

**ANERI D. MUNI**

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**EDUCATION****ETH | Zurich, Switzerland**

December 2020

*Major: MSc. in Robotics, Systems and Control*

- **Robotics Summer School:** “Real World, Real Environments”, Summer 2019

**GEORGIA INSTITUTE OF TECHNOLOGY | Atlanta, Georgia**

May 2018

*Major: Bachelor of Science in Electrical Engineering*

GPA: 3.56

*Minor: Robotics*

- Graduated with Highest Honors
- **Study Abroad Experience:** Georgia Tech Lorraine (France), Summer 2014.

**EXPERIENCE****INSTITUTE FOR DYNAMIC SYSTEMS AND CONTROL | ETH Zurich***Safe Model Based Reinforcement Learning*

Sept. 2019 – Dec. 2019

- Safe learning based on Thompson’s sampling with open-loop model predictive control
- Model-based RL with scenario-based optimization arguments to obtain safety-certified algorithms

**AUTONOMOUS SYSTEMS LAB | ETH Zurich***Visiting Student Researcher*

June 2017 – August 2017

- Programmed ABB’s YuMi robot to rebuild a block stack after scanning it.
- Developed pick-place routine using MoveIt! and object-detection routine using PCL and ASUS PrimeSense sensor.

**GEORGIA TECH RESEARCH INSTITUTE | Atlanta, Georgia***Robotics and Image Processing*

August 2015 – Dec. 2015

- Programmed an agricultural robot to maneuver autonomously in poultry houses.
- Developed obstacle avoidance algorithms using data from Xbox Kinect.
- Implemented path finding algorithm using pre-defined map of chicken houses.
- Designed user friendly Windows GUIs in C# to run a pedestrian tracking software.
- Processed data and accessed results for Georgia Department of Transport using MySQL.

May 2016 – August 2016

**SCHOOL OF MATHEMATICS | Atlanta, Georgia***Teaching Assistant for Differential Equations*

Jan. 2016 – May 2016

- Tutored a class of 30 students by holding recitations twice a week.
- Held office hours, solved difficulties and graded exams and homework..

**PROJECTS****PLANNING UNDER UNCERTAINTY | Zurich**

Sept. 2019 – Nov. 2019

*Autonomous Mobility on Demand (Duckietown), ETH*

- Goal: To anticipate “future” obstacles in unseen regions and modify duckiebot’s behavior to maximize its safety
- Designed a probabilistic model to represent uncertainty in environment and change duckiebot’s velocity profile corresponding to this uncertainty of “shadow” regions

**DYNAMIC SCENE RECONSTRUCTION | Atlanta, Georgia**

Jan. 2017 – May 2018

*Georgia Tech Research Institute*

- Conducted literature review for 3D reconstruction and studied algorithms like *KinectFusion* and *DynamicFusion*.
- Goal: To implement algorithms for tracking and reconstruction of dynamic, non-rigid scenes in real time.

**QUADRUPED ROBOT | Atlanta, Georgia**

August 2016 – Dec. 2016

*IVALabs, Georgia Tech*

- Programmed a quadruped that emulates the locomotion gaits of quadrupeds found in nature.
- Designed 3D model of quadruped with an actuated spine using Autodesk Inventor.

## GT-MAB - AUTONOMOUS BLIMPS | Atlanta, Georgia

### Georgia Tech Systems Research Lab

May 2015 – July 2015

- Performed system identification and developed PID controllers to control 3D motion of a robotic helium blimp.
- Acquired light intensity data to map air current flow patterns.
- **Nano Blimp** – developed a hardware/software for communication for smaller version of blimp. Jan. 2016 – April 2016

## AWARDS

- |  |                                       |
|--|---------------------------------------|
| • Best Oral Presentation, 3 <sup>rd</sup> position, Undergraduate Research Symposium | Spring, 2018                          |
| • Best Overall Design Award, <i>MakeHarvard</i> Hackathon                            | Spring, 2018                          |
| • President's Undergraduate Research Award   | Spring 2018, Spring 2016, Summer 2015 |
| • ThinkSwiss Research Scholarship  | Summer 2017                           |
| • James G. and Mary G. Wohlford Co-op Scholarship                                    | Spring 2017                           |
| • IEEE Control System Society Video Contest, 3 <sup>rd</sup> position                | Summer 2015                           |

## PUBLICATIONS

- Q. Tao, M. King-Smith, **A.D. Muni**, V. Mishra, S. Cho, J.P. Varnell, F. Zhang, *Control Theory – Autonomous Blimp*. 2015 [Online]. Available: <https://youtu.be/5M-V4GOFNDA>.
- S. Cho, V. Mishra, Q. Tao, P. Varnell, M. King-Smith, **A. Muni**, W. Smallwood, F. Zhang. *Autopilot Design for a Class of Miniature Autonomous Blimps*. 2017 IEEE Conference on Control Technology and Applications. Pages: 841 - 846.
- C. T Usher, W. D Daley, B. P Joffe and **A. Muni**. *Robotics for Poultry House Management*. 2017 ASABE Annual International Meeting. 1701103.(doi:10.13031/aim.201701103).

## SKILLS/INTERESTS

**Programming:** Python, MATLAB, C++, Java, RobotC

**Platforms:** Linux, Robotic Operating System (ROS)

**Hardware:** ARM Mbed microcontroller, Arduino, Raspberry Pi, FPGAs, oscilloscope, logic analyzer

**Software:** GitHub, MathCAD, Multisim, LTSpice, Autodesk Inventor, Quartus II, NI LabVIEW, OpenCV, PCL, MoveIt!

**Communication:** Design proposals, technical reports, instruction manuals, presentations (large and small audiences)

**Languages:** English (fluent), Hindi (native), Gujarati (fluent)

**Volunteer:** Volunteered as a tutor for underprivileged students from K-5<sup>th</sup> grade in Atlanta's communities.

## RELEVANT COURSES

### Systems and Control:

- **Currently enrolled:** Probabilistic Artificial Intelligence, System Identification, Vision Algorithms for Mobile Robots
- Masters: Model Predictive Control, Control Systems 2, Nonlinear Systems Control, Introduction to Machine Learning, Autonomous Mobile Robots, Dynamic Programming and Optimal Control, Image Analysis and Computer Vision, Robot Dynamics, Linear Systems Theory, Autonomous Mobility on Demand
- Bachelors: Introduction to Automation and Robotics, Feedback Control, Control System Design, Signals and Systems, Embedded Systems

**Computer Science:** Introduction to Machine Learning, Introduction to Artificial Intelligence, Data structures and Algorithms, Introduction to Object-Oriented Programming, Engineering Software Design

**Core ECE:** Computer Communication, Digital Signal Processing, Circuit Analyses, Microelectronics, Electromagnetism, Electrical Energy Systems.