

# 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](https://less-lab-uva.github.io))
- 2022 – 2022   Graduate Research Intern, Raytheon BBN ([www.rtx.com](http://www.rtx.com))
- 2019 – 2022   Head of Technology, Vuetech Health Innovations LLC([www.vuetechhealth.com](http://www.vuetechhealth.com))
- 2017 – 2018   Research Assistant, Nimbus Lab, University of Nebraska ([www.nimbus.unl.edu](http://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. 11,688,265
- 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. 11,282,367

## 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, <b>Robotics for Software Engineers</b> , The University of Virginia
2021	Lab Designer and Guest Lecturer, <b>Robotics for Software Engineers</b> , The University of Virginia
2020	Lab Designer and Teaching Assistant, <b>Robotics for Software Engineers</b> , The University of Virginia
2016	Head Teaching Assistant, <b>Data Structures and Algorithms in Java</b> , The University of Pretoria
2015	Head Teaching Assistant, <b>Program Design in C++</b> , The University of Pretoria
2015	Teaching Assistant, <b>Data Structures and Algorithms in Java</b> , The University of Pretoria
2014	Teaching Assistant, <b>Introduction to Programming in C</b> , The University of Pretoria

## Service

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