NARAYANAN 'BOBBY' KASTHURI
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EDUCATION

M.D. Washington University School of Medicine, St. Louis, MO - 2005.
D.Phil., Oxford University, Oxford, England – 2002.
B.S. Princeton University, Princeton, NJ - 1996.

PROFESSIONAL EXPERIENCE

Neuroscientist, Argonne National Labs (August 2015-present)
Assistant Professor (*part time*), Department of Neurobiology, University of Chicago, Chicago, IL (September 2018-present)
Assistant Professor (*part time*), Department of Neurobiology, University of Chicago, Chicago, IL (September 2015-2018)
Assistant Professor, Department of Anatomy and Neurobiology, Boston University School of Medicine, Boston, MA (2014 – 2015)
Manager of the Connectomics Project, Jeff Lichtman Lab, Harvard University, Cambridge, MA (2009 – 2014)
Postdoctoral Fellow, Connectomics, Jeff Lichtman Lab, Harvard University, Cambridge, MA (2006 – 2009)

HONORS AND AWARDS

Rhodes Scholar - 1998.
Phi Beta Kappa - 1996.
Salutatorian - 1992.
National merit scholar - 1992.
Presidential scholar - 1992.

PROFESSIONAL ACTIVITIES

Rhodes scholar selection committee (New England Region) (2005 – 2010)
French-American Young Leader (and member of selection committee) (2010 – present)
Society for Neuroscience (2003 – present)

PUBLICATIONS

1. (2000)Pike FG, Goddard RS, Suckling JM, Ganter P, Kasthuri N, Paulsen O. *Distinct frequency preferences of different types of rat hippocampal neurones in response to oscillatory input currents*. **Journal of Physiology**;529 Pt 1:205-13. PubMed PMID: 11080262; PubMed Central PMCID: PMC2270176.
2. (2002) Grutzendler J, Kasthuri N, Gan WB. *Long-term dendritic spine stability in the adult cortex*. **Nature**;420(6917):812-6. doi: 10.1038/nature01276. PubMed PMID: 12490949.
3. (2002) Kettunen P, Demas J, Lohmann C, Kasthuri N, Gong Y, Wong RO, Gan WB. *Imaging calcium dynamics in the nervous system by means of ballistic delivery of indicators*. **Journal of Neuroscience Methods**;119(1):37-43. PubMed PMID: 12234633.
4. (2003) Kasthuri N, Lichtman JW. *The role of neuronal identity in synaptic competition*. **Nature**;424(6947):426-30. doi: 10.1038/nature01836. PubMed PMID: 12879070.

