

7 February 2024

**DR. KANAKA RAJAN**

**Associate Professor**

Department of Neurobiology, Harvard Medical School  
Kempner Institute for the Study of Natural and Artificial Intelligence, Harvard University  
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[Wikipedia](https://en.wikipedia.org/wiki/Kanaka_Rajan) • [Rajan Lab](https://www.kanaka-rajana.com/)

**EDUCATION**

PhD Neuroscience, Columbia University in the City of New York, 2009  
MS Brandeis University, 2005  
BTech Industrial Biotechnology, Anna University, 2000

**PROFESSIONAL APPOINTMENTS**

2023 – present Associate Professor, Department of Neurobiology, Harvard Medical School  
2023 – present Faculty, Kempner Institute for the Study of Natural and Artificial Intelligence, Harvard University  
2023 – present Adjunct Associate Professor, Department of Neuroscience & Friedman Brain Institute, School of Medicine at Mount Sinai, NY  
2022 – 2023 Associate Professor (Tenured), Department of Neuroscience & Friedman Brain Institute, School of Medicine at Mount Sinai, NY  
2022 – 2023 Visiting Professor, Center for Theoretical Neuroscience, Columbia University, NY  
2019 – 2020 Visiting Professor, Samsung Artificial Intelligence Center (SAIC), NY  
2018 – 2022 Assistant Professor, Department of Neuroscience & Friedman Brain Institute, Icahn School of Medicine at Mount Sinai, NY  
2009 – 2018 Biophysics Theory Fellow, Princeton University, NJ

**GRANT SUPPORT**

**Funded**

2023 R01, National Institute of Mental Health, NIH (as Co-Investigator, \$4,143,082, PI: Peter Rudebeck)  
2023 Simons Collaboration for the Global Brain Pilot Grant Program (as Principal Investigator, \$240,000)  
2023 CIFAR Azrieli Global Scholar (as Principal Investigator, funded \$100,000 CAD)  
2022 RF1 (Competing Renewal of R01), Theories, Models, and Methods pathway, NIH (as Principal Investigator, funded \$1,259,010)  
2022 McKnight Endowment Fund for Neuroscience Scholar Awards (as Principal Investigator, funded \$225,000)  
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 – 2023 Alfred P. Sloan Research Fellowship  
(as Principal Investigator, funded \$70,000)

2018 Mindlin Foundation Award, Neuroscience meets Graphic Novel  
(as Principal Investigator)

2016 – 2024 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 Research Foundation (NARSAD) Young Investigator Award  
(as Principal Investigator, funded \$65,000 over two years)

**Pending**

2023 DP1, NIH Director's Pioneer Award, Computational Theory of the Neural Mechanisms of Social Cognition Across Small Groups (as Principal Investigator, \$3,500,000)

2023 U19, BRAIN Integrated and Quantitative Approaches to Understanding Circuits, Towards a unified framework for dopamine signaling and basal ganglia function (as Project Lead, \$2,892,246 to Rajan lab, PI: Bernardo Sabatini)

