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

Carnegie Mellon University *Pittsburgh, PA*

Research Assistant, PL/Program Verification, Advised by Dr. Jonathan Aldrich & Dr. Jenna DiVincenzo — May 2022 - Present

- Core contributor on the early development of the Gradual Verification framework.
  - *Verification*: Implemented a Property Based Testing tool for evaluating soundness of Gradual C_0 and developed formal proofs for establishing semantic correspondence between static and dynamic verification.
  - *Performance*: Significantly optimized benchmark results by using second-order logic equivalences for runtime assertions.
- Exploring the application of Gradual Verification to smart contracts on the *Algorand* and *Ethereum* blockchain platforms. Developed a prototype for Gradually Verified Teal and Gradually Verified Ethereum.

Cornell University *Ithaca, NY*

Teaching Assistant, CS 4110 Programming Languages and Logics, Taught by Dr. Adrian Sampson — January 2024 - Present

- Graded students' assignments, led weekly discussion sections containing 20+ people, 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] DiVincenzo, J., McCormack, I., Gouni, H, Gorenburg, J., **Ramos-Dávila, J.**, Zhang, M., Zimmerman, C., Sunshine, J., Tanter, É., Aldrich, J., *Gradual C0: Symbolic Execution for Gradual Verification*, In ACM Transactions on Programming Languages and Systems (***In Submission***)

[2] Singh, K., Sun, H., **Ramos-Dávila, J.**, Aldrich, J., DiVincenzo, J. *Gradual Verification of Smart Contracts*, In Workshop on Principles of Secure Compilation (PRiSC, co-located with POPL '24)

[3] **Ramos-Dávila, J.**, *Optimization of a Gradual Verifier: Lazy evaluation of Iso-recursive Predicates as Equi-recursive at Runtime*, In 51st ACM SIGPLAN Symposium on Principles of Programming Languages Student Research Competition (POPL '24 SRC), Midwest Programming Languages Summit 2023 (MWPLS '23)

[4] **Ramos-Dávila, J.**, *Evaluating Soundness of a Gradual Verifier with Property Based Testing*, In 50th ACM SIGPLAN Symposium on Principles of Programming Languages Student Research Competition (POPL '23 SRC), Cornell Undergraduate Research Journal, 2(1), 17–27. https://doi.org/10.37513/curj.v2i1.696 [Pub] [Presentation] [Poster]

Projects

- **Optimization of a Concurrent PL Model Checker.** (*Cornell CS 6120 Advanced Compilers*) Reduction of state explosion for the Harmony Concurrent Programming Language's model checker.
- **Incremental Specification Mining** (*Cornell CS 6156 Runtime Verification*) Instrumentation for Maven-based projects that *incrementally* mines specifications for runtime verification. Significantly decreases overhead for evolutionary-aware specification miners. Supports integration with Javert and BDDMiner. [Repo]
- **RNAFoldml** (*Cornell CS 3110 Functional Programming*) OCaml package that enables users to input both RNA sequences in FASTA format and a set of constraints to predict RNA secondary structure. [Repo]

Awards and Honors

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

Winner, Third Place: ACM SIGPLAN POPL SRC *'23*

Travel Scholarship: ACM SIGPLAN PLDI *'22*

Sponsor Prize: Cornell BRH Hackathon [Course2Career] *'21*

Finalist, Mathematics: Regeneron International Science and Engineering Fair *'20 & '21*

Academic Service

London, UK	**Student Volunteer**: ACM SIGPLAN POPL 2024 (AV Team)	*Jan. '24*
Cascais, PT	**Video Co-Chair**: ACM SIGPLAN SPLASH 2023 (Organizing Committee)	*Oct. '23*
Seattle, WA	**Student Volunteer**: ACM SIGPLAN ICFP 2023 (AV Team)	*Sept. '23*

Skills

Languages	OCaml, Scala, Python, Haskell, JavaScript, Java, C, Racket, Rust, English, Español, Italiano
Tools	LaTeX, Coq IDE, Agda-mode, Unix, Git, Shell, Neovim, Emacs, Docker, Heroku, HTML/CSS, Flask
Courses	Advanced Functional Programming Summer School 2023 (*Utrecht University*) Advanced Compilers, Advanced Programming Languages, Runtime Verification, Functional Programming, Operating Systems (*Cornell University*)