

Alex Ledger

Resume

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Work Experience

- 2016–Present **Associate Staff, MIT Lincoln Lab**, Lexington, MA.
- Designed and implemented a framework for secure multi-party computation, a privacy-enhancing, cryptography-based technology for computing analytics while preserving the privacy of inputs.
 - The design and implementation involved novel cryptographic optimizations, concurrent and parallelized code, and a uniquely tailored test harness.
- 2016 **Software Engineer, Sailfan**, Portland, OR.
- Researched and developed algorithms and software to detect features in images and compute statistics in domains with a limited training set.
 - Implemented a RESTful interface for clients to interact with the image processing code.
- 2015–2016 **Math-Computer Science Research Assistant, Reed College**, Portland, OR.
- Worked with professor Adam Groce on Oblivious RAM (ORAM), a cryptographic technique for obfuscating a client's access patterns to a server.
 - Implemented ORAM protocols in C++, wrote cryptographic proofs that the protocols were secure, and published a paper.
- 2015–2016 **Computational Biology Research Assistant, Reed College**, Portland, OR.
- Worked with professor Anna Ritz on identifying structural variants in DNA using Python and graph analytics.

Education

- 2016–2017 **Student, MIT**, Cambridge, MA.
- Participated in classes at MIT including Lattice Cryptography with Vinod Vaikuntanathan, Public Ledgers with Silvio Micali, and Multicore Programming with Nir Shavit.
- 2012–2016 **Bachelor of Arts in Math-Computer Science, Reed College**.
- Thesis *Implementing Component-Based Garbled Circuits*
- Advisor Professor Adam Groce
- Description Explores methods of secure computation, a cryptographic protocol for allowing two people who do not trust each other to work together. I developed a new technique for chaining components of Yao's garbled circuits, and I implemented the technique in C to achieve an order of magnitude speed up over prior work.

Computer Skills

- Experienced C, C++, Python, Rust, Java, R, Bash, Linux, Git, Latex
- Intermediate Go, Clojure, Coq, SQL, Mathematica, Matlab, Haskell, MongoDB, NoSQL

More Information

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