Emily Mackevicius

Curriculum Vitae

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Education

2011–2018 **PhD, Neuroscience**, *Massachusetts Institute of Technology, Cambridge MA.*

2012 **Methods in Computational Neuroscience Course**, *Marine Biological Laboratory, Woods Hole, MA.*

2007–2011 **BS, Mathematics**, *University of Chicago, Chicago IL.*

Research Experience

2018-present **Postdoctoral Associate**, Aronov Lab, Zuckerman Institute, Columbia University.

2018 **Postdoctoral Associate**, Fee Lab, McGovern Institute, Department of Brain and Cognitive Sciences, MIT.

2011-2018 **PhD Student**, Fee Lab, McGovern Institute, Department of Brain and Cognitive Sciences, MIT.

2010-2011 **Undergraduate Researcher**, Bensmaia Lab, Department of Organismal Biology and Anatomy, University of Chicago.

2009 **VIGRE Summer REU**, Mathematics Department, University of Chicago.

Publications

Mackevicius, E. L., Bahle, A. H., Williams, A. H., Gu, S., Denisenko, N. I., Goldman, M. S., and Fee, M. S. (2019). Unsupervised discovery of temporal sequences in high-dimensional datasets, with applications to neuroscience. *eLife* 8:e38471. `https://doi.org/10.7554/eLife.38471`

Mackevicius, E. L., and Fee, M.S. (2018). Building a state space for song learning. *Current Opinion in Neurobiology.* 49:59-68. `https://doi.org/10.1016/j.conb.2017.12.001`

Deny, S., **Mackevicius, E. L.**, Okubo, T. S., Berman, G., Shaevitz, J., and Fee, M. S. (2016). Learning stable representations in a changing world with on-line tSNE: proof of concept in the songbird. *International Conference on Learning Representations (ICLR), 2016.* `https://openreview.net/forum?id=oVgo1jRRDsrlgPMRsBzY`

Okubo, T. S., **Mackevicius, E. L.**, Payne, H. L., Lynch, G. F., and Fee, M. S. (2015). Growth and splitting of neural sequences in songbird vocal development. *Nature*, 528(7582), 352-7. `https://doi.org/10.1038/nature15741`

Okubo, T. S., **Mackevicius, E. L.**, and Fee, M.S. (2014). In Vivo Recording of Single-Unit Activity during Singing in Zebra Finches. *Cold Spring Harb Protoc*; (12):1273-83. `https://www.doi.org/10.1101/pdb.prot084624`

Mackevicius, E. L., Best, M. D., Saal, H. P., and Bensmaia, S. J. (2012). Millisecond preci-

sion spike timing shapes tactile perception. *The Journal of neuroscience: the official journal of the Society for Neuroscience*, 32(44), 15309-17. https://doi.org/10.1523/JNEUROSCI.2161-12.2012

Papers in progress

Mackevicius, E. L., Happ, M. T. L., and Fee, M. S. Chunking song into syllables: a cortical circuit for translating tutor song into simple vocal-motor units; *in review.*

Mackevicius, E. L., Gu, S., Denisenko, N. I., and Fee, M. S. Self-organization of a neural circuit for socially learned behavior with delayed social exposure; *about to be submitted.*

Invited and Selected Talks

2019 **Brain Against the Machine Workshop, Bernstein Conference**.

2019 **NeuroNex Junior Scientist Workshop on Advanced Neural Data Analysis**.

2018 **Janelia Junior Scientist Workshop on Mechanistic Cognitive Neuroscience**.

2018 **Songbird Data Science Workshop, SfN pre-meeting**.

2018 **Quantitative Approaches to Naturalistic Behaviors at Banbury (Cold Spring Harbor)**.

2018 **Computational Neuroscience Tutorial, MIT Brain and Cognitive Sciences Department**, https://www.youtube.com/playlist?list=PLyGKBDfnk-iAU7N6dYVy7HhK2aLjLSPKM.

2018 **COSYNE (Computational and Systems Neuroscience) conference**, *https://youtu.be/XyWtCtZ_m-8?list=PL9YzmV9joj3FNsAV2S_cKxY8Ik_-YlQfu*.

2017 **Janelia J-Theory seminar**.

2017 **Stanford Neuroscience Invited Graduate Student Talk Series**.

2017 **MIT Brain and Cognitive Sciences Department Retreat**.

2016 & 2017 **Quantitative Methods Workshop, MIT Biology Department and Center for Minds Brains and Machines**.

2016 & 2017 **MIT Brain and Cognitive Sciences Department Interview Day Talk**.

2015 **Integrative Neuronal Systems Conference, MIT Brain and Cognitive Sciences Department**.

2014 **Center for Minds Brains and Machines Summer School at Woods Hole**, http://cbmm.mit.edu/video/emily-mackevicius-learning-computational-neuroscience-perspective.

Fellowships and Awards

2018 **COSYNE Presenters Travel Grant**, Selected to give a talk and awarded a travel grant based on the high reviewer ranking of my abstract.

2015-2018 **Computational Neuroscience Tutorial Series, awarded department funding for filming and admin support**, https://stellar.mit.edu/S/project/bcs-comp-tut/index.html.

