Sydney Katz

Co-founder and CTO

Valgo (Valgorithmic, Inc.)

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Education

Stanford University
Aeronautics and Astronautics
2020 - 2023 | **PhD**
2018 - 2020 | **MSc.**
Thesis: Safe Machine Learning-Based Perception via Closed-Loop Analysis

Washington University in St. Louis
Electrical and Systems Engineering
2014-2018 | **B.S., B.S.A.S.**
Valedictorian

Technical Skills

Relevant Coursework
Decision Making Under Uncertainty, Machine Learning, Convex Optimization, Deep Generative Models, State Estimation, Artificial Intelligence, Trustworthy Machine Learning

Programming
Julia, Python, Matlab, LaTeX

Awards

2025: Stanford AIAA **Excellence in Teaching** Award
2021: Third place in student research competition at Digital Avionic Systems Conference (DASC)
2020: National Science Foundation Graduate Research Fellow
2019: **Best Paper of Session** at DASC
2018: Electrical and Systems Engineering (ESE) **Outstanding Senior Award**
2017: ESE **Outstanding Junior Award**, Tau Beta Pi, Caltech Space Challenge
2016: ESE **Outstanding Sophomore Award**
2014 - 2018: WashU W.E. Moerner Langsdorf Scholar and McKelvey Research Scholar

Research and Projects

2018 - 2025 — **Stanford Intelligent Systems Laboratory** — Researcher
Stanford, CA

- Authoring a **textbook** called *Algorithms for Validation* on algorithms for **validating the performance of safety-critical decision-making systems** using topics from optimization, probability theory, and formal methods
- **Mechanistic Interpretability:** exploring the ability to scale a traditional dictionary learning algorithm to disentangle high-dimensional embeddings from transformer models such as LLMs
- **Safe Design of Perception Systems:** designed safer perception systems using a risk-driven approach that accounts for closed-loop safety properties
- **Verified Neural Network Perception:** created a method to formally verify image-based neural network controllers that uses generative models to capture the set of plausible inputs
- **Probabilistic Safety Guarantees for Neural Networks:** developed a technique to analyze the safety of neural network controllers used in stochastic environments

Work Experience

2025 - present — **Valgo** — Co-founder and CTO
San Mateo, CA

- Building tooling for algorithmic safety validation

Summer 2022 — **Reliable Robotics** — Machine Learning Research Intern
Mountain View, CA

- Led implementation and analysis of machine learning techniques in support of the development of autonomous cargo aircraft

Summer 2017/18 — **MIT Lincoln Laboratory** — Collision Avoidance Research Intern
Boston, MA

- Supported testing of **Airborne Collision Avoidance System X (ACAS X)**
- Improved safety and decreased reversals in advisories for aircraft coordinating horizontal collision avoidance maneuvers by modifying **Markov decision process (MDP)** formulation

Summer 2016 — **Johns Hopkins University Applied Physics Laboratory** — NASA Intern
Laurel, MD

- Assisted with guidance and control for **NASA's Parker Solar Probe** mission

Summer 2013-15 — **NASA Glenn Research Center** — Summer Intern
Cleveland, OH

Leadership/Teaching

Winter 2025 — **Validation of Safety-Critical Systems** — Stanford University
Stanford, CA

- Primary instructor for a new course that presents a variety of mathematical concepts and algorithms that can be used to validate their performance in simulation.
- Led development of all lecture materials, assignments, and assessments

2021/2023 — **Teaching Assistant** — Stanford University
Stanford, CA

- Managed assignments and held weekly office hours for graduate-level courses on **Decision Making under Uncertainty** and **Engineering Design Optimization**
- Assisted with the development and execution of a course with the Stanford Center for Professional Development on **Designing Robust and Reliable AI Systems**

2021/2023 — **AI4All Mentor** — Stanford University
Stanford, CA

- Led the robotics group for a three-week summer camp to introduce high school students from underrepresented backgrounds to AI concepts and topics

Publication Highlights

- M. J. Kochenderfer, **S. M. Katz**, A. L. Corso, and R. J. Moss, *Algorithms for Validation*, Preprint, 2025.
- R. Valentin, **S. M. Katz**, V. Vanhoucke, and M. J. Kochenderfer, "DB-KSVD: Scalable Alternating Optimization for Disentangling High-Dimensional Embedding Spaces," Preprint, 2025.
- **S. M. Katz**, "Safe machine learning-based perception via closed-loop analysis," PhD Thesis, 2023.
- A. L. Corso*, **S. M. Katz***, C. A. Innes, X. Du, S. Ramamoorthy, and M. J. Kochenderfer, "Risk-driven design of perception systems," in Advances in Neural Information Processing Systems (NeurIPS), 2022.
- **S. M. Katz***, A. L. Corso*, C. A. Strong*, and M. J. Kochenderfer, "Verification of image-based neural network controllers using generative models," *Journal of Aerospace Information Systems*, 2022.