Curriculum Vitae
Aaditya V. Rangan

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- **Academic Affiliations and Professional Experience**
  - 2012-present: Courant Institute, NYU. Associate Professor
  - 2006-2012: Courant Institute, NYU. Assistant Professor
  - 2003-2006: Courant Institute, NYU. Postdoctoral Student
  - 1999-2003: University of California, Berkeley. Graduate Student

- **Education**
  - 2003: Ph.D. in Mathematics, University of California, Berkeley.
  - 1999: B.A. in Mathematics and Physics, Dartmouth College.

- **Research Interests**
  - Large-scale scientific modeling of physical, biological and neurobiological phenomena, and the development of efficient numerical methods and related analysis.
  - Large-scale analysis of genomic data, and the development of efficient methods for this analysis.
  - Computational tools for analyzing cryo-electron microscopy (Cryo-EM) data.

- **Grants and Awards:**
  - NIH grant U19 AG023122, $405,085, 2018-2023
  - NSF-NIH seed grant 24-74501-X0096-R9834: $24,696, 2016-2017.
  - NSF grant F7163: $355,580, 2012-2015.
  - NSF grant F6532: $270,000, 2009-2012.
  - Swartz Foundation: $54,000, 2006-2007.

- **Professional Associations**
  - 2018-present: Schork Lab, TGen, Affiliated Researcher
  - 2016-present: Flatiron Institute Center for Computational Mathematics, Consultant
  - 2015-present: NCBI dbGaP, Member
  - 2013-present: Psychiatric Genomics Consortium (PGC), Member

- **Professional Activities**
  - Advised Postdoctoral fellows Y. Sun, D. Zhou, D. Hu and J. Zhang
  - Advised Ph.D. thesis research of M. Patel (M.D. Ph.D. Student) and Zhongyi Wang.
  - Advised master's thesis research of Arjang Talattof, Brenda Jiminez, Rachid Ounit, Zuo Xi, Andrew Ronan, Sijing Shao, Quentin Chediak, Haosheng Zhao and Shreya Thirumalai.
  - Reviewer for various academic journals.
  - Grant Reviewer for DOE, NSF and NIH.

- **Publications**

- A.V. Rangan, W.S. Tang, P. Cossio, K. Zhang, N. Grigorieff. Estimating the tails of the spectrum of the Hessian of the log-likelihood for *ab-initio* single-particle reconstruction in electron cryomicroscopy. https://arxiv.org/abs/2411.13263. (2024).
- W.S. Tang, J. Soules, A.V. Rangan, P. Cossio. CryoLike: A python package for Cryo-EM image-to-structure likelihood calculations. Acta Cryst. D. (under review). https://doi.org/10.1101/2024.10.18.619077. (2024).
- K. Zhang, P. Cossio, A.V. Rangan, B.A. Lucas, N. Grigorieff. *New Statistical Metric for Robust Target Detection in Cryo-EM*. International Union of Crystallography (IUCr) J. (under review). https://doi.org/10.1101/2024.10.01.616095. (2024).
- C. McGrouther, A.V. Rangan, A. Di Florio, J.A. Elman, N.J. Schork, J. Kelsoe, the Bipolar Disorder Working Group of the Psychiatric Genomics Consortium. *Heterogeneity analysis provides evidence for a genetically homogeneous subtype of bipolar-disorder*. PLoS Comput. Bio. accepted and in press. https://arxiv.org/abs/2405.00159 (2024).
- K.S. O'Connell, M. Koromina, T. van der Veen, T. Boltz, F.S. David, J. Mei Kay Yang, K.H. Lin, X. Wang, J.R.I. Coleman, B.L. Mitchell, C. McGrouther, A.V. Rangan, P.A. Lind, E. Koch, A. Harder, N. Parker, J. Bendl, et al. *Genomics yields biological and phenotypic insights into bipolar disorder*. Nature. accepted and in press (2024).
- J.A. Elman, N.J. Schork, A.V. Rangan, the Alzheimer's Disease Neuroimaging Initiative. *Exploring the genetic heterogeneity of Alzheimer's disease: Evidence for genetic subtypes*. Journal of Alzheimer's Disease. accepted and in press. medRxiv 2023.05.02.23289347; doi: https://doi.org/10.1101/2023.05.02.23289347. (2024).
- H. Zhou, W. Lin, S.R. Labra, S.A. Lipton, J.A. Elman, N.J. Schork, A.V. Rangan. *Detecting Boolean Asymmetric Relationships with a Loop Counting Technique and its Implications for Analyzing Heterogeneity within Gene Expression Datasets*. IEEE/ACM Transactions on Computational Biology and Bioinformatics. accepted and in press. bioRxiv 2022.08.04.502792; doi: https://doi.org/10.1101/2022.08.04.502792. (2023).
- A.V. Rangan, L. Greengard. *Robust ab initio solution of the cryo-EM reconstruction problem at low resolution with small data sets*. J. Structural Biology. 215(3): 107994. (2023).
- A.V. Rangan, C. McGrouther, N. Bhadra, S. Venn-Watson, E.D. Jensen, N.S. Schork. *A time-series analysis of blood-based biomarkers within a 25-year longitudinal dolphin cohort*. PLoS Comput. Bio. 19(2): 10.1371/journal.pcbi.1010890. (2023).
- A.P. Chan, Y. Choi, A.V. Rangan, G. Zhang, A. Podder, M. Berens, S. Sharma, P. Pirrotte, S. Byron, D. Duggan, N.J. Schork. *Interrogating the Human Diplome: Computational Methods, Emerging Applications, and Challenges*. Methods Mol Biol. 2023;2590:1-30. doi: 10.1007/978-1-0716-2819-5_1. PMID: 36335489. (2022).
- A.V. Rangan., *Radial recombination for rigid rotational alignment of images and volumes*. Inverse Problems. 39(1): 10.1088/1361-6420/aca047. (2022).
- H. Tuckman, J. Kim, A.V. Rangan, H. Lei, M. Patel. *Dynamics of sensory integration of olfactory and mechanical stimuli within the response patterns of moth antennal lobe neurons*. J. Theoretical Biology. 509(21): 110510. (2021).
- M. Patel and A.V. Rangan. *Olfactory encoding within the insect antennal lobe: The emergence and role of higher order temporal correlations in the dynamics of antennal lobe spiking activity*. J. Theoretical Biology. Aug 7;522:110700. doi: 10.1016/j.jtbi.2021.110700. Epub 2021 Apr 2. (2021).
- L.S. Young, L. Tao, M. Shelley, R. Shapley, A.V. Rangan and D.W. McLaughlin. *The evolution of large-scale modeling of monkey primary visual cortex, V1: Steps towards understanding cortical function*. Commun. Math. Sci. 17(5): 1387-1406. (2019).
- A.V. Rangan, M. Spivak, J. Anden and A. Barnett, *Factorization of the translation kernel for fast rigid image alignment*. Inverse Problems. http://iopscience.iop.org/10.1088/1361-6420/ab4e66 (2019).

