Omar S Navarro Leija, PhD

https://gatowololo.github.io
San Francisco

I combine rigorous software engineering with a researcher mindset to solve difficult technical problems. I bring expertise in Linux systems programming, with over 7 years experience with Rust.

Work Experience

Bolt Labs | Senior Software Engineer **Oct 2022 - Present**

- Drove development from conception to deployment for the company's flagship SaaS: Lock-Keeper a cryptographic key management RESTful server built on a modern Rust stack (*tokio*, *Axum*, *serde*, *sqlx*, *thiserror*, *tracing*).
- Spearheaded rapid development of a business-critical proof-of-concept, enabling leadership to successfully demo our upcoming product to prospective customers and investors.
- Interfaced with cross-functional R&D team to extend our cutting-edge distributed cryptographic protocols software library (open source: github.com/boltlabs-inc/tss-ecdsa).
- Established and documented processes for engineering teams including: coding standards, agile workflows, system testing, peer review, security and best practices.

University of Pennsylvania | Doctoral Researcher **Sept 2016 – Sept 2022**

- Pioneered Dettrace, a Linux container abstraction for reproducible program execution.
- Brought project from concept to fully realized system through entire project life cycle: design → implementation → testing → benchmarking → publication.
- Engineered custom asynchronous runtime for Linux process tracing based on reactor-executor pattern; seamlessly integrated on top of Rust's async/await functionality.
- Led project management including: setting scope and roadmap, planning weekly agendas, driving meetings, raising technical concerns and pitfalls, and delegating work team members.

Microsoft Research | Research Software Engineer Intern **Summer 2021**

- Implemented RDMA backend for Demikernel, a libOS providing microsecond latencies over a range of kernel-bypass technologies for datacenters.
- Created idiomatic Rust bindings (FFI) for RDMA's *communication manager* and *verbs* C libraries.
- Explored modifications to DPDK-based TCP/IP network stack for experimental TCP connection migration support.

Cloudseal.io | Researcher Lead **2020**

- Software containerization and reproducibility startup founded on my Dettrace project, successfully acquired by *[Big Tech Company]*.

VMware Research | Research Software Engineer Intern **Summer 2020**

- Added performance profiling and visualization for Differential Datalog, a DSL for incremental computation, allowing the team to understand and diagnose parallel scaling issues.

Mozilla Corporation | Research Software Engineer Intern **Summer 2019**

- Integrated experimental "lightweight" record-and-replay support to Servo, a highly-concurrent web browser engine, in order to reduce the number of intermittent (false positive) test failures.

Education

University Of Pennsylvania | PhD, Computer Science **2016 - 2022**

Dissertation: *Leveraging System Call Interposition for Low-level Process Manipulation*

University Of Pennsylvania | MSE, Computer Science **2016 - 2017**

University of Nevada, Las Vegas | BS, Computer Science, Math Minor **2011 - 2016**

Skills

Programming Languages: Rust, C, Python, C++, Haskell, Java, shell scripting

Technologies and Systems: Github Actions, Docker, postgreSQL, git
Familiarity with: Cuda, LLVM, DPDK, RDMA, TCP/IP stack, AWS Nitro Secure Enclaves

Natural Languages: Spanish (Native)

Publications (Computer Science)

- ***Demikernel Datapath OS Architecture for Microsecond-scale Kernel-bypass Systems*** **|** Irene Zhang, Amanda Raybuck, Pratyush Patel, Kirk Olynyk , Jacob Nelson, Omar S Navarro Leija, Ashlie Martinez, Jing Liu, Anna Kornfeld Simpson, Sujay Jayakar, Pedro Henrique Penna, Max Demoulin, Piali Choudhury, Anirudh Badam | **SOSP 2021**
- ***Static detection of uncoalesced accesses in GPU programs*** **|** Rajeev Alur, Joseph Devietti, Omar S. Navarro Leija, Nimit Singhania | **Formal Methods in System Design 2021**
- ***Reproducible Containers*** **|** Omar S Navarro Leija, Kelly Shiptoski, Ryan Scott, Ryan Newton and Joseph Devietti | **ASPLOS 2020**
- ***A Monad for Deterministic Parallel Shell Scripting*** **|** Ryan Scott, Omar S Navarro Leija, Joseph Devietti, and Ryan R Netwon | **OOPSLA 2017**
- ***GPUDrano: Detecting uncoalesced accesses in GPU programs*** **|** Rajeev Alur, Joseph Devietti, Omar S Navarro Leija, and Nimit Singhania | **CAV 2017**

Publications (Other)

- ***Transcriptome analyses of tumor-adjacent somatic tissues reveal genes co-expressed with transposable elements*** **|** Nicky Chung, GM Jonaid, Sophia Quinton, Austin Ross, Corinne E Sexton, Adrian Alberto, Cody Clymer, Daphnie Churchill, Omar S Navarro Leija, and Mira V Han | **Mobile DNA 2019**
- ***Measuring accelerated rates of insertions and deletions independent of rates of nucleotide substitution*** **|** Omar S Navarro Leija, Sanju Varghese, and Mira V Han | **Journal of Molecular Evolution 2016**
- ***Agile multiscale decompositions for automatic image registration*** **|** James M Murphy, Omar S Navarro Leija, and Jacqueline Le Moigne | **Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXII 2016**