

October 12, 2021

DR. KANAKA RAJAN

Department of Neuroscience & The Friedman Brain Institute,
Icahn School of Medicine at Mount Sinai

Hess 10-111, One Gustave Levy Place, NY 10029, USA

+1 646 469 5275 ○ kanaka.rajan@mssm.edu ○ @KanakaRajanPhD

https://en.wikipedia.org/wiki/Kanaka_Rajan ○ <https://www.rajanlab.com/> ○ US Citizen

EDUCATION

Ph.D. Neuroscience, Columbia University in the City of New York, 2009
M.S. Brandeis University, 2005
B.Tech. Industrial Biotechnology, Anna University, 2000

PROFESSIONAL APPOINTMENTS

2018–present Assistant Professor, Department of Neuroscience & Friedman Brain Institute,
Icahn School of Medicine at Mount Sinai, NY
2018–present Visiting Faculty, Center for Theoretical Neuroscience, Columbia University, NY
2019–2020 Visiting Professor, Samsung Artificial Intelligence Center (SAIC), NY
2009–2017 Biophysics Theory Fellow, Princeton University, NJ
2007–2009 Visiting Graduate Assistant, Center for Brain Science, Harvard University, MA
2005–2009 Doctoral Candidate, Columbia University in the City of New York, NY
2002–2005 Graduate Research Assistant, Dept of Neuroscience, Brandeis University, MA

GRANT SUPPORT

Funded

2021 Simons Collaboration for the Global Brain Pilot Grant Program
(as Principal Investigator, funded \$240,000)
2021 National Science Foundation (NSF) Early Career Development (CAREER)
(as Principal Investigator, funded \$550,000 over 5 years)
2020 Dyal Foundation Research Scholars Award
(as Principal Investigator, funded \$50,000)
2019 R01, Theories, Models, and Methods pathway, National Institutes of Biomedical
Engineering and Bioimaging, National Institutes of Health (NIBIB/NIH)
(as Principal Investigator, funded \$1,100,000)
2019 FOUNDATIONS Award from the NSF
(as Principal Investigator, funded \$1,200,000)
2019 Friedman Research Scholars Award from the DiSabato Family Foundation
(as Principal Investigator, funded \$50,000)
2019–2021 Alfred P. Sloan Research Fellowship
(as Principal Investigator, funded \$70,000 over two years)
2018 Mindlin Foundation Award, Neuroscience meets Graphic Novel
(as Principal Investigator)

- 2016–2023 Understanding Human Cognition Scholar Award, James McDonnell Foundation (as Principal Investigator, funded \$600,000 over six years)
- 2016–2017 Visiting Fellowship, Janelia Research Campus, Howard Hughes Medical Institute (as Principal Investigator, funded \$10,000 for one year)
- 2015–2017 Brain and Behavior Foundation (formerly, NARSAD) Young Investigator Award (as Principal Investigator, funded \$65,000 over two years)

Pending

- 2021 R01 Competing Renewal, Theories, Models, and Methods pathway, National Institutes of Biomedical Engineering and Bioimaging, National Institutes of Health (NIBIB/NIH) (as Principal Investigator, \$1,259,010)
- 2021 California Institute of Technology Air Force Research Laboratories: An implementation-level account of human decision-making circuits (as Principal Investigator, \$983,125)

AWARDS AND HONORS

- 2021 National Science Foundation (NSF) CAREER Award
- 2021 Harold and Golden Lampport Basic Science Research Award
- 2020 Subject Matter Expert for Multi-Scale Neural Network Models, SPARC Program, National Institutes of Health
- 2020 Lead, Computational Neuroscience Working Group, Interagency Modeling and Analysis Group (IMAG), National Institutes of Health
- 2020 Mentor for the Ideas Lab on Predictive Modeling to Inform Development of Bioelectronic Medicine Therapies, National Institutes of Biomedical Engineering and Bioimaging
- 2020 Elected to Faculty Council, Icahn School of Medicine at Mount Sinai
- 2011–2013 Lectureship, Department of Molecular Biology and the Lewis-Sigler Institute, Princeton University for Methods & Logic in Quantitative Biology
- 2011 Travel Award from the Organization for Computational Neurosciences (OCNS) awarded at the 19th Annual Computational Neuroscience (CNS) meeting
- 2010–2012 Sloan-Swartz Theoretical Neuroscience Postdoctoral Fellowship
- 2004 Pulin Sampat Memorial Teaching Award, Brandeis University
- 2001–2002 Tata Institute of Fundamental Research Junior Research Fellowship