**AWARDS AND HONORS**

2023 CIFAR Azrieli Global Scholar – Brain, Mind & Consciousness Program

2022 McKnight Scholar Award

2021 Allen Institute Next Generation Leader

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

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**

1. Schwark, R., Ogundare, S., Weinreb, C., Sheng, P., Foster, W., Toussaint, A., Chang, P., Tsai, Y-Y.W., Comfere, M., Arnold, A., Guadagnino, A., McCloskey, D., Schaffer, E., Rajan, K., Datta, S.R. & Abdus-Saboor, I. (2024) Behavioral fingerprinting of the naked mole-rat uncovers signatures of eusociality and social touch, *bioRxiv*, DOI: <https://doi.org/10.1101/2024.02.21.581483>
2. Bussell, J.J., Badman, R.S., Marton, C.D., Bromberg-Martin, E.S., Badman, R.S., Abbott, L.F, **Rajan, K.**, Abbott, L.F & Axel, R. (2023) Representations of information value in mouse orbitofrontal cortex during information seeking, *bioRxiv*, DOI: <https://doi.org/10.1101/2023.10.13.562291>
3. Young, M.E., Spencer-Salmon, C., Mosher, C., Tamang, S., **Rajan, K.\***, Rudebeck, P.H. (2023) Temporally-specific sequences of neural activity across interconnected corticolimbic structures during reward anticipation, *Neuron*, DOI: <https://doi.org/10.1016/j.neuron.2023.07.012>  
\*senior and sole theorist
4. Brynildsen, J.K., **Rajan, K.**, Henderson, M.X., & Bassett, D.S. (2023) Network models to enhance the translational impact of cross-species studies, *Nature Reviews Neuroscience*, DOI: <https://doi.org/10.1038/s41583-023-00720-x>
5. Beiran, M., Spencer-Salmon, C.A., **Rajan, K.\*** (2023) A ‘programming’ framework for recurrent neural networks, *Nature Machine Intelligence*, DOI: <https://doi.org/10.1038/s42256-023-00674-w>  
\*corresponding author
6. Clem, R.L., Cai, D.J., **Rajan, K.**, Shuman, T., Wu, X., & Wu, Z. (2023) The Computational Brain in The Frontiers of Medical Research: Brain Science (*Science/AAAS*, Washington, DC), p. 19-20.
7. Akitake, B., Douglas, H.M., LaFosse, P.K., Beiran, M., Deveau, C.E., O’Rawe, J., Li, A.J., Ryan, L.N., Duffy, S.P., Zhou, Z., Deng, Y., **Rajan, K.\***, Histed, M.H. (2023) Amplified cortical neural responses as animals learn to use novel activity patterns, *Current Biology* 33:1-12, DOI: <https://doi.org/10.1016/j.cub.2023.04.032>.  
\*senior theorist
8. Zaki, Y., Pennington, Z.T., Morales-Rodriguez, D., Francisco, T.R., LaBanca, A.R., Dong, Z., Carrillo Segura, S., Silva, A.J., Shuman, T., Fenton, A., **Rajan, K.**, & Cai, D.J. (2023) Aversive experience drives offline ensemble reactivation to link memories across days, *bioRxiv*, DOI: <https://doi.org/10.1101/2023.03.13.532469>
9. Perich, M.G., Arlt, C., Soares, S., Zhou, S., Beiran, M., Andalman A.S., Benster, T., Young, M.E., Mosher, C.P., Minzha, J., Carter, E., Rutishauser, U., Rudebeck, P.H., Harvey, C.D., Deisseroth, K., **Rajan, K.\*** (2023) Inferring brain-wide interactions using data-constrained recurrent neural network

models, *under consideration at Cell as a Resource paper, bioRxiv*, DOI:

<https://doi.org/10.1101/2020.12.18.423348>. Open source code: <https://github.com/rajanlab/CURBD>

\*corresponding author

10. Perich, M.G., Beiran, M.A., Benster, T., Andalman, A.S., Carter, E.S., **Rajan, K.\***, Deisseroth, K.\* , (2023) Brain-wide compositional modes as a neural basis for behavior, *in consideration at CellPress as a companion paper to Perich et al. 2023, CURBD article (above)*.  
\*co-corresponding author and senior theorist
11. Haynes, S., Lacagnina, A., Seong, H.S., Afzal, M.F., Morel, C., Menigoz, A., **Rajan, K.\***, Clem, R.L., Mayberg, H.S., Rannie, D.G., Young, L.J., Han, M., (2022) CRF neurons establish resilience via stress-history-dependent BNST modulation, *in press at Nature Neuroscience; bioRxiv*, DOI: <https://doi.org/10.1101/2022.08.31.505596>  
\*senior and sole theorist
12. Albanna, B.F.\* , Insanally, M.N.\* , Toth, J., DePasquale, B., Fadaei, S.S., Gupta, T., Lombardi, O., Kuchibhotla, K., **Rajan, K.\***, Froemke, R.C. (2022) Contributions and synaptic basis of diverse cortical neuron responses to task performance, *in review at Nature Neuroscience; bioRxiv*, DOI: <https://doi.org/10.1101/2022.05.04.490676>  
\*senior theorist
13. Afzal, M.F., Marton, C.D., Mayberg, H.M., Rich, E.L., **Rajan, K.\*** (2022) Reservoir-based Tracking (TRAKR) For One-shot Classification Of Neural Time-series Patterns, *in review at Neural Computation, bioRxiv*, DOI: <https://doi.org/10.1101/2021.10.13.464288>  
\*corresponding author
14. Marton, C.D., Gagnon, L., Lajoie, G\*., **Rajan, K.\*** (2022) Efficient and robust multi-task learning in biological brains with modular task primitives, *in review at Neural Computation, arXiv*, DOI: <https://doi.org/10.48550/arXiv.2105.14108>  
\*corresponding author
15. Dong, Z., Mau, W., Feng, Y.S., Pennington, Z.T., Chen, L., Zaki, Y., **Rajan, K.\***, Shuman, T., Aharoni, D., Cai, D.J. (2022) Minian: An open-source miniscope analysis pipeline, *eLife*, DOI: <https://doi.org/10.7554/eLife.70661>  
\*senior and sole theorist
16. Marton, C.D., Zhou, S., **Rajan, K.\*** (2022) Linking task structure and neural network dynamics, *Nature Neuroscience*, DOI: <https://doi.org/10.1038/s41593-022-01090-w>  
\*corresponding author
17. Monaco, J.D., **Rajan, K.**, Hwang, G.M. (2022) A brain basis of dynamical intelligence for AI and computational neuroscience, *in press at Nature Machine Intelligence, ArXiv*, DOI: <https://arxiv.org/abs/2105.07284>
18. Kepple, D.R., Engelken, R.E., **Rajan, K.\*** (2022) Curriculum learning as a tool to uncover learning principles in the brain, *International Conference on Learning Representations (ICLR)*, [https://openreview.net/forum?id=TpJMvo0\\_pu-](https://openreview.net/forum?id=TpJMvo0_pu-)  
\*corresponding author
19. 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>

