Eric Mugnier

emugnier

Seeking a full time position, as Research Scientist in Security and Formal Methods

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San Diego, California

Education

- **UC San Diego** USA, Sept 2020-Summer 2025(Expected)
  - Ph.D. student in security and formal methods advised by Pr. Yuanyuan Zhou
- **Bordeaux INP, MS and BS in Computer Science** France, Sept 2014-Dec 2019

Industry Experience

- **Research Scientist Intern** AWS Seattle, June-Sept 2023
  - Developed a plugin to enable portofolio solving in Dafny, with Z3, CVC5 and Vampire
  - Demonstrated that the porfolio approach improves solving time by 25%, while increasing the proof stability
  - Presented my work at the Dafny workshop, advocating for enhanced support for various solvers
- **Research Scientist Intern** AWS Seattle, June-Sept 2022
  - Proved the correctness in Dafny of part of AWS internal authorization library, handling billions of calls per seconds
  - Led the initiative to decouple the code from the specification, creating a language-agnostic specification
  - Tested the compilation from Dafny to the target languages and fixed 11 bugs in the compiler
- **Security Software Engineer** Whova San Diego, Oct–July 2019–2020
  - Improved the security of APIs receiving 10M requests per day by automating penetration tests
  - Led the transition from Python2 to Python3 for the entire codebase
  - Trained the engineering team on cybersecurity by giving talks, writing newsletters and organizing quizzes

Research Experience

- **Dafny User-study** Ongoing
  - Interviewing Dafny users to understand how verification tool are used in the real-world
  - Employing grounded theory methodology to investigate the impact of verification on software development
- **Laurel: Unblocking Automated Verification with Large Language Models** In submission
  - Designed Laurel, a tool that generates helper assertions by leveraging Large Language Models with 60% accuracy
  - Built a dataset of Dafny lemmas containing 202 helper assertions, drawn from three real-world codebases.
  - Proposed techniques to improve the accuracy of the LLM leveraging in context-examples and prompt placeholders
- **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 runs software of 200,000 lines in 5 min
  - Evaluated on users and real-world cases, reducing errors on Apache, Iptables, Nginx, and Redis from 50% to 3.57%

Additional publications

- **Effective Bug Detection with Unused Definitions.** Eurosys 24. L. Zhong, C. Xiang, H. Huang, B. Shen, E. Mugnier, and Y. Zhou.
- **Give and Take: An End-To-End Investigation of Giveaway Scam Conversion Rates.** IMC 24. E. Liu, G. Kappos, E. Mugnier, L. Invernizzi, S. Savage, D. Tao, K. Thomas, G. Voelker, S. Meiklejohn.

Skills

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