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Princeton University
Princeton Neuroscience Institute
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DOB: August 27, 1975 (Reading, PA)

POSITIONS

Princeton University

Director, Princeton Neuroscience Institute (2022-)
Karol and Marnie Marcin '96 Professor of Neuroscience (2022-)
Professor, Princeton Neuroscience Institute (2019-)
Professor, Department of Molecular Biology and Princeton Neuroscience Institute (2019)
HHMI Faculty Scholar (2016-2021)
Associate Professor (with tenure), Department of Molecular Biology and Princeton Neuroscience Institute (2016-2019)
Assistant Professor and McDonnell Preceptor in Neuroscience, Department of Molecular Biology and Princeton Neuroscience Institute (2010-2016)

California Institute of Technology

Helen Hay Whitney Postdoctoral Fellow (2005-2009)
Advisor: Gilles Laurent

EDUCATION

Stanford University

Ph.D., Neuroscience, 2004
Thesis: Membrane Trafficking and the *Drosophila* Exocyst Complex
Advisors: Thomas Schwarz and Richard Scheller

Cold Spring Harbor Labs

Summer Course - Imaging Structure and Function in the Nervous System, 2002

Massachusetts Institute of Technology

S.B., Biology, 1997
Undergraduate Thesis: Characterization of Genes Involved in Aging in *S. cerevisiae* (awarded the Asinari prize)
Advisor: Leonard Guarente

PUBLICATIONS

Cowley, BR, Calhoun, AJ, Rangarajan, N, Turner, M, Pillow, JW, and **Murthy, M**. One-to-one mapping between deep network units and real neurons uncovers a visual population code for social behavior. *Nature* 629, 1100–1108, 2024. doi.org/10.1038/s41586-024-07451-8.

Eckstein, N, Bates, AS, Champion, A, Du, M, Yin, Y, Schlegel, P, Lu, A, Rymer, T, Finley-May, S, Paterson, T, Parekh, R, Dorkenwald, S, Matsliah, A, Sterling, AR, Yu, S-C, McKellar, CE, Eichler, K, Costa, M, Seung, HS, **Murthy, M**, Hartenstein, V, Jefferis, GSXE, and Funke, J. Neurotransmitter Classification from Electron Microscopy Images at Synaptic Sites in *Drosophila melanogaster*. *Cell* 187, 2574–2594, May 9, 2024. doi.org/10.1016/j.cell.2024.03.016

Roemschied, FA, Pacheco, DA, Aragon, MJ, Ireland, E, Li, X, Pang, R, Thieringer, K, and **Murthy, M**. Flexible Circuit Mechanisms for Context-Dependent Song Sequencing. *Nature* 622, 794–801 (2023). doi.org/10.1038/s41586-023-06632-1

Pang R, Baker C, **Murthy M**, Pillow J. Inferring neural dynamics of memory during naturalistic social communication. *bioRxiv* 2024 Jan 27:2024.01.26.577404. doi: 10.1101/2024.01.26.577404. PMID: 38328156 *in revision, PNAS*

Baker CA, Guan X-J, Choi M, **Murthy, M**. The role of fruitless in specifying courtship behaviors differs across *Drosophila* species. *Science Advances* 13 Mar 2024. Vol 10, Issue 11. doi: 10.1126/sciadv.adk1273.

Ahmed, OM, Crocker, A, **Murthy, M**. Transcriptional profiling of *Drosophila* male-specific P1 (pC1) neurons. *bioRxiv* 2023 Nov 10:2023.11.07.566045. PMID: 37986870

Dorkenwald, S, Matsliah, A, Sterling, AR, Schlegel, P Yu, S-C, McKellar, CE, Lin, A, Costa, M, Eichler, K, Yin, Y, Silversmith, W, Schneider-Mizell, C, Jordan, CS, Brittain, D, Halageri, A, Kuehner, K, Ogedengbe, O, Morey, R, Gager, J, Kruk, K, Perlman, E, Yang, R, Deutsch, D, Bland, D, Sorek, M, Lu, R, Macrina, T, Lee, K, Bae, JA, Mu, S, Nehoran, B, Mitchell, E, Popovych, S, Wu, J, Jia, Z, Castro, M, Kemnitz, N, Ih, D, Bates, AS, Eckstein, N, Funke, J, Collman, F, Bock, DD, Jefferis, GSXE, Seung, HS*, **Murthy, M***, and the FlyWire Consortium. *co-corresponding authors. Neuronal wiring diagram of an adult brain. *bioRxiv* 2023 10.1101/2023.06.27.546656. *accepted, Nature*

Schlegel, P, Yin, Y, Bates, AS, Dorkenwald,S, Eichler, K, Brooks, P, Han, DS, Gkantia, M, dos Santos, M, Munnely, EJ, Badalamente, G, Capdevila, LS, Sane, VA, Pleijzier, MW, Tamimi, IFM, Dunne, CR, Salgarella, I, Javier, A, Fang, S, Perlman, E, Kazimiers, T, Jagannathan, SR, Matsliah, A, Sterling, AR, Yu, S-C, McKellar, CE, the FlyWire Consortium, Costa, M, Seung, HS, **Murthy, M**, Hartenstein, V, Bock, DD, and Jefferis, GSXE. Whole-brain annotation and multi-connectome cell typing quantifies circuit stereotypy in *Drosophila*. *bioRxiv* 2023 10.1101/2023.06.27.546055. *accepted, Nature*

Lin, A, Yang, R, Dorkenwald, S, Matsliah, A, Sterling, AR, Schlegel, P, Yu, S-C, McKellar, CE, Costa, M, Eichler, K, Bates, AS, Eckstein, N, Funke, J, Jefferis, GSXE, and **Murthy, M**. Network Statistics of the Whole-Brain Connectome of *Drosophila*. *bioRxiv* 2023 10.1101/2023.07.29.551086. *accepted, Nature*

