Jiaming Shan

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RESEARCH INTERESTS

Core Interests: Large Language Models, Autonomous Agents, Reasoning, Long-Context Algorithms
Research Approach: Unifying high-level agentic capabilities with low-level algorithmic innovations to realize scalable and capable AI.

EDUCATION

Shanghai Jiao Tong University Sep 2020 – Jun 2024
Bachelor of Computer Science

- Member of ACM Honors Class, an elite CS program for top 5% talented students
- GPA (All Core Courses): 3.98/4.3, Ranking: 3/36

University of California, Santa Barbara Sep 2024 – Present
PhD student in Computer Science

PUBLICATIONS

Peer-Reviewed Conference Publications

[1] Building Constrained Human-AI Cooperation: An Inclusive Embodied Social Intelligence Challenge
Weihua Du, Qiushi Lyu, **Jiaming Shan**, Zhenting Qi, Hongxin Zhang, Sunli Chen, Andi Peng, Tianmin Shu, Kwonjoon Lee, Behzad Dariush, Chuang Gan
Conference on Neural Information Processing Systems (NeurIPS), Datasets and Benchmarks Track, 2024. **(Poster)**

[2] Building Cooperative Embodied Agents Modularly with Language Models
Hongxin Zhang*, Weihua Du*, **Jiaming Shan**, Qinhong Zhou, Yilun Du, Joshua B. Tenenbaum, Tianmin Shu, Chuang Gan
International Conference on Learning Representations (ICLR), 2024. **(Poster)**
(* Equal Contribution)

Manuscripts Under Submission

[1] Adaptive Counter-Attack Synthesis for Mitigation of Onchain Exploits
Hanzhi Liu, Yanju Chen, **Jiaming Shan**, Jiaxin Song, Chaofan Shou, Hongbo Wen, Yu Feng
Submitted to *International Symposium on Software Testing and Analysis (ISSTA)*, 2026.

[2] Mid-Segment Editing: Teaching Language Models to Maintain Precise State Through Efficient In-Context Editing
Jiaming Shan, Yuzhou Nie, Eric Xin Wang
Targeting *Conference on Language Modeling (COLM)*, 2026.

[3] Proactive Agent Research Environment: Simulating Active Users to Evaluate Proactive Assistants
Deepak Nathani, Cheng Zhang, Chang Huan, **Jiaming Shan**, Yinfei Yang, Alkesh Patel, Zhe Gan, William Yang Wang, Michael Saxon, Xin Eric Wang
Submitted to *International Conference on Machine Learning (ICML)*, 2026.

RESEARCH EXPERIENCE

University of California, Santa Barbara Sep 2024 – Present
PhD Student / Research Assistant

- **Mid-Segment Editing (Targeting COLM 2026):** Proposed a novel framework enabling LLMs to perform in-place context editing via unified rewrite operations. Developed GroupedRoPEAttention, a Triton kernel enabling efficient multi-edit training with 2-78× speedup. Validated on state tracking and competitive programming, proving $O(n)$ efficiency gains in "large state, small edits" tasks.
- **PARE (Submitted to ICML 2026):** Developed the Proactive Agent Research Environment, a framework modeling mobile apps as Finite State Machines (FSMs) for evaluating proactive agents. Contributed to ProactiveMobileBench, a benchmark of 150+ tasks for testing goal inference and multi-app orchestration.

- **MathEye (Auto-formalization):** Developed a system scaling the auto-formalization of mathematical theorems by integrating LLM-guided decomposition with optimistic proof-checking. Demonstrates strong capability in Neuro-Symbolic AI and Mathematical Reasoning.

Massachusetts Institute of Technology (MIT) Aug 2023 – Jun 2024
Research Intern, CSAIL *Advisor: Prof. Chuang Gan*

- **Constrained Human-AI Cooperation (NeurIPS 2024):** Conceptualized and implemented novel physically-constrained agents and helper bots within the ThreeDWorld (TDW) simulation environment. Leveraged in-context learning of LLMs to deploy language-based agents for human assistance tasks, generating a new benchmark dataset.

MIT / Shanghai Jiao Tong University Feb 2023 – May 2023
Remote Research Intern *Advisor: Prof. Chuang Gan*

- **Modular Embodied Agents (ICLR 2024):** Co-developed a novel framework using LLMs for multi-agent cooperation by translating environmental states into textual prompts. Designed and conducted user studies demonstrating that LLM agents collaborate more effectively with humans than heuristic planning baselines. Led the implementation of the VirtualHome environment and heuristic baselines.

INTERNSHIP EXPERIENCE

Nubit Jun 2025 – Sep 2025
Smart Contract Security Researcher *Advisor: Prof. Yu Feng*

- Developed **Sentinel**, a fully automated run-time defense system that neutralizes pending key on-chain exploits. Designed a conflict-driven optimization loop to synthesize counter-attack smart contracts under strict gas and safety constraints.
- Evaluated on 33 real-world DeFi exploits, preserving an estimated $167M. The work resulted in the paper "Adaptive Counter-Attack Synthesis for Mitigation of Onchain Exploits" (Submitted to ISSTA 2026).

Honors & Awards

- 2023 National Scholarship Award
- 2020, 2021, 2022, 2023 Zhiyuan Honorary Scholarship (Top 2% in Shanghai Jiao Tong University)
- 2021 Interdisciplinary Contest In Modeling Honorable Mention
- 2021 Third Prize, National Undergraduate Mathematical Contest in Modeling, Provincial Level
- 2021 Silver Medal, International Physics Competition for University Students

Technical Skills

Programming Languages: Python, C++, Lisp, Java, Triton
AI / ML Frameworks: PyTorch, Hugging Face, Scikit-learn, OpenAI API
Formal Methods & Synthesis: Lean, Rosette, SAT/SMT Solvers, EVM Bytecode
AI-Native Workflow: Cursor, Claude Code, Tmux
Developer Tools & MLOps: Git, Docker, LaTeX, Weights & Biases