

Meriel von Stein

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EDUCATION

PhD Candidate of Computer Science (Software Engineering & Robotics) Charlottesville, VA | Dec. 2024
UNIVERSITY OF VIRGINIA

Masters of Computer Science (Software Engineering & Robotics) Charlottesville, VA | Aug. 2022
UNIVERSITY OF VIRGINIA

BA Honors of Art History (Islamic Art & Architecture) Oberlin, OH | May 2016
OBERLIN COLLEGE

PUBLICATIONS

SAFE UNIVERSAL TRANSFORMATIONS

MERIEL VON STEIN, SEBASTIAN ELBAUM, HONGNING WANG
UNDER PREPARATION FOR IEEE ROBOTICS AND AUTOMATION LETTERS JOURNAL (IRAL) 2024.
DOI FORTHCOMING.

DEEPMANEUVER: ADVERSARIAL TEST GENERATION FOR TRAJECTORY MANIPULATION OF AUTONOMOUS VEHICLES

MERIEL VON STEIN, DAVID SHRIVER, SEBASTIAN ELBAUM
IEEE TRANSACTIONS ON SOFTWARE ENGINEERING JOURNAL (TSE) 2023.
DOI: [10.1109/TSE.2023.3301443](https://doi.org/10.1109/TSE.2023.3301443)

PHYSICOV: PHYSICAL TEST COVERAGE FOR AUTONOMOUS VEHICLES

CARL HILDEBRANDT, MERIEL VON STEIN, SEBASTIAN ELBAUM
ACM SIGSOFT INTERNATIONAL SYMPOSIUM ON SOFTWARE TESTING AND ANALYSIS (ISSTA) 2023. SEATTLE, WA
DOI: [10.1145/3597926.3598069](https://doi.org/10.1145/3597926.3598069)

FINDING PROPERTY VIOLATIONS THROUGH NETWORK FALSIFICATION: CHALLENGES, ADAPTATIONS AND LESSONS LEARNED FROM OPENPILOT

MERIEL VON STEIN, SEBASTIAN ELBAUM
IEEE/ACM INTERNATIONAL CONFERENCE ON AUTOMATED SOFTWARE ENGINEERING (ASE) 2022. ROCHESTER, MI.
DOI: [10.1145/3551349.3559500](https://doi.org/10.1145/3551349.3559500)

PREPARING SOFTWARE ENGINEERS TO DEVELOP ROBOT SYSTEMS

CARL HILDEBRANDT, MERIEL VON STEIN, TREY WOODLIEF, SEBASTIAN ELBAUM
IEEE/ACM INTERNATIONAL CONFERENCE ON SOFTWARE ENGINEERING (ICSE) 2022. PITTSBURGH, PA.
DOI: [10.1145/3510456.3514161](https://doi.org/10.1145/3510456.3514161)

AUTOMATED ENVIRONMENT REDUCTION FOR DEBUGGING ROBOTIC SYSTEMS

MERIEL VON STEIN, SEBASTIAN ELBAUM
IEEE INTERNATIONAL CONFERENCE ON ROBOTICS AND AUTOMATION (ICRA) 2021. XI'AN, CHINA.
DOI: [10.1109/ICRA48506.2021.9561997](https://doi.org/10.1109/ICRA48506.2021.9561997).

PROBABILISTIC CONDITIONAL SYSTEM INVARIANT GENERATION WITH BAYESIAN INFERENCE

MERIEL VON STEIN, SEBASTIAN ELBAUM, LU FENG, SHILI SHENG
AVAILABLE VIA ARXIV AS OF DECEMBER 2020.
DOI: [10.48550/ARXIV.2012.06615](https://doi.org/10.48550/ARXIV.2012.06615).

HONORS AND LEADERSHIP

UNIVERSITY OF VIRGINIA GRADUATE TEACHING AWARD, 2023. Recipient of university-wide award for student teaching.
IEEE ECE/FSE SE4SAFE4ML WORKSHOP ORGANIZING COMMITTEE MEMBER (2023) on ML for safety-critical systems.
CRA-W GRAD COHORT WORKSHOP SELECTED PRESENTER (2023) on mentoring work and upcoming research.
CSGSG MENTORING CHAIR (2022-2023) enrich mentoring program, advocate for student well-being in faculty meetings, organize orientation and prospective visits, and host department events.
RECIPIENT OF OBERLIN COLLEGE GRANT & JOHN F. OBERLIN SCHOLARSHIP (2012-2016).

