# LUCY LAI

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## EDUCATION

**HARVARD UNIVERSITY**, CAMBRIDGE, MA — 2018 –
Ph.D. in Neuroscience

**RICE UNIVERSITY**, HOUSTON, TX — 2014 – 2018
B.A. in Cognitive Sciences with Honors
Minors in Neuroscience, Computational and Applied Mathematics
Distinction in Research and Creative Work | Thesis: *Multisensory context warps time perception*

## AWARDS &HONORS

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| Center for Brains, Minds, and Machines (CBMM) Summer School | 2019 |
| National Science Foundation Graduate Research Fellowship | 2018 – 2023 |
| Phi Beta Kappa National Honor Society | 2018 |
| Rice University Student-Taught Course (STC) Teaching Award | 2017 |
| Cognitive Computational Neuroscience student travel award | 2017 |
| Janelia Undergraduate Scholars Program Fellowship | 2017 |
| Barry M. Goldwater Scholarship honorable mention | 2017 |
| Center for Sensorimotor Neural Engineering (CSNE) NSF-REU Fellowship | 2016 |
| Computational and Systems Neuroscience (Cosyne) undergraduate travel award | 2016 |
| Rice Undergraduate Scholars Program thesis grant | 2016 – 2018 |

## RESEARCH

**HARVARD UNIVERSITY**, CAMBRIDGE, MA — JUN 2019 –
*Department of Psychology*
Advisor: Samuel Gershman

- Developing computational models and designing experiments to understand the behavioral and neural origins of habit formation.

**MARINE BIOLOGICAL LABORATORY**, WOODS HOLE, MA — AUG 2019
*CBMM Summer School*

- Investigating the emergence of representational specificity during continual learning in multi-layer convolutional neural networks.

**BAYLOR COLLEGE OF MEDICINE**, HOUSTON, TX — JAN 2015 – JUN 2018
*Department of Neuroscience*
Advisor: Jeffrey Yau

- Designed behavioral experiments and built computational models to understand how context influences time perception across the senses.

**JANELIA RESEARCH CAMPUS**, ASHBURN, VA — JUN 2017 – AUG 2017
*Janelia Undergraduate Scholars Program*
Advisor: Joshua Dudman

- Used *in-vivo* neural recordings to understand how the motor cortex and striatum represent the kinematics of motor behaviors during reward-seeking actions.

**MASSACHUSETTS INSTITUTE OF TECHNOLOGY**, CAMBRIDGE, MA — JUN 2016 – AUG 2016
*Center for Sensorimotor Neural Engineering NSF-REU, McGovern Institute for Brain Research*
Advisor: Mehrdad Jazayeri

- Designed behavioral experiments and built Bayesian inference models to understand the role of memory in sensorimotor control.

## PUBLICATIONS& PRESENTATIONS

**Lai, L.,** Magnotti, JF., Yau, JM. *Conditioned inference through evidence filtering explains multisensory time warping.* Manuscript in preparation.

**Lai, L.,** Pho, GN., Ölveczky, BP., Gershman, SJ. *A computational division of labor for motor skill learning.* From Neuroscience to Artificially Intelligent Systems (NAISys) meeting, Cold Spring Harbor, NY. Accepted as a talk, *conference postponed due to COVID-19.*

Mikhael, JG, **Lai, L.,** Gershman, SJ. *Rational inattention and tonic dopamine.* Manuscript in revision.

**Lai, L.,** Magnotti, JF., Yau, JM. *Multisensory context warps time perception*. Cognitive Computational Neuroscience (CCN) meeting, New York, NY. Conference paper & poster: September 7, 2017.

**Lai, L.,** Dudman, JT. *Neural correlates of action kinematics in the dorsal striatum.* Janelia Undergraduate Scholars symposium, Ashburn, VA. Poster: August 3, 2017.

**Lai, L.,** Magnotti, JF., Yau, JM. *Contextual determinants of cue binding or separation in multisensory time perception.* International Multisensory Research Forum (IMRF) annual meeting, Nashville, TN. Poster: May 21, 2017.

