

# Junrui Zhu

Tsinghua University, P.R.C. | juneray2003@gmail.com | <https://zhujuneray.github.io>

## Education

---

**Tsinghua University**, B.S. in Math and Physics + B.Eng in Electrical Engineering Sept 2021 – June 2025  
(dual degree)

- **Coursework:** (major)

CS: Data Structure, Object-Oriented Programming, Operating Systems, Database

EE: Principle of Circuits, Digital and Analog Electronics, Power System

Math: Calculus, Linear Algebra, Mathematical Physics Equations, Prob and Stats, Num Analysis, Convex Optim

Physics: Mechanics, Special Relativity, Optics, Electromagnetism, Thermodynamics, Quantum

**University of California, Berkeley**, EECS Exchange Student for 24 Spring Jan 2024 – May 2024

- GPA: 4.0/4.0

- **Coursework:** Introduction to AI (A), Signal and Systems (A), Feedback Control Systems (A+)

## Research Interests

---

Data System, AI, HCI

My research interests lie in **Compound AI systems** and **Interactive Machine Learning**, with a focus on developing intelligent systems that enable *seamless interaction, efficient and high-quality data processing, and adaptive learning*.

## Preprints and Working Papers

---

**Robo-Sora: Controllable and Generalizable Robotic Video Generation Framework** working on

*Junrui Zhu\**, Lingfeng Sun\*, Fangchen Liu, Tianjun Zhang, Joseph Gonzalez, Masayoshi Tomizuka, Pieter Abbeel

**EAGLE: Extracting data provenance for LLM-powered retrieval augmented AI system** working on

*Junrui Zhu\**, Yiming Lin\*, Hannah Moore, Eugene Wu, Aditya Parameswaran

**CoordAuth: Hands-Free Two-Factor Authentication in Virtual Reality Leveraging Head-Eye Coordination**

Sheng Zhao\*, *Junrui Zhu\**, Xueyang Wang, Hongyi Li, Fang Yi, Shuning Zhang, Xin Yi, Hewu Li

Under review of IEEE VR 2025

**ProChatter: Interactively Identifying and Resolving the Ambiguity in Querying with Conversational AIs**

Shuning Zhang, Xin Yi, Shixuan Li, Jiarui Liu, *Junrui Zhu*, Maggie Shao, Dakuo Wang, Hewu Li

Major Revision of CSCW 2025

## Research Experience

---

**University of California, Berkeley**, Research Intern at Sky Lab & BAIR Sept 2024 – August 2025

Advised by Prof. Joseph Gonzalez, Prof. Pieter Abbeel

- Developing a controllable and generalizable robotic video generation model and video-to-sim pipeline for improved pre-action prediction with latent diffusion model.

- Adapted from Open-Sora, trained on large-scale datasets including DROID, BRIDGE, and RT-1 for hundreds of hours on multiple A100/H100 GPUs.

**University of California, Berkeley**, Research Intern at EPIC Data Lab March 2024 – March 2025

Advised by Prof. Aditya Parameswaran, co-advised by Prof. Eugene Wu

- Developed an interpretable and interactive RAG system that enhances user trust through data provenance extraction.
- Reduced provenance inference time and LLM cost by implementing heuristic-driven  $\mathcal{O}(n)$  search algorithms and optimized LLM prompts. Conducted experiments on cross-domain datasets of varying scale, including central distributed ground truth and hierarchy-dependent data.
- Maintaining an open-source codebase for the project, offering APIs for various implemented search algorithms, and developed a user interface.
- Contributed to lab's summer reading group for "Alice's Adventures in a Differentiable Wonderland." (a book by Simone Scardapane)

**Tsinghua University**, Research Intern at PI (Pervasive HCI Lab)

April 2023 – Jan 2024

Advised by Prof. Xin Yi, co-advised by Yuanchun Shi

- Conducting formative studies and literature review to identify user pain points and devise novel interactive systems to visualise and reduce ambiguity through collaborating editing.
- Developed a refined and interactive UI based on React and python flask
- Built a end-to-end pipeline and backend server for interactive prompting optimization strategy, by implementing structured output and regular expressions.
- Conducting user study to validate the usability in searching tasks

## Selected Awards and Honors

---

|   |                   |
|---|-------------------|
| Excellent Projects of Tsinghua University Academic Promotion Program  | Nov 2024          |
| Tsinghua Research Excellence Award  | Oct 2024 and 2023 |
| The 3rd Tsinghua Craftsman Competition First Prize  | Oct 2023          |
| Excellent Student Leader at Tsinghua University   | Oct 2023          |
| “TI Cup” Digital System Innovation Design Competition Champion (1 out of 30 teams, implemented reinforcement learning search algorithms in a microcontroller-equipped vehicle to achieve highest score in a game env) | Oct 2022          |

## Additional Skills

---

TOEFL: 106

Proficient in Python, C, C++, C#, and Java, with a strong 3-year foundation in algorithm design and software development principles with Python and C++.

Extensive experience of compound AI system building with LLM/VLM, generative model development, training, and fine-tuning across distributed computing clusters. Skilled in leveraging machine learning frameworks such as PyTorch for complex model building and deployment.

Hands-on experience in web and application development using frameworks including React, Flask, JavaScript, and HTML. Skilled in creating user-friendly interfaces and seamless integrations with backend services.