PUBLICATIONS (links to pdfs + supplemental materials: <https://www.rajanlab.com/publications>)

Publications in current role as Principal Investigator, Rajan lab, Mount Sinai

In Preparation and/or In Review

1. Afzal, M.F., Marton, C.D., Rich, E.L., **Rajan, K.***, (2021) TRAKR - A reservoir-based tool for fast and accurate classification of neural time-series patterns, *in preparation, submitted to International Conference on Learning Representations (ICLR)*

*corresponding author

2. Benster, T., Perich, M.G., Andalman, A., Deisseroth, K.* , **Rajan, K.***, (2021) Conserved and uniquely divergent roles of brain wide glial and neuronal population dynamics in controlling behavioral state transitions, *in preparation*
*co-corresponding author
3. Kepple, D.R., Engelken, R.E., **Rajan, K.***, (2021) Using curriculum learning to infer learning rules in the biological brain during task acquisition in lab settings and imitation- or skill learning in nature, *in preparation, submitted to International Conference on Learning Representations (ICLR)*
*corresponding author

Preprints

4. Marton, C.D., Lajoie, G., **Rajan, K.***, (2021) Efficient and robust multi-task learning in biological brains with modular task primitives, *in review at NeurIPS, ArXiv*, DOI: <https://arxiv.org/pdf/2105.14108.pdf>
*corresponding author
5. Monaco, J.D., **Rajan, K.**, Hwang, G.M., (2021) A brain basis of dynamical intelligence for AI and computational neuroscience, *in review at Nature Machine Intelligence, ArXiv*, DOI: <https://arxiv.org/abs/2105.07284>
6. Dong, Z., Mau, W., Feng, Y.S., Pennington, Z.T., Chen, L., Zaki, Y., **Rajan, K.***, Shuman, T., Aharoni, D., Cai, D.J., (2021) Minian: An open-source miniscope analysis pipeline, *in review at eLife, BioRxiv*, DOI: <https://doi.org/10.1101/2021.05.03.442492>. Open source code available at: <https://github.com/DeniseCaiLab/minian>
*senior and sole theorist
7. Young, M.E., Spencer-Salmon, C., Mosher, C., Tamang, S., **Rajan, K.***, Rudebeck, P.H., (2021) Temporally-specific sequences of neural activity across interconnected corticolimbic structures during reward anticipation, *in review at Neuron, BioRxiv*, DOI: <https://doi.org/10.1101/2020.12.17.423162>
*senior and sole theorist
8. Perich, M.G., Arlt, C., Soares, S., Benster, T., Andalman A., Young, M.E., Mosher, C.P., Minxha, J., Rutishauser, U., Rudebeck, P.H., Harvey, C.D., Deisseroth, K., **Rajan, K.***, (2020) Untangling brain-wide interactions using data-constrained recurrent neural network models, *in review at Cell as a Resource paper, BioRxiv*, DOI: <https://doi.org/10.1101/2020.12.18.423348>. Open source code available at: <https://github.com/rajanlab/CURBD>
*corresponding author

Published

9. Momennejad, I., Krakauer, J.W., Sun, C., Yezerets, E., Rajan, K., Vogelstein, J.T., Wyble, B. (2021) The Learning Salon: Toward a new participatory science, *Neuron*, ISSN 0896-6273, DOI: <https://doi.org/10.1016/j.neuron.2021.08.023>.
10. Martini, M.L., Valliani, A.A., Sun, C., Costa, A.B., Zhao, S., Panov, F., Ghatan, S., **Rajan, K.***, Oermann E.K.* (2021) Deep anomaly detection of seizures with paired stereoelectroencephalography and video recordings, *Scientific Reports*, 11:7482. DOI: <https://doi.org/10.1038/s41598-021-86891-y>
*co-corresponding author

