LIYU XIA

EMAIL: jimmyxia@math.berkeley.edu **HOMEPAGE:** xialiyu1995.github.io

EDUCATION

University of California, Berkeley 09/2016 - 05/2021 (expected)
PhD in Applied Mathematics *Advisors: Anne Collins, James Pitman*

- State and temporal abstractions in human reinforcement learning
- Credit assignment and hidden state inference in hierarchical tasks
- Learning to learn to probe individual differences in human learning

University of Chicago 09/2012 - 06/2016
BS in Pure and Computational Mathematics (both with honors) *Advisors: Laszlo Babai, Gregory Lawler*

CONFERENCES AND PUBLICATIONS

Liyu Xia, Sarah Master, Maria Eckstein, Linda Wilbrecht, Anne Collins. (2020). Learning under uncertainty changes during adolescence. In *Cognitive Science Society* (CogSci). **Oral presentation**.

Liyu Xia, Anne Collins. (2020). Temporal and state abstractions for efficient learning, transfer and composition in humans (in revision). preprint.

Liyu Xia, Anne Collins. (2019). Humans flexibly transfer options at multiple levels of abstractions. In *Advances in Neural Information Processing Systems* (NeurIPS). paper. **Contributed talk** in the Biological and Artificial Reinforcement Learning Workshop. talk. **Student poster prize**.

Liyu Xia, Anne Collins. (2019). The options framework enables flexible transfer in humans. In *the Multi-disciplinary Conference on Reinforcement Learning and Decision Making* (RLDM). paper. **Contributed talk.** slides.

Liyu Xia, Anne Collins. (2019). Hierarchical reinforcement learning enables flexible transfer in humans. In *Cognitive Neuroscience Society* (CNS). poster.

Liyu Xia, Anne Collins. (2019). The options framework enables flexible transfer at distinct behavioral hierarchies. In *Sackler Colloquium for Brain Produces Mind by Modeling.* poster.

Liyu Xia, Anne Collins. (2018). Hierarchical reinforcement learning and transfer in humans. In *Society for Neuroscience* (SfN). poster.

Liyu Xia, Mary Kemp, Afzal Hossain, Alexandra Howes. (2016). #Conversations: Customer service through Twitter platform. In *Joint Mathematics Meeting.* paper.

Mackenzie Leake*, **Liyu Xia***, Kamil Rocki, Wayne Imaino. (2015). A Probabilistic View of the Spatial Pooler in Hierarchical Temporal Memory. In *International Conference on Artificial Neural Networks (ICANN).* paper.

Mackenzie Leake*, **Liyu Xia***, Kamil Rocki, Wayne Imaino. (2015). Effect of Spatial Pooler Initialization on Column Activity in Hierarchical Temporal Memory. In *AAAI Conference on Artificial Intelligence.* paper.

INVITED TALKS

2020 *Barbados Reinforcement Learning Workshop* organized by McGill University, University of Alberta, and DeepMind (cancelled due to COVID-19).

2020 *Neuro-AI seminar* at MILA. recording.

HONORS AND AWARDS

2019 Outstanding Graduate Student Instructor Teaching Award (**top 10%**)

2019 Berkeley Graduate Division Conference Travel Grant (**$1800**)

2019 NeurIPS Travel Award (**$500**)

2019 Sackler Colloquium Travel Award (**$800**)

2018 Society for Neuroscience Trainee Professional Development Award (**$1000**)

2016 Phi Beta Kappa (**GPA: 3.9/4.0**)

GRADUATE STUDENT INSTRUCTOR

MATH 1B: Calculus Fall 2016 - Fall 2017

MATH 16B: Analytic Geometry and Calculus Spring 2018

COG SCI 1: Introduction to Cognitive Science Spring 2019

OTHER POSITIONS

RIKEN Brain Science Institute Summer 2017
Research Intern *Advisors: Tomoki Fukai, Tomoki Kurikawa*

- Probed individual difference of decision making in rats
- Simulated neural trajectory using STDP and RL in RNN to explain individual difference in rats

University of California, Los Angeles, Research in Industrial Projects for Students Summer 2015
Research Intern *Advisors: Roja Bandari, Brian Kim*

- Analyzed 40 million tweets for Twitter as a platform for conducting customer service
- Presented results to CTO at Twitter Headquarter

IBM Almaden Research Center Summer 2014
Research Intern *Advisors: Wayne Imaino, Kamil Rocki*

- Formulated a probabilistic framework for the Spatial Pooling phase of Hierarchical Temporal Memory (HTM), a brain-inspired online unsupervised learning algorithm
- Presented to senior IBM fellows on a weekly basis and at Numenta (whose founder Jeff Hawkins proposed HTM)

GRANT WRITING

Co-author of awarded NIH grant (R01MH119383-01): The neural computations supporting hierarchical reinforcement learning

AD HOC REVIEWER

Nature Neuroscience, Neuron

UNDERGRADUATES MENTORED

Katya Brooun, Joy Chang, Flora Dong, Kshitiz Gupta, Soobin Hong, Yi Liu, Sabrina Ni, Wendy Shi

SKILLS

Programming: MatLab, Python (Tensorflow, Keras), R, STAN, Javascript (jspsych)

Language: Chinese, English, Japanese