Bryan Zhao

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U.S. Citizen | Secret Level Security Clearance

Objective

Innovative computer science graduate student with 12+ months of internship experience and strong technical abilities from 10+ projects. Seeking full-time positions related to ML/AI, robotics, and software development starting May 2024 or later.

Education

GEORGIA INSTITUTE OF TECHNOLOGY **Atlanta, GA**

***Master of Science in Computer Science**, Specialization in Machine Learning GPA: 4.00* *Expected May 2024*

- Courses: Algorithms, Convex Optimization, Parallel Algorithms, Databases, Deep Learning, Systems for Machine Learning

***Bachelor of Science in Mechanical Engineering**, Minor in Computer Science GPA: 3.98* *May 2022*

- Courses: Object Oriented Programming, Data Structures, Machine Learning, Artificial Intelligence, Computer Architecture, Circuits, Robot Perception & Planning, Robot Design & Dynamics, Interactive Robot Learning

Experience

MIT LINCOLN LABORATORY **Boston, MA**

***Research Intern** | Python, C/C++, ROS, Linux, GNN, CV, SLAM* *May 2023 – Present*

- Building PyTorch computer vision models to extract hierarchical graphs from satellite imagery, enabling robots to use MIT Hydra, a simultaneous localization and mapping (SLAM) algorithm, to navigate outdoors in search-and-rescue missions
- Implemented Python scripts to integrate OpenStreetMaps API responses into a data pipeline to generate 3D visualizations of geospatial data as a proof of concept, convincing management of the need for map extraction research in robot autonomy
- Created Python scripts utilizing Google Maps API to create training and validation datasets containing 1000 satellite images
- Developed Python ROS packages for the Boston Dynamics Spot robot to move to waypoints in search of objects/people
- Led a group of 5 interns to build ROS software packages, interface sensors with an NVIDIA Jetson, and 3D print parts for the SpotMicro, an open-source version of the Spot robot by Boston Dynamics, for multi-robot experimentation

BMW GROUP **Greenville, SC**

***Machine Learning Intern** | Python, AWS, LLM* *May 2022 – Aug 2022*

- Built a Python pipeline in AWS to train OpenAI's 175B-parameter Large Language Model (LLM) called GPT-3 that automatically classifies business documents, saving $500k and achieving 98% accuracy (+30% versus existing methods)
- Created Python scripts with AWS Textract/Translate to extract text from 500+ German PDF documents for model training
- Developed the backend for Meta AI's LLM called OPT to be used on-premises, enabling processing of confidential data

RAYTHEON TECHNOLOGIES **East Hartford, CT**

***Research and Development Intern** | LabVIEW, UI/UX* *May 2021 – Aug 2021*

- Developed the user interface, state machine transition logic, and PID temperature control in LabVIEW for mechanically testing airplane engine parts, resulting in a system that operated autonomously for 500+ continuous hours
- Automated 3D modeling processes to generate CAD renders, reducing time spent on modeling by 80% from 10 to 2 weeks

ANDURIL **Atlanta, GA**

***Research and Development Intern** | Solidworks, Manufacturing* *Jan 2021 – May 2021*

- Engineered a new testing program for the next generation of drone and launcher systems to attain a 330% increase in launch energy, creating the Solidworks design, plan for manufacture and assembly, data collection system, and testing procedures
- Designed and managed a MS Access database to track customer requirements on a $1M+ government contract

Research

CORE ROBOTICS LABORATORY **Atlanta, GA**

***Graduate Research Assistant** | C++, ROS, Linux, CV* *Aug 2022 – May 2023*

- Published an IEEE conference paper with a team of 10+ students presenting development of a tennis-playing wheelchair robot used to better understand human-robot collaboration: core-robotics-lab.github.io/Wheelchair-Tennis-Robot
- Developed Robot Operating System (ROS) packages in C++ for camera systems to triangulate the position of tennis balls in real-time, resulting in 1.5X quality and 2X framerate of video data over existing systems to improve ball return rate to 50%
- Processed and visualized flight data and VICON camera data in Python to create a model-based controller for a quadcopter

GEORGIA TECH RESEARCH INSTITUTE **Atlanta, GA**

***Research and Development Intern** | Solidworks, Manufacturing* *July 2020 – Aug 2020*

- Contributed to a research paper analyzing bio-inspired, slip-resistant materials for gloves, robotic traction, shoe soles, etc. by generating mechanical software models in ANSYS simulating animal traction on wet surfaces
- Researched novel computational techniques to simulate 3 key behaviors to understand water evacuation under animal paws