11. Perich, M.G., **Rajan, K.***, (2020) Rethinking brain-wide interactions through multi-region “network of networks” models, *Current Opinion in Neurobiology*, 65:146–151, DOI: <https://doi.org/10.1016/j.conb.2020.11.003>. Online (not paywalled) at <https://osf.io/58qwj/>
*corresponding author
12. Martini, M.L., Neifert, S.N., Oermann, E.K., Gal, J., **Rajan, K.***, Nistal, D.A., Caridi, J.M., (2020) Machine learning with feature domains elucidates candidate drivers of hospital readmission following spine surgery in a large single-center patient cohort, *Neurosurgery*, May 11; nyaa136. PMID: 32392339 DOI: 10.1093/neuros/nyaa136
*senior and sole theorist
13. Martini, M.L., Costa, A., **Rajan, K.**, Panov, F., Oermann, E.K., (2020) Deep, Self-supervised learning for patient-specific anomaly detection in stereoelectroencephalography, *Journal of Neurosurgery*, 132 (4), 37, <https://thejns.org/view/journals/j-neurosurg/132/4/article-p1.xml>
14. Yang, G.R., Cole, M.J., and **Rajan, K.***, (2019) How to study the neural mechanisms of multi-task learning, *Current Opinion in Behavioral Sciences*, 29, 134-143. DOI: <https://doi.org/10.1016/j.cobeha.2019.07.001>
*corresponding author
15. Andalman, A.S., Burns, V.M., Lovett-Barron, M., Broxton, M., Poole, M., Yang, S.J., Grosenick, L., Lerner, T.N., Chen, R., Benster, T., Mourrain, P., Levoy, M., **Rajan, K.***, and Deisseroth, K., (2019) Neuronal dynamics regulating brain and behavioral state transitions., *Cell*, May 2; 177(4): 970-985.e20. DOI: 10.1016/j.cell.2019.02.037. Epub 2019 Apr 25. PMID: 31031000
*senior and sole theorist
16. Insanally, M.N., Carcea, I., Field, R.E., Rodgers, C.C., DiPasquale, B., **Rajan, K.**, DeWeese, M.R., Albanna, B.F., Froemke, R.C., (2019) Nominally non-responsive frontal and sensory cortical cells encode task-relevant variables via ensemble consensus-building, *eLife*, 2019;8:e42409 DOI: 10.7554/eLife.42409 (see also *BioRxiv* 347617 [Preprint] June 28, 2018, DOI: <https://doi.org/10.1101/347617>)
17. Pinto, L., **Rajan, K.***, DePasquale, B., Thiberge, S.Y., Tank, D.W., Brody, C.D., (2019) Task-dependent changes in the large-scale dynamics and necessity of cortical regions, *Neuron*, 2019 Nov 20;104(4):810-824.e9. doi: 10.1016/j.neuron.2019.08.025. Epub 2019 Sep 26. PMID: 31564591. PMCID: PMC7036751 (available on 2020-11-20) DOI: 10.1016/j.neuron.2019.08.025
*senior theorist

Publications as Postdoctoral Fellow (Princeton) and Doctoral Student (Columbia)

18. DiPasquale, B., Cueva, C., **Rajan, K.**, Escola, G.S., Abbott, L.F., (2018) Full-FORCE: A least-squares algorithm for training recurrently connected neural networks, *PLoS One* 13(2): e0191527 PMID: 29415041 PMCID: PMC5802861 DOI: 10.1371/journal.pone.0191527
19. **Rajan, K.***, Harvey, C.D., Tank, D.W., (2016) Recurrent network models of sequence generation and memory, *Neuron*, 90(1): 128-142. PMID: 26971945 PMCID: PMC4824643 DOI: 10.1016/j.neuron.2016.02.00900463
*corresponding author and sole theorist
20. **Rajan, K.**, Bialek, W., (2013) Maximally informative “stimulus energies” in the analysis of neural responses to natural signals, *PLoS One*, 8: 11: e71959. PMID: 24250780; PMCID: PMC3826732 DOI: 10.1371/journal.pone.0071959

21. **Rajan, K.**, Marre, O., Tkacik, G., (2012) Learning quadratic receptive fields from neural responses to natural stimuli: information theoretic and likelihood methods, *Neural Computation*, 25: 7: 1661. PMID: 23607557; DOI: 10.1162/NECO_a_00463
22. **Rajan, K.**, Abbott, L.F., Sompolinsky, H., (2010) Inferring stimulus selectivity from the spatial structure of neural network dynamics, In Lafferty, Williams, Shawne-Taylor, Zemel and Culotta. *Advances in Neural Information Processing Systems (formerly, NIPS, renamed NeurIPS)* 23.
23. **Rajan, K.***, Abbott, L.F., Sompolinsky, H., (2010) Stimulus-dependent suppression of chaos in recurrent neural networks, *Physical Reviews E*, 82: 01193. PMID: 20866644; DOI: 10.1103/PhysRevE. 82.011903

