Craig Fouts

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I am an enthusiastic **scientist/engineer** interested in building mathematical descriptions of living systems and studying the dynamics of emergent behavior in the context of biomedical data.

EDUCATION

Columbia University | MSc
Applied Mathematics **2022 – 2023**

Completed a graduate research internship in the Tech Innovation Lab at the New York Genome Center.

The Ohio State University | BSc
Computer Science & Mathematics **2018 – 2022**

Received honors research distinction for research and publication completed with Google Research.

EXPERIENCE

Uppsala University | Department of Immunology, Genetics, and Pathology

Computational Research Engineer **Oct 2024 –**

Developing mathematical models and machine learning tools that facilitate genomics research using single-cell and spatial transcriptomics data. Current work involves building a nonparametric topic model for identifying pathologies in single-cell datasets based on gene expression and spatial distribution.

New York Genome Center | Technology Innovation Laboratory

Associate Computational Biologist II **Feb 2024 – Sep 2024**
Graduate Research Assistant **Sep 2022 – Dec 2023**

Developed a probabilistic dimensionality reduction model called sceLDA that clusters anatomical structures in histological spinal cord datasets based on cell type composition and spatial distribution. The model is part of a spatial transcriptomics pipeline that repurposes Illumina HiSeq 2500 sequencers.

The Ohio State University | Translational Data Analytics Institute

Student Research Assistant **Aug 2021 – Sep 2022**

Developed a computational pipeline for aggregating and analyzing multimodal data collected from environmental sensors used to study the effects of aircraft combustion engines in urban neighborhoods. The pipeline uses dynamic time warping to align data streams based on location and wind conditions.

PUBLICATIONS

Growing Steerable Neural Cellular Automata

Ettore Randazzo, Alexander Mordvintsev, & **Craig Fouts**. 24 – 28 July 2023. “Growing Steerable Neural Cellular Automata.” *Presented at ALIFE 2023*. https://doi.org/10.1162/isal_a_00564

Growing Isotropic Neural Cellular Automata

Alexander Mordvintsev, Ettore Randazzo, & **Craig Fouts**. 18 – 22 July 2022. “Growing Isotropic Neural Cellular Automata.” *Presented at ALIFE 2022*. https://doi.org/10.1162/isal_a_00552

ACCOLADES

Honors

The Ohio State University: Magna Cum Laude | Honors Research Distinction **2022**
Granville High School: Cum Laude Society | National Honor Society | Sociedad Honoraria Hispánica **2017**
Scouting America: Eagle Scout **2016**

Competitions

HackOHI/O Hackathon: 1st Place Grand Prize | Microsoft Challenge Winner | People's Choice Award **2021**
Ohio State FEH Honors Robotics Competition: 2nd Place Outstanding Achievement in Innovation **2019**
OMEA Solo & Ensemble: Rank 1 Class A Violin Solo Performance **2016** & **2017**

Scholarships

Battelle Memorial Institute Full Tuition Award | Honors Engineering Research Award | Ohio State Maximus Award | Ohio State Mankoff Engineering Award | Raymond H. and Beryl Dean Penick Memorial Award

COURSEWORK

Columbia University

Applied Statistics III (A), Machine Learning for Functional Genomics (A), Advanced Linear Algebra (A+) **2023**
Numerical Algebra & Optimization (A), Partial Differential Equations (A-) **2022**

The Ohio State University

Discrete Mathematical Models (A), Quantitative Neuroscience (A), Computer Networking (A) **2022**
Mathematical Statistics II (A), Advanced Artificial Intelligence (A), Programming Languages (A) **2021**
Data Structures & Algorithms (A), Experimental Physics (A), Intermediate Mechanics (A-) **2020**
Ordinary Differential Equations (A), Honors Physics Electricity & Magnetism (A) **2019**
Honors Real Analysis (A), Honors Psychology (A) **2018**