Mala Murthy, PhD

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DOB: August 27, 1975 (Reading, PA)

POSITIONS

Princeton University
Professor, Princeton Neuroscience Institute (2019-)
Professor, Department of Molecular Biology and Princeton Neuroscience Institute (2019)
HHMI Faculty Scholar (2016-2021)
Associate Professor, 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
Advisor: Thomas Schwarz

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*
Advisor: Leonard Guarente

PUBLICATIONS

Baker, CA, Clemens, J and Murthy, M. Acoustic Pattern Recognition and Courtship Songs: Insights from Insects. ***Annual Review of Neuroscience***. *in press*

Clemens, J*, Deutsch, D*, Thiberge, SY, and **Murthy, M**. Shared Song Object Detector Neurons in *Drosophila* Male and Female Brains Drive Divergent, Sex-Specific Behaviors. ***bioRxiv***; doi/10.1101/366765. *equal authors *in revision at Neuron*

Pereira, T[#], Aldarondo, D[#], Willmore, L, Kislin, M, Wang, SS, **Murthy, M***, Shaevitz, 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

Tayler, 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 presynatic 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, Denef, 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. cerevisae*. ***Cell***. 1997 May 2;89(3):381-91.

AWARDS AND HONORS

Special Lecture, Society for Neuroscience Annual Conference, 2018
Exhibitor at US Capitol BRAIN Fair, 2018
NIH BRAIN Initiative Awards (one as lead PI, and two as co-PI), 2017-2022 (1) and 2018-2023 (2)
HHMI Faculty Scholar, 2016-2021
Schuetze Prize, 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-present
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
Co-Instructor for NEU 501/502 “Intro to Neuroscience: From Molecules to Systems to Behavior” (graduate, Princeton), 2009-present
Co-Instructor for NEU/MOL 403 “Neurogenetics of Behavior” (undergraduate, Princeton), 2012 and 2015
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