

James Bowden

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EDUCATION

California Institute of Technology
B.S. Computer Science, Data Science

GPA 4.2/4.0
Grad: 2023

WORK EXPERIENCE

Machine Learning Researcher, SURF Intern | Jun. 2020 - Present
Yisong Yue Group, Caltech

- Integrated deep kernel learning (DKL) with Bayesian optimization (BO) using PyTorch to improve model fit, find global optima faster
- Supplemented with Thompson sampling, Monte Carlo dropout, deep ensembles, dynamic architectures and acquisition parameters
- Invited to stay on for academic year to work on real-world problems like COVID-19 protein engineering and nanophotonics filter design
- Cut regret by over 80% with DKL-BO compared to best GP models

Undergraduate Bioinformatics Researcher | Dec. 2019 – Present
Kaihang Wang Lab, Caltech

- Undergraduate bioinformatics lead in research group
- Produced tools to predict set of minimum essential genes, assemble nanopore reads, recode genes using Pandas, NumPy
- Pioneer graph theory approach to model gene dependencies
- Inform wet bench projects like genome minimization and recoding

PROJECT EXPERIENCE

Ancestral Genome Reconstruction, Wang Lab | Mar. 2020 - Present

- Lead team of 3 Caltech juniors to create automated pipeline:
 - Collapse large amounts of sequence data to gene ordering data
 - Analyze ordering differences to predict consensus ordering
 - Reconstruct consensus genome and perform viability checks
- Researched and integrated existing cmd line tools into pipeline
- Build server to host as web tool for use by scientific community

Alien Escape Game, Caltech | Mar. - Jun. 2020

- Created escape game from scratch using C with team of 3 students
- Implemented A* pathfinding, physics engine w/ elastic collisions and forces, geometric vision, map, SDL graphics
- Significantly reduced lag via dynamic programming

Social Media App | Jun. 2020 - Present

- Develop original social media application with React.js

TEACHING EXPERIENCE

Teaching Assistant, Caltech CS 1 | Sept. 2020 - Present

- Assist instructors, hold office hours, grade assignments as paid TA for CS 1 (Intro Programming) course taught in Python

Investing Principles Crash Course, Wave LF | Jun. - Aug. 2020

- Created curriculum and co-taught basics of investing, stock market, indicators, options to over 1100 middle and high school students

SKILLS

Languages

Python, C, Java, JavaScript, MATLAB, HTML, Latex

Tools

PyTorch, Pandas, NumPy, matplotlib, React.js

Techniques

Bayesian Optimization, Deep Learning, Web Scraping

COURSEWORK

- Machine Learning
- Computing Systems
- Data Structures and Algorithms
- Software Design
- Asynchronous Programming
- Decidability and Tractability
- Data Processing and Analysis for Biology

AWARDS

Thermo-Fisher Sch., 2019

One of six recipients of scholarship for biomedical research experience

Teaching Mode, 2018

Best summer research presentation in cohort of 30

Eagle Scout, 2018

ACTIVITIES

Treasurer, Caltech Student Investment Fund

\$1M AUM, focused on STEM sectors

Ambassador, Caltech SURF

Advise and support cohort of summer research interns

Frosh Camp Counselor

Orient and support new frosh

Caltech Cannon Master

Fire and maintain 1.3-ton, 130-year-old cannon

Caltech Water Polo Team