetchnikov A., and Mingolla E. (2011). Adaptive computation with memristive memory. *IEEE Computer*.
2. **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.
3. Versace M., **Ames H.**, Leveille J., Fortenberry B., Mhatre H., and Gorchetchnikov A. (2008). Kinness: A modular framework for computational neuroscience. *Neuroinformatics*. 6(4), 291-309.

Magazine Articles

1. **Ames H.**, Mingolla, E., Sohail, A., Chandler, B., Gorchetchnikov A., Leveille J., Livitz G., and Versace M. (2012). The Animat. IEEE Pulse. In press.

Conference Papers

1. Gorchetchnikov A., Versace M., **Ames H.**, Chandler B., Leveille J., Livitz G., Mingolla E., Snider G., Amerson R., Carter D., Abdalla H., and Qureshi M. (2011). A unified learning framework for memristive neuromorphic hardware. International Joint Conference on Neural Networks, San Jose, CA (IJCNN 2011).
2. Livitz G., **Ames H.**, Chandler B., Gorchetchnikov A., Leveille J., Vasilkoski Z., Versace M., Mingolla E., Snider G., Amerson R., Carter D., Abdalla H., and Qureshi M. (2011). Visually-guided adaptive robot (ViGuAR). International Joint Conference on Neural Networks, San Jose, CA (IJCNN 2011).
3. Vasilkoski Z., **Ames H.**, Chandler B., Gorchetchnikov A., Leveille J., Livitz G., Mingolla E., and Versace M. (2011). Stability analysis of neural plasticity rules for implementation on memristive neuromorphic hardware. International Joint Conference on Neural Networks, San Jose, CA (IJCNN 2011).
4. Leveille J., **Ames H.**, Chandler B., Gorchetchnikov A., Mingolla E., Patrick S., and Versace M. (2010). Learning in a distributed software architecture for large-scale neural modeling. BIONETICS10, Boston, MA (BIONETICS 2010).
5. 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).

Book Chapters

1. **Ames H.**, Versace M., Gorchetchnikov A., Chandler B., Livitz G., Leveille J., Mingolla E., Carter D., Abdalla H., and Snider G. (2012). Persuading computers to act more like brains. In Advances in Neuromorphic Memristor Science and Applications, Kozma R., Pino R., and Paziienza G. (eds). In press.

Online Publications

1. Livitz G., Versace M., Gorchetchnikov A., Vasilkoski Z., **Ames H.**, Chandler B., Leveille J., and Mingolla, E. (2011). Scalable adaptive brain-like systems. The Neuromorphic Engineer. DOI: 10.2417/1201101.003500 February, 2011.

Abstracts

1. Leveille J., **Ames H.**, Chandler B., Gorchetchnikov A., Livitz G., Versace M., and Mingolla E. (2011). Object recognition and localization in a virtual animat: large-scale implementation in dense memristive memory devices. International Joint Conference on Neural Networks Abstracts, San Jose, CA (IJCNN 2011).
2. Gorchetchnikov A., Leveille J., Versace M., **Ames H.**, Livitz G, Chandler B., Mingolla E., Carter D., Amerson R., and Snider G. (2011). MoNETA: Massive parallel application of biological models navigating through virtual Morris water maze and beyond. Computational Neuroscience Meeting Abstracts, Stockholm, Sweden (CNS 2011).
3. Livitz G., **Ames H.**, Chandler B., Gorchetchnikov A., Leveille J., Versace M., and Mingolla E. (2011). Visually-Guided Adaptive Robotic Agent (ViGuAR). International Conference on Cognitive and Neural Systems Abstracts, Boston, MA (ICCNS 2011).
4. Leveille J., **Ames H.**, Chandler B., Gorchetchnikov A., Livitz G., Versace M., and Mingolla E. (2011). Invariant object recognition and localization in a virtual animat. International Conference on Cognitive and Neural Systems Abstracts, Boston, MA (ICCNS 2011).