*Physical Reviews Spotlight Paper in 2020, out of ~50,000 papers published since 1993

24. **Rajan, K.**, Abbott, L.F., Sompolinsky, H., (2010) Stimulus-dependent suppression of intrinsic variability in recurrent neural networks, *BioMed Central Neuroscience*, 11, O17: 11.
25. **Rajan, K.**, (2010) What do random matrices tell us about the brain? Grace Hopper Celebration of Women in Computing, Anita Borg Institute for Women and Technology and the Association for Computing Machinery.
26. **Rajan, K.**, Abbott, L.F., Sompolinsky, H., (2009) Interactions between intrinsic and stimulus-dependent activity in recurrent neural networks, *The Dynamic Brain: An Exploration of Neuronal Variability and its Functional Significance*, M Ding and D Glanzman eds., Oxford Uni Press.
27. **Rajan, K.**, (2009) Nonchaotic responses from randomly connected networks of model neurons, Ph. D. Dissertation from Columbia University in the City of New York, New York, USA.
28. **Rajan, K.**, Abbott, L.F., (2007) Temperature compensation of chemical reactions, *Physical Reviews E*, 75: 022902. PMID: 17358384; DOI: 10.1103/PhysRevE.75.022902
29. **Rajan, K.***, Abbott, L.F., (2006) Eigenvalue spectra of random matrices for neural networks, *Physical Reviews Letters*, 97: 188104. PMID: 17155583; DOI: <http://dx.doi.org/10.1103/PhysRevLett.97.188104>

*Rajan-Abbott distribution, Universality proven by Terry Tao

<https://link.springer.com/content/pdf/10.1007/s00440-011-0397-9.pdf>

30. Vogels, T.P., **Rajan, K.**, Abbott, L.F., (2005) Neural network dynamics, *Annual Review of Neuroscience*, 28: 357. PMID: 16022600; DOI: 10.1146/annurev.neuro.28.061604.135637

PATENT APPLICATIONS

Kepple, D.R., Lee, D.W., Isler, I.V., **Rajan, K.**, Park, I.M., Lee, D., (2019) *Jointly Learning Visual Motion And Confidence From Local Patches In Event Cameras*, U.S. Provisional Patent Application No. 62/940,380, November 26, 2019, United States Patent and Trademark Office

MENTORING EXPERIENCE

Direct Reports – Postdoctoral Fellows

- 2021– Manuel Beiran, PhD (doctoral advisor: Srdjan Ostojic, EPFL), Postdoctoral Fellow, Department of Neuroscience, ISMMS; Subject: Linking structural and functional connectomics using data-constrained recurrent neural network models with sparsity constraints; Role: Advisor

- 2020– Daniel Kepple, PhD (doctoral advisor: Alex Koulakov, CSHL; first postdoc with Daniel Lee, Samsung AI Center, NYC), Postdoctoral Fellow, Department of Neuroscience, ISMMS; Subject: How curriculum learning shapes the evolution of latent representations in the brain during task learning in lab settings or skill-acquisition in nature; Role: Advisor
May transition to staff scientist in my lab in FY2023
- 2020– Christian Márton, PhD (doctoral advisors: Simon Schultz, Imperial College London and Bruno Averbeck, NIH), Postdoctoral Fellow, Department of Neuroscience, ISMMS; Subject: Dynamical state representations underlying the multitasking functionality of the brain; Role: Advisor
- 2019–2022 Matthew Perich, PhD (doctoral advisors: Lee Miller and Sara Solla, Northwestern), Postdoctoral Fellow, Department of Neuroscience, ISMMS; Subject: Current based decomposition for uncovering brainwide interactions; Role: Advisor
Starting as Assistant Professor in Fall 2022, joint appointment with the University of Montreal and Mila-Quebec AI Institute (originally, MILA – Montreal Institute for Learning Algorithms)

