Joseph Campbell

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EDUCATION

Georgia Institute of Technology, Atlanta, GA — Expected Graduation: May 2025
Bachelor of Science, Double Major in Computer Science and Mathematics — GPA: 3.96/4.0
Coursework:

- *Computer Science:* Machine Learning, Operating Systems, Databases, Computer Vision, Data Structures, Networking
- *Mathematics:* Real and Complex Analysis, Abstract Algebra, Multivariable Calculus, Linear Algebra, Statistics

EXPERIENCE

GT Research Institute, Atlanta, GA — May 2022 - August 2023
Secure Cloud Development Co-op, CIPHER/SIS Team

- Collaborated on a cross-company team to deliver secure virtual machines for 500+ clients in the DoD using AWS.
- Updated 10+ software binaries in AWS S3 for desktop applications and rewrote relevant Ansible processes.
- Automated procedure for extracting .msp files for future Office Suite patching using Powershell.
- Debugged AppLocker group policies and revised GPOs to reflect new software updates for all binary changes.
- Wrote cron jobs to continuously check validity of server certificates and send notifications upon expiry.

Technologies: AWS EC2, AWS S3, Ansible, Linux, Windows Server, Git, Agile, Bash, Powershell

Rényi Institute of Mathematics, Budapest, Hungary — May 2024 - Present
Undergrad Researcher in Computational Mathematics, Erdös' UDG Problem

- Continued work on an 80 year-old unsolved problem regarding dense graph construction with unit distance edges.
- Refactored existing algorithms using GPU-optimized PyTorch tensors and rewrote specialized functions using kernel operations (KeOps) to achieve a search speed-up of over 400%.
- Developed an innovative approach using evolutionary algorithms (CMA-ES) to expand search space beyond heuristic basis assumptions, allowing for a novel generalization of Erdös' conjecture into 3 dimensions.

Technologies: Python (NumPy, PyTorch, PyKeOps, TensorFlow, matplotlib), GPU optimization, machine learning, WSL

PROJECTS

Campus Drone Delivery - Using ArduPilot-powered drones to deliver small packages — August 2024 - Present

- Led a 20+ member team of software engineers to develop drone flight path planning and safe package delivery.
- Used Kalman filtering to optimize flight routes around campus to avoid over 20 no-fly zones due to pedestrians.
- Implemented UDP communication with drone cameras to relay vital visual information to mission pilots.

Extreme Events Engineering - Understanding earthquakes with machine learning — August 2023 - May 2024

- Led team of 8 undergrads to simulate effects of disasters on infrastructure and develop resistant construction.
- Gathered and cleaned ground acceleration data from over 1000 sensors for the 2023 Turkey earthquake.
- Wrote MATLAB scripts to run on the TACC supercomputer on acceleration data to analyze ground conditions.

Music Genre Classification - Evaluating performance of ML models on music data — October - December 2023

- Analyzed dataset of over 1700 spectrograms of English songs across 16 distinct genres and subgenres.
- Evaluated performance of various supervised and unsupervised ML models such as RF, SVM, and LogReg.
- Achieved accuracy of 76% using CNN, with most errors occurring on similar genres (e.g. classical and opera).

ADDITIONAL INFORMATION

Technical Skills: C, C++, R, Java, Python (pandas, scikit-learn, keras, SciPy), JavaScript, HTML, CSS, MATLAB, SQL, Scala, Swift, Excel, JIRA, Git, LaTeX, Amazon Web Services, Google Cloud Platform, Docker, Kubernetes
Languages: English (native), Russian (fluent), Spanish (limited working proficiency)
Honors/Awards: 7x GT Faculty Honors, 2x top-500 Putnam math contest, Honorable Mention in Mathematical Contest in Modeling, 2x 1st place GT Fitness Challenge, 5x American Invitational Mathematics Examination, USACO Gold
Interests: GT Brazilian Jiu-Jitsu Club (Treasurer), Intramural sports (2x school champ, soccer and futsal), calisthenics