Alex R. Lee

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Education

Stanford University *2019-2024* (COVID Gap Year 2020-2021)

B.S. Computer Science (Systems Concentration) ***with Distinction*** **GPA: 4.1/4.0**

Coursework: Natural Language Processing with Deep Learning (CS 224N), Technology and National Security (MS&E 193)

Clubs: Stanford Review, Catholic Community at Stanford, Hoover Institution

M.S. Computer Science (Computer Network Security) 2025-

Coursework: Advanced Topics in Cryptography (CS 355), Topics in Computer and Network Security (CS 356)

Work Experience

Founding Engineer, Halliday International, San Francisco, CA *June- Dec '22, June '23- Sep '23, Jan' 24 - Sep' 25*

- Co-designed the **Halliday Workflow Protocol**, an agentic orchestration system enabling safe, transparent, and auditable multi-step workflows across blockchain and traditional finance systems
- Developed **core execution infrastructure**, including execution contexts, replay-safe multi-step hashing, and customizable call logic, enabling user-defined workflow steps with predictable and secure execution
- Wrote and audited Halliday's **first production workflow programs** with cross-system payment operations
- Integrated cross-chain bridges and decentralized exchanges, doubling supported blockchain networks
- Reviewed and co-drafted **provisional patent applications**, identifying novel smart contract primitives and workflow orchestration mechanisms with commercial licensing potential

Research Assistant, Hoover Institution, Stanford, CA *Nov '21- Jun '22, Feb '23- Jun '23*

- Selected as a **Hoover Student Fellow** through a competitive process
- Produced research on the semiconductor supply chain under Hoover Fellows **Glenn Tiffert** and **Larry Diamond**, focusing on American semiconductor resilience and the Taiwanese semiconductor industry landscape
- Presented findings to **Condoleezza Rice**, discussing national-security risks, export controls, and institutional resilience in the context of global technological and geopolitical competition
- Contributed research to ***Silicon Triangle: The United States, Taiwan, China, and Global Semiconductor Security***
- Conducted data collection, visualization, and analysis informing Hoover reports on the Chinese battery industry and U.S.-China research collaboration

Notable Projects

Methods to Incorporate Off-chain Computation for NFT Minting *Sep- Dec '23*

- Designed four tamper-resistant NFT minting models using **verifiable off-chain computation** and **random selection**
- Implemented **ZK-SNARK (Groth16)** verification using Circom to validate the correctness of off-chain computation
- Achieved **69% gas reduction** vs on-chain computation **without weakening security**

Investigating Techniques for Improving NMT Systems for Low Resource Languages *Jan- Mar '21*

- Built a Nepali to English translation system using an encoder-decoder seq2seq model with attention on ~65k sentences
- Applied **transfer learning** from Hindi, **diversified iterative back-translation**, and augmentation with noisy data, improving translation performance by +4.55 BLEU (in-domain) and +3.93 BLEU (out-of-domain)
- Tackled linguistic equity challenges in machine learning for low-resource languages

Awards

- **Phi Beta Kappa**, Class of 2024
- **German Club of Stanford Essay Award**, 2022–2023 (GERMAN 266: Political Theology)
- **Individual and Group Gold Medal Winner**, 15th International Olympiad of Linguistics