Direct Reports – Graduate Students

- 2019–2023 Siyan Zhou, PhD Student at Harvard University; Subject: Multi-region neural network models of flexible rule-based decision making; Role: Co-advised with Chris Harvey, ABD: January 2024
- 2018–2022 Camille Spencer-Salmon, MD/PhD Student, ISMMS; Subject: Dynamical foundations of task-related computations in multitask learning paradigms; Role: Doctoral advisor, ABD: March 2022
- 2018–2021 Muhammad Furqan Afzal, PhD Student, Department of Neuroscience, ISMMS; Subject: Inferring state transitions in time series data using recurrent neural network models; Role: Doctoral advisor, co-advised with Helen Mayberg, ABD: March 2022
- 2018–2022 Yosif Zaki, PhD Student, Department of Neuroscience, ISMMS; Subject: Memory linking in recurrent neural networks; Role: Doctoral advisor, co-advised with Denise Cai
F31 grantee funded by the NIMH

Thesis Committees

- Taylor Pullinger, PhD candidate, ISMMS
- Fred Kwon, MD/PhD candidate, ISMMS: *graduated with distinction Jan 2021, postdoc at NYU*
- Madeline Aster “Q” Perkins, PhD candidate, ISMMS: *F31 grantee funded by the NIMH*
- Kaustubh Kulkarni, PhD candidate, ISMMS
- Joseph Simon IV, PhD candidate, ISMMS
- Randy Ellis, PhD candidate, ISMMS

TEACHING EXPERIENCE

- 2022– Tutorial Chair, Computational and Systems Neuroscience (COSYNE) meeting
- 2021 Lecturer, CNeuro2021, Theoretical and Computational Neuroscience Summer School, August 14-21
- 2021– Lecturer in Dynamic Brain School, Summer Island, Allen Institute & U of Washington
- 2021 Tutorial on Recurrent Neural Network Models for Neuroscience, Computational and Systems Neuroscience (COSYNE) meeting, Feb 23, 2021

- 2020 Designing Neural Network Models for Understanding the Nervous System, Graduate Seminar in Computational Neuroscience, Depts of Neuroscience, Data Science, and Computer Science, New York University, Dec 2, 2020
- 2019 Neuromatch Academy Mentor
- 2011–2013 Lectureship, Department of Molecular Biology and the Lewis-Sigler Institute for Integrative Genomics, Princeton University for Methods and Logic in Quantitative Biology

Princeton University, Co-Instructor and Teaching Assistantships

- Computational Neuroscience (fall 2009, fall 2010, spring 2011): *Lecturer*
- Method and Logic in Quantitative Biology (spring 2011, spring 2012): *Lecturer*
- Mathematics Bootcamp for Life Sciences – BioMath (summers 2010–2013): *Lecturer*

Columbia University, Assistant Instructor

- Advanced Topics in Theoretical Neuroscience (spring 2005, spring 2006)
- Computational Neuroscience (fall 2006)

Brandeis University, Teaching Assistant

- Pulin Sampat Memorial Teaching Award, Brandeis University
- Biostatistics and Statistical Methods in Neuroscience (summer 2004)
- Comparative Neurophysiology (fall 2003, fall 2004)
- Biology Laboratory (fall 2004)

SELECTED MEDIA & PRESS

Print & Digital

- 2021 [“Simons Collaboration on the Global Brain Pledges New Funds to Explore How Brain Regions Interact,”](#) *Simons Foundation*, October 7
- 2020 [“Virtual Neuroscience with The Learning Salon,”](#) Computational Neuroscience Center, University of Washington, November 5
- 2020 [“Tracking Information Across the Brain,”](#) *Simons Foundation*, May 28
- 2020 [“Building Predictive Models of Brain Health and Disease,”](#) *The Friedman Brain Institute*, Spring Newsletter, March 31
- 2019 [“‘Silent-type’ cells play a greater role in brain behavior than previously thought,”](#) *Science Daily*, February 26
- 2019 [“Outstanding Indian American Scholars Named Prestigious Sloan Research Fellows for 2019,”](#) *India West*, November 22
- 2017 [“James S. McDonnell Foundation Announces 2016 Grants for The 21st Century Science Initiative Awards,”](#) *James S. McDonnell Foundation*, Press release, February 21

Podcasts & Webinars

- 2021 [“Modeling Human Cognition with RNNs and Curriculum Learning with Kanaka Rajan”](#) *This Week in Machine Learning and Artificial Intelligence (TWIML)*, October 4
- 2021 [“BI NMA 02: Dynamical Systems Panel”](#) *Brain Inspired*, July 15
- 2021 [“Dr. Kanaka Rajan, Computational Neuroscientist & Assistant Professor at Mt Sinai,”](#) *Lady Scientist Podcast*, July 7
- 2021 [“BI 100.1 Special: What Has Improved Your Career or Well-being?”](#) *Brain Inspired*, March 10