5. (2004) Kasthuri N, Lichtman JW. *Structural dynamics of synapses in living animals*. **Current Opinion in Neurobiology**;14(1):105-11. doi: 10.1016/j.conb.2004.01.013. PubMed PMID: 15018945.
6. (2007) Kasthuri N, Lichtman JW. *The rise of the 'projectome'*. **Nature Methods**;4(4):307-8. doi: 10.1038/nmeth0407-307. PubMed PMID: 17396125.
7. (2009) Kasthuri N, Lichtman JW. *Neurocartography*. **Neuropsychopharmacology**. 2010;35(1):342-3. doi: 10.1038/npp. 138. PubMed PMID: 20010709; PubMed Central PMCID: PMC2849285.
8. (2011) Fox MA, Tapia JC, Kasthuri N, Lichtman JW. *Delayed synapse elimination in mouse levator palpebrae superioris muscle.* **The Journal of Comparative Neurology**;519(15):2907-21. doi: 10.1002/cne.22700. PubMed PMID: 21681746; PubMed Central PMCID: PMC3268260.
9. (2012) Glenn DR, Zhang H, Kasthuri N, Schalek R, Lo PK, Trifonov AS, Park H, Lichtman JW, Walsworth RL. *Correlative light and electron microscopy using cathodoluminescence from nanoparticles with distinguishable colours.* **Scientific Reports**;2:865. doi: 10.1038/srep00865. PubMed PMID: 23155483; PubMed Central PMCID: PMC3498735.
10. (2012) Tapia JC, Kasthuri N, Hayworth KJ, Schalek R, Lichtman JW, Smith SJ, Buchanan J. *High-contrast en bloc staining of neuronal tissue for field emission scanning electron microscopy.* **Nature Protocols**;7(2):193-206. doi: 10.1038/nprot.2011.439. PubMed PMID: 22240582; PubMed Central PMCID: PMC3701260.
11. (2012) Tapia JC, Wylie JD, Kasthuri N, Hayworth KJ, Schalek R, Berger DR, Guatimosim C, Seung HS, Lichtman JW. *Pervasive synaptic branch removal in the mammalian neuromuscular system at birth.* **Neuron** Jun 7;74(5):816-29. doi: 10.1016/j.neuron.2012.04.017.
12. (2013) Beyer J, Al-Awami A, Kasthuri N, Lichtman JW, Pfister H, Hadwiger M. *ConnectomeExplorer: query-guided visual analysis of large volumetric neuroscience data.* **IEEE transactions on visualization and computer graphics**;19(12):2868-77. doi: 10.1109/TVCG.2013.142. PubMed PMID: 24051854; PubMed Central PMCID: PMC4296725.
13. (2013) Beyer J, Hadwiger M, Al-Awami A, Jeong WK, Kasthuri N, Lichtman JW, Pfister H. *Exploring the connectome: petascale volume visualization of microscopy data streams.* **IEEE computer graphics and application**;33(4):50-61. doi: 10.1109/MCG.2013.55. PubMed PMID: 24808059; PubMed Central PMCID: PMC4296712.
14. (2013) Burns R, Roncal WG, Kleissas D, Lillaney K, Manavalan P, Perlman E, Berger DR, Bock DD, Chung K, Grosenick L, Kasthuri N, Weiler NC, Deisseroth K, Kazhdan M, Lichtman J, Reid RC, Smith SJ, Szalay AS, Vogelstein JT, Vogelstein RJ. *The Open Connectome Project Data Cluster: Scalable Analysis and Vision for High-Throughput Neuroscience.* **Scientific and statistical database management : International Conference, SSDBM : proceedings International Conference on Scientific and Statistical Database Management.** doi: 10.1145/2484838.2484870. PubMed PMID: 24401992; PubMed Central PMCID: PMC3881956.
15. (2013) Terasaki M, Shemesh T, Kasthuri N, Klemm RW, Schalek R, Hayworth KJ, Hand AR, Yankova M, Huber G, Lichtman JW, Rapoport TA, Kozlov MM. *Stacked endoplasmic reticulum sheets are connected by helicoidal membrane motifs.* **Cell**;154(2):285-96. doi: 10.1016/j.cell.2013.06.031. PubMed PMID: 23870120; PubMed Central PMCID: PMC3767119.
16. (2014) Tomassy GS, Berger DR, Chen HH, Kasthuri N, Hayworth KJ, Vercelli A, Seung HS, Lichtman JW, Arlotta P. *Distinct profiles of myelin distribution along single axons of pyramidal neurons in the neocortex.* **Science**; 344(6181):319-24. doi: 10.1126/science.1249766. PubMed PMID: 24744380; PubMed Central PMCID: PMC4122120.
17. (2014) Al-Awami A, Beyer J, Strobelt H, Kasthuri N, Lichtman JW, Pfister H, Hadwiger M. *NeuroLines: A Subway Map Metaphor for Visualizing Nanoscale Neuronal Connectivity*. **IEEE Transactions on Visualization and Computer Graphics**; 20(12):2369-2378.
18. (2014) Haehn D, Knowles-Barley S, Roberts M, Beyer J, Kasthuri N, Lichtman JW, Pfister H. *Design and Evaluation of Interactive Proofreading Tools for Connectomics*. **IEEE Transactions on Visualization and Computer Graphics**;20:12(2466-2475)
19. (2015) Kaynig V, Vazquez-Reina A, Knowles-Barley S, Roberts M, Jones TR, Kasthuri N, Miller E, Lichtman J, Pfister H. *Large-scale automatic reconstruction of neuronal processes from electron microscopy images.* **Medical Image Analysis.**;22(1):77-88. doi: 10.1016/j.media.2015.02.001.
20. (2015) Kasthuri N, Hayworth K, Berger D, Schalek R, Conchello J, Knowles-Barley S, Lee D, Vazquez-Reina A, Kaynig V, Jones T, Roberts M, Morgan J, Tapia J, Seung H, Roncal W, Vogelstein J, Burns R, Sussman D, Priebe C, Pfister H, and Lichtman J. *Saturated reconstruction of a volume of neocortex.* **Cell**;162(3):648-61. doi: 10.1016/j.cell.2015.06.054

