

# {BENJAMIN MURPHY}

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## EDUCATION

### HARVARD LAW SCHOOL

CAMBRIDGE, MA / SEPTEMBER 2021 TO MAY 2024

### BROWN UNIVERSITY

PROVIDENCE, RI / MAY 2019

Sc.B. / COMPUTER SCIENCE

Sc.M. / COMPUTER SCIENCE

3.9 / 4.0 GPA

## LEADERSHIP

### ART OF PROBLEM SOLVING Remote

CLASS ASSISTANT AND GRADER July 2014 / March 2016

Assisted with live online classes on topics such as algebra, geometry, and number theory, which involved answering student questions in concert with the instructor. Graded long-answer questions for weekly homework sets.

### WHEELER SCHOOL Providence, Rhode Island

AERIE INSTRUCTOR November 2014 / May 2015

Taught elective classes on computer programming and advanced mathematics (linear algebra, abstract algebra) to small groups of students.

## SKILLS & INTERESTS

I am focused on the intersection of law and technology, with a particular interest in improving data security and privacy through technological and legal means. I also am interested in distributed systems, and the theory and implementation of machine learning.

### PROGRAMMING LANGUAGES

Expert: Python, JavaScript, NodeJS

Proficient: C++, C, HTML/CSS, Go

Beginner: Matlab, Rust, Java, Bash

FRAMEWORKS AND TOOLS / Docker, React, MongoDB, Postgres, MySQL, Amazon Web Services, Google Cloud Platform, Vagrant, Git, Nginx, Jupyter, Meteor, Django.

SOFTWARE / Adobe Lightroom, Adobe Photoshop, Adobe Illustrator, Microsoft Excel

HOBBIES / Photography, running, politics, ultimate frisbee, reading, skiing, gaming

## ACTIVITIES

### BROWN DEBATING UNION

November 2017 / Present

Participated in and judged tournaments following the American Parliamentary Debate format at colleges including Tufts and Brown.

## DEVELOPMENT EXPERIENCE

### TWO SIGMA New York, New York

SOFTWARE ENGINEERING INTERN Summer 2018

Designed and implemented library to accelerate analytics on trading data through the use of Apache Spark and Apache Parquet.

### FORMALLY Providence, Rhode Island

CO-FOUNDER & HEAD OF INFRASTRUCTURE February 2018 / Present

Co-founded Formally, a company aiming to streamline the process of filling out immigration and asylum forms, with the goal of helping refugees and illegal immigrants obtain legal status. Learn more at [www.formally.us](http://www.formally.us).

### MEDITECT Remote

CONTRACTOR & BACKEND DEVELOPER July 2018 / Present

Implement administration interface, web portal, and client APIs, and administer infrastructure running on Amazon Web Services and Docker.

### FACEBOOK Menlo Park, California

PRODUCTION ENGINEERING INTERN Summer 2017

Developed tooling in Python to assist with service configuration and monitoring, focusing on automated error detection and resolution, which was deployed to multiple production microservices by conclusion of internship.

### MONGODB New York, New York

SOFTWARE ENGINEERING INTERN Summer 2016

Designed and implemented a new company-wide web application for tracking Objectives and Key Results (OKRs) using React, Docker, MongoDB, and NodeJS.

SOFTWARE ENGINEERING INTERN Spring 2016

Developed new query and aggregation features for MongoDB 3.4, including \$graphLookup (a headlining feature), more than fifteen new aggregation expressions including \$zip and \$switch, and many internal optimization techniques designed to improve query speed.

SOFTWARE ENGINEERING INTERN Summer 2015

Redesigned and implemented the primary interface for MongoDB University, an online course platform, using React. Implemented a REST API for the MongoDB University mobile app using Django.

### BROWN COMPUTER SCIENCE Providence, Rhode Island

#### UNDERGRADUATE TEACHING ASSISTANT

Held weekly office hours, graded student assignments, offered support via email and Piazza, and mentored individual students.

CS0190 ACCELERATED INTRODUCTION TO COMPUTER SCIENCE (FALL 2016)

CS1570 DESIGN AND ANALYSIS OF ALGORITHMS (FALL 2017)

CS1670 OPERATING SYSTEMS (SPRING 2018)

CS1570 DESIGN AND ANALYSIS OF ALGORITHMS (FALL 2018)

SYSTEMS PROGRAMMER, OPERATOR, AND CONSULTANT Spring 2017 / Present

Manage and maintain department systems, including hundreds of workstations, web servers, databases, and a distributed file system. Respond to acute issues, and handle administrative requests from faculty and students.

