

Guanang Su

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EDUCATION

University of Minnesota, Twin City

Ph.D. in Computer Science

Minneapolis, MN, USA

Sep. 2023 - Now

Northeastern University

M.S. in Robotics (Major: Computer Science)

Boston, MA, USA

Sep. 2021 - Jul. 2023

Virginia Polytechnic Institute and State University

B.S. in Computer Engineering (Major: Controls, Robotics, and Autonomy, Minor: Mathematics)

Blacksburg, VA, USA

Aug. 2016 - May 2021

RESEARCH EXPERIENCE

- **Robot Manipulation - Robotics: Perception and Manipulation (RPM) Lab** University of Minnesota
Research Assistant - Supervised by Prof. Karthik Desingh
Aug. 2023 - Now
 - **High-precision Bimanual Manipulation Tasks**
- **Robot Learning in Manipulation - The Helping Hands Lab** Northeastern University
Research Assistant - Supervised by Prof. Robert Platt
Nov. 2021 - Jul. 2023
 - **Sample Efficient Equivariant Reinforcement Learning** (Link)
 - Designed collision detection and avoidance algorithm for robot arm in Python.
 - Implemented and tested a sample-efficient equivariant grasp learning algorithm on a robot arm platform.
 - **Imitation Learning** (Link)
 - Developed simulation learning environments for robot manipulation using PyBullet.
 - Conducted real-world robot imitation learning experiments for solving household tasks on UR5 with ROS.

WORK EXPERIENCE

- **DJI** Shenzhen, China
R & D Engineer Intern., Robomaster Research and Development Center
Jun. 2019 - Aug. 2019
 - **Overall Duties:** Designed a new missile launching robot, with missiles, launcher, and launch silo components, which was used to substantiate new rules for the 2020 DJI Robomaster competition.
 - **Mechanical Design:** Designed missile airfoils and supplied fringes with flow simulation and aerodynamic analysis.
 - **Control System and Embedded Software Design**
 - Engineered a PID-based feedback controller for missiles and achieved agile control and precise landing performance.
 - Developed a basic embedded framework for missiles using C with Keil's embedded development tool.
 - Designed internal programs for missiles to achieve auto-targeting at a distance of 20-30m with OpenCV.
- **Changchun Surveying and Mapping Institute** Changchun, China
Technician Intern., Smart City Department
May 2017 - Aug. 2017
 - **Overall Duties:** Assisted in constructing Changchun City Cloud Platform for intelligent city service, an intelligent network of connected objects and machines that transmit data using wireless technology and the cloud.
 - Processed collected data from sensors and cameras in Urban areas, and carried out UI and content design Used Arcgis with Python to collect, clean, process and store data.
 - Connected traffic lights receive data from sensors and cars adjusting light cadence and timing to respond to real-time traffic, significantly reducing road congestion in morning and evening peaks.

PUBLICATIONS

- Mingxi Jia*, Dian Wang*, **Guanang Su**, David Klee, Xupeng Zhu, Robin Walters, Robert Platt. *SEIL: Simulation-augmented Equivariant Imitation Learning.*(Link) **2023 IEEE International Conference on Robotics and Automation (ICRA)**. (Also presented in **Workshop on Sim-to-Real Robot Learning, CoRL 2022**.)
- Xupeng Zhu, Dian Wang, **Guanang Su**, Ondrej Biza, Robin Walters, Robert Platt. *On Robot Grasp Learning Using Equivariant Models.* (Link) **Autonomous Robots Journal 2023**, 04 July 2023.
- Xupeng Zhu, Dian Wang, Ondrej Biza, **Guanang Su**, Robin Walters, Robert Platt. *Sample Efficient Grasp Learning Using Equivariant Models.*(Link) **Robotics: Science and Systems XVIII (RSS 2022)**. (Also presented in **RLDM 2022 & Workshop on Scaling Robot Learning, ICRA 2022**.)
- Dian Wang, Xupeng Zhu, Jung Yeon Park, Mingxi Jia, **Guanang Su**, Robert Platt, Robin Walters. *A General Theory of Correct, Incorrect, and Extrinsic Equivariance.* (Link) **Advances in Neural Information Processing Systems 36 (NeurIPS 2023)**.

