

CURRICULUM VITAE

Name: Athena Akrami

Date of Birth: 03-24-1982

Nationality: Iranian

Address:

Brodylab, Howard Hughes Medical Institute & Princeton University

Princeton Neurosci. Inst. & Dept. of Molecular Biology

Email: aakrami@princeton.edu

Education:

- **PhD. October 2005 – December 2009:** PhD in Computational Neuroscience, International School for Advanced Studies (SISSA/ISAS), with Prof. Alessandro Treves, Thesis title: “Attractors, memory and perception”
- **B.Sc. (Double Major):**
- **2000-2004:** Biomedical Engineering, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran, (GPA: 18.1/20),
2002-2005: Control Engineering, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran (Allowed exceptionally as an award for honored students in 2002), (GPA: 17.89/20),

Positions:

- **December 2012 – present:** Post-doctoral research fellow, Brodylab, Howard Hughes Medical Institute & Princeton University, Princeton Neurosci. Inst. & Dept. of Molecular Biology, USA
- **December 2009 – December 2012:** Post-doctoral researcher, Tactile Perception and Learning Lab, Cognitive Neuroscience Sector, SISSA/ISAS International School for Advanced Studies, Trieste

Publications:

Submitted:

1. Chunyu A. Duan*, Marino Pagan*, Charles D. Kopec, Alex Riordan, **Athena Akrami**, Jeffrey C. Erlich & Carlos D. Brody, “A collicular circuit for flexible sensorimotor routing in the rat”.

In preparation:

1. **Athena Akrami***, Charles Kopec*, C. Brody, Investigating the efficacy of different inhibitory opsins in rat cortex (In Preparation).
2. Nicholas Roy, Ji Hyun Bak, **Athena Akrami**, Carlos Brody, Jonathan Pillow, Efficient tracking of dynamic psychophysical behavior during learning (In Preparation).
3. **Athena Akrami**, Alessandro Treves. “ Ambiguous Patterns and Recent Experience; an Autoassociative Network Model” (In Preparation).

Published:

1. **Athena Akrami**, Charles Kopec, Mathew Diamond Carlos Brody. “Posterior parietal cortex represents sensory stimulus history and is necessary for its effects on behavior”. (Nature, 2018 - BioRxiv).
2. Benjamin Scott*, Christine Constantinople*, **Athena Akrami**, Timothy Hanks, Carlos Brody and David Tank. “Fronto-parietal cortical circuits encode accumulated evidence with a diversity of timescales” (Neuron, 2017)

3. Arash Fassihi, **Athena Akrami**, Vinzenz Schoenfelder, Francesca Pulecchi, Mathew Diamond. "Transformation of Perception from Sensory to Motor Cortex". (Current Biology, 2017).
4. Ji Hyun Bak, Jung Yoon Choi, **Athena Akrami**, Witten Ilana, & Pillow Janathan. "Adaptive optimal training of animal behavior", Advances in Neural Information Processing Systems 29 (NIPS, 2016)
5. **Athena Akrami***, Natalia Grion*, Yangfang Zuo, Federico Stella, Mathew E. Diamond, "Coherence between rat sensorimotor system and hippocampus is enhanced during tactile discrimination" (PLoS Biology 2016, *equal co-first author)
6. **Athena Akrami***, Arash Fassihi*, Vahid Esmaceli, Mathew E. Diamond, "Tactile perception and working memory in rats and humans", (PNAS 2014, *equal co-first author)
7. Arash Fassihi, **Athena Akrami**, Vahid Esmaceli, Fabrizio Manzano and Mathew E. Diamond, "Sensation of a noisy whisker vibration in rats", (Living Machines 2012, LNAI 7375 proceedings)
8. Sara Ebrahimi Nasrabady, Anujaianthi Kuzhandaivel, **Athena Akrami**, Andrea Nistri. "An unusual increase in the lumbar network excitability of the rat spinal cord is evoked by the PARP-1 inhibitor PJ-34 through inhibition of glutamate uptake", (Neuropharmacology, 2012)
9. **Athena Akrami**, Eleonora Russo, Alessandro Treves, "Lateral thinking, from the Hopfield model to cortical dynamics", (Brain Research, 2011)
10. **Athena Akrami**, Pavel Itskov, Mathew E. Diamond, "Hippocampal population dynamics underlying memory trace activation in a tactile classification task", (BMC Neuroscience, 2011)
11. **Athena Akrami**, Alessandro Treves, "Neural basis of perceptual expectations: insights from transient dynamics of attractor neural networks", (BMC Neuroscience, 2009)
12. **Athena Akrami**, Yan Liu, Alessandro Treves and Bharathi Jagadeesh, "Converging neuronal activity in inferior temporal cortex during the classification of 'morphed' stimuli", (Cerebral Cortex, 2009)
13. **Athena Akrami**, Soroosh Solhjoo, Ali M. Nasrabadi, "EEG-Based Mental Task Classification: Linear & Nonlinear Classification of Movement Imagery," 27th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS), September 1-4, 2005, Shanghai, China

