

BLAIR JOHNSON

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Education

Georgia Institute of Technology — Atlanta, Georgia

Aug. 2018 – May 2022

Bachelor of Science in Electrical Engineering | Stamps President's Scholar

GPA 3.91/4.0

Honors and Awards

Stamps President's Scholar

2018

Georgia Institute of Technology

Best Overall Project, ECE

2022

Georgia Institute of Technology Capstone Design Expo

Experience

Georgia Tech Research Institute

Aug. 2022 – Pres.

AI/ML Research Engineer I

Atlanta, GA

- Conducted research in inductive logic programming and adversarial machine learning.
- Leveraged high performance compute resources to serve large language models (OPT-175B) and text-to-image models for internal research.

Omni Lab for Intelligent Visual Engineering and Science (OLIVES Georgia Tech)

July 2022 – Pres.

Research Assistant

Atlanta, GA

- Researched feature selection schemes for minimizing privacy loss in large multimodal medical imaging datasets.
- Characterized the impact of different biomarkers on patient reidentification in an optical coherence tomography dataset.

InstaJam LLC

July 2022 – Pres.

Machine Learning Engineer

Remote.

- Researched ML approaches to radio jamming detection and classification.
- Developed Android back-end software for triangulation of radio signals.
- Attended unclassified test events and collected data on jamming emissions.

SkinIO

June 2022 – Aug. 2022

Machine Learning Engineer Intern

Atlanta, GA

- Developed image quality assessment pipeline for triaging skin lesion images captured on mobile devices.
- Performed survey and analysis of common image quality issues encountered in mobile skin lesion imaging.

Intel Corporation

May 2021 – Aug. 2021

Deep Learning Research and Development Intern

Atlanta, GA

- Used C++ to write a prototype SYCL feature that will improve performance and programmability of OpenCV.
- Won a company-wide intern hack-a-thon creating prototype computer vision business applications using OpenVINO.

Georgia Tech Research Institute

May 2019 – May 2022

High Performance Computing and Data Analytics Student Researcher

Atlanta, GA

- Worked on many of Machine Learning and Data Analytics research projects for both internal and external sponsors.
- Topics include: Streaming Computer Vision, Graph ML for Cybersecurity, Resource-Efficient ML, DL for 5G Network Slicing, Historical Population Mapping, ML Accelerator Benchmarking, Naval Vessel Trajectory Tracking.

CurbSide.ai

Mar. 2020 – Aug. 2021

Computer Vision Engineer (Co-Founder)

Atlanta, GA

- Developed low-latency Computer Vision models and streaming DSP pipelines for monitoring and reinforcing safe riding behavior among dockless personal electric vehicle users via low-cost embedded systems.
- Achieved 20x latency reduction for real-time computer vision execution on < 7Watt ARM CPU.
- Designed custom Deep Learning architectures and automated data-ingest and training pipelines for rapid prototyping.

Projects

Haptic Feedback Wearable Device for People with Visual Impairments | *Python, DepthAPI* Aug. 2021 – May 2022

- Winning project of ECE category at Georgia Tech Capstone Design Expo.
- Designed and built wearable haptic motor display
- Utilized Intel Movidius Myriad X vision co-processor to perform real-time depth perception and point cloud sampling
- Conducted experimental testing procedures to tune hardware and software components to improve user experience

Deep Learning for 5G Network Slicing (GTRI) | *Python, PyTorch* Sep. 2021 – May 2022

- Designed a novel unsupervised learning framework for optimal packet queue management under slicing scheme.
- Implemented and trained time-series network forecasting models using PyTorch.
- Evaluated empirical risk associated with real-time 5G network slicing under different resource allocation algorithms.
- Performed literature review of recent work in predictive 5G network slicing.

Historical Populations Mapping (GTRI) | *Python, QGIS, GEOS, OGR* Sep. 2021 – May 2022

- Provided data engineering support for researchers modeling the movement of historical populations in North America.
- Used QGIS and OGR to generate polygon masks of population shifts over time using spatio-temporally interpolated smallpox outbreak data.

Deep Learning Accelerator Benchmarking (GTRI) | *Python, TensorFlow* Jan. 2021 – May 2021

- Wrote automated benchmarking module for evaluating and comparing deep learning accelerator devices.
- Used TensorFlow to measure inference times across different layer types, common algorithms, and data types.

