

# BENJAMIN POSNICK

## Software Engineering Experience

Microsoft | *Software Engineering Intern* May 2020 – Aug 2020

Azure Core Operating Systems & Intelligent Edge: Enterprise & Security Remote

- Developed an application in C++ to scan disk drives on Windows 10 desktop systems, verifying the certificates and Windows Defender reputation of all binaries
- Designed algorithms to determine which binaries will not be allowed to execute under a new, heightened security model and which applications will be affected as a result
- Investigated feasibility of migrating Windows 10 desktops to a proactive security model

SRC Inc | *Software Engineering Intern* May 2019 – Aug 2019

Electronic Warfare: Infrastructure & Security Syracuse, NY

- Developed a lexer, parser, and interpreter for a query language using ANTLR & Java to enable a unified way of querying in Alfresco and SOLR for improved user experience
- Containerized backend services for a monolithic web app using Docker & Ansible and implemented a Jenkins continuous integration pipeline for deploying microservices
- Built a full-stack web app in React.js & Node.js to configure an electronic warfare system

## Research Experience

Cornell University | *Distributed Systems Research Assistant* Mar 2020 – Dec 2020

Department of Computer Science: Ken Birman Research Group Ithaca, NY

- Analyzed the effects of SPDK-based persistent storage on latency and bandwidth as part of a library for building high-speed replicated systems on RDMA networks

Syracuse University | *Computational Biology Research Assistant* Jun 2018 – Oct 2019

Syracuse Biomaterials Institute: NSF REU Program Syracuse, NY

- Implemented real-time image segmentation and object tracking as part of a cell tracking software package in MATLAB to enable analysis of cell migratory behavior during imaging

## Software Projects

**A sharded, linearizable key-value storage system with dynamic load balancing**

- Designed a distributed key-value storage system in Java capable of handling network partitions and redistributing shards across replica groups while maintaining linearizability
- Implemented multi-Paxos to ensure fault tolerance of replica groups, optimized with mechanisms for garbage collection and electing a distinguished proposer

**ChipotLang. An interpreted functional programming language for concurrent programming**

- Designed a functional programming language that uses continuations to model threads
- Built an interpreter, along with a lexer and parser, in OCaml that translates expressions into continuation-passing style and then evaluates them using the semantics of  $\lambda$ -calculus

**OCamulator. A domain-specific language for linear algebra, probability, and statistics**

- Developed an interpreted DSL in OCaml for mathematical computations, including row reduction, matrix factorizations, solving linear systems, and matrix-vector arithmetic

## Teaching Experience

CS 4820: Analysis of Algorithms | *Teaching Assistant (TA)* Fall 2020

CS 2110: Data Structures & OO-Programming | *Head TA / TA* Spring 2020 / Fall 2019

CS 1110: Computing in Python | *Teaching Assistant (TA)* Spring 2019

## Campus Involvement

Delta Tau Delta Fraternity | *Executive Board* Jan 2019 – Jul 2020

Cornell Interfraternity Council | *VP for Communications* Jan 2019 – Jan 2020

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## Education

Cornell University | College of Engineering

B.S. in Computer Science, May 2021

Cumulative GPA: **3.91** (*Magna cum laude*)

Focus Areas: *Systems & Machine Learning*

External Specialization: *Economics*

## Skills

### Programming Languages

Java • OCaml • C++ • C • Python • R •  
MATLAB • JavaScript • SQL • Bash

### Systems

Linux • Microsoft Azure • RISC-V assembly

### Machine Learning & Data Science

PyTorch • Keras • NumPy •  
scikit-learn • Stata

### Web Development & DevOps

React.js • Node.js • Docker • Ansible

## Coursework

### Computer Science

Distributed Computing  
Cloud Computing & Smart IoT Systems  
Operating Systems  
Supervised & Unsupervised Machine Learning  
Programming Languages & Logics  
Data Science  
Artificial Intelligence  
Analysis of Algorithms  
Functional Programming  
Computer Organization & Systems Programming  
Data Structures & Object-Oriented Programming  
Discrete Structures

### Mathematics

Probability Theory  
Engineering Probability & Statistics  
Linear Algebra  
Multivariable Calculus  
Differential Equations

### Economics

Applied Econometrics  
Intermediate Microeconomic Theory  
Environmental Economics

## Publications

S.L. Buffington, **B.M. Posnick**, J. Paul, and P.T. Mather, "Ternary Polymeric Composites Exhibiting Bulk and Surface Quadruple-Shape Memory Properties," ChemPhysChem in press (2018).