# DAVID BREWSTER

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## EDUCATION

**University of Illinois at Urbana-Champaign** *exp.* Spring 2021
B.S. Computer Science — *Theory & Artificial Intelligence* GPA: $3.63/4.00$
B.S. Mathematics — *Applied Mathematics* *Dean's List*

## CONCENTRATIONS

Randomized Algorithms • Biological Computation • Machine Learning

## PROFESSIONAL EXPERIENCE

- **Citadel Securities** — *SWE Intern, Options Market Making — New York, NY* Summer 2019
  - Developed several UIs for viewing and interacting with Options and ETFs info
  - Created a real-time profile manager to store configurations of the UIs
  - Technologies used: TypeScript, React, Redux, Node.js, Python, Redis, MongoDB, WebSockets
- **Citadel** — *SWE Intern, Global Quantitative Strategies — Chicago, IL* Fall 2018
  - Created a UI for visualizing important aggregate stock exchange data
  - Ran analysis on Depositary Receipts used internally
  - Improved debugging support for internal market data library
  - Technologies used: C++, Pybind, Python, R, TypeScript, React, WebSockets
- **Two Sigma IQ** — *SWE Intern, Data Engineering — New York, NY* Summer 2018
  - Built an HTTP API for high-level database operations in order to more easily automate data storage and retrieval
  - Added statistics summarizations to incoming vendor data for monitoring purposes
  - Technologies used: JavaScript, Express.js, Python, AWS EC2, PostgreSQL
- **Microsoft** — *SWE Intern, Azure Compute — Redmond, WA* Spring 2018
  - Added a widget to the Azure Portal that summarizes update management errors
  - Made improvements to various update management scripts
  - Technologies used: TypeScript, Knockout.js, C#, Powershell, Azure, KustoML
- **Google** — *SWE/SRE Intern, Zipit (Reviews) — New York, NY* Summer 2017
  - Created a DNN for predicting Memcached hits and misses in an attempt optimize cache policies for internal groups
  - Technologies used: C++, Python, Memcached, Flume (MapReduce), Tensorflow
- **Volume Technologies** — *SWE Intern — Champaign, IL* Fall 2016 - Spring 2017
  - Created various internal scripts for automation and data visualization
  - Technologies used: Python, JavaScript, Java (Android)
- **Gloucester Parks, Recreation, and Tourism** — *SWE Intern — Gloucester, VA* Fall 2015 - Spring 2016
  - Co-developed an Android application for an annual county festival
  - Technologies used: Java (Android)

## RESEARCH EXPERIENCE

- **ICLUE @ UIUC** — *Algebraic Combinatorics — University of Illinois at Urbana-Champaign* Summer 2020
  - Mainly worked on topics in Representation Theory and Algorithms
  - Helped to form and strengthen conjectures through computer verification
- **Biological Computation Group** — *Protein Folding Algorithms — University of Illinois at Urbana-Champaign* Spring 2020
  - Worked on approximation algorithms for protein folding in the 2D HP model
- **Supercomputing Genomics Group** — *DNNs for Cancer Drug Predictions — Institute for Genomic Biology* [1] Spring 2017
  - Used Keras + Theano to train CNNs on protein and drug use data

## TEACHING

- **Intro to Algorithms & Models of Computation (CS 374)** — *Course Assistant — UIUC: Champaign, IL* Fall 2020

[1] In collaboration with Argonne National Laboratories

- **Software Design Studio (CS 126)** — *Senior Course Assistant — UIUC: Champaign, IL* Fall 2017 - Spring 2020
  - Wrote many of the homework assignments
  - Answered many student online and in-person questions
  - Developed and maintained a lot of the course infrastructure
- **Honors Intro to Computer Science (CS 196)** — *Homework Writer — UIUC: Champaign, IL* Fall 2017
  - Co-wrote many of the homework assignments
  - Managed a team for a group project
- **New Horizons GSST STEM Camp: Web Design** — *Instructor — TNCC: Hampton, VA* Summer 2016
  - Taught $5^{\text{th}} - 8^{\text{th}}$ grade students HTML, CSS, and some JavaScript
  - Students were also exposed to Computer Science concepts such as binary numbers and recursion

## MEMBERSHIPS

- **Blacks and African Americans in Computing (BAAC @ Illinois)** — Technical Staff
- **National Society of Black Engineers (NSBE) - UIUC Chapter** — Member
- **Illinois Programming League (IPL)** — team placed $13^{\text{th}}$ out of $\sim 100$ at 2017 Mid-Central Regional ACM-ICPC

## PROGRAMMING SITES

- **Project Euler** — *Computational Mathematics* — 150+ problems solved
- **Rosalind** — *Computational Biology* — 60+ problems solved

## CODE SAMPLES (ON GITHUB)

- **Random Projections** — *Approximation Algorithms for Large Matrices* — Python/NumPy
- **NLNum** — *Littlewood-Richardson coefficients and Newell-Littlewood numbers calculator* — C++/Python
- **Quasi-key Tableaux** — *Quasi-key Tableaux Calculator* — Python/TypeScript/React
- **Pong** — *Multi-threaded Pong Reinforcement Learning Environment* — C++/Python
- **Falling Blocks** — *Deep Reinforcement Learning with Hyper-NEAT* — JavaScript/React
- **Symbolic Computation** — *Parser + Lexer for Arithmetic Expressions from scratch* — F#
- **GDAX** — *Wrapper for Websocket connection to GDAX Crypto Exchange w/ Online Linear Regression* — Golang

## TOOLS

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|---|---|
| **Programming Languages** | C/C++, Python, TypeScript, F#, Java, Golang, Sage, J (APL Dialect) |
| **Frameworks** | NumPy, Torch, Node.js, React, Tensorflow |
| **Other Tools** | AWS, Bazel, CMake, GCP, OpenMP, OR-Tools, PyBind |