- J.W. Zhang, Y.X. Shao, A.V. Rangan, L. Tao, A coarse-graining framework for spiking neuronal networks: from strongly-coupled conductance-based integrate-and-fire neurons to augmented systems of ODEs. J. Comput. Neurosci. 46(2): 211-232. (2019).
- A.V. Rangan, C.C. McGrouther, J. Kelsoe, N. Schork, E. Stahl, Q. Zhu, A. Krishnan, V. Yao, O. Troyanskaya, S. Bilaloglu, P. Raghavan, S. Bergen, A. Jureus, M. Landen and the Bipolar Disorders Working Group of the Psychiatric Genomics Consortium, *A loop-counting method for covariate-corrected low-rank biclustering of gene-expression and genome-wide association study data*. PLoS Computational Biology. https://doi.org/10.1371/journal.pcbi.1006105 (2018).
- M. Patel, A.V. Rangan, *Role of the locus coeruleus in the emergence of power law wake bouts in a model of the brainstem sleep-wake system through early infancy*. J. Theoretical Biology. 426(7): 82-95 (2017).
- H. Lei, Y. Yu, S. Zhu, A.V. Rangan, *Intrinsic and network mechanisms constrain neural synchrony in the moth antennal lobe*. Frontiers in Physiology, doi: 10.3389/fphys.2016.00080 (2016).
- J. Zhang, A.V. Rangan, *A reduction for spiking integrate-and-fire network dynamics ranging from homogeneity to synchrony*. J. Comput. Neurosci. 38(2):355-404. doi: 10.1007/s10827-014-0543-3 (2015).
- J. Zhang, D. Zhou, D. Cai and A.V. Rangan, *A coarse-grained framework for spiking neuronal networks: between homogeneity and synchrony*. J. Comput. Neurosci. DOI 10.1007/s10827-013-0488-y (2013).
- A.V. Rangan, L.S. Young. *Emergent dynamics in a model of visual cortex.,* J. Comput. Neurosci. 35(2): 155-167 DOI: 10.1007/s10827-013-0445-9 (2013).
- D. Zhou, A.V. Rangan, D.W. McLaughlin and D. Cai, Spatiotemporal dynamics of neuronal population response in the primary visual cortex. Proc. Nat. Acad. Sci. (USA). 110(23): 9517-9522 (2013)
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- D. Cai, A.V. Rangan and D. McLaughlin, *Architectural and synaptic mechanisms underlying coherent spontaneous activity in V1*, Proc. Natl. Acad. Sci. (USA), 102**,** 5868 (2005).
- A.V. Rangan, *Adaptive solvers for partial differential and differential-algebraic equations*, Ph.D. Thesis (2003).