Yiyang (Daphne) Zhang

https://daphnez311.github.io/daphne-portfolio/

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EDUCATION

University of California, Los Angeles (UCLA)   **Los Angeles, CA**
BS, Cognitive Science with Specialization in Computing   Aug. 2021 – May 2025
- GPA: 3.91/4.0 (Major GPA: 4.0/4.0).
- Relevant coursework: Sensation and Perception, Behavioral Neuroscience, Psychological Statistics, Advanced MATLAB, Python with Applications, Introduction to Machine Learning.
- Honors and Awards: 2024 URC-HASS Summer Fellowship 2024 ($3,000), 2024 Psychology Departmental Honors Program.

PUBLICATIONS

Zhu, H., **Zhang, Y.**, Beierholm, U., Shams, L. (under review at *Psychonomic Bulletin & Review*). Crossmodal Interaction of Flashes and Beeps Across Time and Number Follows Bayesian Causal Inference. Preprint: https://www.biorxiv.org/content/10.1101/2025.03.13.643161v1

McGee, T., **Zhang, Y.**, Blank, I. (under review). Evidence Against Syntactic Encapsulation in Large Language Models.

Johnson, M. A., Keser, Z., Lammers, B., Sydnor, M., Murter, J., **Zhang, Y.**, Sadil, P., Desmond, J. E., Hillis, A. E., Lindquist, M. A., Sebastian, R. (under review). White Matter Predictors of Cerebellar tDCS Treatment Effects in Aphasia Rehabilitation.

Zhang, Y., Ivan, S., Shams, L. (in prep). Vibrotactile Stimulation Modulates Arousal but Not Performance under Cognitive Load.

Zhang, Y., Schoeller, F., Reggente, N. (in prep). Examining the Relationship Between Peak Emotional Reward (Aesthetic Chills) and Memory/Time perception.

CONFERENCE PRESENTATIONS

Talk
Zhang, Y., Ivan, S., Shams, L. (2025 May). Investigating the Transient Effects of Vibrotactile Stimulation on Stress Regulation. *2025 UCLA Psychology Undergraduate Research Conference (PURC).*

Posters
Zhang, Y., Schoeller, F., Reggente, N. (2025 May). Aesthetic Chills and the Mind: How Frisson Influences Time Perception and Memory. *UCLA Undergraduate Research Week, UCLA Psi Chi Conference, Undergraduate Interdisciplinary Research Association(UIRA) Poster Day*

Zhu, H., **Zhang, Y.,** Shams, L. (2024 October). Multidimensional Bayesian Causal Inference Modulates Multisensory Perception. *Brain Research Institute Neuroscience Retreat and Poster Day, UCLA, California.*

RESEARCH EXPERIENCE

Department of Psychology, UCLA   **Los Angeles, CA**
Honor Thesis (PIs: Ladan Shams, Naomi Eisenberger)   May 2024 – Jun. 2025
- Explored applications of tactile feedback in stress management, emotional regulation, and biofeedback systems; investigated how vibrotactile stimulation influences physiological arousal and emotional state.
- Designed and conducted an independent study collecting ECG, PPG, and GSR data using Biopac (N=26); analyzed data with linear mixed-effects models in R.
- Found that vibration selectively reduced subjective arousal without impairing task performance.

UCLA Psi Chi & Institution for Advanced Consciousness Studies   **Los Angeles, CA**
Project Leader (PIs: Nicco Reggente, Idan Blank)   May 2024 – Present
- Led a research team investigating how peak emotional experiences (e.g., aesthetic chills) shape people's perception of time and memory to inform the design of emotionally engaging interactive systems.
- Designed and implemented a survey-based paradigm with Qualtrics, presenting emotion-inducing video

stimuli and collecting measures of chill intensity, time estimation, and memory recall; applied nonparametric inference, and follow-up correlation and regression analyses.
- Incorporated validated psychological scales (PANAS, KAMF, MAIA, MODTAS) to assess how personality, affect, and interoception modulate susceptibility to chills; discovered that higher absorption (MODTAS) predicted greater chills likelihood.

Multisensory Processing Lab, Department of Psychology, UCLA   **Los Angeles, CA**
Research Assistant (PI: Ladan Shams)   Apr. 2024 – Present
- **Project 1:** Investigated the Sound-Induced Flash Illusion through a 2D Bayesian Causal Inference Model (N=24), which outperformed alternative traditional models, such as Bayesian forced-fusion and Maximum Likelihood Estimation (MLE) models.
- **Project 2:** Examined how numerical expectations influence body-size perception with a Bayesian observer model (N=328); found a robust effect of irrelevant number on body-size perception (i.e., the larger the number is, the larger the body-size perceived is); showed that such an effect weakened at high sensory reliability and vanished when number priors were not processed.
- **Project 3:** Designed and implemented a novel three-stimulus spatial localization paradigm (N=30), extending classical audiovisual integration models to multi-cue, multi-causal Bayesian inference.

Neuromatch Academy – Computational Neuroscience   **Los Angeles, CA**
Student Researcher (Mentor: Arefeh Sherafati, Gal Vishne)   Jul. 2025
- Completed an intensive 3-week training in machine learning, dynamical systems, and stochastic processes.
- Investigated serial dependence in motion perception by extending Laquitaine & Gardner's (2018) switching-observer model to capture temporal integration of visual motion cues.
- Computed trial-wise orientation differences and modeled perceptual error as a function of stimulus history; applied a derivative-of-Gaussian tuning model following Fischer & Whitney (2014) to estimate serial attraction bias amplitude.
- Identified a systematic attraction (~+10° bias) for small orientation differences ($|\Delta\theta| < 60°$) and a repulsive bias for larger offsets, consistent with a recency-weighted Bayesian integration mechanism in human motion perception.

BlankLang Lab   **Los Angeles, CA**
Research Assistant (PI: Idan Blank)   Jan. 2024 – Present
- Explored whether large language models (LLMs) distinguish between syntactic and semantic information by integrating human judgment experiments with model analyses.
- Designed controlled linguistic stimuli for four syntactic structures (Dobj, Iobj, Nsubj, Pobj) across three conditions.
- Developed a surprisal computation pipeline for GPT-2 and BERT using token masking and negative log-probability extraction, addressing modeling constraints for one-token vs. multi-token surprisal aggregation.
- Found that for GPT-2 and BERT, attention heads previously classified as "syntactic" show reduced structural alignment under semantic implausibility, suggesting syntax representations are meaning-sensitive, not encapsulated.

ADVOCACY & SERVICE

UCLA Synapse – Brain Injury Support & Mental Health Advocacy   **Los Angeles, CA**
Member   Aug. 2021 – Present
- Facilitated peer-support sessions for individuals recovering from traumatic brain injury, leading social-cognition games and emotional rehabilitation activities to enhance community reintegration and interpersonal confidence.
- Designed and implemented mental health advocacy materials and outreach campaigns focused on reducing stigma surrounding brain trauma and promoting neuropsychological recovery awareness across the UCLA community.

TECHNICAL SKILLS

Programming: Python, MATLAB, R (RStudio)
Neuroimaging & Experiment Tools: FSL, PsychoPy, Eye-tracking (Eyelink 1000), Biopac
Statistical Analysis & Modeling: t-tests, ANOVA, mixed-effects regressions, non-parametric methods