Shiu, PK, Sterne, GR, Spiller, N, Franconville, R, Sandoval, A, Zhou, J, Simha, N, Kang, CH, Yu, S, Kim, J, Dorkenwald, S, Matsliah, A, Sterling, AR, Yu, S-C, McKellar, CE, Schlegel, P, Costa, M, Eichler, K, Jefferis, GSXE, **Murthy, M**, Bates, AS, Eckstein, N, Funke, J, Bidaye, SS, Hampel, S, Seeds, AM, and Scott, K. A leaky integrate-and-fire computational model based on the connectome of the entire adult *Drosophila* brain reveals insights into sensorimotor processing. *bioRxiv* 2023 10.1101/2023.05.02.539144. *accepted, Nature*

Pospisil DA, Aragon MJ, Dorkenwald S, Matsliah A, Sterling AR, Schlegel P, Yu SC, McKellar CE, Costa M, Eichler K, Jefferis GSXE, **Murthy M**, Pillow JW. From connectome to effectome: learning the causal interaction map of the fly brain. *bioRxiv* 2024 Feb 9:2023.10.31.564922. doi: 10.1101/2023.10.31.564922.PMID: 37961285. *accepted, Nature*

Matsliah A, Yu SC, Kruk K, Bland D, Burke A, Gager J, Hebditch J, Silverman B, Willie K, Willie RW, Sorek M, Sterling AR, Kind E, Garner D, Sancer G, Wernet MF, Kim SS, **Murthy M**, Seung HS; FlyWire Consortium. Neuronal "parts list" and wiring diagram for a visual system. *bioRxiv* 2024 Apr 15:2023.10.12.562119. doi: 10.1101/2023.10.12.562119.PMID: 37873160 *accepted, Nature*

Brezovec, LE, Berger, AB, Hao, YA, Lin, A, Ahmed, OM, Pacheco, DA, Thiberge, SY, **Murthy, M***, Clandinin, TR*. *co-corresponding authors. BIFROST: a method for registering diverse imaging datasets. *bioRxiv* 2023 10.1101/2023.06.09.544408. *in revision, PNAS*

Baker, CA, McKellar, C, Pang, R, Nern, A, Dorkenwald, S, Pacheco, D, Eckstein, N, Funke, J, Dickson, BJ, and **Murthy, M.** Neural Network Organization for Courtship Song Feature Detection in *Drosophila*. **Current Biology** 2022 August 8 32 1-17. <https://doi.org/10.1016/j.cub.2022.06.019>

Co-Editor (w/ Tiago Branco), for the Neurobiology of Behavior issue, *Current Opinion in Neurobiology* (April 2022).

Pereira, TD, Tabris, N, Matsliah, A, Turner, D, Li, J, Ravindranath, S, Papadoyannis, ES, Normand, E, Deutsch, D, Wang, ZY, McKenzie-Smith, G, Mitelut, C, Diez Castro, M, D'Uva, J, Kislin, M, Sanes, D, Kocher, SD, Wang, S-H, Falkner, AL, Shaeviz, JW, and **Murthy, M.** SLEAP: A deep learning system for multi-animal pose tracking. **Nature Methods**. 2022 April 4, 19, 486-495. <https://doi.org/10.1038/s41592-022-01426-1>.

Dorkenwald, S, McKellar, C, Macrina, T, Kemnitz, N, Lee, K, Lu, R, Wu, J, Popovych, S, Mitchell, E, Nehoran, B, Jia, Z, Bae, JA, Mu, S, Ih, D, Castro, M, Ogedengbe, O, Halageri, A, Ashwood, Z, Zung, J, Brittain, D, Collman, F, Schneider-Mizell, C, Jordan, C, Silversmith, W, Baker, C, Deutsch, D, Encarnacion-Rivera, L, Kumar, S, Burke, A, Gager, J, Hebditch, J, Koolman, S, Moore, M, Morejohn, S, Silverman, B, Willie, K, Willie, R, Yu, S-C, **Murthy, M***, and Seung, HS*. FlyWire: Online community for whole-brain connectomics. **Nature Methods** 2022 Jan;19(1):119-128. 10.1038/s41592-021-01330-0. Epub 2021 Dec 23. *co-corresponding authors

Clemens, J, and **Murthy, M.** Quadratic and adaptive computations yield an efficient representation of song in *Drosophila* auditory receptor neurons. **bioRxiv** 2021. 10.1101/2021.05.26.445391. *in revision, Nature Communications*

Pacheco, DA, Thiberge, SY, Pnevmatikakis, E, and **Murthy, M.** Auditory Activity is Diverse and Widespread Throughout the Central Brain of *Drosophila*. **Nature Neuroscience**. 2021 Jan;24(1):93-104. doi: 10.1038/s41593-020-00743-y. Epub 2020 Nov 23. PMID: 33230320

Deutsch, D, Pacheco, DA, Encarnacion-Rivera, L, Pereira, T, Fathy, R, Calhoun, A, Ireland, EC, Burke, AT, Dorkenwald, S, McKellar, C, Macrina, T, Lu, R, Lee, K, Kemnitz, N, Ih, D, Castro, M, Halageri, A, Jordan, C, Silversmith, W, Wu, J, Seung, HS, and **Murthy, M.** The Neural Basis for a Persistent Internal State in *Drosophila* Females. **eLife** 2020 elifesciences.org/articles/59502. PMID: 33225998

Pereira, TD, Shaeviz, JW, and **Murthy, M.** Quantifying behavior to understand the brain. **Nature Neuroscience**. 2020 Nov 9, 23, 1537–1549. doi.org/10.1038/s41593-020-00734-z. PMID: 33169033

Ahmed, OM, and **Murthy, M.** Neuroscience: Tantalized Flies Are Primed for Satiety. **Current Biology**. 2019 Nov 4;29(21): R1146-R1148. doi: 10.1016/j.cub.2019.09.029. PMID: 31689404 *Preview*

Calhoun, AJ, Pillow, JW, and **Murthy, M.** Unsupervised identification of the internal states that shape natural behavior. **Nature Neuroscience**. 2019 Nov 25. 22, p. 2040–2049. PMID: 31768056

Baker, CA, Clemens, J and **Murthy, M.** Acoustic Pattern Recognition and Courtship Songs: Insights from Insects. **Annual Review of Neuroscience**. 2019 Jul 8; 42: 129-147. doi: 10.1146/annurev-neuro-080317-061839.

