Aneri Muni

Education

University of Montreal / Mila — May, 2022 - Present
Ph.D. Computer Science
Advisor: Dr. Pierre-Luc Bacon

ETH Zurich (Eidgenössische Technische Hochschule) — 2018 - 2021
MSc. Robotics, Systems and Control
Advisor: Prof. Dr. Andreas Krause
Thesis: Safe Learning-based Control in High-dimensional Spaces

Georgia Institute of Technology — 2013 - 2018
BSc. Electrical Engineering, Minor in Robotics, Co-op Rotation
Graduated with Highest Honors
Thesis: 3D Reconstruction of Live Chickens in Poultry Houses

Academic Research

Mila Research Institute | Advisor: Dr. Pierre-Luc Bacon — Feb. 2021 - August 2021
Visiting Student Researcher

- Proposed algorithms to design synthetic antimicrobial peptides in high-dimensional molecular spaces using Meta Reinforcement Learning and Bayesian Optimization.

ETH Zurich | Advisor: Prof. Dr. Andreas Krause — April 2020 - Jan. 2021
Safe Learning-Based Control in High-dimensional Spaces

- Implemented safe Bayesian optimization algorithm with sim-to-real approach for position control of quadrotors.
- Employed genetic algorithms to identify controllers that efficiently trade-off safety and performance.

ETH Zurich | Advisor: Prof. Dr. Melanie Zeilinger — Sept. 2019 - Jan. 2020
Safe Model-Based Reinforcement Learning

- Performed sample efficient learning using Thompson sampling and open-loop Model Predictive Control.
- Augmented model-based Reinforcement Learning with Scenario-based Optimization arguments to obtain safety-certified algorithms.

Georgia Institute of Technology | Advisor: Dr. Fumin Zhang — May 2015 - April 2016
GT-MAB: Miniature Autonomous Blimps

- Performed system identification and developed PID controllers to control 3D motion of a robotic helium blimp.
- **Nano Blimp:** developed hardware and software for communication protocol for smaller version of blimp.

Industry Experience

NNAISENSE, Lugano — October 2021 - April 2022
Research Intern

- Proposed transfer-learning approach to enable fast and efficient adaptation of Recurrent Neural Network models of dynamical systems.
- Designed Lyapunov-based safety certificates for formal verification of model-based Reinforcement Learning algorithms.

Georgia Tech Research Institute — Fall 2015, Spring 2016, Summer 2017
Co-op Intern: Robotics and Image Processing

- Implemented and deployed path-planning algorithms for an agricultural ground robot to autonomously navigate poultry houses.
- Collaborated with poultry scientist to develop novel obstacle (chicken) avoidance routines using point cloud data from XBox Kinect.
- Designed Windows GUIs in C# to run a pedestrian tracking software and identify ideal road-crossing locations for the Georgia Department of Transport.

Preprints

On the adaptation of recurrent neural networks for system identification.
Under Review: Automatica Journal. (Available at: https://arxiv.org/abs/2201.08660). 2022.
M. Forgione, **A. Muni**, D. Piga, M. Gallieri.

Designing Biological Sequences via Meta-Reinforcement Learning and Bayesian Optimization.
Under Review: 39^{th} *International Conference on Machine Learning (ICML).* 2022.
L. Feng, P. Nouri, **A. Muni**, Y. Bengio, P. Bacon.

Publications

Autopilot Design for a class of Miniature Autonomous Blimps.
IEEE Conference on Control Technology and Applications. Pages:841-846. 2017.
S. Cho, V. Mishra, Q. Tao, P. Varnell, M. King-Smith, **A. Muni**, W. Smallwood, F. Zhang.

Robotics for Poultry House Management.
ASABE Annual International Meeting. 1701103.(doi:10.13031/aim.201701103). 2017.
C. T Usher, W. D Daley, B. P Joffe and **A. Muni**.

Control Theory – Autonomous Blimp.
IEEE Control Systems Society Video Contest. Available Online: YouTube video. 2015.
Q. Tao, M. King-Smith, **A.D. Muni**, V. Mishra, S. Cho, J.P. Varnell, F. Zhang.

Talks

Opening the Black Box: High-dimensional Safe Policy Search via Sim-to-Real.
16^{th} *Workshop for Women in Machine Learning (WiML), NeurIPS 2021.*
A. Muni, M. Turchetta, A. Krause.

Learning-Based Control for Constrained Systems using Thompson Sampling and Scenario Optimization.
Machine Learning Summer School (MLSS), Tübingen. 2020. Available: YouTube video.
A. Muni, K. Wabersich, M. Zeilinger.

3D Reconstruction of Live Chickens in Poultry Houses.
13^{th} *Annual Undergraduate Research Spring Symposium, Georgia Tech. 2018.*
A. Muni and Colin Usher.

Honors and Awards

UdeM Fee Exemption Scholarship for International Students ($21,038.13/year)	2022
NeurIPS Travel Grant, WiML Workshop	2021
Best Oral Presentation, 3^{rd} position, Undergraduate Research Symposium	Spring 2018
Best Overall Design Award, *MLH MakeHarvard* Hackathon	Spring 2018
President's Undergraduate Research Award	2018, 2016, 2015
ThinkSwiss Research Scholarship	Summer 2017
James G. and Mary G. Wohlford Co-op Scholarship	Spring 2017
IEEE Control System Society Video Contest, 3^{rd} position	Summer 2015
Faculty Honors, Dean's List (all semesters)	2018, 2017, 2015

Teaching Experience

Teaching Assistant for Differential Equations Jan. 2016 – May 2016
Georgia Tech School of Mathematics

Peer Tutor for Differential Equation Sept. 2014 – Sept. 2015
Georgia Tech Center for Academic Success

Seminars and Summer Schools

AGI Safety Fundamentals Program, Effective Altruism Cambridge	Spring 2022
Machine Learning Summer School (MLSS), Tübingen	July 2020
ETH Robotics Summer School: "*Real World, Real Environments*"	July 2019

Leadership and Service

Panelist: "Designer Farms", Wharton Agribusiness & Food Security Club, UPenn	2020
Georgia Tech Undergraduate Research Ambassador	2017 - 2018
Women in Electrical & Computer Engineering Club - Publicity, Newsletter Chair	2015 - 2018
Georgia Tech School of Electrical and Computer Engineering Ambassador	2014 - 2015
Volunteer tutor for underprivileged students from K-5^{th} grade in Atlanta	2013 - 2014