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 in collaboration with Google Research.

EXPERIENCE

Uppsala University | Department of Immunology, Genetics, and Pathology
Computational Research Engineer **Oct 2024 –**

Developing a nonparametric topic model called PriorLDA that identifies anatomical structures and pathologies in single-cell datasets based on gene expression profile and spatial distribution. Using a mixture-of-finite-mixtures approach, the model estimates the number of spatially relevant topics for semantic segmentation.

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 2500s as accessible imaging platforms.

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 several data streams based on location and ambient wind conditions.

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**

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**

PUBLICATIONS

Growing Steerable Neural Cellular Automata

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

Growing Isotropic Neural Cellular Automata

Alexander Mordvintsev, Ettore Randazzo, & **Craig Fouts**. 18–22 July, 2023. "Growing Isotropic Neural Cellular Automata." *ALIFE 2022 Conference*. https://doi.org/10.1162/isal_a_00552