Anusha Srikanthan

Department of Electrical and Systems Engineering, University of Pennsylvania
Philadelphia, PA

sanusha@seas.upenn.edu GitHub Website LinkedIn Scholar

EDUCATION

University of Pennsylvania **Philadelphia, PA**
Ph.D. in Electrical and Systems Engineering *Aug 2021 – May 2026 (expected)*
Thesis: *Control Decompositions for Scalable Computation in Resource-Constrained Robots.*
Advisors: Nikolai Matni, Vijay Kumar

Georgia Institute of Technology **Atlanta, GA**
M.S. Thesis in Electrical and Computer Engineering *Aug 2019 – Jul 2021*
Thesis: *Learning task requirements for coalition formation in heterogeneous multi-agent systems.*
Advisors: Harish Ravichandar, Sonia Chernova

National Institute of Technology **Trichy, India**
B.Tech. (Hons.) in Electronics and Communication Engineering *Jul 2015 – May 2019*
Graduated with First Class Honors specializing in Digital Signal Processing with a Minor in Computer Science.
Advisors: P. Palanisamy, Varun Gopi.

RESEARCH EXPERIENCE

A Layered Control Architecture for Safe Real-Time Navigation **University of Pennsylvania**
Paper published at ICRA 2025. *Nov 2023 - May 2025*
Spearheaded my work on iterative trajectory optimization and real-time safety for motion planning with dynamic obstacles in collaboration with Yifan Xue and Dr. Nadia Figueroa enabling real-time dynamic obstacle avoidance.

Closed-Loop Analysis of ADMM-based Suboptimal Linear MPC **University of Pennsylvania**
Published at the journal L-CSS 2024 and presented at ACC 2025 session on MPC. *Apr 2024 - Dec 2024*
This letter proposes a suboptimal MPC scheme based on the alternating direction method of multipliers (ADMM). We show that using a warm-start approach combined with enough iterations per time-step, yields an ADMM-based suboptimal MPC scheme which asymptotically stabilizes the system and maintains recursive feasibility in collaboration with Dr. Aren Karapetyan and Dr. Nikolai Matni.

A Data-Driven Approach to Quadrotor Trajectory Generation **University of Pennsylvania**
Published at IROS 2023 and ICRA 2025 Workshop. *Apr 2022 - May 2025*
Derived a hierarchical approach to trajectory optimization and feedback control for general nonlinear dynamical systems to obtain trajectory generation and tracking control layers. Demonstrated my algorithm on a Crazyflie 2.0 and Dragonfly quadrotor platform showing significant improvements in tracking error by offsetting aerodynamic drag in collaboration with Dr. Vijay Kumar and Dr. Nikolai Matni.

Resilient Coalition Formation in Robot Teams via Imitation Learning **University of Pennsylvania**
Won the excellent paper award at the IROS 2021 Workshop. *May - Oct 2021*
Interpretable and self-supervised learning-based approach to coalition formation for robots operating under environmental disturbances in collaboration with my Masters advisor, Dr. Harish Ravichandar at Georgia Tech and PhD supervisor, Dr. Vijay Kumar.

Learning Task Requirements for Coalition Formation in Heterogeneous MAS **Georgia Tech**
Published as AAMAS 2022 Extended Abstract and RSS 2023 proceedings. *Jan 2020 - Feb 2023*
Established the research problem for using expert demonstrations to learn different strategies for complex tasks and perform multi-robot task assignment with heterogeneous agents. This was demonstrated in battle scenarios on the latest release of StarCraft II Editor and with tasks on the Robotarium Simulator showing learned strategies led to higher task performance. Extended the work to design an interactive bandit-based approach to learn to form coalitions, given sub-optimal demonstrations from users. This work was done partly during my Master's thesis and continued in collaboration with Sukriti Singh, and Dr. Harish Ravichandar.

Studying the neuron topology through *C. elegans* connectome **University of Pennsylvania**
Course project in ESE 566 *Fall 2021*
Investigating the relationship between spatial modules and functional modules using Louvain Community Detection algorithm to identify clusters responsible for motor behavior in collaboration with Dr. Lorenzo Caciagli and Dr. Danielle Bassett.

REFEREED CONFERENCE AND JOURNAL PUBLICATIONS

[1]: **A. Srikanthan**, Y. Xue, V. Kumar, N. Matni and N. Figueroa. *ADMM-MCBF-LCA: A Layered Control Architecture for Safe Real-Time Navigation*. 2025 IEEE International Conference on Robotics and Automation (ICRA), Atlanta, GA, USA, 2025.

[2]: **A. Srikanthan**, A. Karapetyan, V. Kumar and N. Matni. *Closed-Loop Analysis of ADMM-Based Suboptimal Linear Model Predictive Control*. IEEE Control Systems Letters, vol. 8, pp. 3195-3200, 2024 (Presented at ACC 2025 in Denver, CO, USA).

