

Lily Zihui Zhu

PHD STUDENT · HARVARD PSYCHOLOGY

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Education

Harvard University

PH.D. IN PSYCHOLOGY

• Advisors: Dr. Jesse Snedeker, Dr. Erika Bergelson

Cambridge, MA

2024 - 2029 (expected)

Johns Hopkins University

M.S.E. IN DATA SCIENCE

• Thesis: "Modeling the acquisition of generative principles: the mapping between cross-linguistic number words and symbols"
• Cumulative GPA: 4.0/4.0

Baltimore, MD

2022 - 2024

B.S. IN APPLIED MATHEMATICS AND STATISTICS & B.A. IN COGNITIVE SCIENCE

• Minor in Linguistics
• Cumulative GPA: 4.0/4.0

2019 - 2023

Publications

Zhu, R., Kilonzo, T. N., **Zhu, L. Z.**, Fan, J., & Frank, M. C. (submitted). Cross-contextual diversity in children's early understanding of visual media. *Topics in Cognitive Science*.

Zhu, R., Goddu, M. K., **Zhu, L. Z.**, & Gopnik, A. (2024). Preschoolers' comprehension of functional metaphors. *Open Mind*, 8, 924-949.

Zhu, Z., & Nguyen, A. (2022). The interaction between structure, discourse, and prosody in wh-questions in English. *Proceedings of the Fifty-eighth Annual Meeting of the Chicago Linguistic Society*, Chicago, IL, 501-517.

Zhu, L. Z. & Yuan, L., (in prep). Cross-linguistic differences without cross-cultural confounds: Modeling the effect of linguistic systematicity on learning.

Yuan, L., **Zhu L. Z.**, Johns, E., Mix K., & Smith, L. (in prep). Road to transfer and generalization: the role of knowledge "hub".

Research Experience

DEL Lab, University of Colorado Boulder - Research Assistant

Principle Investigator/Advisor: Dr. Lei Yuan

Boulder, CO

Jan 2022 - May 2024

- Contributed 700+ hours to 3 projects investigating children's learning mechanisms (e.g., language-guided relational attention, associative learning) and knowledge structure (e.g., place value).
- Implemented and trained deep image captioning models (CNN + LSTM) in PyTorch to name multi-digit number symbols, assessed their sensitivity to the consistency of visual-verbal mappings in learning input.
- Conducted systematic literature review on children's early knowledge of place value concepts.
- Modeled the structure of components of mathematical knowledge using partial correlation networks and co-occurrence networks and created network visualizations in R and Python.
- Performed hypothesis testing in R using mixed effect models to assess effectiveness of various place value training paradigms.
- Implemented Hidden Markov Model in Python to model eye gaze patterns and reduce noise in behavioral data.
- Analyzed and visualized eye-tracking data in R via growth curve analysis, onset-contingent analysis, and divergence analysis.

Gopnik Lab, University of California, Berkeley - Research Assistant

Berkeley, CA

Principle Investigator: Dr. Alison Gopnik | Advisor: Dr. Rebecca Zhu

June 2021 - May 2024

- Contributed 600+ hours to 4 projects studying how children comprehend, produce, and learn from various types of symbols (e.g., non-literal language, pictures, and relational words).
- Extracted 250+ million utterances from CHILDES using R to study the distribution of abstract relational words (e.g., same, different) in child-directed speech and children's production.
- Trained 5 research assistants on study-specific procedures and supervised their experimental data collection processes.
- Collected data from 50+ preschoolers (i.e., 3-5 year-olds) and 30+ adults on studies investigating how children acquire and learn from non-literal expressions.
- Administered standardized experiments online over Zoom, e.g., checking consent forms, collecting demographic information, running experimental scripts, and coding behavioral data.

Language Acquisition Lab, Johns Hopkins University - Research Assistant

Baltimore, MD

Principle Investigator: Dr. Géraldine Legendre | Advisor: Dr. An Nguyen

Jan 2021 - Dec 2022

- Contributed 300+ hours to 2 projects investigating linguistic cues that guide children to acquire syntactic variations.
- Analyzed 10 children's corpora on CHILDES using CLAN to study the distribution of different wh-questions.
- Designed and launched controlled linguistic production experiments on Prolific.
- Collected, cleaned, and analyzed 600+ recordings to extract phonetic information such as pitch and word duration.
- Applied statistical models to understand prosodic differences of English wh-questions in different contexts.
- Abstract on wh-question prosody in English was accepted as an oral presentation at the Chicago Linguistic Society annual conference in 2022.

