

Lily Zihui Zhu

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Education

Johns Hopkins University

Baltimore, MD

M.S.E. IN DATA SCIENCE

2022 - 2024 (expected)

- Thesis: "Modeling the acquisition of generative principles: the mapping between cross-linguistic number words and symbols"

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

2019 - 2023

- Minor in Linguistics
- Cumulative GPA: 4.0/4.0

Publications

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

Hochmann, J.R., Zhu, R., **Zhu, L. Z.**, & Carey, S. (in prep). Evidence for a format change in the representation of the abstract relations same and different during the preschool years.

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

Boulder, CO

Principle Investigator/Advisor: Lei Yuan, PhD

Jan 2022 - Present

- Contributed 500+ hours to 3 projects investigating children's learning mechanisms (e.g., language-guided relational attention, associative learning) and knowledge structure (e.g., place value).
- 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 paradigm.
- 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: Alison Gopnik, PhD | Advisor: Rebecca Zhu, PhD

June 2021 - Present

- 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 2 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.
- Designed experimental stimuli and order sheets using PowerPoint (storybook with animated objects).

Language Acquisition Lab, Johns Hopkins University - Research Assistant

Baltimore, MD

Principle Investigator: Géraldine Legendre, PhD | Advisor: An Nguyen, PhD

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.553.431 HONORS INTRODUCTION TO STATISTICS

Fall 2022, Spring 2023

- Instructor: Avanti Athreya, PhD, 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: Mario Micheli, PhD, 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.

Awards

2023	AMS Achievement Award , Dept. of Applied Mathematics and Statistics, JHU	\$ 500
	Intuitive Surgical Best Project Award , EN.601.488 Machine Learning: Deep Learning, JHU	\$ 400
	General Honors , JHU	
	Departmental Honors , Dept. of Applied Mathematics and Statistics, JHU	
	Departmental Honors , Dept. of Cognitive Science, JHU	
	Phi Beta Kappa , Alpha of Maryland at JHU	
2021	"Design Your Summer Experience" Grant , JHU Life Design Lab	\$ 1,000
	JHU Student Employee of the Year (Nomination) , University Experiential Learning, JHU	
2020	Bloomberg Distinguished Professors Summer Research Award , HOUR, JHU	\$ 4,000
2019-2023	Dean's List x 6 , JHU	

Outreach

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

Skills

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

Data Analytics network modeling, time series analysis, deep learning, regression analysis, database management

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

Coursework

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

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

Linguistics: 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

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

References

AVANTI ATHREYA, PHD, DATHREY1@JHU.EDU

- Associate Research Professor, Dept. of Applied Mathematics and Statistics, Johns Hopkins University
- Relationship: course instructor, supervisor for teaching assistantship

GÉRALDINE LEGENDRE, PHD, LEGENDRE@JHU.EDU

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

LEI YUAN, PHD, LEI.YUAN@COLORADO.EDU

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

REBECCA ZHU, PHD, REBECCAZHU@BERKELEY.EDU

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