Ziyang Li, **Assistant Professor, Johns Hopkins University**
https://cs.jhu.edu/~ziyang
Email : ziyang@cs.jhu.edu
Mobile : +1-858-699-3237

Positions

- **Johns Hopkins University** — Baltimore, MD
  Assistant Professor, Tenure Track — *Jul 2025 – Present*

Education

- **University of Pennsylvania** — Philadelphia, PA
  Ph.D. Computer and Information Science, Advisor: Mayur Naik (GPA: 4.0/4.0) — *Jul 2019 – Jun 2025*
- **University of California – San Diego** — La Jolla, CA
  B.S. Computer Science (GPA: 3.9/4.0); B.S. Mathematics (GPA: 3.7/4.0) — *Sep 2015 – Jun 2019*

Research Interest

Ziyang Li is an Assistant Professor of Computer Science at Johns Hopkins University, affiliated with the Data Science and AI Institute (DSAI) and the Information Security Institute (ISI). He received his Ph.D. in Computer Science from the University of Pennsylvania under the supervision of Prof. Mayur Naik. His research spans programming languages and machine learning, with a focus on neurosymbolic methods, as well as applications in security and software engineering. His dissertation introduced Scallop, a general-purpose neurosymbolic programming language and compiler toolchain, which has enabled applications across natural language processing, computer vision, cybersecurity, clinical decision-making, and bioinformatics. For this work on trustworthy AI, he was awarded the AWS Fellowship in 2023.

Publications

Monographs:

- **Neurosymbolic Programming in Scallop: Principle and Practice**
  Ziyang Li, Jiani Huang, Jason Liu, Mayur Naik
  Invited Monograph, Foundations and Trends in Programming Languages, 2024

Conferences and Journals:

- **ESCA: Contextualizing Embodied Agents via Scene-Graph Generation**
  Jiani Huang, Matthew Kuo, Amish Sethi, Neelay Velingker, Mayank Keoliya, Ser-Nam Lim, Ziyang Li, Mayur Naik
  CORR 2025, [arXiv]
- **TurnaboutLLM: A Deductive Reasoning Benchmark from Detective Games**
  Yuan Yuan, Muyu He, Muhammad Adil Shahid, Jiani Huang, Ziyang Li, Li Zhang
  EMNLP 2025, [arXiv]
- **Lobster: A GPU-Accelerated Framework for Neurosymbolic Programming**
  Paul Biberstein, Ziyang Li, Joseph Devietti, Mayur Naik
  ASPLOS 2026, [arXiv]
- **Locus: Agentic Predicate Synthesis for Directed Fuzzing**
  Jie Zhu, Chihao Shen, Ziyang Li, Jiahao Yu, Yizheng Chen, Kexin Pei
  CORR 2025, [arXiv]

- **Challenges and Paths Towards AI for Software Engineering**
  Alex Gu, Naman Jain, Wen-Ding Li, Manish Shetty, Yijia Shao, Ziyang Li, Diyi Yang, Kevin Ellis, Koushik Sen, Armando Solar-Lezama
  CORR 2025, [arXiv]

- **NeuroStrata: Harnessing Neurosymbolic Paradigms for Improved Design, Testability, and Verifiability of Autonomous CPS**
  Xi Zheng, Ziyang Li, Ivan Ruchkin, Ruzica Piskac, Miroslav Pajic
  FSE 2025 Vision Track, [arXiv]

- **IRIS: LLM-Assisted Static Analysis for Detecting Security Vulnerabilities**
  Ziyang Li, Saikat Dutta, Mayur Naik
  ICLR 2025, [arXiv]

- **LASER: A Neuro-Symbolic Framework for Learning Spatio-Temporal Scene Graphs with Weak Supervision**
  Jiani Huang, Ziyang Li, Mayur Naik, Ser-Nam Lim
  ICLR 2025, [arXiv]

- **Understanding the Effectiveness of Large Language Models in Detecting Security Vulnerabilities**
  Avishree Khare, Saikat Dutta, Ziyang Li, Alaia Solko-Breslin, Rajeev Alur, Mayur Naik
  ICST 2025, [arXiv]

- **Data-Efficient Learning with Neural Programs**
  Alaia Solko-Breslin, Seewon Choi, Ziyang Li, Neelay Velingker, Rajeev Alur, Mayur Naik, Eric Wong
  NeurIPS 2024

