LUCY LAI

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EDUCATION

HARVARD UNIVERSITY, CAMBRIDGE, MA — 2018 –
Ph.D. in Neuroscience
Teaching Certificate, Derek Bok Center for Teaching and Learning

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*

RESEARCH

HARVARD UNIVERSITY, CAMBRIDGE, MA — JUN 2019 –
Department of Psychology and Center for Brain Science
Advisor: Samuel Gershman

- Developed a theory of **policy compression**: a resource-rational model of action selection.
- Designed and implemented human behavioral experiments on Amazon MTurk to test novel predictions resulting from our models.
- Developed reinforcement learning & decision-making tasks to characterize learning and choice strategies in healthy and clinical populations.

UNIVERSITY COLLEGE LONDON, LONDON, UK — JUN 2022 – AUG 2022
Max Planck UCL Centre for Computational Psychiatry and Ageing Research
Advisors: Quentin Huys and Tobias Hauser

- Developed a computational account of egodystonia and designed behavioral experiments to test model predictions in a population with a range of obsessive-compulsive traits.

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

- Developed Bayesian inference models and designed behavioral experiments to understand how context influences time perception across the senses.

SUMMER SCHOOLS & INTERNSHIPS

NSAS Computational Psychiatry Summer School, Venice, Italy — JUN 2022
Center for Brains, Minds, and Machines (CBMM) Summer School, Woods Hole, MA — AUG 2019
HHMI Janelia Undergraduate Scholars Program, Ashburn, VA — JUN – AUG 2017
Center for Sensorimotor Neural Engineering NSF-REU @ MIT, Cambridge, MA — JUN – AUG 2016

PUBLICATIONS

Lai, L.*, Huang, ZX*, Gershman, SJ. (under review). Action chunking as policy compression.

Gershman, SJ., Lai, L. (2021). The reward-complexity trade-off in schizophrenia. *Computational Psychiatry.*

Lai, L., Gershman, SJ. (2021). Policy compression: an information bottleneck in action selection. *Psychology of Learning and Motivation, Volume 74.*

Bhui, R., Lai, L., Gershman, SJ. (2021). Resource-rational decision making. *Current Opinion in Behavioral Sciences.*

Mikhael, JG, Lai, L., Gershman, SJ. (2021). Rational inattention and tonic dopamine. *PLOS Computational Biology.*

Lai, L., Magnotti, JF., Yau, JM. (2017). Multisensory context warps time perception. *Conference on Cognitive Computational Neuroscience.*

AWARDS &HONORS

HMS Department of Neurobiology Service Award (awarded for DEIJ efforts)	2022
Harvey Fellowship ($16k/year)	2022 – 2025
MAHPING Pedagogy Fellowship	2022
Harvard University Certificate of Distinction in Teaching	2021, 2022
Harvard Mind, Brain, Behavior (MBB) Graduate Student Award ($8560)	2021
National Science Foundation Graduate Research Fellowship	2018 – 2021
Phi Beta Kappa National Honor Society	2018
Rice University Student-Taught Course (STC) Teaching Award	2017
Cognitive Computational Neuroscience student travel award	2017
Barry M. Goldwater Scholarship honorable mention	2017
Computational and Systems Neuroscience (Cosyne) undergraduate travel award	2016
Rice Undergraduate Scholars Program thesis grant	2016 – 2018

INVITED TALKS

Shahar Lab Computational Seminar, Tel Aviv University, Tel Aviv, Israel	NOV 2022
RLDM Workshop: Maps in reinforcement learning, Brown University, Providence, RI	JUN 2022
FriSem, Dept. of Psychology, Stanford University, Stanford, CA	MAY 2022
Otto Lab Meeting, McGill University, Providence, RI	NOV 2021
Gold Lab Meeting, University of Maryland School of Medicine, Baltimore, MD	OCT 2021
RL Super Lab (Akrami, Botvinick, Gershman, Hermundstad, Paton, Pehlevan, Pouget)	OCT 2021
Shenhav Lab Meeting, Brown University, Providence, RI	OCT 2021
From Neuroscience to Artificially Intelligent Systems (NAISys), CSHL, NY	NOV 2020
Computational Principles of Intelligence Lab, MPI Tübingen, Germany	SEP 2020

CONFERENCE ABSTRACTS

Lai, L., Gershman, SJ. Policy compression: an information bottleneck in action selection.
Reward and Decision Making 2022, Lake Arrowhead, CA.

