

# Jan-Paul Vincent Ramos-Dávila

✉ mail@janpaul.pl | 🏠 https://janpaul.pl | 🌐 janpaulpl | 📄 conf.researchr

## 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 [1].

### 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  $C_0$  [2] and provided formal proofs of completeness between the dynamic and static verifiers [3].
- Explored the application of Gradual Verification to smart contracts on the *Algorand* and *Ethereum* blockchain platforms and developed a prototype for Gradually Verified Teal [2].

### Cornell University, CIS

Ithaca, NY

Teaching Assistant, CS 4/5111 Practicum in Operating Systems, Taught by Dr. Robbert van Renesse

January 2025 - May 2025

- Ran coding workshops with hands-on demos building and debugging C applications while teaching the EGOS operating system.

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

August 2024 - December 2024

- Graded assignments and ran coding workshops 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] [Poster] [Presentation]
- [2] *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] *Formal Verification of a Software Defined Delay-Tolerant Network*. **Ramos-Dávila, J.**, Goodloe, A.  
In The Eleventh International Workshop on Coq for Programming Languages (co-located with POPL'25); In IEEE Workshop on Optimizing Interplanetary Communication Through Network Autonomy.
- [2] *Gradual Verification of Smart Contracts*. Sun, H., Singh, K., **Ramos-Dávila, J.**, Aldrich, J., DiVincenzo, J.  
In Workshop on Principles of Secure Compilation (co-located with POPL'24). [Preprint] [Presentation]
- [3] *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

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<b>Travel Scholarship:</b> Verification Mentoring Workshop @ CAV	'24
<b>Fellow:</b> Amazon Summer Undergraduate Research Experience (CMU)	'23
<b>Winner, Third Place:</b> ACM SIGPLAN POPL SRC [2]	'23
<b>Travel Scholarship:</b> Programming Languages Mentoring Workshop @ ACM SIGPLAN PLDI	'22
<b>Finalist, Mathematics:</b> Regeneron International Science and Engineering Fair	'20 & '21

## Academic Service

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

## Skills

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