

# BLAIR JOHNSON

U.S. Citizen | 451 Lynch Ave NW, Atlanta, GA 30318

☎ 865-310-5398 ✉ [blairjohnson@gatech.edu](mailto:blairjohnson@gatech.edu)  [in/blair-b-johnson](https://www.linkedin.com/in/blair-b-johnson)  [github.com/Blair-Johnson](https://github.com/Blair-Johnson)

## Education

<b>Georgia Institute of Technology — Atlanta, Georgia</b> <i>Bachelor of Science in Electrical Engineering   Stamps President's Scholar</i>	<b>Aug. 2018 – May 2022</b> <i>GPA 3.9/4.0</i>
<b>West High School — Knoxville, Tennessee</b> <i>International Baccalaureate Diploma</i>	<b>Aug. 2014 – May. 2018</b> <i>GPA 4.0/4.0</i>
<b>Austin Peay State University — Clarksville, Tennessee</b> <i>Governor's School For Computational Physics   3 week intensive program</i>	<b>June 2017</b>

## Honors and Awards

<b>Stamps President's Scholar</b> <i>Georgia Institute of Technology</i>	<b>2018</b>
---	-------------

## Experience

<b>Intel Corporation</b> <i>Deep Learning Research and Development Intern</i> <ul style="list-style-type: none"><li>Used C++ to write a prototype SYCL feature that will improve performance and programmability of OpenCV.</li><li>Won a company-wide intern hack-a-thon creating prototype computer vision business applications using OpenVINO.</li></ul>	<b>May 2021 – Aug. 2021</b> <i>Atlanta, GA</i>
<b>Georgia Tech Research Institute</b> <i>High Performance Computing and Data Analytics Student Researcher</i> <ul style="list-style-type: none"><li>Worked on many of Machine Learning and Data Analytics research projects for both internal and external sponsors.</li><li>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.</li></ul>	<b>May 2019 – Pres.</b> <i>Atlanta, GA</i>
<b>CurbSide.ai</b> <i>Computer Vision Engineer (Co-Founder)</i> <ul style="list-style-type: none"><li>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.</li><li>Achieved 20x latency reduction for real-time computer vision execution on &lt; 7Watt ARM CPU.</li><li>Designed custom Deep Learning architectures and automated data-ingest and training pipelines for rapid prototyping.</li></ul>	<b>Mar. 2020 – Aug. 2021</b> <i>Atlanta, GA</i>

## Publications

<b>Risk Aware Triage to Attenuate Observational Uncertainty in Intelligence Environments</b> <i>GTRI IRAD 2020 Journal</i>	<b>2020</b> <i>Accepted.</i>
---	---------------------------------

## Projects

<b>Deep Reinforcement Learning for 5G Network Slicing (GTRI)   Python, PyTorch</b> <ul style="list-style-type: none"><li>Implemented and trained time-series network forecasting models using PyTorch.</li><li>Evaluated empirical and theoretical risk associated with real-time 5G network slicing under different resource allocation algorithms.</li><li>Performed literature review of recent work in predictive 5G network slicing.</li></ul>	<b>Sep. 2021 – Pres.</b>
<b>Historical Populations Mapping (GTRI)   Python, QGIS, GEOS, OGR</b> <ul style="list-style-type: none"><li>Provided data engineering support for researchers modeling the movement of historical populations in North America.</li><li>Used QGIS and OGR to generate polygon masks of population shifts over time using spatio-temporally interpolated smallpox outbreak data.</li></ul>	<b>Sep. 2021 – Pres.</b>
<b>Deep Learning Accelerator Benchmarking (GTRI)   Python, TensorFlow</b> <ul style="list-style-type: none"><li>Wrote automated benchmarking module for evaluating and comparing deep learning accelerator devices.</li><li>Used TensorFlow to measure inference times across different layer types, common algorithms, and data types.</li></ul>	<b>Jan. 2021 – May 2021</b>
<b>Deep Reinforcement Learning for 5G Network Slicing (GTRI)   Python, PyTorch</b> <ul style="list-style-type: none"><li>Performed literature review of previous research in the area of ML for network slicing.</li><li>Studied existing implementation of deep RL algorithm for TCP replacement.</li></ul>	<b>Aug. 2020 – Nov. 2020</b>

**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.

**Autonomous Source Seeking in Turbulent Fields (Georgia Tech RoboSense) | *MATLAB* Aug. 2018 – Dec. 2018**

- Worked with a student team to research control algorithms for autonomous source seeking agents in noisy environments.
- Implemented a novel source-seeking control algorithm on robotic blimps for real-world motion tracking tests.

**NLP Analysis of Gender-on-Gender Violence in CSI: (GT English Project) | *Python* Aug. 2018 – Dec. 2018**

- Used keyword searches to identify sentences depicting on-screen violence using screenplays of six season of CSI: Crime Scene Investigation.
- Used Google Cloud API to identify subjects and objects of physical violence. Census data was used to predict likely gender of each aggressor and victim.
- Data was analyzed for frequencies of different types of gender-on-gender violence, and metrics were compiled into a descriptive infographic.

**3D Visualization of Power System Data (UTK CURENT | NSF | DOE) | *MATLAB* Jun. 2016 – Jul. 2016**

- Created a power grid data visualization program within MATLAB to analyze major disturbances.
- Processed, cleaned, and created 3D geospatial animations of events.
- Presented results at NSF site visit poster symposium.

**Survey of Transient Instability Events (UTK CURENT | NSF | DOE) | *MATLAB* Jun. 2015 – Jul. 2015**

- Utilized MATLAB and Simulink to model the breaker dynamics that resulted in Brazil's 2009 blackout.
- Analyzed performance of transmission line breakers and the effect of opening times on transient instability.
- Presented results at NSF site visit poster symposium.

## 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

## Leadership / Extracurricular

---

### Electrify Georgia Tech

*Co-Founder & VP of Research*

**Aug. 2021 - Pres.**

*Georgia Institute of Technology*

- Worked with campus stakeholders to build electrification plans for phasing out fossil fuel usage.
- Prepared and presented feasibility report to Georgia Tech Police Department, resulting in the purchase of 3 pilot electric patrol vehicles.
- Passed unanimous student government resolution in support of campus electrification.
- Organized tabling events and social media posts for raising campus awareness.
- Conducted building electrification and industrial heat pump research for building electrification feasibility report.