Deutsch, D*, Clemens, J*, Thiberge, SY, Guan, G and **Murthy, M.** Shared Song Detector Neurons in *Drosophila* Male and Female Brains Drive Sex-Specific Behaviors. **Current Biology**. 2019 Oct 7;29(19): 3200-3215.e5. doi: 10.1016/j.cub.2019.08.008. PMID: 37699336 *equal authors

Pereira, T#, Aldarondo, D#, Willmore, L, Kislin, M, Wang, SS, **Murthy, M***, Shaeviz, JW*. Fast animal pose estimation using deep neural networks. **Nature Methods**. vol 16, pages 117–125 (2019). #equal authors, *co-corresponding authors

Clemens, J*, Coen, P*, Roemschied, FA*, Pereira, T, Mazumder, D, Aldarondo, D, Pacheco, D, and **Murthy, M.** Discovery

of a new song mode in *Drosophila* reveals hidden structure in the sensory and neural drivers of behavior. **Current Biology** 28, 1–13, August 6, 2018. doi.org/10.1016/j.cub.2018.06.011 *equal authors

Clemens, J, Ozeri-Engelhard, N, and **Murthy, M**. Fast Intensity Adaptation Enhances the Encoding of Sound in *Drosophila*. **Nature Communications**. 2018 Jan 9;9(1):134. doi: 10.1038/s41467-017-02453-9.

Pereira, TD and **Murthy, M**. To Fight or Not to Fight. **Neuron**. 2017 Aug 30;95(5):986-988. doi: 10.1016/j.neuron.2017.08.029. *Preview*.

Stern DL, Clemens J, Coen P, Calhoun AJ, Hogenesch JB, Arthur BJ, **Murthy M**. Experimental and statistical reevaluation provides no evidence for *Drosophila* courtship song rhythms. **Proc Natl Acad Sci U S A**. 2017 Sep 12; 114(37):9978-9983. doi: 10.1073/pnas.1707471114.

Calhoun, AJ and **Murthy, M**. Quantifying Behavior to Solve Sensorimotor Transformations: Advances from Worms and Flies. **Curr Opin Neurobiol**. 2017 Aug 30; 46:90-98. doi: 10.1016/j.conb.2017.08.006.

Clemens, J and **Murthy, M**. The Use of Computational Modeling to Link Sensory Processing with Behavior in *Drosophila*. From “Decoding neural circuit structure and function” Wernet, M and Celik, A editors. **Springer Books**. 2017. doi: 10.1007/978-3-319-57363-2_9.

Crocker, A, Guan, XJ, Murphy, CT, and **Murthy, M**. Cell Type-Specific Transcriptome Analysis in the *Drosophila* Mushroom Body Reveals Memory-Related Changes in Gene Expression. **Cell Reports**. 2016 May 17;15(7):1580-96. doi: 10.1016/j.celrep.2016.04.046.

Coen, P and **Murthy, M**. Singing on the Fly: Sensorimotor Integration and Acoustic Communication in *Drosophila*. **Curr Opin Neurobiol**. 2016 Feb 10;38:38-45. doi: 10.1016/j.conb.2016.01.013.

Coen, P, Xie, M, Clemens, J, and **Murthy, M**. Sensorimotor transformations underlying variability in song intensity during *Drosophila* courtship. **Neuron**. 2016 Feb 3;89(3):629-44. doi: 10.1016/j.neuron.2015.12.035.

Clemens, J*, Girardin, C*, Coen, P, Guan, XJ, Dickson, BJ, and **Murthy, M**. Connecting neural codes with behavior in the auditory system of *Drosophila*. **Neuron**. 2015 Sep 23;87(6):1332-43. doi: 10.1016/j.neuron.2015.08.014. *equal authors

LaRue, KM, Clemens, J, Berman, G, and **Murthy, M**. Acoustic duetting in *Drosophila virilis* relies on the integration of auditory and tactile signals. **eLife**. 2015 June 5. doi: 10.7554/eLife.07277

Coen, P, Clemens, J, Weinstein, A, Pacheco, D, Deng, Y, and **Murthy, M**. Dynamic sensory cues shape song structure in *Drosophila*. **Nature**. 2014 Mar 13;507(7491):233-7. doi: 10.1038/nature13131.

Sun, XR, Badura, A, Pacheco, DA, Lynch, LA, Schneider, ER, Taylor, MA, Hogue, IB, Enquist, LW, **Murthy, M**, and Wang, S,S-H. Fast GCaMPs for improved tracking of neuronal activity. **Nature Communications**. 2013;4:2170. doi: 10.1038/ncomms3170.

Murthy, M and Turner, G. Whole-cell *in vivo* patch clamp recordings in the *Drosophila* brain. **Cold Spring Harb Protoc**. 2013 Feb 1;2013(2):140-8. doi: 10.1101/pdb.prot071704.

Murthy M, and Turner, G. Dissection of the head cuticle and sheath of living flies for whole-cell patch clamp recordings in the *Drosophila* brain. **Cold Spring Harb Protoc**. 2013 Feb 1;2013(2):134-9. doi: 10.1101/pdb.prot071696.

Arthur, BJ, Sunayama-Morita, T, Coen, P, **Murthy M***, and Stern DL*. Multi-channel acoustic recording and automated analysis of *Drosophila* courtship songs. *BMC Biology*. 2013 Jan 31;11:11. doi: 10.1186/1741-7007-11-11. *co-corresponding authors

Taylor, TD, Pacheco, D, Hergarden, AC, **Murthy, M**, and Anderson, DJ. A neuropeptide circuit that coordinates sperm transfer and copulation duration in *Drosophila*. *Proc Natl Acad Sci U S A*. 2012 Dec 11;109(50):20697-702. doi: 10.1073/pnas.1218246109.

