

Jan-Paul Vincent Ramos-Dávila

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Education

Cornell University

B.A. in Computer Science, Conc. in Programming Languages & B.A. in Philosophy, Conc. in Logic

Ithaca, NY

August 2021 - May 2025

Experience

NASA, Langley Formal Methods

Hampton, VA (R)

Research Assistant, Program Verification, Advised by Dr. Alwyn Goodloe

June 2024 - Present

- Mechanized proofs that model correct behaviors behind a Software Defined Delay-Tolerant Network's Match-Action pipeline for NASA's Interplanetary Overlay Network framework.
- Developed a formally verified Network Calculus IR in Coq (*NetQIR*). Wrote an interpreter for a subset of P4 to target NetQIR [2].

Carnegie Mellon University, S3D

Pittsburgh, PA

Research Assistant, PL/Program Verification, Advised by Dr. Jonathan Aldrich & Dr. Jenna DiVincenzo

May 2022 - May 2024

- Core contributor on the early development of the Gradual Verification framework [1]. Empirically evaluated the soundness of Gradual C_0 [5] and provided formal proofs of completeness between the dynamic and static verifiers [4].
- Explored the application of Gradual Verification to smart contracts on the *Algorand* and *Ethereum* blockchain platforms and developed a prototype for Gradually Verified Teal [3].

Cornell University, CIS

Ithaca, NY

Teaching Assistant, CS 4114 Systems Programming, Taught by Dr. Ken Birman

August 2024 - December 2024

- Graded students' assignments, held weekly office hours, and ran coding workshops each week with hands-on demos building and debugging C++/Linux applications.

Teaching Assistant, CS 4/5110 Programming Languages and Logics, Taught by Dr. Adrian Sampson

January 2024 - May 2024

- Examination czar in charge of the infrastructure of midterms, graded students' assignments, and held weekly office hours.

Research Assistant, Programming Languages, Advised by Dr. Adrian Sampson

October 2021 - December 2022

- Implemented *Graphicionado Graph Analytics* algorithm in Calyx as a case study of the language. Found/solved soundness bugs in the front-end in the Computer Architecture & Programming Abstractions group.
- Worked on a symbolic execution tool for verifying parallelism in Calyx.

Publications & Presentations

- [1] *Gradual C0: Symbolic Execution for Gradual Verification*. DiVincenzo, J., McCormack, I., Gouni, H., Gorenburg, J., **Ramos-Dávila, J.**, Zhang, M., Zimmerman, C., Sunshine, J., Tanter, É., Aldrich, J. In ACM Transactions on Programming Languages and Systems; In 52nd ACM SIGPLAN Symposium on Principles of Programming Languages. [DOI] [Preprint]
- [2] *Type Preserving Compilation for Formally Verified Software Defined Delay-Tolerant Networks*. **Ramos-Dávila, J.**, Goodloe, A. In ACM SIGPLAN/LOG Certified Program Proofs 2025 (**In Submission**); In IEEE Workshop on Optimizing Interplanetary Communication Through Network Autonomy; In Cornell Undergraduate Research Board Fall Forum 2024. [Poster] [Presentation]
- [3] *Gradual Verification of Smart Contracts*. Sun, H., Singh, K., **Ramos-Dávila, J.**, Aldrich, J., DiVincenzo, J. In ACM SIGPLAN Workshop on Principles of Secure Compilation. [Preprint] [Presentation]
- [4] *Optimization of a GV: Lazy evaluation of Iso-recursive Predicates as Equi-recursive at Runtime*. **Ramos-Dávila, J.** In 51st ACM SIGPLAN Symposium on Principles of Programming Languages Student Research Competition; In Midwest Programming Languages Summit 2023. [Poster] [Abstract]
- [5] *Evaluating Soundness of a Gradual Verifier with Property Based Testing*. **Ramos-Dávila, J.** In 50th ACM SIGPLAN Symposium on Principles of Programming Languages Student Research Competition; In Cornell Undergraduate Research Journal, 2(1), 17–27. [DOI] [Paper] [Presentation] [Poster]

Awards & Grants

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Travel Scholarship: Verification Mentoring Workshop @ CAV	'24
Fellow: Amazon Summer Undergraduate Research Experience (CMU)	'23
Winner, Third Place: ACM SIGPLAN POPL SRC [5]	'23
Travel Scholarship: Programming Languages Mentoring Workshop @ ACM SIGPLAN PLDI	'22
Finalist, Mathematics: Regeneron International Science and Engineering Fair	'20 & '21

Academic Service

Seoul, KR	Video Co-Chair: ACM SIGPLAN PLDI 2025	<i>Jun. '25</i>
Denver, CO	Video Co-Chair: ACM SIGPLAN POPL 2025	<i>Jan. '25</i>
Milan, IT	Virtualization Chair: ACM SIGPLAN ICFP 2024	<i>Sep. '24</i>
Copenhagen, DK	Virtualization Chair: ACM SIGPLAN PLDI 2024	<i>Jun. '24</i>
London, UK	AV Committee: ACM SIGPLAN POPL 2024	<i>Jan. '24</i>
Cascais, PT	Video Co-Chair: ACM SIGPLAN SPLASH 2023	<i>Oct. '23</i>
Seattle, WA	Student Volunteer: ACM SIGPLAN ICFP 2023	<i>Sept. '23</i>

Skills

Languages	OCaml, Scala, Python, Haskell, Java/TypeScript, Java, C/C++, Rust, English, Español, Italiano
Tools	LaTeX, Coq IDE, Agda-mode, Unix, Git, Shell, Neovim, Emacs, Docker, Heroku, HTML/CSS, Flask
PL Schools	Oregon Programming Languages Summer School 2024 (<i>Boston University</i>) Advanced Functional Programming Summer School 2023 (<i>Utrecht University</i>)