- 2021 “How Brain Circuits Function in Health and Disease: Understanding Brain-wide Current Flow,” *Brain & Behavior Research Foundation, Meet the Scientist Webinar Series*, February 9
- 2020 “Inferring brain-wide current flow using data-constrained neural network models,” *World Wide Theoretical Neuroscience*, November 18
- 2020 “566: Dr. Kanaka Rajan: Creating Computational Models to Determine How the Brain Accomplishes Complex Tasks,” *People Behind the Science*, August 10
- 2019 “BI 054 Kanaka Rajan: How Do We Switch Behaviors?” *Brain Inspired*, November 27

PROFESSIONAL SERVICE

Diversity, Inclusion, and Belonging

Diversity Working Group, Friedman Brain Institute, Mount Sinai
 Faculty Council (*elected position*), Icahn School of Medicine at Mount Sinai

Grant Review

Space Radiation Brain Modeling Panel, NASA
 Multiscale Modeling (MSM) Consortium, National Institutes of Health
 SPARC Program Panel, National Institutes of Health
 Robust Intelligence Grant Review Panel, National Science Foundation
 CRCNS Grant Review Panel, National Science Foundation
 U19 Grant Review Panel, NINDS, National Institutes of Health

Paper Review

Cell
 Neuron
 Nature Neuroscience
 Nature Methods
 Nature Machine Intelligence
 Neural Computation
 PLoS Computational Biology

Conference Abstract Review

Advances in Neural Information Processing Systems (NeurIPS)
 Computational and Systems Neuroscience (COSYNE)
 Annual Conference on Cognitive Computational Neuroscience (CCNeuro)

PROFESSIONAL ASSOCIATIONS

Program Committee, Computational and Systems Neuroscience (COSYNE), 2021–
 American Physical Society, 2002–present
 Society for Neuroscience, 2005–present
 Organization for Computational Neuroscience, 2002–2010

CONFERENCE ACTIVITY

Selected Talks

- 2021 Advances in Systems & Computational Neuroscience Symposium, Center for Systems Neuroscience, Boston University, Oct 5
- Keynote** - Allen Brain Institute & European Institute for Theoretical Neuroscience (EITN), Towards Multipurpose Neural Network Models II: Model Testing and Model Fitting Workshop, October 10
- eLife Symposium on Computational and Systems Biology, September 9
- Special Seminar*, Department of Neuroscience, Brown University, May 26
- Neuronal Ensembles Symposium, Kavli Foundation and Columbia University, May 5
- Special Seminar*, Grossman Center, University of Chicago, April 15
- Bernstein Conference, April 14
- Stanford's Center for Mind, Brain, Computation and Technology Seminar Series, April 12
- Center for Theoretical Neuroscience Invited Talk, Columbia University, March 26
- Swartz Theoretical Neuroscience Series Invited Talk, NYU, March 12
- Center for Computational Brain Science (CCBS) Seminar, Brown University, March 8
- Brain and Behavior Foundation. Meet the Scientist Talk, Feb 9
- 2020 University of Bristol Computational Neuroscience Seminar, Dec 4
- SciViz NYC Invited Speaker, Dec 2
- World Wide Theoretical Neuroscience Meeting Talk, Nov 18
- Invited Speaker. Human Single Neuron conference, Caltech, Nov 13
- BRAINCoGs Special Seminar, Princeton University, Oct 7
- BRAIN Initiative PI Meeting Highlight Talk, June 1
- Neuromatch Unconference Invited Talk, April 17
- Neurotheory.world Invited Talk, April 8
- 8th Annual Virtual Conference. Brain Function: In Health & Disease; NIH, Mar 11
- Computational and Systems Neuroscience (COSYNE), Recurrent Network Models of Adaptive and Maladaptive State Transitions, March 3
- Computational and Systems Neuroscience (COSYNE), Recurrent Network Models of Evidence Accumulation, March 2
- 2019 Department of Physiology, Biophysics & Systems Biology, Weill Cornell College of Medicine, June 21
- Friedman Brain Institute, Mt. Sinai School of Medicine, June 15
- Extramural Postdoctoral Seminars at Columbia University (EPSC), Department of Neurobiology and Behavior, Zuckerman Institute, Columbia University in the City of New York, June 7
- Brain and Cognitive Sciences (BCS) Seminar Series, Massachusetts Institute of Technology (MIT), Cambridge, MA, April 7
- BioX, Graduate Program in Neurobiology and Department of Bioengineering joint meeting, Clark Center, Stanford University, Palo Alto, CA, March 28-29
- Network models of evidence accumulation and behavioral variability, Computational Neuroscience Initiative & Department of Bioengineering, University of Pennsylvania, March 31