Tootoonian, S, Coen, P, Kawai, R, and **Murthy, M**. Neural representations of courtship song in the *Drosophila* brain. *Journal of Neuroscience*. 2012 Jan 18;32(3):787-98. doi: 10.1523/JNEUROSCI.5104-11.2012.

Murthy, M*, Teodoro, R*, Miller, TP, and Schwarz, TL. Sec5, a member of the exocyst complex, mediates *Drosophila* embryo cellularization. *Development*. 2010 Aug;137(16):2773-83. doi: 10.1242/dev.048330. *equal authors

Murthy, M. Unraveling the auditory system of *Drosophila*. *Curr Opin Neurobiol*. 2010 Jun;20(3):281-7. doi: 10.1016/j.conb.2010.02.016. Review.

Menon, K, Andrews, S, **Murthy, M**, Gavis, E, and Zinn, K. The translational repressors Nanos and Pumilio have divergent effects on presynaptic terminal growth and postsynaptic glutamate receptor subunit composition. *Journal of Neuroscience*. 2009 Apr 29;29(17):5558-72. doi: 10.1523/JNEUROSCI.0520-09.2009.

Murthy, M, Fiete, I, and Laurent, G. Testing odor response stereotypy in the *Drosophila* mushroom body. *Neuron*. 2008 Sep 25;59(6):1009-23. doi: 10.1016/j.neuron.2008.07.040.

Langevin J, Morgan MJ, Sibarita JB, Aresta S, **Murthy M**, Schwarz T, Camonis J, Bellaiche Y. *Drosophila* exocyst components Sec5, Sec6, and Sec15 regulate DE-Cadherin trafficking from recycling endosomes to the plasma membrane. *Developmental Cell*. 2005 Sep;9(3):355-76.

Murthy, M, Ranjan, R, Deneff, N, Higashi, M, Schupbach, T, and Schwarz TL. Sec6 mutations and the *Drosophila* exocyst complex. *Journal of Cell Science*. 2005 Mar 15;118(Pt 6):1139-50.

Murthy, M and Schwarz, TL. The exocyst component sec5 is required for membrane traffic and polarity in the *Drosophila* ovary. *Development*. 2004 Jan 131(02): 377-388.

Murthy, M, Garza, D, Scheller, RH, and Schwarz, TL. Mutations in the exocyst component sec5 disrupt neuronal membrane traffic, but neurotransmitter release persists. *Neuron*. 2003 Feb 6;37(3):433-47.

Chen, YA, Scales, SJ, Duvvuri, V, **Murthy, M**, Patel, SM, Schulman, H, and Scheller, RH. Calcium regulation of exocytosis in PC12 cells. *J Biol Chem*. 2001 Jul 13;276(28):26680-7.

Kennedy, BK, Gotta, M, Sinclair, DA, Mills, K, McNabb, DS, **Murthy, M**, Pak, SM, Laroche, T, Gasser, SM, and Guarente, L. Redistribution of silencing proteins from telomeres to the nucleolus is associated with extension of life span in *S. cerevisiae*. *Cell*. 1997 May 2;89(3):381-91.

AWARDS AND HONORS

Finalist, HHMI Investigator Competition, 2024

Gill Center Transformative Research Award, Indiana University, 2024

Special Lecture, Society for Neuroscience Annual Conference, 2023

Simons Collaboration on the Global Brain (SCGB) Investigator, 2021-

Appointed to NIH BRAIN Initiative Multi-Council Working Group (provides ongoing oversight of the long-term scientific vision of The BRAIN Initiative), 2021-

Featured Inventor (for patent PCT/US19/54723) at 'Celebrating Princeton Innovation', 2019
NIH NINDS Research Program Award, 2019
Attended US Senate reception for the BRAIN Initiative, 2019
Special Lecture, Society for Neuroscience Annual Conference, 2018
Exhibitor at US Capitol BRAIN Fair, 2018
NIH BRAIN Initiative Awards (three as lead PI, and two as co-PI)
HHMI Faculty Scholar, 2016-2021
Schuetze Memorial Lecture, Columbia University, 2016
Princeton University Dean for Research Innovation Award for New Ideas in the Natural Sciences, 2016-2018
NIH New Innovator Award (R01, NINDS), 2014-2019
Attended White House BRAIN Conference, 2014
NSF BRAIN Initiative EAGER Award (lead PI), 2014-2016
McDonnell Preceptorship in Neuroscience, Princeton University, 2013-2016
Princeton-Humboldt Collaborative Research Grant, 2013-2014
Princeton Neuroscience Institute Innovation Fund, 2013
Janelia/HHMI Visiting Scholar, 2012-2014, 2015-2018
McKnight Foundation Scholar Award, 2012-2015
Klingenstein-Simons Fellowship Award in the Neurosciences, 2012-2015
Princeton-Oxford Collaborative Research Grant, 2012-2014
Human Frontiers Science Program Young Investigator Award, 2011-2014
Alfred P. Sloan Foundation Research Fellow, 2011-2013
NSF CAREER Award, 2011-2016
Caltech Baxter postdoctoral fellowship, 2008-2009
Helen Hay Whitney Foundation postdoctoral fellowship, 2005-2008
Caltech Della Martin postdoctoral fellowship, 2004-2005
Damon Runyon Cancer Research Foundation postdoctoral fellowship (declined)
MIT John Asinari award for outstanding research in the life sciences, 1997
MIT Burchards Scholar in the humanities, 1996

TEACHING (2007-present)