Abstracts:

1. N. Roy, JH. Bak, **A. Akrami**, C. Brody, J. Pillow, "Efficient tracking of dynamic psychophysical behavior during learning", Cosyne 2018, Denver, USA
2. **A. Akrami***, C. Kopec*, C. Brody, "Investigating the efficacy of different inhibitory opsins in rat cortex", SfN 2017, Washington DC, USA
3. **A. Akrami**, C. Kopec, C. Brody, Role of Posterior Parietal Cortex in the influence of sensory history on Parametric Working Memory SfN 2016, San Diego, USA
4. C. Duan, M. Pagan, C. Kopec, J. Erlich, A. Riordan, **A. Akrami**, C. Brody, "A collicular mechanism for flexible sensorimotor gating during task switching". Cosyne 2016, Salt Lake City, USA.
5. **A. Akrami**, A. El Hady, C Kopec, C Brody, "Time dependent involvement of Posterior Parietal and Prefrontal cortex in a rat auditory parametric working memory task", SfN 2015, Chicago, USA
6. KJ. Miller, **A. Akrami**, M. Botvinick, C Brody, "The role of orbitofrontal cortex in model-based planning in the rat", SfN 2015, Chicago, USA
7. A Fassihi, **A. Akrami**, VH. Schonfelder, ME. Diamond, "Temporal integration in a vibrotactile delayed comparison task: From sensory coding to decision in humans and rats", SfN 2015, Chicago, USA
8. **A. Akrami**, A. El Hady, C. Brody, "Posterior Parietal and Prefrontal cortex involvement in a rat auditory parametric working memory task", Cosyne 2015, Salt Lake City, USA.
9. **A. Akrami**, C Brody, "Auditory parametric working memory in rats – behavioral impairments induced by prefrontal and posterior parietal cortex inactivations", SfN2014, Washington, USA.

10. **A. Akrami**, A Fassihi, M.E. Diamond, C Brody, “Auditory parametric working memory—Where is memory?”, Cognition Meeting, CSHL, 2014
11. V. Esmaili, A. Fassihi, **A. Akrami**, Mathew E. Diamond, “Parametric working memory in rats: sensory vs. Prefrontal cortex”, Cosyne 2014, Salt Lake City, USA
12. **A. Akrami**, A. Fassihi , V. Esmaili, M.E. Diamond, “Tactile working memory in rat and human: Prior competes with recent evidence”, Cosyne 2013, Salt Lake City, USA
13. Arash Fassihi , **A. Akrami**, V. Esmaili, M.E. Diamond, “How humans and rats accumulate information in a tactile task, and a putative neuronal code”, Cosyne 2013, Salt Lake City, USA
14. **A. Akrami**, V. Esmaili, A. Fassihi, M.E. Diamond, "Tactile working memory – a comparative study between rats and human”, FENS 2012, Barcelona, Spain
15. N. Grion, **A. Akrami**, M.E. Diamond, “Phase locking of somatosensory cortex neurons to hippocampal theta rhythm during a tactile discrimination task”, FENS 2012, Barcelona, Spain
16. A Fassihi, **A Akrami**, V Esmaili, M.E Diamond, “Sensation of a “noisy” whisker vibration in rats: Psychometric and neurometric analysis”, COSYNE 2012, Salt Lake City, USA
17. **A. Akrami**, V. Esmaili, A. Fassihi, M.E. Diamond, “Tactile working memory in rats”, SfN 2011, Washington DC, USA
18. A. Fassihi, **A. Akrami**, M.E. Diamond, V. Esmaili, SfN 2011, “Whisker-mediated vibration perception in rats: psychophysics and neurometrics”, Washington DC, USA.
19. **A. Akrami**, P. Itskov, M.E. Diamond, “Hippocampal population dynamics underlying memory trace activation in a tactile classification task”, CNS 2011, July, Stockholm, Sweden.
20. **A. Akrami**, A. Treves, “Attractor neural networks and conflicting effects of recent experience on the perception of ambiguous stimuli”, FENS 2010, July, Amsterdam, The Netherlands
21. **A. Akrami**, A. Treves, “Modeling neural mechanisms producing conflicting effects of recent experience on the perception of ambiguous stimuli”, EBBS 2009, September, Rhodes, Greece
22. **A. Akrami**, A. Treves, “Neural basis of perceptual expectations: insights from transient dynamics of attractor neural”, CNS 2009, July, Berlin, Germany
23. **A. Akrami**, B. Liu, A. Treves, B. Jagadeesh, “Neural network analyses show cortical “categorization” dynamics is not due to spike-frequency adaptation”, SfN 2007, November, San Diego, USA
24. **A. Akrami**, B. Liu, A. Treves, B. Jagadeesh, “Converging neural activity in inferior temporal cortex during classification of “morphed” stimuli”, IBRO2007, July 2007, Melbourne, Australia
25. **A. Akrami**, B. Liu, A. Treves, B. Jagadeesh, “Dynamics of neural response in inferotemporal cortex during categorical processing of natural images”, SfN 2006, October 2006, Atlanta, USA
26. **A. Akrami**, B. Liu, A. Treves, B. Jagadeesh, “Categorical processing of continuously morphed natural images in inferotemporal cortex”, Fifteenth Annual Computational Neuroscience Meeting CNS, July, 2006, Edinburgh, UK
27. **A. Akrami**, B. Liu, A. Treves, B. Jagadeesh, “Converging neural activity in inferior temporal cortex underlies the categorization of “morphed” stimuli, FENS forum, July 2006, Vienna, Austria