20. 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
21. 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
22. 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
23. 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>  
\*senior theorist
24. Yang, G.R., Cole, M.J., **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
25. 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.\***, 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
26. 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) Spike-timing-dependent ensemble encoding by non-classically responsive cortical neurons, *eLife*, 2019;8:e42409 DOI: 10.7554/eLife.42409 (see also *bioRxiv*, 347617, June 28, 2018, DOI: <https://doi.org/10.1101/347617>)
27. 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. Epub 2019 Sep 26. PMID: 31564591. PMCID: PMC7036751 (available on 2020-11-20) DOI: 10.1016/j.neuron.2019.08.025  
\*senior theorist
28. DePasquale, 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

### In Preparation

29. Simmons-Edler, R., Littman, M., **Rajan, K.\*** (2023) Do Deep RL Agents Trained on Modular Tasks Learn Modular Representations? *Accepted at RLDM, in preparation.*

30. Badman, R., Bussell, J., Stone, J., Simmons-Edler, R., Clark, D., Kepple, D., Mirachhi Titus, L., Summerfield, C., Barak, O., Littman, M., **Rajan, K.\*** (2023) Curriculum learning and other learning theories, *in preparation for Nature Reviews Neuroscience (invited review)*.

\*corresponding author

31. Beiran, M.A., Perich, M.G., Benster, T., Andalman, A., Deisseroth, K.\*, **Rajan, K.\*** (2023) Conserved and uniquely divergent roles of brain wide glial and neuronal population dynamics in controlling behavioral state transitions, *in preparation*.

\*co-corresponding author and senior theorist

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

32. **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

33. **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

34. **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

35. **Rajan, K.**, Abbott, L.F., Sompolinsky, H. (2010) Inferring stimulus selectivity from the spatial structure of neural network dynamics, *Advances in Neural Information Processing Systems (formerly NIPS, renamed NeurIPS)* 23. <http://www.columbia.edu/cu/neurotheory/Larry/RajanNIPS10.pdf>

36. **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

37. **Rajan, K.**, Abbott, L.F., Sompolinsky, H. (2010) Stimulus-dependent suppression of intrinsic variability in recurrent neural networks, *BioMed Central Neuroscience*, 11, O17: 11.

38. **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.

39. **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.

40. **Rajan, K.** (2009) Nonchaotic responses from randomly connected networks of model neurons, PhD Dissertation from Columbia University in the City of New York, New York, USA.

