

NEELAY VELINGKER

(267)-642-2073 • nvelingker@gmail.com • <https://nvelingker.github.io/>

EDUCATION

University of Pennsylvania, Ph.D. Computer and Information Science (Spring 2024 - Present) (GPA: 4.0)

- Focus: Efficient Deep Learning and Neurosymbolic AI
- Fellowships: Amazon Web Services Fellowship for Trustworthy AI
- Highlighted Coursework: Large Language Models (created the course), Special Topics in Natural Language Processing, Special Topics in Deep Learning, AI for Health, Compilers, Machine Learning

University of California, Berkeley, B.S. Electrical Engineering & Computer Science (2019 - 2022) (GPA: 3.6)

- Highlighted Coursework: Machine Learning, Artificial Intelligence, Convex Optimization, Operating Systems and System Programming, Formal Methods, Computer Security, Algorithms and Intractable Problems

SKILLS

Programming Languages: Python, C, Java, JavaScript, Rust, Scallop, Go, OCaml, X86 Assembly, RISC-V Assembly, XML

Databases: PostgreSQL, MongoDB, AWS RDS

Libraries: OpenCV, PyTorch, bitsandbytes, transformers, accelerate, ROS, gym, sklearn, cvxpy, pandas, gdb

Operating Systems: Windows, macOS, Linux (Ubuntu, WSL), FreeBSD

WORK EXPERIENCE

Ph.D. Student, ASSET Lab, University of Pennsylvania (June 2022 - Present)

- LASER (Current): A general-purpose foundation model for video spatio-temporal scene graph generation
- Slimscale (Current): a framework for LLM compression using pruning, quantization, and parameter-efficient finetuning
- ISED (**NeurIPS '24**): blending neural networks with black-box APIs through sampling-based gradient estimation
- DISCRET (**ICML '24 Spotlight**): an RL-based program synthesizer for explainable treatment effect estimation
- Viera (**AAAI '24**): a new programming language designed for neuro-symbolic reasoning with LLMs

Undergraduate Research Intern, Model Predictive Control Laboratory, UC Berkeley (September 2021 – May 2022)

- Applying deep learning algorithms to imitate human decision-making in mixed-autonomy driving environments
- Developing control algorithms for self-driving vehicles based on imitation learning and vehicle-to-vehicle communication

Robotics and Machine Learning Intern, Tortuga AgTech (May 2021 – August 2021)

- Designed and implemented company's first set of deep reinforcement learning models for autonomous robot decision making, currently deployed and training across the world on various fleets of agricultural robots
- Finetuned convolutional neural network models on the robots for improved arm-movement accuracy
- Architected and project-managed the development of a python library, from scratch, designed to retrieve and visualize data from fleet robots in real time, powering nearly all current and planned company data tools

Quantum Software Engineering Intern (Part-Time), QuSecure (March 2021 – May 2021)

- Building out the quantum key management service, a C-based networking system that serves as the backbone for nearly all other quantum software products in the cybersecurity suite
- rewriting, reorganizing, and debugging past software code to be more modular and functional

Software Engineering Intern, Lockheed Martin (June 2018 – August 2018)

- Full stack development on an internal training platform used by thousands of employees
- Led agile planning sessions for sub-team and continuously searched for ways to engage new and current users

PUBLICATIONS

Alaia Solko-Breslin, Ziyang Li, Seewon Choi, Neelay Velingker, Rajeev Alur, Mayur Naik, Eric Wong. 2024. Beyond Differentiability: Neurosymbolic Learning with Black-Box Programs. *Advances in Neural Information Processing Systems, 2024*.

Wu, Y., Keoliya, M., Chen, K., Velingker, N., Li, Z., Getzen, E. J., ... Wong, E. (2024). DISCRET: Synthesizing Faithful Explanations For Treatment Effect Estimation. *Forty-First International Conference on Machine Learning*.

Bergquist, Timothy et al. "Crowd-sourced machine learning prediction of long COVID using data from the National COVID Cohort Collaborative." *EBioMedicine 108 (2024)*.

Ziyang Li, Jiani Huang, Jason Liu, Felix Zhu, Eric Zhao, William Dodds, Neelay Velingker, Rajeev Alur, Mayur Naik. 2024. Relational Programming with Foundation Models. In *Conference on Association for the Advancement of Artificial Intelligence (AAAI)*.

Heath, Brian, Neelay Velingker, Osbert Bastani, and Mayur Naik. 2019. "PolyDroid: Learning-driven Specialization of Mobile Applications." *ArXiv.org*.