

Victor Aladele

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EDUCATION

Georgia Institute of Technology

PhD in Electrical Engineering

Anticipated Graduation

Research focus

Atlanta GA

Aug 2016 - Present

Aug 2022

Robotics and Machine Learning

New Jersey Institute of Technology

B.S. in Electrical Engineering

Minor in Applied Mathematics

Overall GPA: 3.76 (Magna Cum Laude)

Newark NJ

May 2016

PUBLICATIONS

- **V. Aladele, A. Longhini, A. Riechlin, H. Yin, C. Pek, D. Kragic, Compensating for Errors in Cooperative Manipulation: A Decentralized Approach via Residual Reinforcement Learning**, IEEE International Conference on Robotics and Automation (ICRA), 2023 under review.
- **V. Aladele, C. De Cos, D. Dimarogonas, S. Hutchinson, An Adaptive Cooperative Manipulation Control Framework for Multi-Agent Disturbance Rejection**, IEEE Conference on Decision and Control (CDC), 2022 .
- **V. Aladele and S. Hutchinson, Impedance-Based Collision Reaction Strategy via Internal Stress Loading in Cooperative Manipulation**, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021.
- **V. Aladele and S. Hutchinson, Collision reaction through internal stress loading in cooperative manipulation**, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020.
- M. Murtaza, **V. Aladele, E. A. Theodorou, S. Hutchinson, and B. Boots, Semi-parametric approaches to learning in model-based hierarchical control of complex systems**, in Proceedings of the 2018 International Symposium on Experimental Robotics (ISER), Springer Nature, vol. 11, 2020, p. 387.

TECHNICAL SKILLS

Programming Languages

C++, Python

Tools

Robot Operating System (ROS), Pytorch, Pybullet, Tensorflow

OpenAI gym, MATLAB, Gazebo, Blender, CUDA, Autodesk Inventor

WORK EXPERIENCE

Georgia Institute of Technology

Graduate Research Assistant

Atlanta GA

Aug 2016 - Present

- PhD Advisor: *Seth Hutchinson, PhD*
- Dissertation Title: *Cooperative manipulation strategies for multi-robot and human-robot collaboration*

Royal Institute of Technology (KTH)

Visiting PhD Student

Stockholm, Sweden

Aug 2021 - Jan 2022

- Host Advisor: *Danica Kragic Jensfelt, PhD*

- Designed a novel application of residual reinforcement learning to cooperative manipulation. Tools used include: Pybullet, Stable-baselines, OpenAI gym

Google (Brain/Research)
Research Intern

Remote / Mountain View CA
May 2021 - August 2021

- Worked on developing reinforcement learning solutions for high-speed robotics.
- Developed and implemented curriculum learning algorithms to improve robot learning.

Blue River Technology (A John Deere Subsidiary)
Software Engineering Intern

Remote / Sunnyvale CA
May 2020 - Aug 2020

- Worked on a team to develop software for cutting-edge *John Deere* machinery
- Tools and frameworks used include: C++17, CUDA, Flatbuffers, Protocol buffers, Google Test, Jira.

Bosch (Advanced Corporate Research), BSH Home Appliances
Robotics Software Intern

Sunnyvale CA
May 2019 - Aug 2019

- Worked on implementing impedance control on a 6 DOF robotic arm for object insertion tasks.
- Tools used include: C++, Python, ROS, RigidBody Dynamics Library (RBDL), Gazebo, Kinova arm.

Massachusetts Institute of Technology
Research Intern

Cambridge MA
June 2015 - Aug 2015

- **Advisors:** Daniela Rus *PhD*, Robert MacCurdy, *PhD*
- Designed and 3D printed gear pumps for hydraulically actuated robots.
- Designed CAD models in Autodesk Inventor.

CSAIL

RESEARCH PROJECTS

Cooperative Mobile Manipulation
Working both in simulation and on hardware

August 2019 - Present

- Developing deep reinforcement learning schemes for multi-robot collaboration.
- Using TrajOpt for motion planning on a single-arm pick-and-place task.
- Applying adaptive control for dual-arm disturbance rejection.
- Implementing operational space control on KUKA IIWA7 arms that are mounted on mobile bases.
- Applying Gaussian Processes as a semi-parametric control approach for a 7DOF manipulator.
- Working in Gazebo, Pybullet, Matlab/Simulink and Drake.

CLASS PROJECTS

Robot Intelligence and Planning

Fall 2020

- Implemented a version of DeepMind's AlphaZero chess AI. Used Deep Reinforcement Learning in conjunction with Monte-Carlo Tree Search to train a deep neural network to play the game of chess. Tools used include: Python, Pytorch, cuda.
- Implemented deep reinforcement learning algorithms like: DQN, REINFORCE and A2C.
- Implemented Rapidly-exploring Random Trees (RRT) to navigate a 2D map. Algorithm implementation included steering dynamics with nonlinear optimization and obstacle detection.

Computer Vision

Fall 2020

- Image classification using deep learning framework; transfer learning with CNNs like Alexnet.
- Feature Matching, using feature detectors (Harris detector) and feature descriptors (SIFT) in pytorch.
- Object detection with limited training data; applied transfer learning.

Advanced Programming Techniques

Fall 2019

- Used OpenGL to simulate a bitmapped football field with multiple drones controlled by a distributed MPI program. The goal was to create a simulation of multiple drones display over a football field.
- Designed a UDP server-client program.

Introduction to Robotics Research

Fall 2017

- Target following and tracking using LIDAR, a camera and a PID controller on a turtlebot.
- Obstacle avoidance using LIDAR and odometry. One of the tasks in this section was to drive the robot to a target location using signs for direction along the way. This required using image processing and classification techniques such as the hough circles and K Nearest Neighbors classifier.
- Used Simultaneous Localization and Mapping (SLAM) with ROS navstack for obstacle avoidance.
- Worked with ROS, python, OpenCV and Gazebo simulator on Linux platforms.

RELEVANT COURSES

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|-----------------------------------------------------------------|-------------------|--------------------|---------------------------------|
| Computer Vision | Machine Learning | Stochastic Systems | Robot Intelligence and Planning |
| Linear Systems | Nonlinear Systems | Optimal Control | Interactive Robot Learning |
| Advanced Programming Techniques (CUDA, OpenMP, OpenGL, Sockets) | | | Mobile Manipulation |

TEACHING POSITIONS

Graduate Teaching Assistant

August 2016 - May 2018

Georgia Tech

Atlanta GA

- Signals and Systems, Junior year course (3 semesters)
- Senior Design Project, Senior year course (2 semesters)

HONORS, AWARDS AND SOCIETIES

- Tau Beta Pi Honors Society, Member *August 2014 - Present*
- Institute of Electrical and Electronic Engineering, Member *August 2013 - Present*
- Selected to participate in an IDEO design-a-thon at the IEEE EMBS *Oct 2014, Seattle WA*
Special Topic Conference on Healthcare Innovation and Point-of-Care Technologies

EXTRACURRICULAR ACTIVITIES

Volunteer Application Reviewer

2018 - present

- Annually review applications for the undergraduate summer research program at MIT.

Conference Publication Reviewer

April 2020 - Present

- Reviewed papers for publication at the following conferences: IROS(2020, 2021, 2022), ICRA(2021).

Conference Session Co-Chair

September 2021

- Co-chaired the "Multi-Robot Systems I" session at the IROS 2021 conference.
- Reviewed papers for publication at the following conferences: IROS(2020, 2021), ICRA(2021).

Volunteer High-school Curriculum Contributor

March 2021

- Worked with Atlanta Public School teachers to develop a project-based learning (PBL) component of the Algebra II curriculum.