41. **Rajan, K.**, Abbott, L.F. (2007) Temperature compensation of chemical reactions, *Physical Reviews E*, 75: 022902. PMID: 17358384; DOI: 10.1103/PhysRevE.75.022902
42. **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, UCLA, Fields Medalist  
<https://link.springer.com/content/pdf/10.1007/s00440-011-0397-9.pdf>
43. 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

## **PATENTS**

Kepple, D.R., Lee, D.W., Isler, I.V., **Rajan, K.**, Park, I.M., Lee, D. (May 27, 2021) *Jointly Learning Visual Motion And Confidence From Local Patches In Event Cameras*, U.S. Patent Application No. 17105028, US 2021/0158483 A1; United States Patent and Trademark Office  
<https://patentimages.storage.googleapis.com/5c/ba/89/afb9786d5d95da/US20210158483A1.pdf>

## **MENTORING EXPERIENCE**

### **Direct Reports – Postdoctoral Fellows**

- 2023 – Satpreet Singh, PhD (doctoral advisor: Bingni W Brunton, Rajesh PN Rao, University of Washington), Postdoctoral Fellow, Department of Neurobiology, Harvard Medical School; Role: Advisor
- 2022 – Ryan Badman, PhD (doctoral degree: Physics, Cornell), Postdoctoral Fellow, Department of Neurobiology, Harvard Medical School,; Role: Advisor
- 2022 – Riley Simmons-Edler, PhD (doctoral advisor: Sebastian Seung, Princeton), Postdoctoral Fellow, Department of Neuroscience, ISMMS; Role: Advisor
- 2021 – Manuel Beiran, PhD (doctoral advisor: Srdjan Ostojic, EPFL), Postdoctoral Fellow, Department of Neuroscience, ISMMS & Zuckerman Institute, Columbia University; Subject: Linking structural and functional connectomics using data-constrained recurrent neural network models with sparsity constraints; Role: Co-Advisor

### **Postdoctoral Alumni with Independent Positions**

- 2020 – 2022 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  
*Research Engineer at Meta AI*
- 2020 – 2022 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  
*Vice President of Technology, Machine Learning at Vektor Medical*
- 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  
*Assistant Professor, joint appointment with University of Montreal & Mila-Quebec AI*

## **Direct Reports – Graduate Students**

- 2019 – Siyan Zhou, PhD Student at Harvard University; Subject: Multi-region neural network models of flexible rule-based decision making; Role: Doctoral advisor, co-advised with Chris Harvey, Graduates: January 2024
- 2018 – 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*
- 2018 – 2023 Camille Spencer-Salmon, MD/PhD Student, ISMMS; Subject: Dynamical foundations of task-related computations in multitask learning paradigms; Role: Doctoral advisor, Graduated: May 2023  
*Next position: Postdoc, Kafui Dzirasa, Duke University School of Medicine*
- 2018 – 2023 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, Graduated: May 2023

## **Thesis Committees**

- Diego Aldarondo, PhD Candidate, Harvard, Advisor: Bence Olveczky
- Trang Anh Nghiem, PhD, École normale supérieure, Advisor: Rava Azeredo da Silveira.  
*Awarded doctorate with distinction in 2022*
- Fred Kwon, MD/PhD, ISMMS, *graduated with distinction*
- Taylor Pullinger, PhD candidate, ISMMS, Advisor: Eric Sobie
- Kaustubh Kulkarni, MD/PhD candidate, ISMMS, Advisor: Xiaosi Gu, *Graduated*
- Joseph Simon IV, PhD candidate, ISMMS, Advisor: Erin Rich
- Randy Ellis, PhD candidate, ISMMS, Advisor: Yasmin Hurd, *Graduated*
- Kanha Batra, PhD candidate, UCSD and Salk Institute, Advisor: Kay Tye
- Jennifer Megan Fredericks, PhD, ISMMS, Advisor: Peter Rudebeck, *Graduated*

## **TEACHING EXPERIENCE**

- 2022 Workshop Lecturer, Computational and Systems Neuroscience (COSYNE) meeting
- 2022 Tutorial Chair, Computational and Systems Neuroscience (COSYNE) meeting
- 2021 Lecturer, CNeuro, Theoretical and Computational Neuroscience Summer School, August 14-21
- 2021 – Lecturer, Dynamic Brain School, Summer Island, Allen Institute & University of Washington
- 2021 Tutorial on Recurrent Neural Network Models for Neuroscience, Computational and Systems Neuroscience (COSYNE) meeting, February 23
- 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, December 2
- 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**

