LILA (SHUCHEN) LIU

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Education

- **Beijing Normal University (BNU)** — Sep 2019 - Jun 2023
  B.S. in Psychology, Department of Psychology — *GPA: 90.05/100*
- **University of California(UC), Berkeley** — Jan 2022 - Jun 2022
  Visiting Student — *GPA: 3.93/4.00*
- **University of Minnesota (UMN), Twin Cities** — Sep 2023 - Apr 2024
  Graduate Researcher, Department of Psychology — *GPA: 3.88/4.00*

Publications & Preprints

[2] **Liu, S.**, Zhou, K. (Submitted). Tunnel Vision and Beyond: Unveiling Implicit Spatial Learning with the "Mouse-Eye" Approach. [Pdf]

[1] **Liu, S.** (Under Review). Serial Dependence in the Perception of Looming Stimuli. Preprint on ***PsyArXiv***: https://doi.org/10.31219/osf.io/w7vqs

Posters & Presentations

[3] **S. Liu**, S. Engel. (2024, May). *Observers Can Learn to Immediately Correct Spatial Distortions Produced by Prescription Lenses.* Poster presented at Vision Sciences Society 2024.

[2] X. Wu, **S. Liu**, C. Liu. (2023, March). *Attention Modulation of Face-Selective Cortical Responses During Dynamic Degradation of Double-Exposure.* Poster presented at BNU Undergraduate Research Symposium 2023.

[1] Y. Jin, **S. Liu**, L. Yan, Q. Gao, Y. Zhou. (2022, November). *Altered Social Learning from Losses in Major Depressive Disorder: Insights from Reinforcement Learning Models in the Trust Game.* Talk given at the 4th Annual Academic Conference of the Decision Psychology Division, Chinese Psychological Society.

Research Experience

- **Perception & Action Lab, University of California, Berkeley** — Sep 2024 - Present
  Research Assistant. Supervisor: Dr. David Whitney — *Berkeley, US*

  Perceptual Modes Transitions in Change Blindness Revealed by Serial Dependency
  - Studied serial dependence as a mechanism driving slow change blindness with systematically generated stimuli set.
  - Estimated hidden Markov models to infer transitions between two latent perceptual states, each associated with a general linear model.

- **Visual Perception & Attention Lab, Beijing Normal University** — Mar 2023 - Sep 2024
  Lab Manager & Research Assistant. Advisor: Dr.Ke Zhou — *Beijing, CN*

  Contextual Cueing Effect in Different Viewing Conditions Using "Mouse-Eye" Paradigm [pipeline]
  - Led a comprehensive study with gaze-contingent displays aimed to investigate the contribution of peripheral vision in implicitly guided spatial attention.
  - Designed and implemented a series of PsychoPy-based wrapper programs to fully automate end-to-end studies, from conducting online behavioral experiments to generating visualized core metrics.
  - Utilized the 'Mouse-as-Eye' method, an innovative alternative to traditional gaze-contingent eye tracking, to simulate various types of scotomas and provide an effective solution for scalable online experimentation.
  - Peripheral vision loss impaired the learning of spatial contexts under tunnel view search, but facilitation became manifest when the display was made fully visible.

- **Vision & Imaging Lab, University of Minneosta, Twin Cities** — Sep 2023 - Apr 2024
  Research Assistant. Advisor: Dr.Stephen Engel — *Minneapolis, US*

  Visual Mode Switching: Repeated Adaptation to Spatial Distortions by Meridional-Size Lens [code]
  - Investigated long-term adaptation to optical distortions caused by astigmatism lenses and explored whether observers can learn to switch to a 'skew mode' when such configurations are repeatedly encountered.
  - Developed a Matlab-based rectangle adjustment task using the cancellation method to quantify individual spatial distortions resulting from wearing astigmatism spectacles, and measured idiosyncratic visual space distortion.

- Coordinated participants wearing cylindrical lenses that magnified images along a 45-degree axis during two 2-hour sessions on each of five consecutive days, along with collecting subjective reports.

