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

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, CISAC, 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

Scientific Program Committee member, International *C. elegans* Conference 2019
Program Committee member, CoSyne 2019
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, Nature Communications, PLOS Biology, Scientific Reports, Philosophical Transactions of the Royal Society B, Integrative Biology, Current Opinions in Systems Biology, Journal of Physical Biology, 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 Foundation; 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*:

PHY 101 Introductory Physics I ..... Fall 2018
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), Kevin Chen (NEU, joint w/ Pillow).

PhD Students (past):

Ashley Linder (Neuroscience, joint w/ Shaevitz).

Undergraduate Students (current):

John Li (Neuroscience, Senior Thesis), Milena Chakraverti-Wuerthwein (Physics, Junior Project).

Undergraduate Students (past):

Alicia Castillo (NEU, Senior Thesis), 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

Vanderbilt University, Department of Physics and Astronomy Colloquium 2019
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
C. elegans 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

PREPRINTS

1. Monika Scholz, Ashley N Linder, Francesco Randi, Anuj K Sharma, Xinwei Yu, Joshua W. Shaevitz and **Andrew M Leifer**, "Predicting natural behavior from whole-brain neural dynamics" *bioRxiv*, 10.1101/445643, October (2018).

PEER-REVIEWED PUBLICATIONS

1. Xiaowen Chen, Francesco Randi, **Andrew M Leifer** and William Bialek, "Searching for collective behavior in a small brain." *Phys Rev E*, in press (2019). [Preprint available at arXiv:1810.07623].

2. Mochi Liu, Anuj K. Sharma, Joshua W. Shaevitz, **Andrew M. Leifer**, "Temporal processing

and context dependency in *C. elegans* mechanosensation." *eLife*, 7:e36419 (2018).

3. 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).

4. 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).

5. Frederick B. Shipley, Christopher M. Clark, Mark J. Alkema, **Andrew M. Leifer**, "Simultaneous optogenetic stimulation and calcium imaging in freely moving *C. elegans*." *Frontiers in Neural Circuits* 8:28 (2014).

6. 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.**

7. Jamie L. Donnelly, Christpoher 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).

8. 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).

9. Chenxiang Lin, Ralf Jungmann, **Andrew M. Leifer**, Chao Li, Daniel Levner, Geroge M. Church, William M. Shih, Peng Yin. "Sub-micrometer geometrically encoded fluorescent barcodes self-assembled from DNA." *Nature Chemistry*, 4, 832–839 (2012).

10. **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) .

11. 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