**Broadcast**

2023 Guest expert, Doctor Radio, SiriusXM (Channel 110), October 31

**Print & Digital**

2023 “Is the brain uncontrollable, like the weather?” *The Transmitter*, December 18  
“Building Models of the Brain to Take Them Apart,” *Harvard Medicine News*, December 5  
“Peeking inside the black box with recurrent neural networks,” *Sainsbury Wellcome Centre*, September 26  
“Computational neuroscientist Kanaka Rajan, leader in using AI and machine learning to study the brain, to join Harvard Medical School faculty and serve as a founding faculty member at the Kempner Institute.” *Kempner Institute*, September 5  
“Kanaka Rajan to join Medical School faculty, will serve as founding faculty member within the Kempner Institute.” *Harvard Gazette*, September 5  
“In AI, is bigger always better?” *Nature Magazine*, March 8  
“Bridging neurobiology and artificial intelligence with Kanaka Rajan,” *Neuro Central*, March 7  
“Sleep helps AI models learn new things without forgetting old ones,” *Science News Explores*, February 22  
2022 “Profiles of Women in Machine Learning: Kanaka Rajan,” *Women in Machine Learning, WiML*, December 12  
“The Tale of Two Intelligence Fields: AI and Neuroscience,” *Federation of European Neuroscience Societies*, August 7  
“2022 McKnight Scholar Awards,” *McKnight Foundation*, Press release, July 7  
“Artificial Intelligence is Giving Way to New Tools for Neuroscience Research,” *News Medical*, July 7  
“Computational Neuroscientist Opens Doors for New Ideas and Talent to Thrive.” *Mount Sinai Blog*, June 23  
“The Science Life: Kanaka Rajan,” *Columbia University Zuckerman Institute*, June 16  
“How to Successfully Collaborate with a Computational Neuroscientist,” *Hello Bio*, March 14

- 2021 ["Crain's Q&A: Health care affordability is tied to accessibility, PAGNY chief says,"](#) *Crain's Health Pulse New York*, Newsletter, November 19
- ["Allen Institute Appoints Mount Sinai Neuroscientist as a Next Generation Leader,"](#) *Mount Sinai Health System*, Press release, November 16
- ["To Be Energy-Efficient. Brains Predict Their Perceptions,"](#) *Quanta Magazine*, November 11
- ["Allen Institute announces 2021 Next Generation Leaders,"](#) *Allen Institute*, Press release, November 8
- ["Rebuilding the Brain from AI 'Legos' with Kanaka Rajan,"](#) *TWIML AI*, October 12
- ["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
- ["Tracking Information Across the Brain,"](#) *Simons Foundation*, May 28
- ["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
- ["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**

- 2023 ["Neuroscience and AI: On the limits of biology with Kanaka Rajan,"](#) *FENS Cast, Federation of European Neuroscience Societies (FENS)*, June 11
- 2022 ["Dr. Kanaka Rajan: Computational Neuroscience,"](#) *RadioBio*, July 21
- 2021 ["Dr. Kanaka Rajan on Modularity of the Brain, Neural Dynamical Motifs, and Learning 'True Grit',"](#) *Stories of Women in Neuroscience (WiN)*, November 3
- ["Modeling Human Cognition with RNNs and Curriculum Learning with Kanaka Rajan,"](#) *This Week in Machine Learning and Artificial Intelligence (TWIML)*, October 4
- ["BI NMA 02: Dynamical Systems Panel"](#) *Brain Inspired*, July 15
- ["Dr. Kanaka Rajan, Computational Neuroscientist & Assistant Professor at Mt Sinai,"](#) *Lady Scientist Podcast*, July 7
- ["BI 100.1 Special: What Has Improved Your Career or Well-being?"](#) *Brain Inspired*, March 10
- ["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
- ["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**

### **Faculty Search Committees**

Kempner Institute Graduate Fellowship Selection Committee, Harvard Medical School, 2024  
Chair, Computational Neuroscience Tenure-Track Faculty Search, ISMMS, 2022  
Member of Search Committee, Computational Psychiatry Center, ISMMS, 2021

### **Diversity, Inclusion, Equity, and Belonging**

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

### **Grant Review**

Virtual Observatory of the Cortex (VORTEX), National Institutes of Health  
NIH/BRAIN Initiative: Targeted BRAIN Circuits Projects, National Institutes of Health  
EFRI BRAID Panel, National Institutes of Health  
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–present  
American Physical Society, 2002–present  
Society for Neuroscience, 2005–present  
Organization for Computational Neuroscience, 2002–2010