# CLASSES TAKEN

## COMPUTER SCIENCE

### **ACCELERATED INTRODUCTION TO COMPUTER SCIENCE** Fall 2014 – A

An introduction to functional programming, algorithms and data structures, primarily using Pyret.

### **SOFTWARE ENGINEERING** Spring 2015 – B

Tools, methods, and best practices for software engineering, including source control, databases, web development, and modern Java programming.

### **PROBABILITY AND COMPUTING** Spring 2015 – A

Introductory probability with a focus on applications to computer science, including basic concentration bounds, Monte Carlo simulations, and Markov chains.

### **INTRODUCTION TO COMPUTER SYSTEMS** Fall 2015 – A

Primer on Unix systems, including x86 assembly, C programming, networking, concurrent programming, and system calls.

### **DESIGN AND ANALYSIS OF ALGORITHMS** Fall 2015 – A

Techniques to analyze runtime and prove correctness of algorithms, including divide-and-conquer, dynamic programming, greedy algorithms, max flow, and reductions.

### **COMPUTER NETWORKS** Fall 2016 – A

Networking from hardware through transmission layers. Projects included implementing TCP, IP, and BitTorrent.

### **THEORY OF COMPUTING** Fall 2016 – A

Theoretical computer science, including DFAs, NFAs, Turing machines, associated proofs of runtime and correctness, and formal definitions of NP-completeness.

### **DISTRIBUTED SYSTEMS** Spring 2017 – A

A practical examination of modern distributed systems including consensus protocols (Raft, two- and three- phase commit), distributed hash tables and distributed file systems.

### **OPERATING SYSTEMS** Spring 2017 – A

An in-depth examination of the Linux operating system. Projects included implementations of two-level threading, virtual file systems, and on-disk filesystems. Topics included networking, drivers, file systems, security, and more.

#### **OPERATING SYSTEMS LABORATORY** Spring 2017 – B

Supplementary and optional laboratory which involved implementing major portions of the Weenix operating system from scratch.

### **SOFTWARE SECURITY AND EXPLOITATION** Fall 2017 – A

A hands-on approach to exploiting and breaking software in an x86 IA-32 environment, including techniques such as buffer overflow, ret2libc, and return-oriented programming, as well as defenses for these attacks.

### **MACHINE LEARNING** Spring 2018 – A

A mathematical and computational introduction to modern machine learning techniques, including topics such as neural networks and backpropagation; Bayesian classifiers; and regressions.

### **INTRODUCTION TO CRYPTOGRAPHY AND COMPUTER SECURITY** Spring 2018 – A

A proof-based approach to modern cryptography, including formal approaches to indistinguishability and reductions, signature schemes, public and private key cryptosystems, zero-knowledge proofs, and multiparty computation.

### **PROBABILISTIC METHODS IN COMPUTER SCIENCE** Spring 2018 – A

An introduction to probabilistic techniques useful in analyzing the performance of algorithms. Topics included Chernoff and Hoeffding bounds, martingales, PAC-learnability, Monte Carlo methods and the Metropolis algorithm.

## MATHEMATICS

### **HONORS MULTIVARIATE CALCULUS** Fall 2014 – A

### **HONORS LINEAR ALGEBRA** Spring 2015 – A

### **ABSTRACT ALGEBRA** Spring 2017 – A

### **CRYPTOGRAPHY** Fall 2017 – A

## ALL OTHER

### **INTRODUCTION TO CREATIVE NONFICTION** Fall 2014 – Pass

### **INTRODUCTION TO HUMAN DEVELOPMENT AND EDUCATION** Fall 2014 – B

### **THE AMERICAN PRESIDENCY** Spring 2015 – Pass

### **COMPUTATIONAL COGNITIVE SCIENCE** Spring 2015 – A

### **MODERN ARCHITECTURE** Fall 2015 – A

### **MANAGEMENT OF INDUSTRIAL AND NONPROFIT ORGANIZATIONS** Fall 2015 – A

### **BASIC JAPANESE (PART ONE)** Fall 2016 – A

### **BASIC JAPANESE (PART TWO)** Spring 2017 – A

### **TWO LIBERAL TRADITIONS: ENGLISH AND FRENCH** Fall 2017 – A

### **GLOBALIZATION AND SOCIAL CONFLICT** Fall 2017 – A