

# CURRICULUM VITAE

**Andrew M. Leifer**  
Assistant Professor

## CONTACT INFORMATION

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## PROFESSIONAL EXPERIENCE

**Princeton University**, Princeton, NJ ..... 2016–present  
*Assistant Professor*, Department of Physics and Princeton Neuroscience Institute

**Princeton University**, Princeton, NJ ..... 2012–2016  
*Lewis-Sigler Fellow*, Lewis-Sigler Institute for Integrative Genomics  
*Lecturer*, Department of Physics.

**Harvard University**, Cambridge, MA ..... 2007-2012  
*NSF Graduate Research Fellow*, Program in Biophysics and Department of Physics.

**JILA (NIST-University of Colorado)**, Boulder, CO ..... Summers 2005-2006  
*NSF Summer Undergraduate Research Fellow*.

**American Association for the Advancement of Science**, Washington, DC .... Spring 2006  
*Leonard Rieser Fellow*, Center for Science Technology and Security Policy.

**Natl. Telecommunications and Information Administration**, Boulder, CO . Summer 2004  
*Researcher*, Institute for Telecommunication Sciences, Theory Division.

**National Institute of Standards and Technology**, Boulder, CO ..... Summer 2003  
*Researcher*, Statistics Division.

## EDUCATION

**Ph.D. in Biophysics**, Harvard University, Cambridge, MA ..... May 2012  
Thesis Topic: “Optogenetics and computer vision for *C. elegans* neuroscience and other biophysical applications” Advisor: Professor Aravinthan D.T. Samuel

**B.S. in Physics**, Stanford University, Stanford, CA ..... June 2007

**B.A. in Political Science**, Stanford University, Stanford, CA ..... June 2007

Honors in International Security Studies, Stanford University, Stanford, CA ..... June 2007  
Thesis Topic: “International scientific engagement for mitigating emerging nuclear security

threats” Advisor: Professor Michael May

## HONORS AND AWARDS

Lewis-Sigler Fellowship, Princeton University ..... 2012–2016  
 Emerging Leaders in Biosecurity Initiative Fellowship, UPMC Center for Health Security.... 2015  
 American Physical Society, Biological Physics Thesis Award, Certificate of Merit ..... 2013  
 National Science Foundation Graduate Research Fellowship ..... 2007–2011  
 Derek C. Bok Certificate of Distinction in Teaching, Harvard University. .... 2008  
 Leonard Rieser Fellowship in Science Tech & Global Security, Bulletin of the Atomic Scientist 2006  
 SPIE International Society for Optical Engineering Scholarship..... 2006  
 American Institute of Physics, Society of Physics Students, Leadership Award..... 2006  
 National Science Foundation, Summer Undergraduate Research Fellowship ..... 2005–2006  
 AAAS, Center for Science Technology and Security Policy, Intern of the Year Award..... 2006  
 Harry Press Journalism Award, Stanford University. .... 2006  
 Boothe Prize for Excellence in Writing, Stanford University ..... 2004  
 Robert C. Byrd Academic Merit Scholarship ..... 2003  
 Dofflemyer Eagle Scout Scholarship ..... 2003  
 Awards for the author’s independent research, “Fractals, Power-Laws and the Weibull Distribution:  
 Mathematically Modeling Crumpled Paper” ..... 2003  
     American Mathematical Society, Karl Menger Award.  
     Office of Naval Research, Naval Science Award.  
     Third Place Team Project, Intel International Science and Engineering Fair 2003.  
     First Place Team Project, Colorado Science and Engineering Fair.  
     Scientific American, Outstanding Achievement in Education.  
 Golden State Governor’s Scholarship, State of California..... 2000

## SERVICE

Organizer, Simons Foundation, Workshop on Unbiased Quantification of Behavior ..... 2016  
 Faculty Fellow, Mathey College, Princeton University ..... 2015 to present  
 Invited Participant, NSF Worskshop: Frontiers for Integrative Study of Animal Behavior .... 2014  
 Session Chair, *C. elegans* topic mtg: Neuronal Development, Synaptic Function & Behavior . 2014  
 Member, Council of the Princeton University Community ..... 2013-2014  
 Chair, Program in Neuroscience Graduate Generals Exam Committee, Princeton University . 2013  
 Senior Staff Committee Member, Lowell House, Harvard College, ..... 2010–2012  
 Resident Tutor, Lowell House, Harvard College ..... 2009–2012  
 Editorial Board Member, Stanford Daily, Stanford University ..... 2006-2007  
 Scientific content reviewer for peer-reviewed journals and conferences including:  
     PNAS, PLOS Biology, Philosophical Transactions of the Royal Society B, Integrative Biol-  
     ogy, Journal of Physical Biology, Nature Communications, Journal of Neuroscience Methods,  
     Journal of Visual Experiments, PLoS One and the conference CoSyNe.  
 Reviewer or panelist for funding agencies including:  
     National Science Foundation, Division of Integrative Organismal Systems; W. M. Keck Foun-  
     dation; NASA Postdoctoral Program; Sir Henry Dale Wellcome Trust; European Research

Commission.

