

## RESEARCH INTERESTS

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**Formal Verification, Proof Assistants, Functional Programming, Algorithms**

## EDUCATION

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<b>Princeton University</b>	Princeton, NJ
• PhD in Computer Science, Advisor: Andrew W. Appel	2020 – 2025
• Thesis: A Foundationally Verified Intermediate Verification Language	
<b>University of Pennsylvania</b>	Philadelphia, PA
• MSE in Computer Science, GPA: 4.0/4.0	2018 – 2020
• BA in Mathematics and Computer Science ( <i>summa cum laude</i> ), GPA: 3.98/4.0	2016 – 2020

## EMPLOYMENT

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<b>Sandia National Laboratories - Formal Methods R&amp;D Intern</b>	Summer 2022 – Present
• Developing formal semantics for the Why3 intermediate verification language.	
<b>AWS - Applied Scientist Intern</b>	Summer 2021
• Proved correctness theorems about the IAM policy evaluator using Dafny.	
<b>AWS - Software Development Engineering Intern</b>	Summer 2019
• Developed internal tools for AWS Key Management Service HSM team.	
• Used several cryptography libraries to interface with Yubikeys.	
<b>KPMG - Data &amp; Analytics Intern</b>	Summer 2018
• Developed Microsoft Office add-in for automated document generation using Javascript.	

## PUBLICATIONS

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- Byun, Chakarov, **Cohen\***, et al. “Formally Verified Cloud-Scale Authorization”. In: *47th IEEE/ACM International Conference on Software Engineering (ICSE 2025)*. To appear. 2025
- **Joshua M. Cohen**. “Implementing OCaml APIs in Coq”. In: *CoqPL 2025: The Eleventh International Workshop on Coq for Programming Languages*. Denver, Colorado, USA, Jan. 2025
- **Joshua M. Cohen** and Philip Johnson-Freyd. “A Formalization of Core Why3 in Coq”. In: *Proceedings of the ACM on Programming Languages* 8. POPL (Jan. 2024)
- **Joshua M. Cohen** and Andrew W. Appel. “Specifying and Verifying a Real-World Packet Error-Correction System”. In: *Verified Software. Theories, Tools and Experiments*. 2024
- **Joshua M. Cohen**, Qinshi Wang, and Andrew W. Appel. “Verified Erasure Correction in Coq with MathComp and VST”. in: *CAV 2022: 34th International Conference on Computer-Aided Verification*. 2022
- Joachim Breitner, Antal Spector-Zabusky, Yao Li, Christine Rizkallah, John Wiegley, **Joshua Cohen**, and Stephanie Weirich. “Ready, Set, Verify! Applying hs-to-coq to Real-World Haskell Code”. In: *Journal of Functional Programming* 31 (2021)

\* Authors listed alphabetically

## TALKS

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- *A Foundationally Verified Intermediate Verification Language*. Portland State University Programming Languages and Verification Seminar. November 2024.
- *Towards a Verified Intermediate Verification Language*. IFIP Working Group 2.3 Programming Methodology. May 2024.
- *A Formalization of Why3 in Coq*. New Jersey Programming Languages and Systems Seminar (NJPLS). May 2023.
- *Verified Erasure Correction in Coq with MathComp and VST*. New Jersey Programming Languages and Systems Seminar (NJPLS). May 2022.

## TEACHING

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### Teaching Assistant - Princeton University

- Programming Languages (COS 510) Spring 2023
- Theory of Algorithms (COS 423) Fall 2022

### Teaching Assistant - University of Pennsylvania

- Introduction to Algorithms (CIS 320) Fall 2019, Spring 2020
- Programming Languages and Techniques I (CIS 120) Spring 2018, Fall 2018, Spring 2019

## SERVICE

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Artifact Evaluation Committee: ICFP 2024, POPL 2025

## HONORS AND AWARDS

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Gordon Wu Fellowship in Engineering - Princeton University  
Benjamin Franklin Scholar - University of Pennsylvania  
IEEE Eta Kappa Nu Honor Society Member - University of Pennsylvania

## SKILLS

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**Verification** - Coq, VST, Dafny, Why3, VeriFast, Liquid Haskell  
**Programming** - OCaml, C, Java, Python, Haskell