Instructor for NEU 301/MOL 310 "Cellular Neurobiology" (undergraduate, Princeton), 2015-present (designed course)
Instructor for NEU 501a "Cellular and Circuits Neuroscience" (graduate, Princeton), 2020-present (led a committee to restructure 501a/502a curriculum, 2017)
Lecturer for NEU 501/502 "Intro to Neuroscience: From Molecules to Systems to Behavior" (graduate, Princeton), 2009-present
Lecturer for CAJAL Course in Computational Neuroscience, Champalimaud Centre for the Unknown (Aug 2019 and 2021)
Lecturer for the 'Physics of Life' summer school (Princeton), 2017-present
Co-Instructor for NEU/MOL 403 "Neurogenetics of Behavior" (undergraduate, Princeton), 2012 and 2015 (designed course)
Co-Instructor for ISC/MOL 235/236 "An Integrated and Quantitative Introduction to the Natural Sciences" (undergraduate, Princeton), 2011-2015
Co-Instructor for MOL 214 "Introduction to Molecular and Cellular Biology" (undergraduate, Princeton), 2011-2014
Lecturer for NEU/MOL 408 "Cellular and Systems Neuroscience" (undergraduate, Princeton), 2013
Lecturer for the Princeton Neuroscience Institute NAND Summer Course (Princeton), 2012-present
Lecturer for "Topics in Systems Neuroscience" (graduate, Caltech), 2007-2008
Lecturer for Neurobiology of *Drosophila* summer research course (graduate and post-graduate, CSHL), 2007 & 2011

INVITED TALKS (2010-present)

Departmental Seminars or Symposia:

HHMI, Janelia Research Campus (Oct 2024)

MPI, Brain Research, Frankfurt (Sept 2024)
Indiana University (Sept 2024)
CSHL Functional Imaging Course (Aug 2023)
MPI, Tübingen, Cybernetics (Nov 2022)
Yale University Neuroscience (Dec 2021)
University of Virginia, Biomedical Sciences, 2021 Distinguished Guest Lecturer (Oct 2021)
Retreat Speaker, University of Texas Medical Center, San Antonio (May 2021)
University of Pennsylvania, Department of Biology (Mar 2021)
University College London (Jan 2021)
MIT Picower Symposia on “Internal States of the Brain” (Oct 2020)
University of Washington, Neuroscience (Apr 2020)
UCLA Neuroscience (Feb 2020)
Stanford University, Computational Neuroscience (May 2019)
Washington University, Neuroscience (Mar 2019)
Scripps Research Institute, Florida (Oct 2018)
UC Berkeley, Molecular and Cellular Biology (Mar 2018)
UT Southwestern, Neuroscience (Feb 2018)
Cambridge University, MRC, Neurobiology (Dec 2017)
Oxford University, Centre for Neural Circuits and Behavior (Dec 2017)
Yale University, Physiology (Nov 2017)
Duke University, Neuroscience (Oct 2017)
NYU Biology (Sept 2017)
MBL Woods Hole, John Nicholls Lectureship (July 2017)
EPFL Lausanne, Neuroscience (June 2017)
Brown University, Neurobiology (Apr 2017)
Haverford College, Neuroscience (Apr 2017)
Columbia University Medical School, Neurobiology (Mar 2017)
University of Delaware, Neuroscience (Mar 2017)
UC Berkeley, Neuroscience (Oct 2016)
Columbia University, Department of Biological Sciences (May 2016)
Sloan Kettering Memorial Hospital, Department of Developmental Biology (May 2016)
University of Chicago Neuroscience (May 2016)
Northwestern University Neuroscience (May 2016)
NYU Center for Neural Science (April 2016)
University of Pennsylvania Mahoney Institute for Neuroscience (Feb 2016)
Caltech Computational and Neural Systems (Feb 2016)
Salk Research Institute Neuroscience (Feb 2016)
Scripps Neuroscience Research Institute, San Diego (Feb 2016)
Columbia University Center for Neurotheory (Jan 2016)
Harvard University Center for Brain Science (Dec 2015)
MIT McGovern Institute for Brain Research (Oct 2015)
Johns Hopkins University Neuroscience (Apr 2015)
Emory University Institute for Quantitative Theory and Methods (Apr 2015)
NYU Neuroscience Institute (Feb 2015)
Harvard Medical School Neurobiology (Jan 2015)
Cornell University, Neurobiology and Behavior (Sept 2014)
UCSF, Neuroscience (Sept 2014)
Bernstein Center for Computational Neuroscience, Berlin (Nov 2013)
Max Planck Institute for Neurobiology, Munich (Nov 2013)
Stanford University, Department of Neurobiology (May 2013)
Harvard University, Biophysics Program (Apr 2013)

University of Texas Austin, Institute for Neuroscience (Mar 2013)

US and International Meetings:

