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EDUCATION

Carnegie Mellon University

Aug. 2023 - May 2025

Master of Science in Robotics

Pittsburgh, PA

- **GPA:** 4.17/4.0 **Advisor:** Prof. George A. Kantor and Dr. Abhisesh Silwal
- **Selected Coursework:** Learning for 3D Vision (A+), Computer Vision(A+)
- **Teaching:** Intro to Robot Learning (Fall, 2023) ([link](#))

International Institute of Information Technology, Hyderabad

Aug. 2018 - May 2023

Integrated BTech/MS in Computer Science and Engineering

Hyderabad

- **GPA:** 8.75/10.0 **Advisor:** Prof. K. Madhava Krishna

PUBLICATIONS

1. **M. Nomaan Qureshi**, Sparsh Garg, Francisco Yandun, David Held, George Kantor, Abhisesh Silwal, "SplatSim: Zero-Shot Sim2Real Transfer of RGB Manipulation Policies Using Gaussian Splatting", *Under Review at ICRA*, 2024. [Paper], [Project Page]
Spotlight Presentation at CoRL-W (Top 7/53)
2. Pranjali Pathre, Gunjan Gupta, **M. Nomaan Qureshi**, Samartha Brahmabhatt, K. Madhava Krishna, "Imagine2Servo: Intelligent Visual Servoing with Diffusion-Driven Goal Generation for Robotic Tasks", in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024. [Paper]
3. **M. Nomaan Qureshi**, Ben Eisner, David Held, "On Time-Indexing as Inductive Bias in Deep RL for Sequential Manipulation Tasks", in *Learning Meets Model-Based Methods for Manipulation and Grasping Workshop @ IROS*, 2023. [Paper]
4. Vishal Reddy Mandadi, Kallol Saha, Dipanwita Guhathakurta, **M. Nomaan Qureshi**, Aditya Agarwal, Bipasha Sen, Dipanjan Das, Brojeshwar Bhowmick, Arun Singh, Madhava Krishna, "Disentangling Planning and Control for Non-Prehensile Tabletop Manipulation", in *2023 IEEE 19th International Conference on Automation Science and Engineering (CASE)*, 2023. [Paper]
5. **M. Nomaan Qureshi***, Prajwal Thakur*, Arun Kumar Singh, YVS Harish, Pushkal Katara, Houman Masnavi, K Madhava Krishna, Brojeshwar Bhowmick, "Learning Arc-Length Value Function for Fast Time-Optimal Pick and Place Sequence Planning and Execution", in *2023 International Joint Conference on Neural Networks (IJCNN)*, 2023. [Paper]
6. Vladimir Petrik, **M. Nomaan Qureshi**, Josef Sivic, Makarand Tapaswi, "Learning Object Manipulation Skills from Video via Approximate Differentiable Physics", in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022. [Paper]
7. **M. Nomaan Qureshi***, Harshit K Sankhla*, Shankara Narayanan V*, Vedansh Mittal, Gunjan Gupta, Harit Pandya, K Madhava Krishna, "Flow Synthesis Based Visual Servoing Frameworks for Monocular Obstacle Avoidance Amidst High-Rises", in *2022 IEEE 19th International Conference on Automation Science and Engineering (CASE)*, 2022. [Paper]
8. **M. Nomaan Qureshi**, Ben Eisner, David Held, "Deep Sequenced Linear Dynamical Systems for Manipulation Policy Learning", in *ICLR 2022 Workshop on Generalizable Policy Learning in the Physical World*, 2022. [Paper]
9. **M. Nomaan Qureshi***, Pushkal Katara*, Abhinav Gupta*, Harit Pandya, YVS Harish, Aadil Mehdi Sanchawala, Gourav Kumar, Brojeshwar Bhowmick, K Madhava Krishna, "RTVS: A Lightweight Differentiable MPC Framework for Real-Time Visual Servoing", in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021. [Paper]

RESEARCH EXPERIENCE

Research Assistant, Robotics Institute, Carnegie Mellon University, U.S.A.

Aug. 2023 – Present

Advisor: Prof. George Kantor and Dr. Abhisesh Silwal

Pittsburgh, PA

- **SplatSim:** Addressed the problem of Sim2Real transfer in robotics by integrating Gaussian splatting with simulators to build structured, photorealistic world models. This approach enabled zero-shot deployment of RGB-only diffusion policies to real-world tasks, achieving a success rate of 86.25% while reducing the time and effort needed for data collection. The work was presented as a spotlight talk at the CoRL Workshop (Top 7/53) and is currently under review at ICRA 2025. splatsim.github.io
- **SoftSplatSim:** Extended SplatSim to handle soft bodies and articulated objects, focusing on challenges in segmentation and alignment. Introduced a KNN-based segmentation approach and used SVD techniques to optimize alignment. This work is being prepared for submission to RSS 2025. [Demo](#)
- **Teleoperation Systems:** Designed and implemented teleoperation systems that facilitated robotic control and data collection for various lab projects. These systems were successfully deployed in field tests and demonstrated their potential to bridge gaps in robotic applications, particularly in agriculture. goodfruit.com/ag-researchers