- **Crowd-sourced machine learning prediction of Long COVID using data from the National COVID Cohort Collaborative**
  Timothy Bergquist et al., . . . , Neelay Velingker, Ziyang Li, Yinjun Wu, Jiani Huang, Adam Stein, Emily J. Getzen, Qi Long, Mayur Naik, Ravi B. Parikh, . . .
  eBioMedicine 2024, **NIH L3C Honorable Mention Award**

- **TYGR: Type Inference on Stripped Binaries using Graph Neural Networks**
  Ziyang Li, Chang Zhu*, Anton Xue, Ati Priya Bajaj, William Gibbs, Yibo Liu, Rajeev Alur, Tiffany Bao, Hanjun Dai, Adam Doupé, Mayur Naik, Yan Shoshitaishvili, Ruoyu Wang, Aravind Machiry*
  USENIX Security 2024

- **DISCRET: Synthesizing Faithful Explanations For Treatment Effect Estimation**
  Yinjun Wu, Mayank Keoliya, Kan Chen, Neelay Velingker, Ziyang Li, Emily J Getzen, Qi Long, Mayur Naik, Ravi B Parikh, Eric Wong
  ICML 2024, **Spotlight**

- **Relational Programming with Foundation Models**
  Ziyang Li, Jiani Huang, Jason Liu, Felix Zhu, Eric Zhao, William Dodds, Neelay Velingker, Rajeev Alur, Mayur Naik
  AAAI 2024

- **Improved Logical Reasoning of Language Models via Differentiable Symbolic Programming**
  Jiani Huang, Hanlin Zhang*, Ziyang Li, Mayur Naik, Eric Xing*
  ACL-Findings 2023

- **Scallop: a Language for Neurosymbolic Programming**
  Ziyang Li, Jiani Huang, Mayur Naik
  PLDI 2023

- **Scallop: From Probabilistic Deductive Databases to Scalable Differentiable Reasoning**
  Jiani Huang, Ziyang Li*, Binghong Chen, Karan Samel, Mayur Naik, Le Song, Xujie Si*
  NeurIPS 2021

- **ARBITRAR: User-Guided API Misuse Detection**
  Ziyang Li, Aravind Machiry, Binghong Chen, Mayur Naik, Ke Wang, Le Song
  IEEE S&P 2021

- **HOPPITY: Learning Graph Transformations to Detect and Fix Bugs in Programs**
  Elizabeth Dinella, Hanjun Dai, Ziyang Li, Mayur Naik, Le Song, Ke Wang
  ICLR 2020, **Spotlight**

Invited Talks and Tutorials

- **Invited Talk on Scallop** *Cornell SE Seminar* — Online, *Sep 2025*
- **Invited Talk on Neurosymbolic CPS** *Toyota Research Institute* — Online, *Aug 2025*
- **Invited Talk on Neurosymbolic CPS** *TACPS @ CAV'2025* — Zagreb, Croatia, *July 2025*
- **Invited Talk on IRIS** *Trail of Bits* — Online, *Jun 2025*
- **Invited Talk on Scallop** *TACPS* — Raleigh, NC, *Nov 2024*
- **Invited Talk on Scallop** *Columbia University PL Seminar* — New York, NY, *Oct 2024*
- **Invited Talk on Scallop** *UT Austin PL Seminar* — Austin, TX, *Sep 2024*
- **Scallop Tutorial** *Summer School of Neurosymbolic Programming (SSNP)* — Salem, MA, *Jun 2024*
- **Neurosymbolic AI** *Guest lecture in Trustworthy AI, UPenn CIS* — Philadelphia, PA, *Apr 17, 2024*
- **Invited Talk on Scallop** *Peking University PL Seminar* — Peking, China, *Dec 10, 2023*
- **Invited Talk on Scallop** *Purdue University PL Seminar* — West Lafayette, IN, *Nov 9, 2023*
- **Invited Talk on Scallop** *KDD'2023* — Los Angeles, CA, *Aug 7, 2023*
- **Tutorial on Scallop** *PLDI'2023* — Orlando, FL, *Jun 17, 2023*
- **Tutorial on Neurosymbolic Methods** *LOG'2022* — Online, *Oct, 2022*
- **Tutorial on Scallop** *Summer Shool of Formal Techniques (SSFT)* — Mountain View, CA, *Jun 1, 2022*

