

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

- Developing and empirically testing the theory of **policy compression**: a resource-rational model of action selection with applications to decision-making behavior and computational psychiatry.

UNIVERSITY COLLEGE LONDON, LONDON, UK SUMMER 2022

Max Planck UCL Centre for Computational Psychiatry and Ageing Research

Advisors: Quentin Huys and Tobias Hauser

- Developing and testing a computational account of egodystonia in action compulsivity.

MARINE BIOLOGICAL LABORATORY, WOODS HOLE, MA AUG 2019

Center for Brains, Minds, and Machines (CBMM) Summer School

- Investigated the emergence of representational specificity during continual learning in CNNs.

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.

JANELIA RESEARCH CAMPUS, ASHBURN, VA SUMMER 2017

Janelia Undergraduate Scholars Program

Advisor: Joshua Dudman

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MA SUMMER 2016

Center for Sensorimotor Neural Engineering NSF-REU, McGovern Institute for Brain Research

Advisor: Mehrdad Jazayeri

PUBLICATIONS | Lai, L.*, Huang, ZX*, Gershman, SJ. (in prep). 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. (in prep). Conditioned inference explains multisensory time distortions.

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

AWARDS &HONORS	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
	Center for Brains, Minds, and Machines (CBMM) Summer School	2019
	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
	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

INVITED TALKS	RLDM Workshop: Maps in reinforcement learning , Brown University, Providence, RI	JUN 2022
	Policy compression: an information bottleneck in action selection	
	Dept. of Psychology FriSem , Stanford University, Stanford, CA	MAY 2022
	Policy compression: an information bottleneck in action selection	
	Otto Lab Meeting , McGill University, Providence, RI	NOV 2021
	Action chunking as policy compression	
	Gold Lab Meeting , University of Maryland School of Medicine, Baltimore, MD	OCT 2021
	Action chunking as policy compression	
	RL Super Lab (Akrami, Botvinick, Gershman, Hermundstad, Paton, Pehlevan, Pouget)	OCT 2021
	Action chunking as policy compression	
	Shenhav Lab Meeting , Brown University, Providence, RI	OCT 2021
	Action chunking as policy compression	
	From Neuroscience to Artificially Intelligent Systems (NAISys) , CSHL, NY	NOV 2020
	A computational division of labor for motor skill learning	
	Computational Principles of Intelligence Lab , MPI Tübingen, Germany	SEP 2020
	The reward-complexity tradeoff explains habit formation in free-operant conditioning	

CONFERENCE ABSTRACTS	Lai, L. , Gershman, SJ. Policy compression: an information bottleneck in action selection. <i>Reward and Decision Making 2022, Lake Arrowhead, CA</i> .	
	Lai, L. , Dudman, JT. Neural correlates of action kinematics in the dorsal striatum. <i>Janelia Undergraduate Scholars Symposium 2017, Ashburn, VA</i> .	
	Lai, L. , Magnotti, JF., Yau, JM. Contextual determinants of cue binding or separation in multisensory time perception. <i>International Multisensory Research Forum (IMRF) 2017, Nashville, TN</i> .	
	Lai, L. , Yau, JM. Attractive and repulsive multisensory interactions in time perception. <i>Society for Neuroscience (SfN) 2016, San Diego, CA</i> .	
	Lai, L. , Jazayeri, M. Characterizing variability in memory recall of time intervals. <i>Center for Sensorimotor Neural Engineering (CSNE) REU Symposium 2016, Seattle, WA</i> .	

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

F2022

Morehouse School of Medicine & Harvard Medical School

- o 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.
- o Course will be taught both at Morehouse (September) and Harvard (November) in Fall 2022.

NB314QC / NB212: MATH TOOLS FOR NEUROSCIENCE

JAN 2020, F 2020

Department of Neurobiology, Harvard Medical School

- o 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.
- o Converted to a full-semester curriculum and added as the foundational course for the Certificate in Computational Neuroscience (F2020).

COLL158: HOW MUSIC PLAYS THE BRAIN

S 2017, F 2017, S 2018

Rice University

- o 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 Support

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

TEACHING FELLOW, *Harvard University*

- o 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 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 discussion section of 15-20 students.
- o NB212: Math Tools for Neuroscience F 2020
- o NB306QC: Quantitative Methods for Biologists AUG 2020
- o NB316QC: Probabilistic Modeling of Neural Data S 2020

TEACHING ASSISTANT, *COSYNE Conference Workshop on Bayesian Modeling*

MAR 2019

TEACHING ASSISTANT, *Rice University*

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

OUTREACH &SERVICE | 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 –

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

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 –

- o 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.
- o 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.

Ann Huang, McGill University Undergraduate Summer Intern 2021

Lily Zheng, Harvard Neuroscience Rotation Student 2021

Varshini Subramanian, Thomas Jefferson High School Student (Now at Georgia Tech) 2020 – 2021

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

Emma Rogge, Harvard Undergraduate Student 2020

Peer Reviewing

NeurIPS Biological and Artificial Reinforcement Learning Workshop

Cognitive Science Society

PLOS Computational Biology

Other

Organizer, Cambridge Graduate Roundtable on Science and Religion 2021 –

Conference Organizer, Exploring the Mind through Music Conference, Rice University 2016

SKILLS & OTHER

Languages: English (native), Mandarin Chinese (limited working proficiency), Python, MATLAB

Programming: jsPsych, Javascript, HTML/CSS, PyTorch, Tensorflow

Interests: classical music, poetry, theology, philosophy of science and religion, running, coffee