Rishidev Chaudhuri

University of California, Davis
Center for Neuroscience
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Professional Positions

Assistant Professor 04/2019 – present
University of California, Davis
Center for Neuroscience
Department of Neurobiology, Physiology, and Behavior
Department of Mathematics

Postdoctoral Fellow 06/2018 – 10/2018
The University of Texas at Austin, Center for Learning & Memory
Adviser: Ila Fiete

Google Research Fellow 01/2018 – 05/2018
University of California, Berkeley,
Simons Institute for the Theory of Computing

Postdoctoral Fellow 08/2014 – 01/2018
The University of Texas at Austin, Center for Learning & Memory
Adviser: Ila Fiete

Postdoctoral Associate 09/2013 – 07/2014
New York University, Center for Neural Science
Adviser: Xiao-Jing Wang

Education

Ph.D. in Applied Mathematics 05/2013
Yale University
Dissertation title: *Timescales and the large-scale organization of cortical dynamics*
Adviser: Xiao-Jing Wang

M.Phil. in Applied Mathematics 2010
Yale University

B. A. in Physics 2006
Amherst College
Magna cum laude

Awards & Honors

Google Research Fellowship at Simons Institute for the Theory of Computing, Berkeley	2018
Finalist for Burroughs-Wellcome's Career Award at the Scientific Interface	2016, 2017
Best Tutorial Award, Janelia Neurotheory Workshop	2016
Amherst College Fellowship for graduate study	2007, 2008, 2009
Phi Beta Kappa	2005
Amherst College Dean of Faculty Grant for summer research	2005
Howard Hughes Fellowship for summer research	2004
Basset Prize for Physics	2002

Publications

Chaudhuri R & Fiete IR. Bipartite expander Hopfield networks as self-decoding high-capacity error correcting codes. To appear in *Advances in Neural Information Processing Systems (NeurIPS) 2019*

Chaudhuri R, Gerçek B*, Pandey B*, Peyrache A & Fiete IR (* denotes equal contribution) (2019). The intrinsic attractor manifold and population dynamics of a canonical cognitive circuit across waking and sleep. *Nature Neuroscience* **22**, 1512

Chaudhuri R, He B & Wang XJ (2018). Random recurrent networks near criticality capture the broadband power distribution of human ECoG dynamics. *Cerebral Cortex* **28**, 3610

Chaudhuri R & Fiete IR (2016). Computational principles of memory. *Nature Neuroscience* **19**, 394 (Review)

Chaudhuri R, Knoblauch K, Gariel M-A, Kennedy H & Wang XJ (2015). A large-scale circuit mechanism for hierarchical dynamical processing in the primate cortex. *Neuron* **88**, 419

Chaudhuri R, Bernacchia A & Wang XJ (2014). A diversity of localized timescales in network activity. *Elife* **3**, e01239

Churchland AK, Kiani R, **Chaudhuri R**, Wang XJ, Pouget A & Shadlen MN (2011). Variance as a signature of neural computations during decision-making. *Neuron* **69**, 818

In Review

Kriener B*, **Chaudhuri R*** & Fiete IR (* denotes equal contribution). Robust parallel decision-making in neural circuits with nonlinear inhibition. *bioRxiv* doi: 10.1101/231753

Selected Invited Talks

Neural Theories of Cognition Meeting, Aspen Meadows Resort. October 2019.
Title: *Approaching cognitive computation via error-correcting codes and hash functions.*

Janelia Research Campus. Computation & Theory Seminar Series. August 2019.
Title: *The attractor manifold and population dynamics of a canonical cognitive circuit across waking and sleep.*

University of California, Berkeley. Redwood Seminar. May 2018.
Title: *Expander graph architectures for high-capacity neural memory.*

Google Campus, Mountain View. Algorithms Seminar. May 2018.
Title: *Architectures for high-capacity memory and efficient decision-making in the brain.*

University of California, Berkeley. Simons Institute, Industry Day. May 2018.
Title: *Expander graph architectures for high-capacity neural memory.*

The University of Texas at Austin. Faculty Recruitment Seminar, Departments of Neuroscience and Mathematics, March 2016.
Title: *Architectures for high-capacity neural memory.*

Princeton University, Princeton. July 2015.
Title: *Exponential capacity and robust error correction in Hopfield networks with sparse random constraints.*

Computational and Systems Neuroscience Annual Meeting, Snowbird. Workshop on "How the brain makes prediction: Relevance of time and spontaneous activity". March 2015.
Title: *A large-scale circuit mechanism for hierarchical dynamical processing in the primate cortex.*

New York University Shanghai, Shanghai, China. March 2014.
Title: *Timescales and hierarchy in the large-scale organization of the brain.*

National Institutes of Health, Bethesda. July 2012
Title: *The timescales of large-scale brain circuit dynamics.*

Sloan-Swartz Centers Annual Meeting, San Diego. June 2012.
Title: *The timescales of large-scale brain circuit dynamics.*

Selected Conference Presentations & Posters

Chaudhuri R*, Kriener B*, Fiete IR (2018). *How fast is neural winner-take-all when deciding between many options?* Poster at Computational and Systems Neuroscience annual meeting. Denver, CO.

Chaudhuri R, Gerçek B, Pandey B, Fiete IR (2017*). Unsupervised latent variable extraction from neural data to characterize processing across states.* Poster at Computational and Systems Neuroscience annual meeting. Salt Lake City, UT.

Chaudhuri R*, Kriener B*, Fiete IR (2016). *Time-complexity and accuracy in neural winner-take-all computation.* Poster at Computational and Systems Neuroscience annual meeting. Salt Lake City, UT.

Chaudhuri R, Fiete IR (2015*). Using expander codes to construct Hopfield networks with exponential capacity.* Poster at Computational and Systems Neuroscience annual meeting. Salt Lake City, UT.

Chaudhuri R, He B, Wang XJ (2014) *The temporal structure of a random network near criticality and human ECoG dynamics.* Poster at Computational and Systems Neuroscience annual meeting. Salt Lake City, UT.

Chaudhuri R, Bernacchia A, Wang XJ. (2013) *Diversity of timescales in network activity.* Poster at Computational and Systems Neuroscience annual meeting. Salt Lake City, UT.