Bernstein Conference on Computational Neuroscience, Frankfurt (Oct 2024)
Chair, Gordon Conference on Neural Mechanisms of Acoustic Communication (May 2024)
Price Family Social Brain Symposium, Rockefeller University (Nov 2023)
McKnight Foundation Neuroscience Conference - Keynote (June 2023)
Gordon Research Conference on Modulation of Neural Circuits (May 2023)
Chen Neuroscience Institute Symposium, Caltech (Jan 2023)
Jackson Labs Course on Machine Learning and Behavior (Oct 2022)
Vice-Chair, new Gordon Conference on Neural Mechanisms of Acoustic Communication (July 2022)
Computational Systems Neuroscience (CoSyNe) Conference (Mar 2022)
CoSyNe Workshop on Global Brain Activity (Mar 2022)
Neuronal Circuits, Cold Spring Harbor Labs (Mar 2022)
Simons Collaboration on the Global Brain Annual Meeting – Keynote (Mar 2022)
NIH BRAIN BBQS Workshop - Keynote (Feb 2022)
Functional Logic of Neural Circuits, Puerto Rico (Feb 2022)
Society for Neuroscience, Invited Symposium Organizer on “Internal States” (Nov 2021)
NIH BRAIN Initiative Investigators Meeting - Keynote (June 2021)
Co-Lead, NIH BRAIN Initiative Workshop on Connectomics: “Analysis, Interpretation and Dissemination” (Mar 2021)
EMBO Meeting: Senses, Development, Connectivity, and Evolution, Bangalore, India (Dec 2020) - *rescheduled*
HHMI Science Meeting (Nov 2020)
SFN CellPress State of the Mind Panelist, Chicago (Oct 2019)
Co-Director, SFN short course on Quantifying Behavior (Oct 2019)
FENS Brain Conference 2019: “Dynamics of the Brain”, Denmark (June 2019)
BRAIN Initiative Investigators Meeting – Session Chair (Apr 2019)
Janelia Fly Brain Nomenclature Workshop (Mar 2019)
Annual Drosophila Conference – Plenary (Apr 2019)
Society for Neuroscience – Special Lecture (Nov 2018)
Gordon Conference on the Neurobiology of Cognition (July 2018)
AREADNE Conference on Neural Coding, Santorini (June 2018)
BRAIN Initiative Investigators Meeting (April 2018)
Royal Society Conference on Physics and Sensory Ecology of Hearing (Dec 2017)
CUNY Graduate Center Workshop on Quantitative Approaches to Behavior (Sept 2017)
Gordon Conference on Neuroethology (June 2017)
NYU Abu Dhabi Genomics and Systems Biology Conference (Feb 2017)
Simons Foundation Workshop on Behavioral Analysis (Nov 2016)
Champalimaud Neuroscience Symposium (Sept 2016)
Columbia University Grossman Center on the Statistics of the Mind Workshop (May 2016)
Columbia University Workshop on Brain Circuits, Memory, and Computation (Mar 2016)
Computational Systems Neuroscience (CoSyNe) Conference (Feb 2016)
BRAIN Initiative Investigators Meeting (Dec 2015)
EMBO/Kavli Foundation Neural Circuits and Behavior of Drosophila Conference, Crete (July 2015)
McKnight Foundation Neuroscience Conference (June 2015)
Klingenstein-Simons Foundation Neuroscience Conference (May 2015)
Swartz Foundation Banbury Center Workshop on Neuronal Response Variability (Apr 2015)
HHMI Conference on Neural Circuits Controlling Sexual Behavior (Nov 2014)
HHMI Conference on Mechanisms and Features of Social Dynamics (Oct 2014)
Sloan-Swartz Theoretical Neuroscience Annual Conference (Jun 2014)
Bi-Annual CSHL Synapses, Circuits, & Behavior Conference (Apr 2013)
Annual *Drosophila* Research Conference (Behavior and Physiology session chair; Apr 2013)

New York Area Sense to Synapse Symposium (Apr 2013)
HHMI Conference on the Evolution and Neurobiology of Insect Acoustic Communication (Co-Organizer; May 2012)
Bi-Annual CSHL Neurobiology of *Drosophila* Conference (Neural Circuits session chair; Oct 2011)
Titisee Conference on the Genetic Analysis of Neural Circuits (Mar 2011)
EMBO Conference on Neurobiology in Minibrains (Oct 2010)

SERVICE and OUTREACH

Service:

Reviewer for several scholarly journals, including *Science*, *Science Advances*, *Nature*, *Nature Communications*, *Journal of Neuroscience*, *Current Biology*, *Neuron*, *Cell*, *Cell Reports*, *eLife*, and *Nature Neuroscience*
Princeton Department of Molecular Biology undergraduate curriculum committee, 2014-2018
Princeton Department of Molecular Biology tech innovations committee, 2014-2017
Princeton Department of Molecular Biology graduate school advisor, 2012-2016
Princeton Department of Molecular Biology faculty search committee (Chair), 2016-2017
Princeton Neuroscience Institute Director, 2022-
Princeton Neuroscience Institute graduate core course committee chair, 2016-2018
Princeton Neuroscience Institute curriculum committee, 2014-present
Princeton Neuroscience Institute faculty search committee, 2011-2012, 2013-2014, 2018-2019, 2020-2021
Princeton Neuroscience graduate program admissions committee, 2009-2013, 2018-present (Director of Admissions)
Princeton Neuroscience Institute seminar series committee chair, 2011-2014, 2018-present
Princeton Neuroscience Institute retreat committee co-chair, 2013 and 2015
Princeton Neuroscience Institute shared molecular equipment committee chair, 2013-2014
Princeton BioEngineering Initiative faculty search committee, 2021-2022
Co-Director, Princeton Presidential Postdoctoral Fellows Program, 2019-2022
Co-PI of the Princeton-CUNY Center for the Physics of Biological Function, 2017-present
Princeton BioEngineering Faculty Search Committee, 2021-22
Executive Committee, Omenn-Darling BioEngineering Institute, 2023-
Princeton University Committee on Undergraduate Life, 2011-2013
Princeton University Committee on the Course of Study, 2016-2019
Princeton University Committee on the Academic Calendar, 2017
Princeton University Committee, Faculty Teaching Awards, 2018
Princeton University Council on Science and Technology, 2018-present
Princeton University Committee on Research Staff Advancements and Appointments (C/7), 2021-2022
Princeton University Faculty Advisory Committee on Diversity, 2022-
Co-Organizer of the annual Princeton University Living at the Intersection symposium, which promotes STEM across campus, 2020
Faculty adviser, Rockefeller College, Princeton, 2010-2014, 2016-2020
Faculty adviser, Wilson College, Princeton, 2014-2015
McKnight Foundation Neuroscience Technology Award review committee, 2017-present
Simons Foundation SFARI grant review, 2021
Simons Collaboration on the Global Brain Executive Committee Member, 2022-
Chan Zuckerberg Biohub Investigator grant review, 2021
NINDS K99/K01 grant review study section, 2017
NIH BRAIN Initiative K99 grant review study section, 2018
NIH grant review study section (MNG), 2015
NIH grant review study section (Blueprint for Neuroscience - Interoception), 2021
NSF grant review study section (Neural Systems), 2012
NIH grant review study section (BRAIN Initiative), 2014 and 2018
NIH Pioneer (DP1) grant review study section, 2019
Foreign grant review, including for the Wellcome Trust (UK), BBSRC (UK Biology Research Council) and DFG (German Research Foundation), 2017-present