Research Assistant, Robotics Research Center, IIIT Hyderabad

May 2020 – July 2023

Advisor: Prof. K. Madhava Krishna

Hyderabad, India

- Proposed a novel and lightweight visual servoing technique for fast navigation which is 10 times faster than existing state-of-the-art approaches. Utilized an effective sampling strategy for optimal control generation, resulting in a 74% decrease in servoing time. [\[IROS '21\]](#)
- Formulated a framework that leverages high-precision visual servoing frameworks for avoiding high-rise buildings. Reduced the collision rate with buildings by 90% and enabled safe navigation in urban environments. [\[CASE '22\]](#)
- Developed a framework leveraging a data-driven arc-length value function for pick-and-place planning, significantly reducing joint-space trajectory arc length and execution time by 20–50% over state-of-the-art methods in manufacturing tasks. [\[IJCNN '23\]](#)
- Formulated the Imagine2Servo framework, using diffusion-based image editing to generate sub-goal images for robotic visual servoing tasks. Mentored two students during implementation. The framework enables robots to perform long-range tasks without predefined goal images, achieving significant improvements over traditional visual servoing. [\[Oral, IROS '24\]](#)
- **Research Intern, Robotics Institute, Carnegie Mellon University, U.S.A.** Apr. 2021 – July 2023
Advisor: Prof. David Held *Pittsburgh, PA*
 - Developed a differentiable trajectory representation to accelerate learning by 150% on tasks from the MetaWorld benchmark. Formulated a reparameterization of Linear Dynamic Systems (LDS), enabling integration into any end-to-end differentiable system. [\[GPL Workshop, ICLR '22\]](#)
 - Developed a time-indexed policy structure to improve skill learning for sequential manipulation tasks, leading to significant performance gains on MetaWorld tasks. Integrated multi-headed neural networks to enable explicit skill switching, improving sample efficiency and stability during training. [\[IROS-W, 2023\]](#)
 - Solved various software engineering problems during the internship. Modified the Garage Reinforcement Learning Library to support multi-action policies and implemented control systems on the newly released Sapien simulator.
- **Research Assistant, CVIT, IIIT Hyderabad** Sep. 2021 – July 2022
Advisor: Prof. Makarand Tapaswi *Hyderabad, India*
 - Worked on integrating Video Object Segmentation (VOS) with skill learning from videos. The improved segmentation masks obtained from VOS led to a 10% improvement in the execution of skills. [\[IROS '22\]](#)
 - Proposed a differentiable approach to solving a set of Ordinary Differential Equations (ODEs) that allows approximate modeling of physical laws, including gravity, friction, and hand-object or object-object interactions.

SELECTED PROJECTS

- **C-Shell** Implemented a Linux Bash shell in C. Supported various bash commands, including piping, foreground, and background processing. Designed with modularity to enhance debugging and scalability. [GitHub Link](#)
- **SoftSplatSim** Extended Gaussian splatting for soft bodies and articulated objects, focusing on segmentation and alignment. Introduced KNN-based segmentation and Singular Value Decomposition (SVD) techniques for optimal alignment. Enabled the simulation of complex articulated objects in robotics. [Project Page](#)
- **Generating Birdview Occupancy Maps for KITTI Dataset** Leveraged pre-trained deep learning models for camera-based occupancy grid generation. Utilized PSMNet for depth estimation and MaskRCNN for instance segmentation. Developed a pipeline to generate a 3D model from stereo pairs and project it to the ground frame for accurate occupancy mapping. [GitHub Link](#)
- **VineStereo**: Created an edge-aware stereo-matching framework for thin structure detection in agricultural robotics. Leveraged NeRF-supervised deep stereo techniques to address dataset scarcity. Enabled high-fidelity reconstruction for tasks like automated grapevine pruning. [Project Page](#)

SKILLS

- **Programming**: Advanced – Python, MATLAB, Intermediate – C/C++, C#, Beginner – R, Julia
- **Tools**: ROS, PyTorch, Linux, Docker, Git
- **Softwares**: SolidWorks, Unity, Gazebo, CATIA V5

HONORS

- **(Top 1/35)** Dean’s Research List for excellence in research for the academic years 2020-21 and 2021-22
- **(Top 15 Percentile)** Dean’s Merit List for academic excellence for the academic years 2018-19 and 2019-20
- **Siebel Scholar Nomination**, Carnegie Mellon University

ACADEMIC SERVICE

- **Reviewer at NeurIPS (2021, 2022, 2023), ICLR(2023, 2024), ICRA (2023, 2024)**
- **CMU PATH AI mentor** for freshmen students (Spring 2024, Fall 2024)

MISCELLANEOUS

- Student Parliament Member at IIIT Hyderabad (2022-23)– heading the committee for Advisor/Avisee Relationship.
- Lead Technical Advisor – Electronics and Robotics Club, IIITH 2020-21