21. (2016) Bouchard K, Aimone J, ChunM , Dean T, Denker M, Diesmann M, Donofrio D, Frank K, Kasthuri N, Koch C, Ruebel O, Simon H, Sommer F, and Prabhat. *High-Performance Computing in Neuroscience for Data-Driven Discovery, Integration, and Dissemination.* **Neuron**. http://dx.doi.org/10.1016/j.neuron.2016.10.035.
22. (2017) Ocola LE, Sampathkumar V, Kasthuri N, Winarski RP. *Contrast enhancement of biological nanoporous materials with zinc oxide infiltration for electron and X-ray nanoscale microscopy.* **Sci Rep**. 2017 Jul 19;7(1):5879. doi: 10.1038/s41598-017-05690-6.
23. (2017) Dyer E, Roncal W, Prasad J, Fernandes H, Gursoy D, Xiao X, DeAndrade V, Fezza K, Vogelstein J, Jacobsen C, Kording K and Kasthuri N. *Quantifying mesoscale neuroanatomy using X-ray tomography* **E-Neuro** 2017 Sep-Oct; 4(5), doi: 10.1523/ENEURO.0195-17.2017
24. (2017) Yang X, DeAndrade V, Scullin W, Dyer E, Kasthuri N, De Carlo F, and Gursoy D. *Low-dose x-ray tomography through a deep convolutional neural network.* **Sci Rep**. 2018 Feb 7;8(1):2575. doi: 10.1038/s41598-018-19426-7
25. (2018) Shahbazi A, Kinnison J, Vescovi R, Du M, Hill R, Joesch M, Takeno M, Zeng H, da Costa NM, Grutzendler J, Kasthuri N, Scheirer WJ. *Flexible Learning-Free Segmentation and Reconstruction of Neural Volumes.* Sci Rep. 2018 Nov 29;8(1):17585. doi: 10.1038/s41598-018-36220-7.
26. KE Bouchard, J Aimone, M Chun, T Dean, M Diesmann, DD Donofrio, LM Frank, N Kasthuri, C Koch, O Rübel, HD Simon, FT Sommer. I*nternational Neuroscience Initiatives through the Lens of High-Performance Computing.* IEEE Computer Society. 2018 April; 51(4):50-59. doi: 10.1109/MC.2018.2141039. (part-time UChicago faculty collab)
27. (2019) KC P, De Andrade V, Kasthuri N, Suuronen JP. *Convolutional neural network based super resolution for brain cell mapping*. **Bulletin of the American Physical Society** 2019 Mar 4. (report)

MENTORING

1. Dong Il Lee, Masters student, sample prep for electron microscopy (2011 – 2015)
2. Whan Lee, Undergraduate, astrocyte and vascular reconstructions (2012 –2014)
3. Kathy Ran, Undergraduate, tracing and neuronal morphology analyses (2012)
4. Opeyemi Alabi, Undergraduate, tracing and neuronal morphology analyses (2011)
5. Hanyu Li, graduate student, Machine learning applications in neuroscience (2016-present).
6. Ming Du*,Graduate student, Mathematical modeling of x-ray interactions with brains, (2015-present)
7. Rafael Vescovi*, Graduate Student, Multiple FOV X-ray micro-tomography for large volume brain imaging (2016-present).
8. Haruo Mizutani, Post-Doctoral Fellow, Combining X-ray and electron microscopy (2016-present).
9. Eva Dyer*, Post-Doctoral Fellow, Automated segmentation of X-ray datasets of brains (2015-present).
10. Tal Heilpern*, Post-Doctoral Fellow, New optical approaches to imaging the brain (2016-present).
11. Vandana Sampathkumar, Post-Doctoral Fellow, Synaptic reconstructions of the enteric nervous system (2016-present).
12. Gregg Wildenbergg, Staff Scientist, Synaptic reconstructions of the newly born neurons (2016-present).
13. Shuichi Shigeno, Staff Scientist, Synaptic reconstructions of the basal ganglia in mammals and octopus (2017-present).
14. Yuqing Zhu, rotating graduate student, Comparison of primate and mouse viual cortex (2017-present).

