Eric Mugnier

emugnier
Looking for full time job
Interested in Formal Methods, Security, Systems, and LLMs

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Education

- **UC San Diego** USA, Sept 2020-Fall 2025 (Expected)
  - Ph.D. student in Computer Science - on formal methods and LLM applications advised by Pr. Yuanyuan Zhou
- **Bordeaux INP, Grandes Ecoles System** France, Sept 2014-Dec 2019
  - M.S in Computer Science, Bordeaux-INP Top 15 French engineering university, 2017 - 2019: GPA 4.0

Experience

- **Research Scientist Intern** AWS Seattle, June-Sept 2023
  - Integrated portfolio solving support to the Dafny language, unifying three solver outputs into one operation, reducing verification time by 25% and stabilizing proof variance by 50%
  - Presented at the Dafny workshop, leading to broader portfolio support for Z3 and CVC5 SMT solvers
- **Research Scientist Intern** AWS Seattle, June-Sept 2022
  - Proved the correctness of part of the AWS authorization library, leading to the separation of specifications from implementation for improved maintainability
  - Tested the compilation from Dafny to target languages, discovering and fixing 11 compiler bugs
- **Security Software Engineer** Whova San Diego, Oct 2019–July 2020
  - Automated penetration testing for APIs handling 10M requests/day, fixing multiple vulnerabilities
  - Led the transition from Python 2 to Python 3 across the entire codebase, improving the maintainability
  - Trained the engineering team on cybersecurity by giving talks, writing newsletters and organizing quizzes

Research Publications

- **VOOST: Speeding-up verification start with Large Language Models** In progress
  - Designing VOOST, a tool that adapts Rust code to the Verus subset and generates specifications
  - Integrating memory and self-learning capabilities to the LLM to capture Verus-specific syntax
  - Applying VOOST to verify real-world crates, including an IBAN parser, an HTTP server, and an HTTP library, allowing to prove functional correctness of critical code
- **On the Impact of Formal Verification on Software Development** OOPSLA 2025
  - Interviewed 14 Dafny users about their use of verification in large-scale projects
  - Applied grounded theory to understand expectations and practices of verification tools
  - Identified opportunities to simplify verified development such as the need for more adapted review tools
- **Laurel: Unblocking Automated Verification with Large Language Models** OOPSLA 2025
  - Designed Laurel, a tool that generates assertions by leveraging LLMs with 60% accuracy
  - Built a benchmark of Dafny lemmas with 202 helper assertions extracted from 3 real-world codebases
  - Leveraged in-context examples and prompt placeholders, improving assertion generation by a factor of three
- **ACSym: Detecting Access Control Change with Symbolic Execution** In submission
  - Developed a tool that leverages symbolic execution to evaluate access control changes in system software
  - Designed a technique combining static analysis and selective execution that run software of 200,000 lines in 5 min
  - Evaluated on users and real-world issues showing its effectiveness on Apache, Iptables, Nginx and Redis

Additional publications

- **Effective Bug Detection with Unused Definitions.** Eurosys 24. Zhong *et al.*
- **Give and Take:** An End-To-End Investigation of Giveaway Scam Conversion Rates. IMC 24. Liu *et al.*

Skills

- Python, Rust, Verus, Dafny, C, C++, LLVM, Git, Docker, JavaScript, NodeJS, MySQL