Deep Reinforcement Learning for 5G Network Slicing (GTRI) | *Python, PyTorch* Aug. 2020 – Nov. 2020

- Performed literature review of previous research in the area of ML for network slicing.
- Studied existing implementation of deep RL algorithm for TCP replacement.

AI Tracks At Sea (GTRI | Naval Information Warfare Center) | *Python, Docker, TensorRT* Nov. 2020–Dec. 2020

- Designed and built computer vision pipeline to generate time-correlated GPS tracking data for ships in a video feed.
- Utilized object detection algorithms, least-squares optimization, Kalman Filtering, and additional DSP methods to produce accurate real-world trajectories from 2D input.

BirdsEye (CurbSide.ai) | *Python, Pytorch, TensorFlow, TensorFlow Lite, C++* Mar. 2020 - Aug. 2021

- Designed custom CNN architectures combining state-of-the-art optimizations to minimize latency on unique high-resolution streaming classification task. Achieved real-time operation on Raspberry Pi with low overhead.
- Directed the collection and labeling of a large dataset of street-level vehicle imagery.
- Designed algorithms that combine vision data with vehicle telemetry to provide quantitative measures of rider behavior.
- Employed real-time digital signal processing algorithms to aggregate streaming data sources into risk metrics.
- Implemented prototype ultra-low-cost streaming BirdsEye service on <1Watt \$20 K210 Neural Embedded System.

Hybrid Deep Learning (GTRI) | *Python, TensorFlow, PyTorch* Aug. 2019 - May 2020

- Researched the feasibility of distributed deep representation learning at the edge.
- Wrote model architecture analysis tool for bandwidth-constrained split local-cloud encoder decoder networks.
- Developed experiments demonstrating the feasibility of multi-view distributed class prediction on a synthetic task.
- Designed and demonstrated the usefulness of a low-cost self-certainty metric for triaging multiple sensor readings for robustness when network bandwidth is heavily constrained.
- Work published in GTRI IRAD 2020 Journal and presented at IRAD Extravaganza virtual symposium.

Deep Learning NetFlow Traffic Analysis and Risk Assessment (GTRI) | *Python, TensorFlow* May 2019 - Aug. 2019

- Leveraged supercomputer to parse, enrich, label, and train graph convolutional networks on multi-terabyte dataset of NetFlow traffic logs for automated risk-assessment of IP subnets.
- Prepared progress reports and project needs for communication to DoD research sponsor.

Technical Skills

Languages: Python, C/C++, SQL, MATLAB, Fortran, HTML/CSS

Libraries: TensorFlow, Pytorch, OpenCV, NumPy, Pandas, Scikit-Learn, Dask, NetworkX, Matplotlib

Software/Technologies: Git, Docker, TFLite, TensorRT, OpenVINO, SYCL, OpenGL, Slurm, Google Cloud, AWS

Operating Systems: Linux, Windows, OSX

ML Algorithms: CNNs, DNNs, LSTMs, Graph Convolutional Networks (GCNs, GraphSAGE), Least Squares Methods, Graph Bayesian Belief Propagation, Siamese Networks, Multi-view Learning, Knowledge Distillation

Additional Skills: Digital Signal Processing, Control System Design, Embedded Systems, Numerical Optimization, Computational Modeling, High Performance Computing

Electrify Georgia Tech

Co-Founder & VP of Research

Aug. 2021 - May 2022

Georgia Institute of Technology

- Prepared and presented feasibility report to the Office of Sustainability and Landscaping Services. Partnership resulted in the announcement that GT Landscaping Services will switch to all-electric landscaping equipment, beginning with electric leaf blowers.
- Prepared and presented feasibility report to Georgia Tech Police Department. Partnership resulted in the purchase of 3 pilot electric patrol vehicles. Data from this pilot program will be used to justify future fleet electrification efforts.
- Passed unanimous student government resolution in support of campus electrification.
- Worked with campus stakeholders to build electrification plans for phasing out fossil fuel usage.
- Organized tabling events and social media posts for raising campus awareness.
- Conducted building electrification and industrial heat pump research for building electrification feasibility report.