Departmental service including:

Admissions committee, Juniors committee, Dicke Fellowship selection committee, Biophysics seminar organizer, prelim grader, FPO examiner, Experimental Project examiner, dissertation reader.

## TEACHING

Princeton University, *Faculty*:

NEU 422 Neural Dynamics of Cognition ..... Fall 2017  
 NEU 457/557 Measurement and Analysis of Neural Dynamics, ..... Spring 2017  
 PHY 103 General Physics I, ..... Fall 2016  
 ISC 233-234 An Integrated, Quantitative Intro to the Natural Sciences II, ..... 2013–2016  
 ISC 231-232 An Integrated, Quantitative Intro to the Natural Sciences I, ..... 2012–2015  
 Neurotechnologies and Analysis of Neural Datasets, ..... Summers 2015–2017

Princeton University, *Guest Lecturer*:

NEU 501,502 Neuroscience: from molecules to systems to behavior ..... 2017–2018  
 Woodrow Wilson School 548, Weapons of Mass Destruction and International Security 2017–2018  
 Woodrow Wilson School 353, Science and Global Security, ..... 2015, 2017  
 NEU 301 Cellular Neurobiology ..... 2016  
 QCB 551 Intro to Genomics & Computational Molecular Biology, ..... 2014

Elsewhere:

Stanford University, CS 379C, Computational Models of the Neocortex, *Guest Lecturer*. .... 2016  
 Marine Biological Laboratory, Woods Hole, Neural Systems & Behavior, *Faculty* ... Summer 2014  
 Harvard University, BIOPHYS 242R, Brain & Behavior, *Guest Lecturer*. .... 2013  
 Harvard University, MCB 199, Statistical Thermodynamics for Quantitative Biology, *T.A.* .. 2008

## ADVISING

PhD Students (current):

Mochi Liu (QCB, joint w/ Shaevitz); Xinwei Yu (Physics).

PhD Students (past):

Ashley Linder (Neuroscience, joint w/ Shaevitz).

Undergraduate Students (current):

Alicia Castillo and John Li (Neuroscience, Senior Thesis).

Undergraduate Students (past):

Milena Chakraverti-Wuerthwein; Xiaoting Sun; David Mazumder (Molecular Biology); Kevin Mizes (Physics Senior Thesis; Treiman Fellow; Sanda & Jeremiah Lambert '55 Undergraduate Neuroscience Research Award Recipient), Peter Johnson (Physics Junior Project); Jose Rico Chinchilla; Lukas Novak.

**INVITED LECTURES**

Columbia University, Center for Theoretical Neuroscience .....	2018
SAND8, Statistical Analysis of Neuronal Data, Keynote Lecturer .....	2017
Rowen University School of Osteopathic Medicine, Department of Cell Biology .....	2017
APS March Meeting, Patterns & Control in Animal Behavior .....	2017
CUNY, The Graduate Center, Initiative for the Theoretical Sciences .....	2016
Cornell University, NBB, Perry Gilbert Lecture, Invited by Grad Students .....	2016
ICFO, Institute of Photonic Sciences, Light for Health Seminar .....	2016
Simons Foundation, Simons Collaboration on the Global Brain Annual Meeting .....	2016
Frontiers in Applied & Computational Mathematics.....	2016
Mid-Atlantic Society for Developmental Biology Regional Meeting .....	2016
Yale University School of Medicine, Department of Neuroscience Seminar .....	2016
Princeton University, Princeton Neuroscience Institute Seminar .....	2016
Yale University, Dept. of Molecular Cellular & Developmental Biology Seminar .....	2016
Google, Inc. ....	2016
Stanford University School of Medicine, Department of Neurobiology Seminar .....	2016
Ludwig Maximilians Universitat, Munchen, Center for Nanoscience Colloquium .....	2015
Northeastern University, Center for Complex Network Research .....	2015
Princeton University, Woodrow Wilson School, Science and Global Security Seminar .....	2015
Simons Foundation, Simons Collaboration on the Global Brain Annual Meeting .....	2015
Princeton University, Princeton Neurosciences Institute, Annual Retreat .....	2015
Rockefeller University, Center for Studies in Physics and Biology Seminar .....	2015
Stanford University, Stanford Neurosciences Institute & Department of Bioengineering .....	2015
New York University, Center for Soft Matter Research .....	2015
Delaware Center for Neuroscience Research .....	2014
Brandeis University, Computational & Systems Neuroscience Journal Club .....	2014
Columbia University, Grossman Center, Quantifying Structure in Large Neural Datasets .....	2014
<i>C. elegans</i> topic meeting: Neuronal Development, Synaptic Function & Behavior .....	2014
Rutgers University, Multi Group Worm Meeting .....	2013
INSERM, University of Paris Descartes, Optics and Photonics Seminar .....	2012
Princeton University, Lewis-Sigler Institute for Integrative Genomics .....	2011
Rutgers University, Molecular Biology and Biochemistry .....	2010
Harvard University, Rowland Institute .....	2010

