

Ricardo Andrés Calvo Méndez

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RESEARCH INTERESTS

My research focuses on the design and analysis of methods and tools that provide rigorous guarantees of software correctness. I am particularly interested in formal verification techniques, theoretical and practical foundations for reasoning about program behavior, and advanced approaches to code analysis.

My research interests include:

- **Formal verification:** Foundations and tools for establishing provably correct behavior in complex software systems.
- **Program analysis and testing:** Static, dynamic, and hybrid methods for understanding, validating, and rigorously evaluating code.
- **Optimization and efficiency:** Techniques for improving performance, reducing resource consumption, and identifying near-optimal implementations.

EDUCATION

Ph.D, Electrical and Computer Engineering <i>Purdue University, West Lafayette, IN</i>	Fall 2025 – Fall 2030
B.Sc. Systems and Computer Engineering <i>Universidad Nacional de Colombia, Bogotá D.C, Colombia</i>	Spring 2018 – Fall 2023

RESEARCH EXPERIENCE

Graduate Research Assistant <i>Purdue University — Advised by James Davis</i>	Aug 2025 – Present
<ul style="list-style-type: none">• Serving as a researcher on <i>AutoUP</i>, an automatic unit-proof generation system for formal verification, contributing to its design and development.	
Undergraduate visiting scholar (UREP-C) <i>Purdue University — Advised by James Davis</i>	Feb 2023 – Jul 2023
<ul style="list-style-type: none">• Contributed to the design and implementation of <i>EmNetTest</i>, a framework for testing embedded network stacks.	

PROFESSIONAL EXPERIENCE

Test engineer & QA Analyst <i>Kravata SAS, Bogotá D.C, Colombia</i>	Sep 2024 – Jul 2025
<ul style="list-style-type: none">• Led the testing area, advancing automation across end-to-end, integration, and unit testing while implementing CI/CD pipelines within a DevOps environment.	
Fullstack software developer <i>Fit Ideas SAS, Bogotá D.C, Colombia</i>	Aug 2023 – Aug 2024
<ul style="list-style-type: none">• Led the development team in the strategic planning, management, and deployment of mobile and web applications.	

Junior software developer
Fit Ideas SAS, Bogotá D.C, Colombia

Aug 2021– Jan 2023

- Supported the implementation of custom functionalities as a developer, and contributed to the design and management of relational database systems.

REFEREED CONFERENCE PUBLICATIONS

- [C-1] P. Amusuo, R.A.C. Méndez, Z. Xu, A. Machiry, and J.C. Davis. *Systematically Detecting Packet Validation Vulnerabilities in Embedded Network Stacks*. Proceedings of the 38th IEEE/ACM International Conference on Automated Software Engineering (ASE'23). 21% acceptance rate (134/629). 13 pages.

TECHNICAL REPORTS

- [T-1] P. Amusuo, D. Liu, R.A.C. Méndez, J. Metzman, O. Chang, and J.C. Davis. *FalseCrashReducer: Mitigating False Positive Crashes in OSS-Fuzz-Gen Using Agentic AI*. <https://arxiv.org/pdf/2510.02185>. 2025.

TECHNICAL COURSE PROJECTS

ECE 60852 Holistic Software Security — Design and develop an automatic unit proof debugger to iteratively identify and fix errors in a bounded model checker, enabling the generation of formally correct unit proofs

CERTIFICATIONS

Ayuda y aprende — Spanish Service Learning <i>Purdue University</i>	2023
Algorithmic Toolbox <i>University of California San Diego (Coursera)</i>	2021
Advanced course on Django <i>Platzi</i>	2021
Introduction to Git and GitHub <i>Google (Coursera)</i>	2020
Crash course on Python <i>Google (Coursera)</i>	2020