Jan-Paul Vincent Ramos-Dávila

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Education

Cornell University *Ithaca, NY*

B.A. in Computer Science, Conc. in Programming Languages & B.A. in Philosophy, Conc. in Logic — 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 [3] and provided formal proofs of completeness between the dynamic and static verifiers [2].
- Explored the application of Gradual Verification to smart contracts on the *Algorand* and *Ethereum* blockchain platforms and developed a prototype for Gradually Verified Teal [1].

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

[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 [Poster] [Presentation]

[3] *Evaluating Soundness of a Gradual Verifier with Property Based Testing*. **Ramos-Dávila, J.**
In Cornell Undergraduate Research Journal, 2(1), 17–27; In 50th ACM SIGPLAN Symposium on Principles of Programming Languages Student Research Competition [DOI] [Paper] [Presentation] [Poster]

Presentations

[1] *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]

[2] *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]

Selected Awards next page

Travel Scholarship: Verification Mentoring Workshop @ CAV *'24*

Fellow: Amazon Summer Undergraduate Research Experience (CMU) *'23*

Winner, Third Place: ACM SIGPLAN POPL SRC [3] *'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	*Jun. '25*
Denver, CO	**Video Co-Chair**: ACM SIGPLAN POPL 2025	*Jan. '25*
Milan, IT	**Virtualization Chair**: ACM SIGPLAN ICFP 2024	*Sep. '24*
Copenhagen, DK	**Virtualization Chair**: ACM SIGPLAN PLDI 2024	*Jun. '24*
London, UK	**AV Committee**: ACM SIGPLAN POPL 2024	*Jan. '24*
Cascais, PT	**Video Co-Chair**: ACM SIGPLAN SPLASH 2023	*Oct. '23*
Seattle, WA	**Student Volunteer**: ACM SIGPLAN ICFP 2023	*Sept. '23*

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 (*Boston University*) Advanced Functional Programming Summer School 2023 (*Utrecht University*)