EXOSKELETON & PROSTHETIC CONTROLS LABORATORY **Atlanta, GA**

Undergraduate Research Assistant | *Solidworks* *Jan 2019 – May 2019*

- Conducted trial investigations on a hip exoskeleton to troubleshoot stepper motor performance and perform study on timing of exoskeleton assistance during the user's walking gait on ramps and stairs of varying steepness at varying speeds
- Modeled exoskeleton parts to assist in the development of a 20% more compact design

NAVAL SUBMARINE MEDICAL RESEARCH LABORATORY **Groton, CT**

Research and Development Intern | *Solidworks, Rapid Prototyping* *May 2017 – Aug 2017*

- Prototyped a remote-controlled, Ø2ft X 6ft blimp contributing to research in a novel concept in lighter-than-air surveillance
- Developed a new method for manufacturing an air-tight blimp envelope from thick metalized polymer film

Projects

PARALLEL ALGORITHMS, *Project Lead* | *C/C++, MPI, PBS Scripting* *Jan 2023 – May 2023*

Implemented parallel quicksort and numerical linear solvers using C/C++ and MPI, deploying codebase on a 120-core computing cluster using PBS scripts to achieve a performance increase of up to 10X compared to sequential methods

AI FOR GOOD: DETECTING MULTIMODAL HATE, *Project Lead* | *Python, PyTorch* *Jan 2023 – May 2023*

Fine-tuned various vision-language models including OpenAI's CLIP to achieve 70% accuracy on the Hateful Memes Challenge, a dataset curated by Meta to promote research on multimodal content moderation: arxiv.org/abs/2305.06159

ATARI AI TRAINER, *Project Lead* | *Python, PyTorch, OpenAI Gym, CV, NLP, RL* *Aug 2022 – Dec 2022*

Created a framework to train an AI to play Atari video games using verbal directives, facial expressions, and numerical input

NASA JPL ROBOT SPACE SAMPLER, *Software & Hardware Lead* | *C, Arduino* *Aug 2021 – Dec 2021*

Developed the C-based Arduino controller for a space robot which will gather extraterrestrial liquid samples in search of life

MANUFACTURING DEFECT CLASSIFIER, *Undergraduate Research Assistant* | *Java* *Aug 2021 – Dec 2021*

Scripted an image classifier using Java in Weka to inspect and classify scans of metal 3D printed parts for porous defects

NHL PLAYOFF PREDICTOR, *Project Lead* | *Python, Tableau, Scikit-learn* *Aug 2021 – Dec 2021*

Processed and visualized data to train models that predict NHL playoff teams with over 80% accuracy using limited data

RED CROSS VEHICLE MANAGEMENT SYSTEM, *Project Lead* | *UI/UX, CRM* *Jan 2021 – May 2021*

Collaborated with Red Cross to digitize their paper-based vehicle reservation system to a completely online user portal

ELECTRIC FORMULA SAE, *Project Lead* | *Solidworks, Project Management* *Aug 2019 – May 2020*

Led a team of 5 to design a mount for dynamometer testing of the electric motor, contributing to data collection initiatives

Leadership

CS 7641 MACHINE LEARNING, *Head Teaching Assistant* | *Python, Project Management* *Jan 2022 – Present*

Managing a team of 30+ TAs to teach machine learning concepts to 700+ students/semester for 20 hours/week, primarily overseeing the creation, advisement, and evaluation of 200+ final projects related to machine learning using real-world datasets

Nominated for the College of Computing Teaching Assistant of the Year (1 in 30)

INVENTION STUDIO, *Instructor* | *Rapid Prototyping, Manufacturing* *Jan 2020 – May 2021*

Managed 3,000 ft^2 makerspace that accommodates 500+ students weekly during volunteer shifts of 3 hours/week

180 DEGREES CONSULTING, *Co-Founder* | *Project Management, UI/UX* *Jan 2020 – May 2021*

Co-Founded the Georgia Tech chapter of 180DC, the #1 largest international pro-bono student consultancy for nonprofits, and launched the creation, management, and promotion of the organization's webpage to garner 500+ monthly visitors

ME 3340 FLUID DYNAMICS, *Teaching Assistant* | *Modeling, Mathematics* *Aug 2020 – Dec 2020*

Created and applied grading rubrics for assignments on fluid mechanics to serve 50+ students for 3 hours/week

GEORGIA TECH EUROPE, *Resident Assistant* | *Management* *May 2019 – Aug 2019*

Supervised and ensured the safety of a 120+ student dorm during a study abroad program in Metz, France

Technical Skills

Languages: Python, C/C++, Java, HTML/CSS, MATLAB, SQL (MySQL), MPI, LaTeX
Developer Tools: Git, Conda, Docker, ROS, Tableau, VS Code, Jupyter/Colab, AWS, Jetson, Arduino, Linux, Agile, JIRA
Libraries: PyTorch, OpenCV, Pandas, NumPy, Matplotlib, Plotly, Scikit-learn, NetworkX