* jointly mentored

TALKS/SYMPOSIA/COLLOQUIA

1. The Dialog Conference, Invited participant (March, 2017).
2. Global Brain Initiatives, Rockefeller University, Sept. 19th, 2016
3. Google Science Fest “Sci-Foo”, July, 2016.
4. Presentation to the United Nations on Global Brain Projects, Invited Participant, (Sep. 2016)
5. “Exascale computing and the Brain Mapping” Invited speaker, House of Representatives, (April, 2016).
6. NSF/Kaveli meeting on Global Brain Initiatives, Invited Speaker, (March, 2016).
7. Janelia Farms Meeting on Connectomics, Invited participant (declined)
8. “Towards complete maps of brains with synchrotron source X-ray microscopy and Automated Serial Electron Microscopy” Keynote speaker: Center for Nanoscale Materials User Meeting, Argonne National Laboratory (May 2016).
9. “Towards complete maps of brains with synchrotron source X-ray microscopy and Automated Serial Electron Microscopy” Fermi Labs, Illinois (Feb., 2016).
10. “Towards complete maps of brains with synchrotron source X-ray microscopy and Automated Serial Electron Microscopy” Argonne Physics Colloquium, Argonne National Lab (Dec., 2015).
11. Briefing Congressmen Chakka Fattah on Brain Mapping @ Argonne (Oct. 2015)
12. “MBL U Chicago Planning Talks”, Marine Biological Labs (Sep., 2015)
13. “Tales from the trenches of connectomics”, University of Iowa, IL (Sep. 2015)
14. “Limits of Brain Reconstructions“ NSF Symposium on Physical Limits of Brain Technologies (2014).
15. “Tales from the trenches of connectomics”, Max Planck / HHMI Connectomics Conference, Berlin, Germany (2014)
16. Invited talk, Visual Computing Center Summit Annual Conference, King Abdullah University, Saudi Arabia (Declined) (2014)
17. ‘Connectomics’, FENS (The Federation of European Neuroscience Societies), Barcelona, Spain (2012)
18. “Tales from the trenches of connectomics”, Northwestern University, IL (2014)
19. “Tales from the trenches of connectomics”, The University of Chicago, IL (2014)
20. “Tales from the trenches of connectomics” Argonne National Laboratory (2014)
21. “Big Data Connectomes” Google, Inc., CA (2014)
22. “ATUM: Another Way to Do Connectomics” Max Planck Munich and Max Planck Heidelberg, Germany (2014)
23. “Tales from the Trenches of Connectomics”. Pfizer, Inc., NY (2014)
24. “Physical Limits of Connectomics”, Physical, Engineering and Biological Limits to Brain Measurements Workshop, NSF, VA (2014)
25. ‘Future of Functional Connectomics’ at KIST, Seoul, S. Korea (2013)
26. ‘Connectomics explained’ Korean National Congress, S. Korea (2013)
27. ‘Connectomics’ Physical and Mathematical Principles of Brain Structure and Function, NSF & The Kavli Foundation, VA (2013)
28. ‘Data management for Connectomics’ Open Connectome Project, Johns Hopkins University, MD (2012)
29. ‘Tools for Connectomics’ Zeiss Inc., MA (2012)
30. ‘Large volume serial EM reconstruction of Cortex’, Gatsby Foundation, London, England (2011)

PATENTS

1. U.S. Provisional Application No.: 60/867,487
Entitled: METHODS AND APPARATUS FOR PROVIDING AND PROCESSING SLICED THIN TISSUE
2. U.S. Provisional Application No.: 12/042332
Entitled: MULTI-COLOR NANOSCALE IMAGING BASED ON NANOPARTICLE CATHODOLUMINESCENCE