2013-2016 **National Defense Science and Engineering Graduate Fellowship (NDSEG)**, Three year graduate fellowship from the Department of Defense covering tuition and stipend for three years.

2015 **Angus MacDonald Award for Excellence in Undergraduate Teaching**, Awarded by MIT Brain and Cognitive Sciences Deparment for my work TAing a new undergraduate course in Computational Neuroscience.

2015 **MIT Graduate Women of Excellence Award**, One of roughly 50 awardees of more than 200 nominees. Award is meant to "honor graduate women who exemplify leadership and outstanding accomplishment".

2012 **Scholarship for Methods in Computational Neuroscience course**, *Marine Biology Lab*, Woods Hole, MA.

2011-2012 **Henry E. Singleton (1940) Presidential Fellowship**, MIT fellowship for first year graduate students.

2010 **Computational Neuroscience Summer Researcher**, NIH-sponsored summer research experience for undergraduates.

2009 **Math Summer Undergraduate Research Fellowship**, *University of Chicago*.

2007-2011 **University Scholarship**, Merit scholarship for entering University of Chicago students.

Teaching and Mentorship

2019 **Instructor, Discover Science Program**, Zuckerman Institute, Columbia University.
- Designed and implemented an after school outreach program for local middle school students

2014-2018 **Member, Education Committee**, MIT Brain and Cognitive Sciences Department.
- Advised committee on graduate and undergraduate curriculum

2013-2017 **Founder, Computational Neuroscience Tutorial Series**, MIT Brain and Cognitive Sciences and Center for Minds Brains and Machines.
- Chose topics, invited speakers, created course website with problem sets, references, slides, and videos: https://stellar.mit.edu/S/project/bcs-comp-tut/index.html

2013-2017 **Teaching Assistant, Methods in Computational Neuroscience**, Woods Hole Marine Biology Laboratory.
- Made tutorials and problem sets, answered student questions, proposed novel projects, and advised students on projects

2016-2017 **Instructor, Quantitative Methods Workshop**, MIT Biology Department and Center for Minds Brains and Machines.
- Designed and taught tutorials at intensive quantitative workshop for undergrads from diverse backgrounds

2013-2017 **Mentor and PAL, MIT Summer Research Program**, MIT Brain and Cognitive Sciences and Center for Minds Brains and Machines.
- Mentored summer student and served as informal PAL to several students in diversity research program

2014-2015 **Teaching Assistant**, MIT Brain and Cognitive Sciences Department.
- 9.40 (Introduction to Computational Neuroscience) TA: designed problem set questions, helped plan lectures and course curriculum, held office hours, answered student questions.

2014 **Teaching Assistant, Brains, Minds and Machines Summer Course**, Woods Hole Marine Biology Laboratory.
- Made MATLAB for neuroscience tutorial, gave neuroscience lecture, answered student questions, advised students on projects.

2014 **Conference organizer**, Graduate Women at MIT (GWAMIT).

• Organized a mentorship event for the 2014 Spring Empowerment Conference, co-chair of the 2014 Fall Leadership Conference

2011-2014 **Video Maker**, MIT+K12 Videos.

• Made outreach videos on science topics for the MIT+K12 Videos project, and Khan Academy. Designated as a 'high quality veteran video maker'.

• `http://k12videos.mit.edu/squid-skin-with-a-mind-of-its-own/`

• `http://www.khanacademy.org/science/mit-k12/v/bread-mold-kills-bacteria`

2012 **Teaching Assistant**, MIT Brain and Cognitive Sciences Department.

• 8.261/9.29 (Introduction to Computational Neuroscience) TA: held office hours and review sessions, and graded assignments

2011 **Teaching Assistant**, University of Chicago Biology Department.

• BIOS 20244 (Biophysics and Chemical Biology) TA: advised and assessed student presentations

2009-2010 **YSP Group Leader**, University of Chicago Mathematics Department.

• Led a discussion group of gifted $5^{th} - 9^{th}$ graders covering topics related to the mathematics of encryption

2008-2010 **VIGRE Course Assistant**, University of Chicago Mathematics Department.

• MATH 151,2,300 (Calculus) TA: held office hours, graded papers, assisted problem sessions

2009 **VIGRE REU**, University of Chicago Mathematics Department.

• Led a discussion group of 11^{th} and 12^{th} graders in Knot Theory and Applied Probability

2007-2008 **Gearup Classroom Support**, University of Chicago Neighborhood Schools Program.

• Assisted 8th grade Chicago Public Schools classroom

Skills and hobbies

Computer	MATLAB, Python, Slurm, LaTex, Mac OS X, Microsoft Office, CAD, Eagle
Fabrication	precision Lathe, precision milling machine, band saw, drill press, 3D printers, laser cutters, computer-controlled machining, electronics, etc.
Cello	MIT Chamber Music Society and Gilbert and Sullivan Pit Orchestra, University of Chicago Symphony Orchestra, Early Music Ensemble, Classical Improvisation Group
Other	Pottery, hiking, slackline, climbing

References

References available upon request