Lai, L., Dudman, JT. Neural correlates of action kinematics in the dorsal striatum.
Janelia Undergraduate Scholars Symposium 2017, Ashburn, VA.

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

Lai, L., Yau, JM. Attractive and repulsive multisensory interactions in time perception.
Society for Neuroscience (SfN) 2016, San Diego, CA.

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

TEACHING

Course Development & Instructor of Record

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

FROM BENCH TO BEDTIME: ENTRAINING POLICY TO SCIENCE F 2022
Morehouse School of Medicine & Harvard Medical School

- Co-designing a 3-day nanocourse with 6 other graduate students as a part of the MAHPING (Morehouse and Harvard Partnering in Neuroscience Growth) Pedagogy Fellows program.
- Course taught at both Morehouse and Harvard in Fall 2022.

NB314QC / NB212: MATH TOOLS FOR NEUROSCIENCE JAN 2020, F 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.
- Converted to a full-semester curriculum and added as the foundational course for the Certificate in Computational Neuroscience (F2020).

TEACHING (CONT.)

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 Teaching Award!

Teaching Support

Designed / graded problem sets, taught discussion sections, proctored exams, and managed a teaching team.

TEACHING FELLOW, *Harvard University*

- Teaching 100: The Theory and Science of Teaching — F 2022
- GenEd1125: Artificial and Natural Intelligence (Head TF) — S 2021, S 2022
  As Head TF (2022), I developed course materials from scratch (all psets and the discussion section curriculum), gave occasional guest lectures, and managed a teaching team of 5 TFs for a course of ~100 students. Both years I also taught my own section of 15-20 students.
- NB212: Math Tools for Neuroscience — F 2020
- NB306QC: Quantitative Methods for Biologists — AUG 2020
- NB316QC: Probabilistic Modeling of Neural Data — S 2020
- COSYNE Conference Workshop on Bayesian Modeling — MAR 2019

TEACHING ASSISTANT, *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

Academic Mentoring

Advising students in academic matters such as curriculum & career planning, graduate school & fellowship applications, and finding research & internship opportunities.

Resident Tutor, Quincy House, Harvard University — 2021 –

- The resident tutor role is akin to a traditional resident assistant (RA) role with the added responsibilities of formal academic advising and student social and emotional support. Tutors live with Harvard College students and play a vital role in the residential and educational life of undergraduates.
- Examples of yearly events that I host: *"Design Your Life", "So you wanna go to grad school?"*

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

Research Mentoring

Advised the following students on independent research projects.

Sidd Tiwari, Harvard Undergraduate Student — 2022 –

Jennifer Guo, Harvard Undergraduate Student — 2022 –

Ann Huang, McGill University Undergraduate Summer Intern — 2021 – 2022

Lily Zheng, Harvard Neuroscience Rotation Student — 2021

Varshini Subramanian, Thomas Jefferson High School Student (Now at CMU) — 2020 – 2021

Danielah Samson, HPREP, Boston Latin Academy High School Student — 2020 – 2021

Emma Rogge, Harvard Undergraduate Student — 2020

OUTREACH &SERVICE (CONT.)

STEM Outreach

Teaching & mentoring local high school students, often from underserved and underrepresented backgrounds.

SciTalks, Manchester Essex Regional High School & Manchester Neuroscience Society 2021
HPREP Teaching and Mentoring Team, Harvard Medical School 2018 – 2021
BrainSTEM, KIPP Sunnyside High School, Houston, TX 2015 – 2017
Splash, Rice University 2017

Diversity and Inclusion

Active efforts to promote diversity, equity, and inclusion within an academic setting.

Founder and Co-Organizer, "Listening Lab" Forum, Harvard Dept. of Neurobiology 2020 –
Committee on Diversity and Inclusion, Harvard Dept. of Neurobiology 2020 –
Growing Up in Science Global Network 2018 –
Harvard Graduate Women in Science and Engineering (HGWISE), Harvard University 2018 – 2020

Peer Reviewing

NeurIPS Biological and Artificial Reinforcement Learning Workshop
Cognitive Science Society
PLOS Computational Biology

Other

Student Interviewer, Harvard PhD Program in Neuroscience Admissions 2022, 2023
Conference Organizer, Exploring the Mind through Music Conference, Rice University 2016

SKILLS &OTHER

Languages: English (native), Mandarin Chinese (limited working proficiency)
Programming: Python, MATLAB, Javascript, HTML/CSS, PyTorch, Tensorflow
Interests: classical music, poetry, philosophy of science and religion, running, coffee