## **CONFERENCE ACTIVITY**

### **Selected Talks (showing only 2010 onwards)**

2023

**Meet-the-Expert**, Society for Neuroscience, November 12

**SfNova Lecture**, Society for Neuroscience, November 11-15

**Plenary Lecture** – Bernstein Network Computational Neuroscience Conference, September 26-29

Neural Systems Analysis Lab, Virtual Seminar, April 20

Virtual Seminar Series, Sainsbury Wellcome Centre at the University College London, March 30

Computational and Systems Neuroscience (COSYNE) Workshop, March 14

Computational and Systems Neuroscience (COSYNE) Workshop, March 13

Functional Logic of Neural Circuits: Diamonds in the Rough, National Science Foundation, February 22-24

Non-Human Primate Research Consortium Workshop (NHPNC), Flatiron Institute, February 13-14

Physics Modeling of Thought, Max Planck Institute in Berlin, January 10

2022 Harvard Medical School and School of Engineering and Applied Sciences Kempner Institute Seminar, Harvard University, December 9

Society for Neuroscience Dual Perspectives Panel, Population or Single Cell Coding: What is the Language of the Brain, November 14

Center for Theoretical Neuroscience, Columbia University, November 11

Optogenetic Approaches to Understanding Neural Circuits and Behavior, Gordon Research Conference, July 18

Brain Debate, Federation of European Neuroscience Societies, July 9

Institute of Neuroinformatics Seminar, University of Zurich, May 6

**Keynote** – Neural Computation and Engineering Connection, University of Washington, Shanahan Foundation, and Allen Institute, May 6

Mount Sinai Morningside-West Hospital Psychiatry Grand Rounds, April 20

Computational and Systems Neuroscience (COSYNE) Workshop, March 22

Computational and Systems Neuroscience (COSYNE) Workshop, March 21

Allen Institute for Neural Dynamics (AIND) Planning Workshop on Neurotheory, Allen Institute, February 8

9th Annual Gulf Coast Consortium (GCC) Theoretical and Computational Neuroscience Conference, Gulf Coast Consortia, February 4

UCSF Neuroscience Formal Seminar, University of California, San Francisco, January 27

2021 FMI Young Investigator Seminar Series, Friedrich Miescher Institute for Biomedical Research, December 10

Advances in Systems & Computational Neuroscience Symposium, Center for Systems Neuroscience, Boston University, October 5

**Keynote** – Towards Multipurpose Neural Network Models II: Model Testing and Model Fitting Workshop, Allen Brain Institute & European Institute for Theoretical Neuroscience (EITN), October 10

eLife Symposium on Computational and Systems Biology, September 9

Max Planck Institute for Brain Research, August 24

Kavli Institute for Systems Neuroscience, June 3

*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 Talk, NYU, March 12

Center for Computational Brain Science (CCBS) Seminar, Brown University, March 8

Brain and Behavior Foundation. Meet the Scientist Talk, February 9

2020 University of Bristol Computational Neuroscience Seminar, December 4

SciViz NYC Invited Speaker, December 2

World Wide Theoretical Neuroscience Meeting Talk, November 18

Invited Speaker. Human Single Neuron conference, Caltech, November 13

BRAINCoGs Special Seminar, Princeton University, October 7

BRAIN Initiative PI Meeting Highlight Talk, June 1

Neuromatch Unconference Invited Talk, April 17

Neurotheory.world Talk, April 8

8th Annual Virtual Conference, Brain Function: In Health & Disease; NIH, March 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 Research Campus Talk, June 9-10
- 2013 Generating slow timing signals from fast neural and synaptic biophysics, Temporal Dynamics conference, Janelia 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

**Workshops and Symposia Organized (showing only 2010 onwards)**

- 2021 Tutorial on Recurrent Neural Networks for Neuroscience. Computational and Systems Neuroscience (COSYNE) virtual meeting, February 23.  
<https://www.youtube.com/watch?v=dJHn1mPsg3A>
- 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 (showing only 2010 onwards)**

- 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 79<sup>th</sup> 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  
20<sup>th</sup> Annual Dynamical Neuroscience Satellite Symposium, Preceding the 42<sup>nd</sup> 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)**

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