Li, Yuxuan (Effie)

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- Ph.D. student with 4+ years of experience in statistics, deep learning, and cognitive science research
- Research interests: deep learning, cognition, context, representation, generalization, interpretability

Education

2019 –   **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. *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 interpretability in transformers trained on structured tasks (paper in prep, 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 observation transition learning (report, code) for deep RL agents.

2017 – 2019   **UPenn Computational Memory Lab**, research specialist. Advisor: Michael Kahana.
- Trained neural classifiers using large-scale EEG data and a novel sampling approach.
- Probed links between biomarkers and behavior in episodic memory formation and retrieval (paper under review).

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.
- Developed predictive models of social investors, companies, and investment activities.

Publications

in prep   **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, LaTeX,** 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, ptsa; rtdists)

Other   Statistics (linear modeling, generalized linear modeling, mixed-effects models), representation analysis, online behavioral platforms (Amazon MTurk, Prolific)