**Lai, L.,** Yau, JM. *Attractive and repulsive multisensory interactions in time perception.* Society for Neuroscience (SfN) annual meeting, San Diego, CA. Poster: November 14, 2016.

**Lai, L.,** Jazayeri, M. *Characterizing variability in memory recall of time intervals.* Center for Sensorimotor Neural Engineering (CSNE) REU Symposium, Seattle, WA. Poster: August 17, 2016.

## TEACHING

### Course Design

Courses that I have personally designed (curriculum, problem sets, etc.) and taught from scratch.

**NB314QC: MATH TOOLS FOR NEUROSCIENCE** JAN 2020

*Department of Neurobiology, Harvard Medical School*

- Designed and taught a new J-term course for the Neuroscience Ph.D. program curriculum. Topics include fundamentals of linear algebra, probability theory, statistical estimation and inference in neural circuits, and analysis of neural population data.

**COLL158: HOW MUSIC PLAYS THE BRAIN** S 2017, F 2017, S 2018

*Rice University*

- Designed and taught a seminar course on the intersection of music and neuroscience. Topics include the neurobiology of music perception and cognition, music therapy, AI and music, etc. Recipient of the 2017 Rice Student-Taught Course Award!

### Teaching Assistantships

Roles in which I helped design/grade problem sets, held office hours, led recitations, and/or proctored exams.

**TEACHING FELLOW** F 2019

*Department of Neurobiology, Harvard Medical School*

- NB316QC: Helped write problem sets for a new graduate course on the probabilistic modeling of neural data.

**TEACHING ASSISTANT** MAR 2019

*Computational and Systems Neuroscience Conference Tutorial*

- Helped design and teach computational exercises at the 2019 Cosyne conference tutorial on Bayesian modeling of behavior.

**TEACHING ASSISTANT**

*Departments of Psychology, Statistics, Biosciences, Rice University*

- NEUR/PSYC 362: Cognitive Neuroscience S 2016, S 2017, S 2018
- NEUR/CAAM 416: Neural Computation S 2018
- NEUR/BIOC 385: Cellular and Molecular Neuroscience F 2016
- STAT 310: Probability and Statistics F 2016
- PSYC 203: Cognitive Psychology F 2015

## OUTREACH &SERVICE

### STEM Education Outreach

Roles where I have helped with curriculum development, mentoring, and teaching for (often underserved) city-area high school students.

**HPREP Curriculum and Teaching Team**, Harvard Medical School 2018 –
**BrainSTEM**, KIPP Sunnyside High School, Houston, TX 2015 – 2017
**Splash**, Rice University 2017

### Academic Mentorship

Roles where I have tutored or mentored students within an academic institution. Includes planning 4-year course curricula, helping with research internship/graduate school/fellowship applications, etc.

**Mind, Brain, Behavior (MBB) Graduate Student Mentor**, Harvard University 2019 –
**Alumni Externship Advisor**, Rice University 2018 –
**Head Academic Fellow**, Lovett College, Rice University 2016 – 2018
**Curriculum Advisor**, Rice Neuroscience Society, Rice University 2015 – 2018
**Orientation Week Advisor**, Lovett College, Rice University 2015

### Peer Reviewing

**NeurIPS Biological and Artificial Reinforcement Learning Workshop**, Vancouver, BC 2019

## LEADERSHIP &PROFESSIONAL

**Alumni Interviewer**, Rice University 2018 –
**Head Academic Fellow**, Lovett College, Rice University 2016 – 2018
**Catalyst Executive Editor**, Rice Undergraduate Science Research Journal 2014 - 2016
**Conference Organizer**, Exploring the Mind through Music Conference, Rice University 2016
**Alumni Week Coordinator**, Lovett College, Rice University 2016
**Urban Immersion Coordinator**, Center for Civic Leadership, Rice University 2014 – 2015
**Tour Guide**, Welcome Center, Rice University 2014 – 2015

## SKILLS &OTHER

**Programming:** MATLAB, Python, PyTorch, Tensorflow, Javascript, HTML/CSS
**Lab:** psychophysics, Amazon MTurk, *In-vivo* electrophysiology, rodent behavior
**Interests:** classical music, philosophy of science and religion, poetry, long-distance running, coffee