

Yuxuan (Effie) Li

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- Ph.D. student with 4 years of experience in cognitive (neuro)science and deep learning research
- Research interests: deep learning, cognition, task decomposition, representation, interpretability

Education

- 2019 – 2024 **Stanford University**, Ph.D. Candidate in Cognitive Psychology. GPA: 4.0/4.0. [Transcript](#).
- Weiland Fellow, School of Humanities and Sciences
 - Trainee, Center for Mind, Brain, Computation and Technology
- 2013 – 2017 **Trinity College**, B.S. in Computer Science and Psychology. GPA: 4.0/4.0. *summa cum laude*.

Research Experience

- 2019 – **Stanford University PDP Lab**, Ph.D. student researcher. Advisor: James McClelland.
- Researching planning and task decomposition in humans and deep learning models.
 - Investigated multi-task learning, systematic generalization, inductive biases, and attention interpretability in transformers trained on structured tasks ([preprint](#), [code](#)).
 - Built cognitive models to characterize the role of context-sensitivity in human goal- and subgoal-directed planning ([paper](#), [code](#)).
 - Explored a hippocampus-inspired recurrent memory module ([report](#), [code](#)) and transfer effects from transition learning ([report](#), [code](#)) for deep reinforcement learning agents.
- 2017 – 2019 **UPenn Computational Memory Lab**, research specialist. Advisor: Michael Kahana.
- Developed neural memory classifiers with large-scale EEG time series data and designed a novel sampling approach (paper under review).
 - Analyzed EEG biomarkers of episodic memory formation and retrieval.
- 2016 – 2017 **Trinity College Dept. of Psychology**, student researcher. Advisors: M.A. Grubb, E.D. Casserly.
- Conducted research on human attention, visual search, and sentiment analysis.
- 2016 **Columbia Business School**, summer research intern. Advisor: Bruce Kogut.
- Built predictive models of social investors, companies, and investment activities.

Publications

- under review* **Li, Y.**, and McClelland, J.L. (2022). Systematic generalization and emergent structures in transformers trained on structured tasks.
- under review* **Li, Y.**, Pazdera, J.K., and Kahana, M.J. (2022). EEG decoders track memory dynamics.
- 2022 **Li, Y.**, and McClelland, J.L. (2022). A weighted constraint satisfaction approach to human goal-directed decision making. *PLOS Computational Biology*.
- 2022 Kahana, M.J., Lohnas, L.J., Healey, K., . . . , **Li, Y.**, . . . , Weidemann, C.T. (2022). The Penn Electrophysiology of Encoding and Retrieval Study. *PsyArXiv*.
- 2022 Katerman, B.S., **Li, Y.**, Pazdera, J.K., Keane, C., & Kahana, M.J. (2022). EEG biomarkers of free recall. *NeuroImage*.
- 2018 Grubb, M.A., **Li, Y.** (2018). Assessing the role of accuracy-based feedback in value-driven attentional capture. *Attention, Perception, & Psychophysics*.

Talks and Presentations

- 2022 **Li, Y.** (Apr 2022). A weighted constraint satisfaction approach to human goal-directed decision making. *Cognitive Tools Lab, University of California, San Diego.*
- 2021 **Li, Y.** (Feb 2021). Model-based reinforcement learning and the reinforcement learning framework for human behavior. *TA Lecture in PSYCH 209, Stanford University.*
- 2021 **Li, Y.** (Oct 2020 & Oct 2021). Building online psychology experiments with jsPsych: a tutorial. *TA Lecture in PSYCH 251, Stanford University.*
- 2020 **Li, Y.** (May 2020). Plan forward and backward in time. *FriSem seminar, Department of Psychology, Stanford University.*
- 2018 **Li, Y., & Kahana, M.J.** (2018). Neural dynamics of memory encoding and retrieval. *Talk at the 51st Annual Meeting of the Society of Mathematical Psychology, Madison, WI.*

Honors and Awards

- 2022 – 2024 Ric Weiland Graduate Fellowship in the Humanities & Sciences. Stanford University.
- 2013 – 2017 Phi Beta Kappa, Dean's Scholar (top 5%), Faculty Honors, Holland Scholar. Trinity College.

Teaching Experience

- 2020 – **Teaching Assistant**, Department of Psychology, Stanford University
- For graduate courses: Neural Network Models of Cognition, Brain Decoding, Experimental Methods, Developmental Psychology
- 2015 – 2017 **Teaching Assistant**, Department of Computer Science, Trinity College
- For undergraduate courses: Introduction to Computing, Mathematical Foundations of Computing

Service

- Reviewer* Cognitive Science Society, 2022 –
- Committee* Cognitive Neuroscience Seminar Organizing Committee, Stanford Psychology, 2021 – 2022

Technical Skills

- Coursework* Graduate coursework in deep learning, reinforcement learning, deep multi-task and meta-learning, machine learning, computational neuroscience
- Programming* **Python, R**, some experience with MATLAB, HTML/CSS/JavaScript (jquery, jspsych)
- Packages* **Deep learning** (pytorch, pytorch-lightning, einops), **machine learning** (scikit-learn), **data analysis** (scipy, numpy, pandas; tidyr, dplyr, lme4), **data visualization** (matplotlib; ggplot2), **cognitive science and neuroscience** (mne, pta; rtdists)
- Other* LaTeX, statistics (linear modeling, generalized linear modeling, mixed-effects models), representation analysis, online behavioral platforms (Amazon MTurk, Prolific)