Invited Talks:

1. Institute of Neuroscience, Oregon University, January 2018
2. SPiNES seminars, The Neuroscience Institute, NYU, December 2017
3. Sainsbury Wellcome Centre, UCL, London, UK, November 2017
4. Sloan Swartz Meeting for Computational Neuroscience, Caltech, August 2016
5. Zuckerman Mind Brain Behavior Institute, Columbia University, July 2016
6. Simons Collaboration on Global Brain, Simons Foundation, June 2016
7. Center for theoretical Neuroscience, Columbia University, May 2016
8. Institut D’Investigacions Biomediques August Pi i Sunyer (IDIBAPS), June 2015, Barcelona, Spain
9. Institut de Fisica Corpuscular (IFIC), University of Valencia, June 2015, Valencia, Spain
10. CiMeC (Center for Mind/Brain Sciences), University of Trento, May 2015, Trento, Italy
11. School of Psychology – University of Padova, May 2015, Padova, Italy
12. School for Cognitive Science, IPM, May 2015, Tehran, Iran.
13. Posterior Parietal and Prefrontal cortex involvement in a rat auditory parametric working memory task, Workshop on “Working memory, data and models – bridging the gap”, SISSA, May 2015, Trieste, Italy.
14. EEG-based Brain-Computer Interface system for mental task classification, Frankfort Institute for Advanced Studies (FIAS), Johann Wolfgang Goethe University, August 2005, Frankfort, Germany

Oral Presentations in International Meetings:

1. Parametric Working Memory and its multiple timescales, Cosyne 2018 Workshop, March 2018, Denver, USA
2. Posterior Parietal Cortex conveys sensory history that acts as a prior during a parametric WM task, Cosyne 2017, February 2017, Salt Lake City, USA
3. Context dependent working memory, Cosyne 2016 Workshop, March 2016, Salt Lake City, USA
4. Auditory and tactile working memory in rat and human: Prior competes with recent evidence, Cosyne 2013 Workshop, February 2013, Salt Lake City, USA
5. Whisker-mediated vibration perception in rats: psychophysics and neurometrics. Italian Society of Physics, l'Aquila, Italy, September 2011
6. Attractor dynamics in the visual domain (Long Term Memory, Adaptation Aftereffects, and Priming), Spring Hippocampal Research Conference, June 2009, Verona, Italy
7. Dynamics of neural response in IT cortex during categorical processing of natural images, Society for Neuroscience meeting (SfN), October 2006, Atlanta, USA
8. Categorical processing of continuously morphed natural images in inferotemporal cortex, Computational Neuroscience Conference (CNS), July 2006, Edinburgh, UK

Meetings organized:

1. Timescales of dynamics in neural networks. Organizers: Athena Akrami, Ahmed El Hady, Cosyne 2016 Workshop, March 2016, Salt Lake City, USA
2. Furry statisticians – how rodents infer the meaningful properties of unreliable environments. Organizers: Athena Akrami, Mathew Diamond, Cosyne 2013 Workshop, February 2013, Salt Lake City, USA

Reviewing Experiences:

- Reviewing for several journals including PLoS Comp. Biol., J. Neuro. Phys., Frontiers in Neural Circuits., Frontiers in Psychology, Proc. of the Royal Society B., PLoS One.
- Member of the editorial board for Frontiers in Neural Circuits, and Frontiers in Psychology
- Reviewing for several conferences including Cosyne (2015-present), CNS (2007-present), ECMS (2013), SIMULTECH 2014/2015, BioCAS 2015