[3]: **A. Srikanthan**, F. Yang, I. Spasojevic, D. Thakur, V. Kumar and N. Matni. *A Data-Driven Approach to Synthesizing Dynamics-Aware Trajectories for Underactuated Robotic Systems*. 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Detroit, MI, USA, 2023.

[4]: S. Singh, **A. Srikanthan**, V. Mallampati, H. Ravichandar. *Concurrent Constrained Optimization of Unknown Rewards for Multi-Robot Task Allocation*. 2023 Proceedings of Robotics: Science and Systems (RSS), Daegu, Republic of Korea, 2023.

[5]: **A. Srikanthan**, H. Ravichandar. *Resource-Aware Adaptation of Heterogeneous Strategies for Coalition Formation*. 21st International Conference on Autonomous Agents and Multiagent Systems (AAMAS '22). International Foundation for Autonomous Agents and Multiagent Systems, Richland, SC.

INDUSTRY EXPERIENCE

PhD Research Intern — **Robotics and AI Institute**
High performance and safety beyond collision avoidance — *Summer and Fall 2025*
Worked with a hardware and controls research group that developed a new platform for high performance humanoid robots equipped with actuators that could achieve close to 40 mph throws of a baseball (video). Currently writing a paper solving a fundamental challenge of impact-aware safety for their platform.

AI Robotics, PhD intern — **Cruise LLC**
ML-based offline policy evaluation for autonomous cars — *Summer 2024*
Identified challenges in the data collection and training of machine learning (ML) models for the offline evaluation of self-driving policies. Developed a principled approach to design loss functions and benchmarked against existing implementations (project report).

Hardware Engineering intern — **NVIDIA Graphics Pvt Ltd**
Tegra System-On-Chip design team — *Summer 2018*
Designed and implemented a Safety Duplication Plugin for multiple error detection using concepts of redundancy and clock domains and integrated it on Perforce using Perl scripts with Viva embedded code programmed on a UNIX based OS. (project report).

INVITED SEMINARS AND WORKSHOP TALKS

Gordon Research Conference — **Ventura, CA, USA**
Presented a poster and attended networking sessions with academic and industry leaders — *Jan 2026*

Robotics Seminar Series — **University of Delaware**
Presented a seminar talk titled "A Layered Control Architecture for Reliable Agility" — *Nov 2025*

Research Internship Presentation — **Robotics and AI Institute**
Presented on "Egocentric Safety via CBFs for Agile Manipulation" — *Oct 2025*

ICRA 2025 Workshop on 25 Years of Aerial Robotics — **Atlanta, GA, USA**
Presented a 5 minute-talk — *May 2025*
Oral Spotlight for my workshop paper titled "QuadLCD: Layered Decomposition Enables Actuator Feasibility"

2025 Grad Cohort For Women Workshop — **Denver, CO, USA**
Computing Research Association — *Mar 2025*
Attended sessions tailored for student career development and received a travel grant from CRA funding the entire travel, stay and registration.

NSF Workshop on Reinforcement Learning — **Harvard University**
Poster Session and Networking — *Jan 2025*

Presented my poster titled "A Data-Driven Approach to Synthesizing Dynamics-Aware Trajectories for Underactuated Robotic Systems".

Invited talk at Dr. Siddhartha Srinivasa's group **University of Washington**
Robotics Research Seminar *Dec 2024*
Presented a research talk to the robotics group at University of Washington, Seattle on "Layered Control Decompositions enable Safe Navigation of Underactuated Robots".

Symposium on Safe Deployment of Foundation Models **Princeton**
Poster Session and Networking *Nov 2024*

Workshop on Optimization, Learning, and Control **Princeton**
Poster Session and Networking *Jun 2024*

Invited research seminar by Dr. Lekan Molu at Microsoft Research **MSR NYC, USA**
Layered Control Architectures for Underactuated Robotic Systems *Mar 2024*

Invited talk by Dr. Asif Rana (currently at Amazon Robotics) **Thirdwave Innovation**
Data-driven Synthesis of Dynamics-Aware Trajectory Generation *Oct 2023*

Invited talk at Dr. John Doyle's group **Caltech**
Data-driven Synthesis of Dynamics-Aware Trajectory Generation *Aug 2023*

AWARDS AND HONORS

Dec 2025: Teaching Certificate from the Center for Excellence in Teaching, Learning, and Innovation, University of Pennsylvania (guest lectures observed by a teaching fellow and pedagogy workshops).

Oct 2023: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* Travel Award to present published work at IROS 2023, Detroit, MI, USA.

Aug 2022-23: PhD Good Citizen Award, ESE Department, University of Pennsylvania, for student advocacy as President of the ESE PhD Association.

Aug 2021–22: Dean's Fellowship, University of Pennsylvania (doctoral research funding).

Oct 2021: Excellent Paper Award, IROS Workshop on Social and Cognitive Aspects of Human–Robot Physical Interaction.