SKILLS

- **Programming Languages:** Python, Java, Processing, C++, C, MATLAB, Swift, JavaScript/HTML/CSS, LaTeX
- **Robotics:** Robot Operating System(ROS), UR5, Arduino, Raspberry Pi, STM32
- **Frameworks:** PyTorch, TensorFlow, OpenCV, Keras, Django, Flask, NodeJS
- **Tools:** Ubuntu, Git, Gazebo, XCode, Godot, Keil, SolidWorks, Creo, Adobe Premiere

TEACHING EXPERIENCE

- **Machine Learning: Analysis and Methods, CSCI 5525** University of Minnesota
Teaching Assistant - Prof. Paul R. Schrater Spring 2025
- **Algorithms and Data Structures, CSCI 4041** University of Minnesota
Teaching Assistant - Prof. James B. Moen Fall 2024
- **Guest Lecture on Pre-training** University of Minnesota
Deep Learning for Robot Manipulation, CSCI 5980 - Prof. Karthik Desingh Oct. 2023
- **Elementary Computational Linear Algebra, CSCI 2033** University of Minnesota
Teaching Assistant - Instructor Bernardo B. Prado Spring 2022
- **Pattern Recognition and Computer Vision, CS5330** Northeastern University
Teaching Assistant - Prof. Bruce A. Maxwell Spring 2023
- **Reinforcement Learning and Sequential Decision Making, CS4180/5180** Northeastern University
Teaching Assistant - Prof. Christopher Amato Fall 2022

SERVICES

Reviewer: RA-L

HIGHLIGHTED PROJECTS

- **Animation and Physics Simulation in Gaming**
 - Simulated a classic 2D pinball game with physics-based collision detection and bouncing effects for balls and obstacles.
 - Created dynamic cloth and water simulations to model realistic behaviors in Processing with Java.
 - Implemented single-agent navigation and multi-arm inverse kinematics for advanced animation scenarios.
 - Designed 3D chess game animations in Blender with effects like jumping, melting, smoking, and celebration fireworks.
- **ORB-SLAM3 on iPhone**
 - Implemented ORB-SLAM3 on a host computer using pre-recorded indoor and outdoor videos from monocular cameras.
 - Achieved real-time off-iPhone detection process by using remote video streaming through WiFi connection.
 - Developed an on-iPhone ORB feature detector with a user-friendly graphic interface.
- **Miniature Online Banking App**
 - Developed a C++ application that simulated an online banking app with a Text-based User Interface (TUI) with functions such as withdrawal, deposit, balance check and accounts information display.
 - Improved TUI to a GUI appearance window with multi-thread and concurrency processing capabilities with Qt library.

ACTIVITIES & RESEARCH

- **Shark Genus Identification from Images - SharkPulse** Virginia Tech
Undergraduate Research - Supervised by Prof. Edward Fox and Prof. Francesco Ferretti Jan. 2021 - Jun. 2021
 - **Data Process** (Link)
 - Performed data preprocessing, including data augmentation, noise reduction, and object identification.
 - **Machine Learning and Image Classification** (Link)
 - Applied networks including VGG16, ResNet with inception v2 and v3 models for classifying shark genus and achieved 70% accuracy across top 20 species with approximately 8,000 images.
 - Built a novel classifier for solving challenging bio-hierarchical classification tasks in small species datasets.
- **RoboGrinder, Team of DJI Robomaster University Championship** Virginia Tech
Chief Mechanical Engineer and Electrical Group Member Oct. 2017 - Oct. 2019
 - **Team Lead of Engineering Robot**
 - Led a team of six to design, prototype, and test a stair-climbing robot with automated box-grasping capabilities.
 - Carried out 3D model design in SolidWorks and assembled the robot with 3D printing and other materials.
 - Collaborated with other teams to discuss re-supply and rescue capabilities for the robot.
 - **Software Embedded Design and Vision Detection**
 - Optimized robot structure with ROS to improve movement efficiency.
 - Simulated a 3-DoF low-fidelity control model with OpenCV-based infrared camera detection in Gazebo to achieve intelligent positioning for the robotic manipulator.
 - Programmed hardware in C to overcome communication restrictions between the robot arm and embedded system.

HONORS AND AWARDS

- GAGE Fellowships in University of Minnesota Jan. 2024
- 2019 Robomaster Special Award in International Regional Competition & 2nd Prize in Final Tournament Aug. 2019
- 2018 Robomaster 1st Prize in International Regional Competition & 2nd Prize in Final Tournament Jul. 2018