Summer Schools Attended:

1. Mini-school and Workshop on Multiple Time Scales in The Dynamics of The Nervous System, 16 – 20 June 2008
2. First triangular Eu-India-Cina Summer School on “ASPECTS OF COMPLEXITY IN COMPUTATIONAL NEUROSCIENCE”, June 25 - July 1, 2007, Torino, Italy
3. FIAS summer school in Computational Neuroscience and Complex Systems, 05-27 August 2006, Frankfurt, Germany
4. Accepted in “Models in neuroscience: turning experiments into knowledge”, 27 April – 5 May 2008, St. Petersburg, Russia, but I could not participate in the School because I was not granted the Visa.

Visits/Collaborations:

November and December 2007: Lab visiting: Prof. Bharathi Jagadeesh lab, Biophysics and Physiology Dept, University of Washington, Seattle, USA.

May and June 2006: Lab visiting: Prof. Bharathi Jagadeesh lab, Biophysics and Physiology Dept, University of Washington, Seattle, USA

Summer 2005: Lab visiting: Tactile Perception and Learning Lab, Prof. Mathew E. Diamond, International School for Advanced Studies (SISSA/ISAS), Trieste, Italy,

Lab visiting: Empirical Inference and Machine Learning Lab, Max Planck Institute in Biological Cybernetics, Tuebingen, Germany,

Fall 2004 & Winter 2005: Cooperating in project "Online Measuring the Depth of Hypnosis based on EEG Signals", which is being done in Neuropsychiatry Research Center affiliated to RCISP (Research Center for Intelligent signal Processing, Tehran, Iran),

Spring & Summer 2004: Final B.Sc. project entitled "EEG-Based Brain Computer Interface System, Recognition of Individual Motor Imagery"; "*Research Center for Intelligent Signal Processing (RCIP)*", Tehran, Iran

Educational Awards and Recognitions:

- **May 2011:** Young Scientist Award (eighteen thousand Euro), SISSA, Italy.
- **June 2011:** OCNS grant for the meeting CNS2011, Stockholm, Sweden.
- **Summer 2007:** IBRO grant for the meeting IBRO2007, Melbourne, Australia.
- **2005-2009:** Full scholarship award of SISSA
- **Winter 2005:** First rank in entrance exam of Cognitive Neuroscience, SISSA
- **Spring 2004:** Accepted to the Master Program for fall 2004 in the Department of Biomedical Engineering in Amirkabir University of Technology (Tehran Polytechnic), Entrance Exam waived as an award for the "Best Student of the Country",
- **Winter 2004:** Selected as the "Best Student of the Country" (One of the 3 Best Engineering Students of the Country), by the Iran Ministry of Sciences, Researches and Technology, Year 2003,
- **2002, 03, 04:** Rank 2nd in the Department of Biomedical Engineering of Amirkabir University of Technology (Tehran Polytechnic), with average score 18.04 (out of 20),
- **September 2002:** Recognized as the honored student in Amirkabir University of Technology (Tehran Polytechnic) and offered to continue my study in the second major (Control Engineering),
- **March 1998:** Accepted in the country level of the Chemical and Physics Olympiads,
- **Fall 1993:** Entering the NODET (National Organization for Development of Exceptional Talents),

Research Interests:

- Memory, Learning, Perception and Decision Making in the Brain,
- Evolutionary Neuroscience,
- Quantitative Biology

Computer Skills:

- High Level Programming Languages: *C, C++, Python, Mathematica, Visual C++, VHDL, VERILOG,*
- Engineering Software: *R, Stan, MATLAB, LABVIEW (Laboratory Virtual Instrument Engineering Workbench), ORCAD, PSPICE, FPGA, Electronic Work Bench, Protel, ...*

Extracurricular Activities:

- Painting, Writing, Music (Piano, Tar, Harmonica)

Language Skills:

- Native language: Persian.
- Fluent in English and Italian.
- Beginner in Spanish and Arabic.

References:

1. Prof. Carlos Brody
Howard Hughes Medical Institute & Princeton University, PNI & Dept. of Molecular Biology
brody@princeton.edu
2. Dr. Ilana Witten
Princeton University, Princeton Neurosci. Inst. & Dept. of Molecular Biology
iwitten@princeton.edu
3. Prof. Mathew Diamond
Cognitive Neuroscience Sector, SISSA, Italy
diamond@sissa.it
4. Prof. Alessandro Treves
Cognitive Neuroscience Sector, SISSA, Italy
alc@sissa.it