- **Social Neuroscience Lab, IDG/McGovern Institute for Brain Research** Sep 2022 - Mar 2023
  Research Intern. Advisor: Dr.Chao Liu *Beijing, CN*
  Attention Modulation of Face-Selective Cortical Responses to Degraded Face-House Images [code]
  - Implemented a phase-shuffled double-exposure flow (JavaScript) to investigate attention modulation on hemodynamic signals, and performed fMRI brain scanning with subjects.
  - Analyzed and interpreted fMRI data using AFNI in FreeSurfer.

- **Perception & Action Lab, University of California, Berkeley** Feb 2022 - Sep 2022
  Research Assistant. Supervisor: Dr. David Whitney *Berkeley, US*
  Serial Dependence in Radiologists: Perception of Mammograms Using Naturalistic Stimuli [code]
  - Examined serial dependence in medical image perception and diagnostic errors among radiologists using GAN-generated mammogram stimuli.
  - Preprocessed raw data and assisted in feature tuning and temporal tuning analyses on response errors in Python.
  - Serial dependence biases perceptual judgments of realistic medical images up to 10 seconds in the past.

- **Social Cognition & Neuroimaging Lab, Chinese Academy of Sciences** Aug 2020 - Sep 2021
  Reserach Intern. Advisor: Dr.Yuan Zhou *Beijing, CN*
  The Dynamic of Interpersonal Trust: Evidence from the Repeated Trust Game [code]
  - Studied how personal experience and prior reputation influenced investment decisions in the trust game across different ages, and explored the potential link between personality traits and strategies used.
  - Proposed and designed an enhanced paradigm based on the Repeated Trust Game, with adjustable parameters such as agents' reputation levels and actual trustworthiness.
  - Implemented the entire experiment using E-Prime, launched it online for data collection, and fed the behavioral data into several candidate reinforcement learning models for comparison.

Funded Projects

- **BrainCognit: A Region-Aware Contrastive Learning Framework for Functional MRI Analysis [code]**
  AWS AI & ML Scholarship *Apr 2024 - Present*
  - Applied a region-aware graph attention mechanism that leverages the functional specificity, connectivity, and consistency of brain regions across individuals ROIs.
  - Introduced a transformer-based encoder-decoder architecture with contrastive learning to capture temporal dynamics from fMRI signals.

- **3D Percept Fusion: Exploring Depth Perception and Realism via Visual Cues Manipulation in XR [code]**
  XR Bootcamp Scholarship *Feb 2024 - Present*
  - Enhanced a custom experimental framework for the Quest 3 in Unity (C#) and leveraged a VR reaching task to assess perceived depth.
  - Manipulated visual cues including binocular disparity, focus, and texture gradients to explore their integration in enhancing 3D perception in virtual reality.

Honors & Awards

- AWS AI & ML Scholarship *Apr 2024*
- Elsevier Vision Research Travel Award *Feb 2024*
- Department of Psychology Graduate Fellowship *2023 - 2024*
- Undergraduate Research Symposium Poster Award *Mar 2023*
- Cognitive Neuroscience Student Travel Award *Jul 2021*
- First-Class Beijing Normal University Scholarship(Top 5% GPA) *2020 - 2022*

Skills Summary

- **Programming Languages**: Matlab, R, Python (scikit-learn, Pandas, NumPy, SciPy, TensorFlow), JavaScript, C#
- **Software & Analytical Tools**: PsychoPy, SPSS, Mplus, JASP, E-Prime, Qualtrics, Git
- **Experimental Techniques**: fMRI, Eye tracker

Teaching & Leadership

- **Instructor at Tencent Education** — Online
  Differential Geometry (note) — *May 2023 - Present*
- **Associate Tournament Directors of US Go Congress** — Portland, OR, US
  Assisted translation, videography and registration coordination — *July, 2024*
- **Teaching Assistant at BNU** — Beijing, P.R.China
  Matlab Technology in Psychology (code) — *Spring, 2021*
- **Co-Chairman of BNU Go Chess Club** — Beijing, P.R.China
  Organized Colloquiums on Informatical Analysis of Go — *Oct 2020 - May 2022*

Language Proficiency

- TOEFL 111: Listening 27 Reading 30 Speaking 25 Writing 29
- GRE 332: Verbal 164 Quant 168 Writing 4.0