Lef (Eleftherios) Ioannidis

elefthei@seas.upenn.edu, +1 (267) 968-3532

"I work in the reliability, security and privacy of computer systems, by combining techniques from type theory, formal verification and cryptographic zero-knowledge proofs."

Industry Experience

May '22 - Aug '22	Research Scientist Intern, Amazon, Automated Reasoning Group, Arlington, VA Designed and prototyped a type system and type inference for the Cedar Authorization language.
Mar '19 - Sep '20	Investment Engineer, Bridgewater Associates, Westport, CT Developed trading algorithms, risk-controls, designed and implemented domain-specific programming languages for financial data science embedded in Scala. Taught Scala to $>$ 100 traders and engineers.
May '16 - Oct '17	Software Architect, UnifyID, San Francisco, CA Designed and implemented the microservice back-end for implicit authentication. Implemented end-to-end encryption and scalable real-time machine-learning services. Acquired by Prove in 2021.
Sep '15 - May '16	Security Engineer, Apple, *FairPlay group*, Cupertino, CA Static Analysis, Security, LLVM compiler, cryptography (NDA).

Publications

In submission	*About time: Structural, mechanized, temporal logic verification in Coq,* SPASH 2025, Singapore.
In submission	*Choice Trees: Representing and Reasoning About Nondeterministic, Recursive, and Impure Programs in Coq.* Journal of Functional Programming, Special POPL 2025 edition.
Apr 2024	*Cedar: A New Language for Expressive, Fast, Safe, and Analyzable Authorization,* SPLASH 2024, Pasadena, CA.
Dec 2023	*Reef: Fast Succinct Non-Interactive Zero-Knowledge Regex Proofs,* USENIX Security 2024, Philadelphia, PA.
Oct 2021	*Efficient Representation of Numerical Optimization Problems for SNARKs,* USENIX Security 2022, Boston, MA.
Apr 2019	*MCQC: Extracting and optimizing formally verified code,* NASA Formal Methods Symposium (NFM 2019), Houston, TX.

Education

Current	PhD in Computer Science, *University of Pennsylvania*, Philadelphia, PA
Research:	*Programming languages for formally verified and cryptographically verifiable computation.* Advised by Sebastian Angel & Steve Zdancewic. Graduation in summer 2025.
2015, 2019	BSc, MEng in Electrical Engineering and Computer Science, *MIT*, Cambridge, MA
Research:	*Extracting and optimizing low-level bytecode from high-level verified Coq.* Advised by Frans Kaashoek & Nickolai Zeldovich.

Programming skills

Skills:	Programming Language design, Type theory, Verification, Compilers, Security, Cryptography.
Languages:	Rust, Scala, Haskell, OCaml, Coq, C, C++, SQL, Python, Go, Java, Javascript.