NIH BRAIN Initiative meeting program committee member, 2018-2019
NIH BRAIN Initiative Multi-Council Working Group member (ongoing oversight on long-term scientific vision), 2021-
NWB (Neurodata Without Borders) Executive Committee Member, 2021-
Visiting Committee, Presidential Nominee, MIT, Brain and Cognitive Sciences, 2023-2027
Scientific Advisory Board, MPI, Florida, 2023-2029
Society for Neuroscience Donald B. Lindsey Prize Selection Committee, 2018-present
Member, Editorial Board, *Cell Reports*, 2015-present
Member, Editorial Board, *Progress in Neurobiology*, 2019-present

Outreach:

Organizer and Moderator, Princeton University Council for Science and Technology “*Living at the Intersection*”
Symposium
Member of the science curriculum committee for the Princeton Charter (K-8) Elementary School, 2018-present
Mobilized the Murthy lab to design and 3D-print nasal testing swabs for area hospitals during the first peak of the
Covid-19 outbreak in New Jersey (March-May, 2020)
Various outreach events and demonstrations on *Drosophila* neurobiology at Princeton area public schools (2013-
present)
Seminar for the *City of Science* public science series at the Graduate Center at CUNY, 2018
Murthy Lab outreach event on *Drosophila* neurobiology and behavior (held in the Murthy lab) for high school students
from Trenton, NJ, 2014
Seminar for Princeton Neuroscience Institute (new building) dedication ceremony, 2014
Princeton University “Tiger Talk” seminar (for 800 area high school students, held at Princeton University’s Richardson
Auditorium), 2013
Community seminars for the HHMI Princeton Summer Teachers Program (2010-2012), Princeton University reunions
(2011), and the Princeton Adult School (2012)
Princeton Science and Engineering EXPO for area middle school students (demo on *Drosophila* courtship songs), 2012

MENTORING

I have trained >50 senior thesis students, graduate students, and postdoctoral research fellows, including ~30
individuals from under-represented backgrounds (women, Black, Latinx, first-generation, LGBTQ, or neurodiverse).

Undergraduates (>50 undergraduates have worked in my lab, including the following 21 Princeton senior thesis
students; their current positions can be found at murthylab.princeton.edu/members):

Rogelio Esparza (class of 2012, Molecular Biology/Neuroscience cert)
Andrew Weinstein (class of 2013, Molecular Biology/Neuroscience cert), awarded the Brinster prize for the best
Neuroscience senior thesis
Tristan Perez (class of 2014, Molecular Biology/Global Health and Neuroscience cert)
Vivien Cheng (class of 2015, Music/Neuroscience cert)
Marjorie Xie (class of 2015, Computational Neuroscience)
Korleki Akiti (class of 2015, Molecular Biology/Quantitative Biology and Neuroscience cert)
Ramie Fathy (class of 2016, Molecular Biology/Neuroscience cert)
Tina Doan (class of 2016, Molecular Biology/Neuroscience cert)
Minseung Choi (class of 2017, Computer Science/Quantitative Biology cert)
David Mazumder (class of 2017, Molecular Biology/Quantitative Biology and Neuroscience cert)
Diego Aldarondo (class of 2018, Neuroscience/Computer Science cert)
Ankush Rakhit (class of 2018, Neuroscience)
Joshua Tam (class of 2018, Operational Research and Finance)
Sage Palmedo (class of 2019, Ecology and Evolutionary Biology), awarded the Brinster prize for the best Neuroscience
senior thesis
Rucha Alur (class of 2020, Neuroscience)
Brandon Ward (class of 2020, Molecular Biology)
Diego Zamalloa-Chion (class of 2022, Computer Science)
Sophie Lockwood (class of 2023, Neuroscience), awarded the Brinster prize for the best Neuroscience senior thesis

Krystal Raymundo (class of 2024, Neuroscience)
Liza Whitmire (class of 2024, Neuroscience)
Jasmeet Dhanoa (class of 2025, Neuroscience)

Graduate Students:

Philip Coen (Neuroscience Graduate Program) 2010-2015
Awarded HHMI International predoctoral fellowship
Awarded the 2015 Elkins Prize for the best thesis in the field of *Drosophila* Neurobiology
Current position: Group Leader (Wellcome CDA), University College London

Kelly LaRue (Molecular Biology Graduate Program) 2010-2015
Current position: Scientific Advisor and Course Director, Jackson Labs (Bar Harbor, ME)

Diego Pacheco (Neuroscience Graduate Program) 2011-2018
Current position: Postdoctoral research fellow, Harvard Medical School (Wilson lab)

Alexandria Hammons (Molecular Biology Graduate Program) 2013-2018
Current position: Medical writing associate, Arena Pharmaceuticals (San Diego, CA)

Talmo Pereira (Neuroscience Graduate Program) 2016-2021
Awarded NSF predoctoral fellowship and Princeton University Jacobus fellowship
Awarded the 2022 Harold M. Weintraub Graduate Student Prize in the Biological Sciences
Current position: Group Leader, Salk Institute (San Diego)

Nivedita Rangarajan (Neuroscience Graduate Program) 2017-2024

Shruthi Ravindranath (Neuroscience Graduate Program) 2018-present

Edna Normand (Rutgers/Princeton MD/PhD Program) 2019-2023
Awarded NIH Diversity Fellowship (BRAIN Initiative)
Awarded NIH F30 (MD/PhD training fellowship)

Max Aragon (Neuroscience Graduate Program) 2020-present

Wayan Gauthey (Neuroscience Graduate Program) 2022-present

Postdoctoral Research Fellows:

Amanda Crocker (PhD, University of Pennsylvania) 2010-2015
Awarded NIH Ruth Kirchstein NRSA postdoctoral fellowship
Current position: Associate Professor (tenured), Middlebury College

