ROBERT I. MOSS

www.robert-moss.com

Research Interests

Algorithms for safe planning in high-dimensional, long-horizon, uncertain environments (POMDPs); applied to aviation, autonomous vehicles, and sustainable energy.

Experience

Valgorithmic, Inc. (Valgo)

Co-Founder and CEO

[2025 - Present]

Building algorithmic safety validation tools for autonomous systems (YC W26).

Stanford Intelligent Systems Laboratory (SISL)

Graduate Student Researcher

[2019 - 2025]

Using surrogate models for high-dimensional planning and safety validation [1–8].

Stanford Doerr School of Sustainability

Graduate Student Researcher

[2022 - 2025]

Developing planning algorithms for sustainable energy applications: carbon capture and storage, geothermal energy production, and critical battery mineral exploration.

Xwing

AI Safety and DAA Consultant, PhD Student Research Intern

[2022 - 2023]

Developed method for failure probability estimation of safety-critical systems [3, 4].

NASA Ames Research Center

Research Engineer

[2020 - 2021]

Created lunar rover traverse GUI for NASA's VIPER, looking for water on the Moon.

MIT Lincoln Laboratory

Associate Staff

[2013 - 2019]

Part of the core team that developed, optimized, and validated the next-generation aircraft collision avoidance system, certified by the FAA (ACAS Xa, Xu, and sXu) [9]. Developed decision support tool for wildfire incident commanders to optimize resources for wildfire suppression [10].

Publications (Selected)

[full list of publications]

- [1] R. J. Moss, Safe planning under uncertainty using surrogate models. Ph.D. Thesis, 2025.
- [2] R. J. Moss, A. Corso, J. Caers, and M. J. Kochenderfer, BetaZero: Belief-State Planning for Long-Horizon POMDPs using Learned Approximations. arXiv 2306.00249, 2023.
- [3] R. J. Moss, M. J. Kochenderfer, M. Gariel, and A. Dubois, Bayesian Safety Validation for Black-Box Systems. AIAA AVIATION Forum, 2023.
- [4] J.-G. Durand, A. Dubois, and R. J. Moss, Formal and Practical Elements for the Certification of Machine Learning Systems. AIAA/IEEE Digital Avionics Systems Conference, 2023.
- [5] R. J. Moss, Algorithms for Efficient Validation of Black-Box Systems. M.S. Thesis, 2021.
- [6] A. Corso, R. J. Moss, et al., A Survey of Algorithms for Black-Box Safety Validation of Cyber-Physical Systems. Journal of Artificial Intelligence Research (JAIR), 2021.
- [7] R. J. Moss, POMDPStressTesting.jl: Adaptive Stress Testing for Black-Box Systems. *Journal* of Open Source Software (JOSS), 2021. https://github.com/sisl/POMDPStressTesting.jl
- [8] R. J. Moss, R. Lee, et al., Adaptive Stress Testing of Trajectory Predictions in Flight Management Systems. AIAA/IEEE Digital Avionics Systems Conference (DASC), 2020.
- [9] M. P. Owen, A. Panken, R. J. Moss, et al., ACAS Xu: Integrated Collision Avoidance and Detect and Avoid Capability for UAS. AIAA/IEEE Digital Avionics Systems Conference, 2019.
- [10] J. D. Griffith, M. J. Kochenderfer, R. J. Moss, et al., Automated Dynamic Resource Allocation for Wildfire Suppression. Lincoln Laboratory Journal, 2017.

Education

Ph.D. in Computer Science (AI)

[2021 - 2025]

Stanford University

M.S. in Computer Science (AI)

Stanford, CA

Stanford University

2019 - 2021Stanford, CA

Awarded best CS master's thesis [5].

Awarded for teaching excellence (Centennial TA).

B.S. in Computer Science

[2010 - 2014]

Minor in Physics

Wentworth Institute of Technology

Boston, MA

Awards

- Best-of-Conference, AIAA/IEEE DASC, 2023. [4]
- Best-of-Track (UAS/AAM), AIAA/IEEE DASC, 2023. [4]
- Best-of-Session (AI/ML), AIAA/IEEE DASC, 2023. [4]
- R&D 100 Award for ACAS sXu, 2022.
- Best CS Master's Thesis, Stanford University, 2021. [5]
- Centennial TA Award, Stanford University, 2021.
- Best-of-Session (Safe & Secure Tech.), AIAA/IEEE DASC, 2021.
- First Place Student Research Award, AIAA/IEEE DASC, 2020. [8]
- Best-of-Session (V&V), AIAA/IEEE DASC, 2020. [8]
- Best-of-Track (UAS), AIAA/IEEE DASC, 2019. [9]
- Best-of-Track (Safety and Resilience), ATM R&D Seminar, 2017.
- R&D 100 Award for ACAS Xu, 2016.
- MIT Lincoln Laboratory Team Award for ACAS X, 2015–2016.
- Magna Cum Laude, Wentworth Institute of Technology, 2014.

Volunteering

Julia Academy

Course Creator and Lecturer

2021

POMDPs.jl course on decision making under uncertainty.

Massachusetts Science and Engineering Fair

Judge for CS and Engineering

[2015 - 2019]

Evaluated middle and high school science projects.

Other Experience

Harvard University

Technical Support (IT) Co-op

2012

Built a diagnostic system for all of Harvard's computer labs.

Awesome Products, LLC

Co-owner, Software Developer

[2012 - 2014]

Handled programming design and development of music making apps. Secured funding through Accelerate at WIT.

Technical Skills

Julia, MATLAB, Python, JavaScript, C++, LATEX, TikZ

Sequential decision making under uncertainty, machine learning, deep learning, optimization, safety validation.

External Links

- CV: https://bit.ly/moss-cv
- Résumé: https://bit.ly/moss-resume
- Website: https://robert-moss.com
- GitHub: https://github.com/mossr
- Google Scholar: https://bit.ly/moss-scholar • LinkedIn: https://www.linkedin.com/in/robert-j-moss