Teaching Experience

Johns Hopkins University

Baltimore, MD

EN.553.432/632 BAYESIAN STATISTICS

Spring 2024

- Instructor: Dr. Sergey Kushnarev, Dept. of Applied Mathematics and Statistics
- Role: Head Teaching Assistant. *Coordinated logistics, graded assignments, and held weekly office hours.*

EN.553.431 HONORS INTRODUCTION TO STATISTICS

Fall 2022, Spring 2023

- Instructor: Dr. Avanti Athreya, Dept. of Applied Mathematics and Statistics
- Role: Teaching Assistant. *Taught lecture materials, led discussion sessions, graded assignments, and held weekly office hours.*

EN.553.291 LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

Fall 2021

- Instructor: Dr. Mario Micheli, Dept. of Applied Mathematics and Statistics
- Role: Teaching Assistant. *Led problem-solving sessions, graded assignments, and held weekly office hours.*

Work Experience

Handshake

San Francisco, CA

DATA ENGINEER INTERN, DATA INFRASTRUCTURE

June 2022 - Aug 2022

- Developed Python SDK for third-party API service, integrated it to existing data pipelines on Google Cloud Platform, simplified data team messaging workflow.
- Refactored Terraform module for scalable access control on cloud service, wrote Bash script for automated module deployment, migrated 1k+ Google Secret Management resources.

Johns Hopkins School of Public Health

Baltimore, MD

STUDENT INTERN, CHILD AND ADOLESCENT HEALTH MEASUREMENT INITIATIVE

Jan 2020 - Aug 2021

- Collected, cleaned, and input annual national child health survey data into SPSS database.
- Created codebook in SPSS, SAS, Stata to generate summary statistics and visualizations to describe the data on the Data Resource Center for Child & Adolescent Health dashboard.

Fellowships, Grants, & Awards

2024	Stimson Research Grant , Harvard University	\$ 1,000
2023	Applied Mathematics & Statistics Achievement Award , Johns Hopkins University	\$ 500
	Intuitive Surgical Best Project Award , Deep Learning Course, Johns Hopkins University	\$ 400
	General Honors , Johns Hopkins University	
	Departmental Honors , Dept. of Applied Mathematics & Statistics, Johns Hopkins University	
	Departmental Honors , Dept. of Cognitive Science, Johns Hopkins University	
	Phi Beta Kappa , Alpha of Maryland at Johns Hopkins University	
2021	“Design Your Summer Experience” Grant , Johns Hopkins University	\$ 1,000
	JHU Student Employee of the Year (Nomination) , Johns Hopkins University	
2020	Bloomberg Distinguished Professors Summer Research Award , Johns Hopkins University	\$ 4,000
2019-2023	Dean’s List x 6 , Johns Hopkins University	

Outreach

2022-2023	Women Mentoring Whiting at Johns Hopkins Whiting School of Engineering , Mentor
2021-2023	Mentorship Program at Johns Hopkins Omega Psi Cognitive Science Society , Mentor
2020-2021	Johns Hopkins University Counseling Center , Counseling Center Advisory Board Member

Skills

Programming Python, PyTorch, Java, R, SQL, Matlab, Bash

Data Analytics statistical analysis (regression, network, time series), eye-tracking data analysis, deep learning

Natural Languages Mandarin (native), English (fluent), Cantonese (fluent)

Coursework

Computer Science: Data Structures, Algorithms, Machine Learning, Deep Learning, Natural Language Processing

Mathematics: Multivariate Calculus, Discrete Mathematics, Linear Algebra, Differential Equations, Probability, Statistics, Optimization, Applied Statistics & Data Analysis, Time Series Analysis, Bayesian Statistics, Information Theory

Linguistics: Psychosemantics, Syntax I, Phonology I, Research Seminar in OT Syntax, Research Seminar in Minimalist Syntax

Psychology: Research Methods in Psychology, Design & Analysis for Experimental Psychology, Developmental Psychology, Social Psychology, Foundations of Brain, Behavior, and Cognition, Developmental Proseminar

Other relevant courses: Foundations of Cognitive Science, Research Seminar in Language Acquisition, First Language Acquisition, Second Language Acquisition

References

DR. JESSE SNEDEKER, SNEDEKER@WJH.HARVARD.EDU

- Professor, Dept. of Psychology, Harvard University
- Relationship: PhD advisor

DR. ELIKA BERGELSON, ELIKA_BERGELSON@FAS.HARVARD.EDU

- Associate Professor, Dept. of Psychology, Harvard University
- Relationship: PhD advisor

DR. GÉRALDINE LEGENDRE, LEGENDRE@JHU.EDU

- Professor & Chair, Dept. of Cognitive Science, Johns Hopkins University
- Relationship: course instructor, research supervisor

DR. LEI YUAN, LEI.YUAN@COLORADO.EDU

- Assistant Professor, Dept. of Psychology and Neuroscience, University of Colorado Boulder
- Relationship: research supervisor

DR. REBECCA ZHU, RYZ@STANFORD.EDU

- Post-Doctoral Scholar, Dept. of Psychology, Stanford University
- Relationship: research supervisor