Michael Bennett

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EDUCATION

MA Economics, Yale University **2022-2024**

Grade Average: Honors

Modules included: Algorithms, Deep Learning, Econometrics I & II

Example project: Object detection of cars from satellite images using Deep Learning.

- Trained, fine-tuned and evaluated YOLOv8n/s/m object detection models on aerial images.
- Used remote GPU rented via vast.ai, initialised using custom Docker image, increasing training speed over 100x at cost under $10. Wrote custom dataloaders in python to download large image datasets on remote servers at maximal speed, reducing GPU downtime cost.

BA Economics, University of Cambridge **2017-2020**

Grade: First Class

Modules included: Microeconomics, Macroeconomics, Advanced Econometrics, Real Analysis

PROFESSIONAL EXPERIENCE

Yale University, New Haven, CT, US **Oct 2023 – June 2024**
Graduate Research Assistant, Costas Arkolakis

Research software development for project on economic growth and clean energy.

- Created UML package and object diagrams to visualise and then improve software architecture for better performance, usability, and maintainability.
- Implemented improved architecture in Julia, upgrading user interface, data processing and first stage solution modules from MATLAB scripts to Julia command line application, leading to 50% runtime improvement and more transparent interface.
- Used Documenter.jl and GitHub Actions to produce automatically updating website of code documentation, eliminating documentation duplication and improving ease of interaction.
- Used Python to collect, visualise and analyse geospatial economic and climate data to quantify the empirical relationship between climate and productivity within geographical regions.

National Bureau of Economic Research, Cambridge, MA, USA **Jul 2020 – Jun 2022**
Genoeconomics Research Assistant

Research software development in a cross-disciplinary statistical genetics and economics lab.

- Developed two command line applications for genetic data analysis on large human genetic datasets using Python, enabling complex analyses to run in under one hour. Used just-in-time compilation via numba to achieve better performance on non-vectorisable operations.
- Designed and implemented internal pipelines using Python, bash, and third-party CLI tools such as PLINK for processing of genetic datasets with sizes between 100GB and 1TB on remote high-performance machines.
- Devised methodology to standardize measures of educational attainment across several national-level datasets. Authored the corresponding section in the resulting paper, published in *Nature Genetics* (2022) with 204 citations as of August 2024.

- Developed visualisation software using Python and matplotlib to produce custom publication-ready graphs (including Manhattan plots) and tables, saving development time for other team-members and allowing rapid automated edits prior to submission and resubmission.

LEADERSHIP EXPERIENCE

Effective Altruism Cambridge, Cambridge, UK **Mar 2019-Feb 2020**
Project Manager and Treasurer

Student-Run organisation at the University of Cambridge.

- Chaired committee meetings and managed a team of 10 other volunteers to plan and run 40 events, achieving 20% increase in attendance compared to the previous year.
- Authored grant applications leading to £5000 in funding.

PUBLICATIONS

[Fifth Author] Okbay, A. et al. (2022). Polygenic prediction within and between families from a 3-million-person GWAS of educational attainment. Nature Genetics 54, 437-449.

[Sixth Author] Becker, J. et al. (2021). Resource Profile and User Guide of the Polygenic Index Repository. Nature Human Behaviour 5, 1744-1758.

SOFTWARE PROJECTS

Stagehunter.cc: A daily web game that tests users' pro cycling knowledge. Built using Typescript and Next.js (frontend), Go (backend), Postgres (database), AWS (hosting) and Cloudflare (DNS).

Gendata.py: A Python package that provides a very simple interface for reading and performing simple operations on human genetic data in bed/bim/fam format, documented using Sphinx.

Rusty Chess Clock: Customisable chess clock GUI (using iced-rs) and CLI (using termion) applications implemented in Rust, backed by a zero-dependency library providing chess clock API.

BellmanSolver.jl: A Julia package which provides methods for solving dynamic programming problems of one choice variable using Value Function Iteration or the Endogenous Grid Method.

Aiyagari_VFI: A simple website that presents a piece of graduate school Economics coursework and some interactive 3d graphs produced for it in an attractive and approachable manner.

KEY SKILLS AND INTERESTS

Software Skills

- TypeScript
- React
- Go
- Python
- Rust
- SQL
- Julia
- Bash
- HTML/CSS
- Git/GitHub
- Docker
- AWS
- UNIX

Technical Skills

- Statistics
- Data Visualisation
- Software Engineering
- DevOps
- High performance computing

Soft Skills

- Communication
- Teamwork
- Leadership
- Organisation
- Research
- Problem Solving

Hobbies & Interests: Road cycling, hiking, rock climbing, trivia nights.