**PEER-REVIEWED PUBLICATIONS**

1. Mochi Liu, Anuj K. Sharma, Joshua W. Shaevitz, **Andrew M. Leifer**, “Temporal processing and context dependency in *C. elegans* mechanosensation.” *eLife*, 7:e36419 (2018).
2. Jeffrey Nguyen, Ashley N. Linder, George Plummer, Joshua W. Shaevitz, **Andrew M. Leifer**, “Automatically tracking neurons in a moving and deforming brain” *Plos Computational Biology*, 13(5): e1005517 (2017).
3. Jeffrey Nguyen\*, Frederick B. Shipley\*, Ashley N. Linder, George Plummer, Mochi Liu, Sagar U. Setru, Joshua W. Shaevitz, **Andrew M. Leifer**, “Whole-brain calcium imaging with cellular resolution in freely behaving *Caenorhabditis elegans*.” *Proceedings of the National Academy of Sciences*, vol. 113 no. 8, E1074-E1081 (2016).
4. Frederick B. Shipley, Christopher M. Clark, Mark J. Alkema, **Andrew M. Leifer**, “Simulta-

- neous optogenetic stimulation and calcium imaging in freely moving *C. elegans*.” *Frontiers in Neural Circuits* 8:28 (2014).
5. Steven J. Husson, Alexander Gottschalk, **Andrew M. Leifer**, “Optogenetic manipulation of neural activity in *C. elegans*: from synapse to circuits and behavior” *Journal of Biology of the Cell*, 105, 1–16 (2013). **Invited review.**
  6. Jamie L. Donnelly, Christopher M. Clark, **Andrew M. Leifer**, Marian Haburacak, Jennifer K. Pirri, Michael M. Francis, Aravinthan D. T. Samuel, and Mark J. Alkema. “Monoaminergic orchestration of motorprograms in a complex behavior in *C. elegans*.” *PLoS Biology* 11(4): e1001529 (2013).
  7. Quan Wen, Michelle Po, Elizabeth Hulme, Sway Chen, Xinyu Liu, Sen Wai Kwok, Marc Gershow, **Andrew M. Leifer**, Victoria Butler, Christopher Fang-Yen, Taizo Kawano, William R. Schafer, George Whitesides, Matthieu Wyart, Dmitri Chklovskii, Mei Zhen, Aravinthan D T Samuel, “Proprioceptive coupling within motor neurons drives *C. elegans* forward locomotion.” *Neuron*, 76, 750–761 (2012).
  8. Chenxiang Lin, Ralf Jungmann, **Andrew M. Leifer**, Chao Li, Daniel Levner, Gero M. Church, William M. Shih, Peng Yin. “Sub-micrometer geometrically encoded fluorescent barcodes self-assembled from DNA.” *Nature Chemistry*, 4, 832–839 (2012).
  9. **Andrew M. Leifer\***, Christopher Fang-Yen\*, Marc Gershow, Mark Alkema, Aravinthan D.T. Samuel, “Optogenetic manipulation of neural activity in freely moving *Caenorhabditis elegans*,” *Nature Methods*, 8(2), p.147–152 (2011) .
  10. Kevin J. Coakley, David S. Simons, **Andrew M. Leifer**. “Secondary Ion Mass Spectrometry Measurements of Isotopic Ratios: Correction for Time Varying Count Rate.” *International Journal of Mass Spectrometry*, 204, 107–120 (2005).

## ACTIVE GRANTS

9/2017–8/2019 National Institute of Health, 1R21NS101629, (PI: Murray, U Penn)  
 “Multicolor labeling for cell identification in the *C. elegans* nervous system”  
 Total Direct & Indirect Costs: \$ 500,000

7/2017–7/2022, Simons Foundation, Simons Collaboration on the Global Brain (co-PI; contact PI is Zimmer)  
 “Neural Dynamics of a Multi-timescale Social Behavior”  
 Total Direct & Indirect Costs: \$900,000

## COMPLETED GRANTS

7/2014–7/2017, Simons Foundation, Simons Collaboration on the Global Brain (PI)  
 “Whole brain calcium imaging in freely behaving nematodes”  
 Total Direct & Indirect Costs: \$320,000

9/2014–8/2016, Princeton University, Inaugural Dean’s Innovation Fund for New Ideas in the Natural Sciences (co-PI with Shaevitz)

“All-neuron I/O in freely behaving animals”

Annual Direct Costs: \$100,000

Total Direct Costs: \$200,000