Carl Hildebrandt

Ph.D. Candidate, University of Virginia

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I specialize in autonomous systems and software testing, focusing on creating, executing, and analysing test suites that bridge software, hardware, and physical world interactions. Outside academia, I'm an athlete and adventurer, with achievements like summiting Kilimanjaro and competing in the world's largest ultramarathon.

Education

2018 – 2024 **University of Virginia**, USA
Ph.D. Computer Science
Advisor: Dr. Sebastian Elbaum

2013 – 2016 **University of Pretoria**, South Africa
B.Eng. in Computer Engineering

Positions Held

2018 – Research Assistant, LESS Lab, University of Virginia (less-lab-uva.github.io)
2022 – 2022 Graduate Research Intern, Raytheon BBN (www.rtx.com)
2019 – 2022 Head of Technology, Vuetech Health Innovations LLC(www.vuetechhealth.com)
2017 – 2018 Research Assistant, Nimbus Lab, University of Nebraska (www.nimbus.unl.edu)
2016 – 2017 Software Engineer, Cheesecake Trails

Publications

2023 **Carl Hildebrandt**, Meriel von Stein, and Sebastian Elbaum, "PhysCov: Physical Test Coverage for Autonomous Vehicles," in *Proceedings of the 32nd ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)*, ACM, 2023

2023 **Carl Hildebrandt**, Wen Ying, Seongkook Heo, and Sebastian Elbaum, "Mimicking Real Forces on a UAV Through a Haptic Suit," in *2023 IEEE International Conference on Robotics and Automation (ICRA)*, IEEE, 2023

2022 **Carl Hildebrandt**, Meriel von Stein, Trey Woodlief, and Sebastian Elbaum, "Preparing Software Engineers to Develop Robot Systems," in *2022 IEEE/ACM 44th International Conference on Software Engineering: Software Engineering Education and Training (ICSE-SEET)*, IEEE, 2022

2021 **Carl Hildebrandt**, and Sebastian Elbaum, "World-in-the-Loop Simulation for Autonomous Systems Validation," in *2021 IEEE International Conference on Robotics and Automation (ICRA)*, IEEE, 2021, pp. 10 912–10 919

2020 **Carl Hildebrandt**, Sebastian Elbaum, Nicola Bezzo, and Matthew B Dwyer, "Feasible and stressful trajectory generation for mobile robots," in *Proceedings of the 29th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)*, 2020, pp. 349–362 **(Distinguished Artifact Award)**

2020 **Carl Hildebrandt**, Sebastian Elbaum, and Nicola Bezzo, "Blending kinematic and software models for tighter reachability analysis," in *2020 IEEE/ACM 42nd International Conference on Software Engineering: New Ideas and Emerging Results (ICSE-NIER)*, IEEE, 2020, pp. 33–36

2018 Evan Beachly, Carrick Detweiler, Sebastian Elbaum, Brittany Duncan, **Carl Hildebrandt**, Dirac Twidwell, and Craig Allen, "Fire-aware planning of aerial trajectories and ignitions," in *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2018, pp. 685–692 **(Best Paper Award)**

NA **Carl Hildebrandt**, Trey Woodlief, and Sebastian Elbaum, "ODD-diLLMma: Making ODD Compliance Checking Tractable with LLM-Driven Sensor Data Analysis," NA **(Under Submission)**

NA **Carl Hildebrandt**, and Sebastian Elbaum, "Are Autonomous Systems Safe: A Continuous Differential Testing Framework using Large Language Models and Unlimited Real Data," NA **(Under Development)**

NA Mira Khan, **Carl Hildebrandt**, and Sebastian Elbaum, "From Simulation to Reality: Streamlining Training AI-Based Drone Navigation Software using Mixed-Reality Environments," NA **(Under Development)**

NA **Carl Hildebrandt**, Brendan Teich, Dylan Callahan, and Borislava I. Simidchieva, "A Framework for Benchmarking Collaborative-Autonomy Behaviors in Robots," NA **(Under Development)**

Patents

2023 Victor Aquino, Melony Bennis, Tien Comlekoglu, Jefferson Griscavage, and **Carl Hildebrandt**, Vuetech Health Innovations LLC, "Systems and Methods for Safety, Security and Well-Being of Individuals", Patent No. US11688265B1

2022 Victor Aquino, Melony Bennis, Tien Comlekoglu, Jefferson Griscavage, and **Carl Hildebrandt**, Vuetech Health Innovations LLC, "Systems and Methods for Safety, Security and Well-Being of Individuals", Patent No. US11282367B1

Honors & Awards

2023 **All-University Graduate Teaching Award**
The University of Virginia - Office of Graduate and Postdoctoral affairs

2022 **Graduate Teaching Award**
The University of Virginia - Annual Computer Science Department End-of-Year Awards

2021 **Best Poster Design**
The University of Virginia - Computer Science Research Symposium

2020 **Best Presentation**
The University of Virginia - Computer Science Virtual Research Symposium

2020 **Distinguished Artifact Award**
Feasible and Stressful Trajectory Generation for Mobile Robots (ISSTA)

2018 **Best Paper Award on Safety, Security, and Rescue Robotics**
Fire-Aware Planning of Aerial Trajectories and Ignitions (IROS)

Teaching

2022 Supporting instructor, **Robotics for Software Engineers**, The University of Virginia
2021 Lab Designer and Guest Lecturer, **Robotics for Software Engineers**, The University of Virginia
2020 Lab Designer and Teaching Assistant, **Robotics for Software Engineers**, The University of Virginia
2016 Head Teaching Assistant, **Data Structures and Algorithms in Java**, The University of Pretoria
2015 Head Teaching Assistant, **Program Design in C++**, The University of Pretoria
2015 Teaching Assistant, **Data Structures and Algorithms in Java**, The University of Pretoria
2014 Teaching Assistant, **Introduction to Programming in C**, The University of Pretoria

Service

2022 **Artifact Reviewer**, IEEE/ACM International Conference on Automated Software Engineering (ASE).
2022 **Graduate Student Council**, The University of Virginia, Computer Science Department (CSGSG).
2022 **Paper Reviewer**, IEEE International Conference on Robotics and Automation Society (ICRA)
2021 **Student Volunteer**, IEEE/ACM International Conference on Software Engineering (ICSE)