# LIYU XIA

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## EDUCATION

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

- Dissertation: State abstraction and temporal abstraction in human reinforcement 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**, Anne Collins. (2019). Behavioral evidence of option transfer and composition in human learning. (in prep)

**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.

**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.** talk.

**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. **Oral presentation.**

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

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.

## HONORS AND AWARDS

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

2019 Berkeley Graduate Division Conference Travel Grant (**$900 * 2**)

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**)

2015 Dean's fund for travel to ICANN Conference (**$1700**)

## 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

## UNDERGRADUATES MENTORED

Katya Brooun, Flora Dong, Sabrina Ni, Wendy Shi

## SKILLS

**Programming:** MatLab, Python, R, STAN, Javascript (jspsych)

**Language:** Chinese, English, Japanese