Blerim Abdullai

Graduate Student · Computer Science

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Education

University of Toronto *Toronto, ON*

MSc Computer Science *2023 - 2025*

- GPA: 4.0/4.0
- Advisor: Florian Shkurti, Tim Barfoot

University of Illinois *Urbana-Champaign, IL*

B.S. Computer Engineering (Highest Honors) *2021 - 2023*

- GPA: 3.92/4.0
- Undergraduate Advisor: Julia Hockenmaier, Alexander Schwing
- Thesis: A System Description For the Kingfisher Simbot - (Vision Focus)

Relevant Coursework, Machine Learning for Mathematical Optimization, State Estimation, Machine Learning, Deep Learning for Computer Vision, Introduction to Robotics, Mobile Robotics, Algorithms and Models of Computation, Computer Systems Engineering, Digital Systems Lab, Digital Signal Processing, Analog Signal Processing.

Research Experience

University of Toronto *Toronto, ON*

Robot Vision and Learning Lab *Sept 2023 - Present*

- Developed novel deep learning based localization methods using radar scans and overhead imagery for an autonomous surface vessel, capable of **global localization of vehicles accurate to 3 m** without GNSS.
- Developing and coordinating deployments of a surface vessel to create a robotic dataset for localization equipped with **imaging radar, lidar, sonar, stereo cameras, and GPS**, including calibrating all sensors and creating sensor mounts.

Pacific Northwest National Lab *Sequim, WA*

Post Bachelors RA *May 2023 - August 2023*

- Developed and field tested an autonomous surface vessel to support autonomous navigation using nautical charts for environmental monitoring missions.
- Created an interactive tracker for pedestrians in live video fused across 16 cameras, using Kalman Filters, Deep Association Metrics, and a novel view manager.

University of Illinois - Dept of Computer Science *Urbana-Champaign, IL*

Undergraduate Research Assistant - Amazon Alexa Prize Simbot Challenge *January 2022 - May 2023*

- Competed amongst 10 universities on a team building a multimodal model utilizing a **seq2seq transformer, FFNNs, and Mask-RCNN** to create collaborative dialog agents within a real-time Alexa deployment.
- Improved the scene understanding of our bot by **augmenting the vision dataset, designing evaluation metrics, and training variations** of Mask R-CNN, for instance segmentation on AWS EC2 Instances.
- Implemented a dialog manager which uses visual information from current and previous observations to **generate clarifying questions** for the user to improve task success rate.

Professional Experience

Caterpillar Inc. *Peoria, IL*

Embedded Software Engineering Intern *May 2022 - August 2022*

- Developed core router features on **production** Engine Control Modules including configurable DHCP server support.
- Supported autonomy team by developing SRT channels for secure low-latency video streams of up to 8 cameras.

Pacific Northwest National Lab *Richland, WA*

Computer Vision and Embedded Security Intern *June 2021 - January 2022*

- Created an automated filtering pipeline for detecting fish near turbines within **passive sonar footage** using Median Filters and Contour Detection algorithms removing 70% of empty frames while detecting 99% of the targets.
- Constructed visualizations for IoT network data to be used with PNNL's CHISSL semi-supervised labeling tool.
- Developed 2 drivers for Z-Wave and ZigBee IoT devices within PNNL's open-source IoT middleware VOLTTRON.

Publications

Published

Blerim Abdullai, Tony Wang, Aoran Jiao, Xinyuan Qiao, Florian Shkurti, and Timothy D. Barfoot "RaSCL: Radar to Satellite Crossview Localization" *ICRA Workshop on Field Robotics 2025* **(Spotlight talk)**

Neeloy Chakraborty, Risham Sidhu, **Blerim Abdullai**, Haomiao Chen, Nikil Ravi, Abhinav Ankur, Devika Prasad, Julia Hockenmaier "BEAST: Building an Embodied Action-prediction System with Trajectory data" *Amazon Science 2023*

In Prep

Theodore Nowak, Garrett Staines, **Blerim Abdullai**, "Toward Automating The Detection of Targets in Acoustic Camera Video Around Tidal Turbines" *Limnology and Oceanography: Methods 2025*

Awards, Fellowships, & Grants

2023	**CGS-M**, NSERC	*27,000 CAD*
2023	**ECE Highest Honors**, Awarded to students with a GPA above 3.8 nominated by a professor for completing a project of superior quality	
2022	**ECE 391 Student Kernel Design Competition**, Placed **1st among 54 groups** of 4 based on the professor's ranking of student linux kernels, the kernel had a network stack up to UDP sockets, R/W filesystem, Buddy Allocation, GUI, and Multicore support	
2022	**UIUC James Scholar**, Awarded to students who maintain a GPA of above 3.5.	
2022	**Varshney Family Scholarship**, ECE Department Scholarship	*1,050 USD*
2022	**Pathways Scholarship**, UIUC Grainger Scholarship	*5,000 USD*
2022	**Eta Kappa Nu Member (IEEE HKN)**, Invitation extended to students in the top 25% of the ECE department.	
2021	**High Honors (College of DuPage)**, Awarded to students graduating with a GPA above 3.6.	

Teaching Experience

FA 23	**Deep Learning and Neural Networks (CSC 413)**, Teaching Assistant	*UofT*
FA 22, SP 23	**Computer Systems Engineering (ECE 391)**, Undergraduate Course Assistant	*UIUC*
SP 22	**Digital Systems Laboratory (ECE 385)**, Undergraduate Course Assistant	*UIUC*

Extracurricular Activities

Service and Outreach

2021	**Poder Program STEM Outreach**, Event Coordinator and Host
2019-2021	**College of DuPage Home School STEM Outreach**, Event Coordinator and Host
2019	**COD Engineering Olympics**, Event Coordinator and Host

Student Organizations

College of DuPage Engineering Club and Robotics Team *Glen Ellyn, IL*

President *August 2019 - May 2021*

- Hosted 10+ STEM outreach events with 250+ underrepresented students, assigned tasks, ran meetings, secured 3 sponsorships with local engineering companies, and managed $30,000 in club finances.
- Led and designed an outreach project where a user could visit our Node.JS web application and control 3D-printed sumobots via a custom low-latency WebRTC live stream and reverse proxies using Nginx to the ESP8266 Arduinos.
- Developed a Gazebo simulation and embedded systems API using ROS, Real-sense Cameras, NVIDIA Jetson Xavier, I2C, and Teensy for our semi-autonomous robot at the NASA Mining Competition.

Skills

Programming Languages: C, C++, Python, System Verilog, x86 Assembly, Java, Javascript, Bash

Libraries: ROS, PyTorch, OpenCV, Tensorflow, NumPy, SciPy, AWS, Node.JS, OpenSSL

Tools: Git, Docker, AWS, ModelSim, Linux, Nginx, QEMU

Citizenship: United States, Canada