- 2017 Partial-In Network Training, a method to explore the continuum between feedforward and random networks, Department of Neurobiology, Columbia University, May 6
Recurrent network models of sequence generation, Janelia Research Campus, Howard Hughes Medical Institute, January 19-21
- 2016 Sequence generation and timing signals from calcium imaging data in cortical circuits, Emerging Tools for Acquisition and Interpretation of Whole-Brain Functional Data conference, Janelia Research Campus, Howard Hughes Medical Institute, November 1-4
Network models of sequential neural activity and timing signals, Cold Spring Harbor Labs, July 8
Network models of slow timing signals and heterogeneous dynamics, Princeton Neuroscience Institute Annual Retreat, Red Bank, NJ, May 4-5
Recurrent network models of sequences and timing signals, Hippocampal-Entorhinal Complexities: Maps, Cell Types and Mechanisms conference, Janelia Research Campus, Howard Hughes Medical Institute, April 8-11
- 2014 Choice-specific sequences in the parietal cortex: a networks perspective, Computational Neuroscience Connection, Center for Sensorimotor Neural Engineering, University of Washington, Seattle, WA, September 25-26
Rewiring or Reconfiguration? Choice-specific sequence generation in the posterior parietal cortex, Neural Population Dynamics Underlying Sensorimotor Integration conference, Janelia Farm Research Campus Talk, June 9-10
- 2013 Generating slow timing signals from fast neural and synaptic biophysics, Temporal Dynamics conference, Janelia Farm Research Campus Talk, May 13-16
- 2012 Sequence generation and timing signals in neural circuits for decision-making, Society for Neuroscience Nanosymposium, October 13-17
- 2010 Meaningful responses from a chaotic neural network exemplified in delayed two-frequency discrimination tasks, Gordon Research Conference on Neurobiology of Cognition, Waterville Valley, H, July 11-24
Stimulus-dependent suppression of intrinsic variability in recurrent neural networks, Computational Neuroscience Meeting (CNS), San Antonio, TX, July 25-30
Interaction between intrinsic dynamics and stimulus-evoked responses in neural networks, BioX and Electrical Engineering Departments Seminar, Stanford University, Palo Alto, CA, June 23
Stimulus selectivity in neural networks with complex spontaneous activity, Statistical Analysis of Neural Data, SAND5, Carnegie Mellon University, Pittsburgh, PA, May 20-22
Input-dependent suppression of chaos in recurrent neural networks, American Physical Society March Meeting, Portland, OR, March 15-19
- 2008 Generating realistic motor patterns from randomly connected model neurons by input-dependent destabilization of oscillatory modes, Computational and Systems Neuroscience (COSYNEe) meeting, Salt Lake City, UT, Feb 28-Mar 2
Non-chaotic responses from randomly connected networks of model neurons, Lewis-Sigler Institute of Integrative Genomics, Princeton University, January 21
- 2007 Interaction between spontaneous and evoked activity in neural networks, Biophysics Seminar, Princeton University, July 8

How are sensory stimuli reconciled with ongoing complex activity in neural networks?
Gordon Research Conference on Neural Circuits & Plasticity, Salve Regina University,
Newport, RI, July 1-6

Results from random matrix theory applied to understanding network dynamics, Howard
Hughes Medical Institute and Columbia University, May 12

2006 Controlling neural network dynamics, Sloan-Swartz Annual Meeting, Columbia University,
July 22-25

A general-purpose pattern generator using controllable network dynamics, Banbury
Workshop on Computational Approaches to Cortical Function, Banbury, NY, April 2-5

Eigenvalue spectra of random matrices specific to neural systems, Gatsby Computational
Neuroscience Unit, University College, London, March 10-13

2005 Neural network model for a general-purpose pattern generator, Department of
Neurobiology and Behavior, Columbia University Retreat, October 15