5. Leveille J., **Ames H.**, Chandler B., GOrchetchnikov A., Livitz G., Versace M., and Mingolla E. (2011). Invariant object recognition and localization in a virtual animat. CELEST External Advisory Board Review Abstracts, Boston, MA (EASRB CELEST 2011).
6. Chandler B., Gorchetchnikov A., Versace M., **Ames H.**, Leveille J., Livitz G., and Mingolla E. (2011). ItEM: A computational infrastructure for high-throughput modeling. CELEST External Advisory Board Review Abstracts, Boston, MA (EASRB CELEST 2011).
7. Gorchetchnikov A., **Ames H.**, Chandler B., Leveille J., Livitz G., Mingolla E., and Versace M. (2010). MoNETA: Modular Neural Exploring Traveling Agent. CELEST Workshop on the Hardware and Software of Functional Connections, Boston, MA (CELEST 2010b).
8. Chandler B., Versace M., Gorchetchnikov A., **Ames H.**, Leveille J., and Mingolla E. (2010). ItEM (Iterative Evolution of Models) project review. DARPA SyNAPSE site visit, Palo Alto, CA (DARPA 2010b).
9. Versace M., Leveille J., Ames H., Gorchetchnikov A., Chandler B., Patrick S., and Mingolla E. (2010). L² Learning Laws project review. DARPA SyNAPSE site visit, Palo Alto, CA (DARPA 2010b).
10. Gorchetchnikov A., Leveille J., Versace M., **Ames H.**, Chandler B., Patrick S., and Mingolla E. (2010). MoNETA (Modular Neural Exploring Traveling Agent) project review. DARPA SyNAPSE site visit, Palo Alto, CA (DARPA 2010b).
11. Gorchetchnikov A., Versace M., **Ames H.**, Leveille J., Yazdanbakhsh A., Chandler B., Mingolla E., and Snider G. (2010). General form of learning algorithms for neuromorphic hardware implementation. CELEST Neural Plasticity Workshop, Boston, MA (CELEST 2010a).
12. Gorchetchnikov A., Versace M., **Ames H.**, Leveille J., Yazdanbakhsh A., Chandler B., Mingolla E., and Snider G. (2010). General form of learning algorithms for neuromorphic hardware implementation. The International Computation Neuroscience Meeting, San Antonio, TX (CNS 2010).
13. 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).
14. 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).
15. 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).
16. **Ames, H.M.**, Versace, M. (2010). Institutionalizing translational research practices with the CELEST Catalyst. NSF CELEST site visit, Boston, MA (NSF CELEST 2010).
17. 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 2010a).
18. **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).
19. **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).
20. **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).
21. **Ames H.** (2008). Learning technologies: embedding CELEST models in real world applications. NSF SLC PI Meeting Abstracts, Washington, DC (NSF SLC 2008).
22. **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).

23. 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).
24. 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).
25. 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).
26. **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).
27. **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).
28. **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).
29. **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).
30. **Ames H.M.** and Grossberg S. (2007). Speaker normalization during steady state vowel identification. NSF SLC PI Meeting Abstracts, Washington, DC (NSF SLC 2007).
31. **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).
32. **Ames H.M.** and Grossberg S. (2007). Cortical maps used in speaker normalization. NSF CELEST Annual Review Abstracts, Boston, MA (NSF CELEST 2007).
33. **Ames H.M.** and Grossberg S. (2007). Speech categorization through auditory cortical interactions. CELEST External Advisory Board Review Abstracts, Boston, MA (EASRB CELEST 2007).
34. **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).
35. **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).

Presentations

- Ames H.** (2011). Technology Initiatives within CELEST. CELEST Annual Review, Boston, MA (CELEST 2011).
- Ames H.** (2011). Technology Initiatives within CELEST. CELEST External Advisory Board Review, Boston, MA (EASRB CELEST 2011).
- Ames H.** (2010). The applied neuroscience of learning. NSF SLC PI Meeting, Washington, DC (NSF SLC 2010).
- Ames H.** (2010). Computational neuroscience beyond the classroom. CELEST Summer Workshop on Computational Neuroscience, Boston, MA (CELEST Summer 2010).
- Ames H.** (2010). Speech in the human brain: From hearing to speaking. Invited talk at HP Labs, Palo Alto, CA (HP 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).

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

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

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

Ames, H. (2008). How can neural networks help us? RUSLE2 & LiDAR Expert Panel Meeting, Nebraska City, NE (LiDAR 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). CELEST as a science of learning center. NSF sponsored inter-Science of Learning Centers, Pittsburgh, PA (NSF iSLC 2008).

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.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. 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. (2007). Recognition through hearing. CELEST Education Summer Workshops.

Invited Panelist

The Role of Technology in Education Panel at NSF SLC PI Meeting 2011
 RUSLE2 Expert Panel 2009
 RUSLE2 & LiDAR Expert Panel 2008
 Joint Fire Science Program Eastern Risk Roundtable 2007