Working Experiences

- **Relational AI** *Research Intern, Mentor: Hung Q. Ngo* — Virtual, *May 2021 – August 2021*
- **Visa, Inc.** *Research Intern, Mentor: Ke Wang* — Virtual, *May 2020 – July 2020*
- **Coursera, Inc.** *Front-end Engineer Intern* — Mountain View, CA, *Jun 2018 - Sep 2018*

Fellowships

- **Amazon Web Service Fellowship** *For work on Trustworthy AI* — Amazon, *May 2023*
- **KPCB Fellows 2018** *Engineering Fellows (<2%)* — San Francisco, *June 2018*

Teaching Experiences

- **Teaching Assistant** *CIS 7000, Large Language Models* University of Pennsylvania, *2024*
- **Teaching Assistant** *CIS 5470, Software Analysis* University of Pennsylvania, *2020;21;22;23;25*
- **Tutor** *CSE 190, Virtual Reality Technology* University of California – San Diego, *Spring 2019*
- **Tutor** *CSE 165, 3D User Interaction* University of California – San Diego, *Winter 2019*
- **Tutor** *CSE 130, Programming Language* University of California – San Diego, *Fall 2018*
- **Tutor** *CSE 163, Advanced Computer Graphics* University of California – San Diego, *Spring 2018*
- **Tutor** *CSE 167, Intro to Computer Graphics* University of California – San Diego, *Winter 2018*
- **Tutor** *CSE 12, Data Structure* University of California – San Diego, *Winter 2017*

Academic Service

- **Workshop Co-organizer** *TACPS Workshop 2025*
- **Reviewer** *ICLR 2024-2025, NeurIPS 2023-2024, ICML 2024, AAAI 2024-2025, ACL ARR 2023-2024*
- **Artifact Evaluation Committee** *USENIX Security 2025*

Selected Side-Projects

Programming Languages and Program Analysis Tools

- **Probabilistic DataLog Engine**: A probabilistic datalog engine with high performance optimizations oriented towards machine learning applications. Written in Rust.
- **Under-constrained Symbolic Execution Engine**: High performance under-constrained symbolic execution engine for LLVM IR written in Rust. Used in Arbitrar.
- **LLVM IR Binding for Rust**: Safe LLVM Binding for Rust. Used in Arbitrar. [Github]
- **Menhera**: A TypeScript-like functional programming language compiler written in OCaml. [Github]

Rendering, Animation, and Simulations:

- **Fourier Depth of Field**: Fourier transform based depth of field analysis for RayTracer. [Github]
- **Rotamina**: Character animator and simulator with GUI. Written in C++. [Github]
- **MPM-RS**: Material point method for simulating fluid and soft-body dynamics. Written in Rust. [Github]
- **Geometry Sketchpad**: Geometry sketching GUI application written in Rust. [Github]
- **AoSoA Storage**: Array-of-struct-of-array storage system for high performance parallel computing with Kokkos and Cabana. Designed for physics simulation applications. Used by UPenn CG Group. [Github]

Video Games and VR Applications:

- **VR Piano**: VR Application for recording virtual characters playing the Piano, connecting MIDI keyboards and body tracking systems. Written in Unity.
- **Naruhodo**: An 3D story puzzle game engine made in Unity for easy level design. [Github]
- **Neon Ping Pong**: VR Ping Pong Game written in C++. [Website] [Video]
- **Space Escape**: VR Room Escape Puzzle Game settled in Space Station. Developed in Unity. [Website] [Video]

Web Applications:

- **inso.link**: A mirror download site for OSU! beatmaps for Chinese players. Hosted and maintained since 2016 and has 30K users while supporting >2M downloads. [Website] [Status Site]
- **saemanga.com**: A minimalistic online manga reader. Had >1K users. (2016-2020, currently out-of-service)

Skills

- **Languages**: Rust, C++/C, Python, C#, TypeScript/JavaScript, OCaml, Java, Haskell, Coq
- **Libraries/Engines/Tools**: PyTorch, Unity, Unreal Engine 4/5, React, ExpressJs, Asp.net
- **Design**: Adobe Photoshop, Final Cut Pro, Premiere, After Effects, Illustrator, Blender, Cinema 4D
- **Audio/Music**: Logic Pro, Ableton

Last update: Sep 15, 2025