Maximal stimulus responses in networks with complex background levels, Sloan-Swartz
Annual Meeting, California Institute of Technology, Los Angeles, CA, July 23-26

Network for generating complex controllable motor trajectories – the Fourier machine,
Computational and Systems Neuroscience (COSYNE), UT, March 17-20

Workshops and Symposia Organized

2021 Tutorial on Recurrent Neural Networks for Neuroscience. Computational and Systems
Neuroscience (COSYNE) virtual meeting, February 23.
<https://www.youtube.com/watch?v=dJHn1mPsq3A>

2020–2021 Co-organizer of Learning Salon

2017–2018 Simons Foundation New York Area Neuroscience Workshop, Simons Foundation, NY,
every other month

2015 Neural Response Variability and Cortical Computation II, Banbury Center, NY, April 19

2014 Sequence Generation and Timing Signals in the Brain, Computational and Systems
Neuroscience (COSYNE) meeting, March 3-4

2012 Characterizing Neural Responses to Structured and Naturalistic Stimuli, Computational
and Systems Neuroscience (COSYNE) meeting, February 27-28

2011 Neural Response Variability and Cortical Computation I, Banbury Center, NY, April 3-6

Selected Posters and Conference Proceedings

2017 Neural network models of evidence accumulation in the neocortex, Cognitive
Computational Neuroscience conference, New York, NY, September 6-8

2016 Recurrent network models of sequence generation, Society for Neuroscience Annual
Meeting, San Diego, CA, November 12-16

2015 Sequence generation and timing signals in neural networks, Society for Neuroscience
Annual Meeting, Chicago, IL, October 12-17

2014 79th Cold Spring Harbor Symposium on Quantitative Biology: Cognition, Cold Spring
Harbor Laboratories, NY, May 28-June 2

2013 Physics of Living Systems, National Science Foundation meeting, Princeton University,
Princeton, NJ, August 5-6

Princeton Neuroscience Institute Annual Retreat, Philadelphia, PA, May 23

Temporal Dynamics conference, Janelia Farm Research Campus Talk, May 13-16

- 2012 Cognitive Neuroscience Conference, Mathematical Biosciences Institute, Columbus, OH, December 10-14
 20th Annual Dynamical Neuroscience Satellite Symposium, Preceding the 42nd Society for Neuroscience Annual meeting, October 11-12
 Sloan-Swartz Annual Meeting, University of California San Diego, La Jolla, CA, June 27-29
 Computational and Systems Neuroscience (CoSyNe) meeting, Salt Lake City, UT, February 23-26
- 2011 NSF/NIH Collaborative Research in Computational Neuroscience (CRCNS) meeting, Princeton University, Princeton, NJ, October 9-11
 CIRM workshop on Mean-field methods and multiscale analysis of neural populations, Centre International de Rencontres Mathématiques (CIRM), Marseille, France, October 3-7
- 2010 Non-chaotic responses from randomly connected neural networks, Society for Neuroscience Annual Meeting, San Diego, CA, November 13-17
 Sloan-Swartz Annual Meeting, Janelia Farm Research Campus, Howard Hughes Medical Institute, July 11-14
 Random matrices for neural networks, Princeton Center for Theoretical Science (PCTS) Rare Events in Biology symposium, February 3-4

REFERENCES (Additional references can be provided upon request)

Prof Karl Deisseroth

Role: current collaborator and co-author

deissero@stanford.edu

D.H. Chen Professor of Bioengineering and of Psychiatry and Behavioral Sciences
 Stanford University and Howard Hughes Medical Institute
 318 Campus Drive West, Clark Center W083
 Stanford University, Stanford, CA 94305

Prof David Tank

Role: postdoctoral mentor

dwtank@princeton.edu

Henry L. Hillman Professor of Neuroscience
 Co-Director, Princeton Neuroscience Institute
 Washington Road
 Princeton University
 Princeton, NJ 08544

Prof Larry Abbott

Role: Doctoral advisor

lfabbott@columbia.edu

William Bloor Professor of Theoretical Neuroscience and Professor of Physiology and Cellular Biophysics (in Biological Sciences)
 Zuckerman Mind Brain Behavior Institute
 Jerome L. Greene Science Center, Columbia University
 L5-072 Mail Code 9854, 3227 Broadway, New York, NY 10027