Cyrille Girardin (PhD, ETH Zurich) 2011-2013
Awarded Marie-Curie international postdoctoral fellowship
Current position: Conseiller scientifique, State Secretariat for Education Research and Innovation (SERI), Switzerland

Jan Clemens (PhD, Bernstein Center for Computational Neuroscience, Berlin) 2012-2016
Awarded both DAAD (German Academic Exchange) and Sloan-Swartz postdoctoral fellowships
Current position: Associate Professor (tenured), University of Oldenburg (Germany)

David Deutsch (PhD, Weizmann Institute of Science) 2014-2022
Current position: Assistant Professor, University of Haifa (Israel)

Adam Calhoun (PhD, UCSD) 2014-2021
Awarded Simons Collaboration on the Global Brain postdoctoral fellowship

Current position: Research Scientist, CTRL Labs (Meta)

Christa Baker (PhD, Washington University) Awarded Jane Coffin Childs postdoctoral fellowship <u>Current position:</u> Assistant Professor, North Carolina State University	2015-2022
Frederic Roemschied (PhD, Bernstein Center for Computational Neuroscience, Berlin) Awarded DFG (German Research Foundation) Postdoctoral Fellowship <u>Current position:</u> Group Leader, European Neuroscience Institute (Max Planck), Goettingen, Germany	2016-2022
Sama Ahmed (PhD, UCSF) Awarded BRAIN Initiative postdoctoral fellowship, Princeton Presidential postdoctoral fellowship, Burroughs-Wellcome postdoctoral enrichment fellowship, and Simons Collaboration on the Global Brain Bridge to Independence Award. <u>Current position:</u> Assistant Professor, University of Washington	2017-2022
Ben Cowley (PhD, Carnegie Mellon), <i>joint w/ Pillow</i> Awarded CV Starr postdoctoral fellowship <u>Current position:</u> Assistant Professor, Cold Spring Harbor Labs	2018-2022
Megan Wang (PhD, Stanford) Awarded NIH T32 postdoctoral fellowship <u>Current position:</u> Research Scientist, CTRL Labs (Meta)	2020-2022
Xinping Li (PhD, Rutgers)	2018-present
Rich Pang (PhD, University of Washington), <i>joint w/ Pillow and Bialek</i> Awarded Sloan-Swartz postdoctoral fellowship	2020-present
Bartul Mimica (PhD, NTNU, Kavli Institute for Systems Neuroscience), <i>joint w/ Falkner</i> Awarded CV Starr postdoctoral fellowship and EMBO postdoctoral fellowship	2021-present
Albert Lin (PhD, Harvard University, Biophysics), <i>joint w/ Clandinin</i> Awarded Princeton Center for Physics of Biological Function (CPBF) fellowship	2021-present
Duncan Mearns (PhD, MPI Munich Neuroscience), <i>joint w/ McBride</i> Awarded CV Starr postdoctoral fellowship	2023-present
Bella Brezovec (PhD, Stanford University)	2024-present

RESEARCH SUPPORT

Current Support (External):

NIH BRAIN U24 NS126935 MURTHY (co-PI)
08/01/22-
Title: Dissemination of FlyWire, A Whole-Brain Connectomics Resource

NIH BRAIN Initiative RF1 MH129268 MURTHY (co-PI)
04/01/22-03/31/25
Title: Accelerating connectomic proofreading for larger brains and multiple individuals

NIH NINDS R35 Research Program Award MURTHY (PI)
07/19 – 07/27
Title: Uncovering the Neural Mechanisms that Flexibly Link Sensory Processing to Behavior

Simons Collaboration on the Global Brain Pilot Award
10/1/21 – 9/30/25
Title: Brain-Wide Dynamics of a Social Interaction

Completed Support (External):
Alfred P. Sloan Foundation
09/01/11-08/31/13
Title: Neural Codes and Variability in the *Drosophila* Auditory System

The Klingenstein-Simons Foundation
6/1/12 – 5/31/15
Title: Neural Mechanisms Underlying Acoustic Communication

Human Frontiers Science Program
6/1/11 – 5/31/15
Title: From genes to circuits: the evolution of species-specific communication in *Drosophila*

Oxford/Princeton Collaborative Research Grant
9/1/12 – 06/30/15
Title: How does the brain encode memories?

Princeton/Humboldt Strategic Partnership
10/01/13 – 09/30/15
Title: Uncovering principles of neural computation in the *Drosophila* auditory system

The McKnight Foundation
7/1/12 – 6/30/16
Title: Scholar Award: Neural Mechanisms Underlying Acoustic Communication in *Drosophila*

NSF-IOS BRAIN Initiative EAGER 1451197
12/01/14 – 11/30/16
Title: BRAIN EAGER: Closing the Loop on Social Behaviors, From Mathematical Models to Neural Circuit Dynamics

NSF CAREER IOS-1054578-005
2/1/11 – 2/28/17
Title: CAREER: Neural Mechanisms for Acoustic Communication in *Drosophila*

NIH Director's New Innovator Award DP2 NS092378-01
09/30/14 – 06/30/19
Title: How does the brain solve the pattern recognition problem?

Princeton University Dean for Research Innovation Fund
3/1/16 – 2/28/19
Title: Dissecting Mosquito Courtship Behaviors: Towards a Novel Intervention to Control Mosquito-Borne Diseases

NIH BRAIN Initiative RF1 MH117815-01 (NCE)
09/22/18 - 09/21/21
Title: Crowdsourcing the Fly Connectome

HHMI Faculty Scholar
10/1/16 - 9/30/21

MURTHY (PI)

NSF Physics Frontier Center

MURTHY (co-PI)

NIH Targeted BRAIN Circuits Projects R01 NS104899
12/01/17 – 11/30/23

MURTHY (lead PI)

Title: Dissecting Sensorimotor Pathways Underlying Social Interactions: Models, Circuits, and Behavior

NIH Targeted BRAIN Circuits Projects R01 NS110060
09/30/18 – 08/31/24

MURTHY (co-PI)

Title: Population Neural Activity Mediating Sensory Perception Across Modalities