Mar 2017: Second Place, Sangam Robotics Competition (assistive device for the visually impaired), NIT Trichy, India.

TEACHING AND MENTORSHIP EXPERIENCE

Center for Excellence in Teaching, Learning and Innovation **University of Pennsylvania**
Teaching Certificate *Fall 2025*
Attending five workshops on different aspects of teaching such as effective lecturing, handling office hours and assessments. In addition to this, I had a teaching fellow observe my lecture and provide feedback. Finally, I participated in a teaching philosophy workshop and presented my teaching statement to complete the requirements to receive the teaching certificate.

Quadrotor Swarm Control using Reinforcement Learning **University of Pennsylvania**
Undergraduate Student Mentor *Spring 2025-26*
Mentoring an undergraduate student, Divya Karnani, in reinforcement learning, guiding her in policy optimization and hands-on implementation using Python, GitHub workflows, and RL libraries such as Stable Baselines.

Learning for Adaptive and Reactive Control of Robots (Graduate) **University of Pennsylvania**
Guest Lecturer (MEAM 620) *Spring 2025*
Presented my research topics in Dr. Nadia Figueroa's robotics course through a bottom-up approach that connected fundamental challenges to complex implementations. The lectures transitioned from decomposition theory for linear systems to the challenges of nonlinear extensions.

Drag-Aware Quadrotor Trajectory Generation **University of Pennsylvania**
MS Student Mentor *Spring 2023-24*
Mentored Hanli Zhang (M.S., Penn) on her first research project, developing drag-aware planning algorithms by leveraging trajectory tracking errors as a data-driven proxy for model mismatch, building on cost-to-go learning methods.

Decision Models (Undergraduate) **University of Pennsylvania**
Teaching Assistant (ESE 2040) *Fall 2023*
Head TA assisting my supervisor, Dr. Nikolai Matni, teaching the undergraduate course spanning linear algebra and optimization. I was tasked with weekly office hours, homework design, grading and recitations.

Applied Machine Learning (Undergraduate / Graduate) **University of Pennsylvania**
Teaching Assistant (CIS 419 / 519) *Spring 2023*
As a TA for a class of over 100 students and a massive instructional team, I was tasked with recitations, weekly office hours, grading and advised student projects.

Elements of Probability Theory (Graduate) **University of Pennsylvania**
Teaching Assistant (ESE 530) *Fall 2022*
I was a part of the instructional staff for Dr. Santhosh Venkatesh teaching ESE 530 which served additional as a qualifier for doctoral students. The course demanded two office hours per Week, monthly recitations and grading. In addition to this, I also helped develop an online course on the foundations of machine learning with Dr. Venkatesh.

AI and Python Programming (High School) **Inspirit AI (Online)**
Instructor *Summer 2023*
Part-time instructor of Python and Artificial Intelligence through project-based learning.

PROFESSIONAL SERVICE & OUTREACH

Conference and Journal Reviewer: IEEE Transactions on Mechatronics 2026-, IEEE Transaction on Automatic Control 2025-, IEEE Robotics and Automation Letters 2023-, ICRA 2023-, AAAI 2024-25, IEEE Transactions on Intelligent Vehicles and Transportation 2024-, L4DC 2024-, IUCAS 2022.

GRASP High School and Industry Day Visit: Presented my research demonstration with a Fetch robot for high school students visiting the university. The students were allowed to interact in close proximity with the moving robot showcasing dynamic obstacle avoidance in real-time.

President of ESE PhD Association, University of Pennsylvania: As the President of the ESE PhD Association, I managed our team of PhD students volunteering to organize professional development and social events from July 2022 - 24.

President of Dance Troupe of NIT Trichy, India: As the President of NIT Trichy's Dance Troupe from July 2018 - May 2019, I led 50 students across two troupes (Indian Classical and Western) in various inter-collegiate dance competitions across the country. I was a dancing member of the troupe from July 2016 onwards.

Memberships: IEEE, Robotics Society of America, ACM, Association for Computing Machinery, USA.

REFERENCES

Dr. Nikolai Matni — Associate Professor and Graduate Chair, Department of Electrical and Systems Engineering, University of Pennsylvania. Contact at nmatni@seas.upenn.edu

Dr. Vijay Kumar — Professor and Nemirovsky Family Dean, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania. Contact at seasdean@seas.upenn.edu

Dr. Nadia Figueroa — Shalini and Rajeev Misra Presidential Assistant Professor, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania. Contact at nadiaf@seas.upenn.edu

Dr. Santosh Venkatesh — Professor, Department of Electrical and Systems Engineering, University of Pennsylvania. Contact at venkates@seas.upenn.edu

Dr. George Pappas — UPS Foundation Professor of Transportation and Associate Dean for Research, Department of Electrical and Systems Engineering, University of Pennsylvania. Contact at pappasg@seas.upenn.edu