

# Shilun (Allan) Li

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shilun-allan-li.github.io

github.com/Shilun-Allan-Li

## Education

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**UC Berkeley** Ph.D. in Mathematics (Advised by Venkatesan Guruswami) GPA: 4.0/4.0 08/22 – 06/27 (expected)

**Stanford University** M.S. in Computer Science (AI track) GPA: 4.0/4.0 09/19 – 07/22

**Stanford University** B.S. in Mathematics with **Honors** (Advised by Rafe Mazzeo) GPA: 4.0/4.0 09/18 – 07/22

Research Areas: Error-correcting Codes, Complexity Theory, Automated Theorem Proving, Autoformalization.

Relevant Coursework: Coding Theory, Machine Learning, Natural Language Processing, Computer Vision, Reinforcement Learning, Mining Massive Data Sets, Parallel Computing, Advanced Theory of Probability, Martingale Theory.

## Experience

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**Apple, Cupertino, CA** Machine Learning Intern 01/26 – 07/26

- Develop end-to-end ML system to solve complex modeling problems.

**XAcademy, Shanghai, China** Advisor/Lecturer 07/23 – 08/23 & 07/25 – 08/25

- Taught a 45-lecture course in 2023 on machine learning and deep learning for 40 college students, covering regression, clustering, neural networks, RNNs, CNNs, NLP fundamentals, Transformers, and large language models.
- Taught a 50-lecture course in 2025 on Multimodal learning for 30 students, focusing on multimodal representation learning, joint embeddings, alignment, multimodal transformers, co-learning, and applications in vision–language tasks.

**Microsoft Research, Mountain View, CA** Research Collaborator 05/24 – 01/25

- Developed a post-training framework combining MCTS, PPO, and reward models for automated theorem proving.
- Improved Qwen2.5-7B-Instruct performance by 10–25% on the MATH dataset.

**FutureX (Futurexyz Co.), Palo Alto, CA** Co-founder 05/22 – 05/23

- Created a platform for Web3 events and professional connections.
- Secured \$300,000 in seed funding from MiraclePlus (formerly Y Combinator China).

**Tencent, Shenzhen, China** AI Developer Intern 06/21 – 09/21

- Designed a 3D AI city-generation algorithm in Unreal Engine 4 (C++).
- Accelerated creation of roads, buildings, rivers, and parks for game design.

**Stanford Vision and Learning Lab (Fei-Fei Li), Stanford, CA** Research Assistant 06/20 – 10/20

- Implemented pedestrian prediction with a Social-GAN model on the JRDB dataset.
- Evaluated model performance in real-world robot perception pipelines.
- Link to poster: [https://math.berkeley.edu/~shilun/papers/Pedestrian\\_Prediction\\_Poster.pdf](https://math.berkeley.edu/~shilun/papers/Pedestrian_Prediction_Poster.pdf)

**Stanford NLP Group (Christopher Manning), Stanford, CA** Research Assistant 06/19 – 09/19

- Designed a probing framework for BERT to analyze syntactic and semantic signals in intermediate layers.
- Link to poster: [https://math.berkeley.edu/~shilun/papers/BERT\\_Poster.pdf](https://math.berkeley.edu/~shilun/papers/BERT_Poster.pdf)

## Selected Publications

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### Density Frankl-Rödl on the Sphere

Venkatesan Guruswami, Shilun Li

RANDOM 2025

- Proved a density statement of spherical avoidance problems, which generalizes Frankl-Rödl theorem to the Sphere.
- Proved all simplices are sphere Ramsey.
- Link to paper: <https://arxiv.org/abs/2505.09839>

### A Deterministic Construction of a Large Distance Code from the Wozencraft Ensemble

Venkatesan Guruswami, Shilun Li

IEEE Transactions on Information Theory

- Applied Sidon sets to code construction (first such application).
- Presented the first explicit construction of rate-1/2 Wozencraft codes with  $\Omega(\sqrt{k})$  minimum distance.
- Link to paper: <https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=10777554>

### Probability in the Toss of a Coin with Symmetric Inhomogeneous Density

Shilun Li

- Proved coin tosses are biased: coins favor the starting face.
- Extended Diaconis's probability formula to general biased coins.
- Link to paper: <https://arxiv.org/abs/2310.02662>

## Skills

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**Programming:** Python, C++, MATLAB, Java, Scala, R

**Frameworks:** PyTorch, TensorFlow, HuggingFace, Scikit-learn, SQL, NumPy, Pandas

## Interests

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Professional Freediver (National Rank #45 in Constant Weight Bi-fins, # 31 in Constant Weight Without Fins)

Skiing, Bartender, Tennis, Golf.