WORK EXPERIENCE

UNIVERSITY OF VIRGINIA | PHD CANDIDATE

Charlottesville, VA | Aug 2018 - ongoing

- Research assistant (qualified in March 2020)
 - **Project lead; Adversarial environments with differentiable rendering** in collaboration with Dr. Claire Le Goues and Squares Lab at Carnegie Mellon University.
 - **Project lead; Safe distribution-aware transformations for sensor hardware versioning.**
 - **Project lead; Off-road benchmark datasets for commercial ruggedized research robots.**
 - **Project lead; State-aware property-driven adversarial testing of system-embedded DNNs.**
- Teaching assistant/Supporting instructor:
 - **Robotics for Software Engineers**, Prof. Sebastian Elbaum.
 - **Software Analysis**, Prof. Mary Lou Soffa.
 - **Introduction to Embedded Computer Systems**, Prof. Joanne Dugan.

NASA GODDARD SPACE FLIGHT CENTER | PATHWAYS PROGRAM

Greenbelt, MD | Aug 2017 – Aug 2018

- Develop, update & maintain GMSEC satellite ground system API and component code.
- Reconcile federal infosec requirements with implementation from a top-down/bottom-up approach.
- Support code reviews & evaluate software systems from a security assurance perspective.
- Interview stakeholders on current & projected implementation of NIST and internal security standards.

NASA KENNEDY SPACE CENTER | SOFTWARE ENGINEER INTERN

Cape Canaveral, FL | Dec 2016 – Aug 2017

- Build & test proof-of-concept Beowulf cluster for granular mechanics and robotics simulations.
- Provide in-house software support for SwampWorks robotics & UAV projects.
- Design, develop and debug automated unit and system testing software for a future launch control system.

UNIV. OF NEBRASKA - LINCOLN | CYBERSECURITY RESEARCH FELLOW

Lincoln, NE | Jun 2016 – Aug 2016

- Ran and extended static analysis tools for malicious Android apps using C++ to handle Java 8 Reflection calls.
- Wrote colluding Android apps in Eclipse and Android Studio for sample runs of static analysis tool.

PROJECTS AND ARTIFACTS

ROSBOT DATA COLLECTION & NAVIGATION: A full stack pipeline for collecting data, training a computer vision model, and deploying it on the ROSbot for navigation.

OPENPILOT FALSIFICATION: Extend state-of-the-art falsification tool DNNF to apply to complex deep neural networks used in the commercial safety-critical driver assistance system OpenPilot.

DEEPMANEUVER: Reproduce the technique outlined in DeepBillboard and improve upon it to leverage the kinematics of the vehicle and state of the test environment.

DDENV: End-to-end tool for delta-debugging robotic environments with a semi-known failure distribution.

ROBOTICS FOR SOFTWARE ENGINEERS: A course for undergraduates that pairs robotics concepts and software engineering techniques, prioritizes experiential learning, and lowers barriers to entry.

SERVICE

Student Mentor, 2022-2023. Sidhard Burre (UVA, Fall 2022), Sam Ghaeze and Zarif Cabrera (Howard University, Summer 2023).

UVA CS department 2021-2023 faculty candidate student reviewer Conduct one-on-one interviews with candidates, assess candidate talks, and write recommendations for faculty search committee.

ICSE Co-reviewer, 2023 Assess submitted research-track papers and provide feedback and analysis to authors and fellow reviewers.

ICSE Organizing Volunteer, 2021 Main conference organizing volunteer supporting paper presentation sessions.

FIRST Robotics Software Engineering Mentor, 2016-2017 Software mentor and software-hardware working group liaison.

Million Woman Mentor Project, Software and Electrical Engineering mentor, grades 1 through 4, 2016-2017.

Association for Computing Machinery (ACM) member, 2015-2017 Rowan chapter, App Development working group.

Contributor to An Efficient, Robust, and Scalable Approach for Analyzing Interacting Android Apps at University of

Nebraska-Lincoln, 2017. Paper accepted by International Conference for Software Engineering (ICSE) 2017

Panelist, thesis presenter at James A. Rawley Graduate Conference in the Humanities, University of Nebraska-Lincoln, 2016

placed second overall for best undergraduate paper.