BHASKAR VUNDURTHY

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Project Scientist, Robotics Institute
Carnegie Mellon University

RESEARCH INTERESTS

I am a Project Scientist at the Robotics Institute, Carnegie Mellon University, where I conduct research on the theoretical and practical foundations of adversarial heterogeneous multi-agent systems. My research investigates the complex interplay between collaborative agents and adversaries in dynamic environments, exploring strategies for effective teamwork and competitive interactions. I employ tools from computational geometry, game theory, control theory, and operations research to develop algorithms and theoretical frameworks that capture the heterogeneity and diversity inherent in real-world scenarios. My work is grounded in practical applications, leveraging both in-house fabricated and commercially available autonomous robots to validate and refine my research findings.

CURRENT AND PRIOR APPOINTMENTS

Project Scientist *Jan. 2023 - Ongoing*
Robotics Institute, Carnegie Mellon University Advisor: Prof. Howie Choset

- Led three research teams spanning 3 PhD candidates, 12 graduate, and 8 undergraduate students
- Recognized with a university-wide Andy Award nomination for my dedication to student success
- Contributed to multiple funded grant proposals, in co-Principal Investigator and support roles

Postdoctoral Fellow *Nov. 2021 - Dec. 2022*
Robotics Institute, Carnegie Mellon University Advisor: Prof. Howie Choset

Postdoctoral Research Associate *Feb. 2021 - Oct. 2021*
Department of Electrical Engineering, University of Notre Dame Advisor: Prof. Vijay Gupta

Software and Application Support Engineer *July 2019 - Jan. 2021*
Advanced Visualization, The MathWorks Inc.

Junior Research Fellow *Oct. 2016 - July 2019*
Department of Science and Technology (DST), Government of India Advisor: Prof. K. Sridharan

- Recognized for outstanding research in multi-agent systems with a three-year research fellowship

EDUCATION

Ph.D. in Electrical Engineering specializing in Robotics Advisor: Prof. K. Sridharan
Indian Institute of Technology (IIT) Madras, Chennai, India.
Dissertation: *Rendezvous of multiple agents amidst obstacles and constraints*

Master of Technology in Control and Instrumentation Advisor: Prof. K. Sridharan
Indian Institute of Technology Madras, Chennai, India.
Thesis: *Design and Development of bipedal robots and implementation of various gait algorithms*

Bachelor of Engineering (Honors) in Electronics and Instrumentation
Birla Institute of Technology and Science (BITS) Pilani, Pilani, India.
Capstone Project: *AOTF Spectral Data Pre-processing with LPC2148 ARM7 based Microcontroller*

Master of Science (Honors) in Chemistry
Birla Institute of Technology and Science (BITS) Pilani, Pilani, India.
Capstone Project: *Molecular Modeling of Bio-Protein Molecules*

Journals (Peer Reviewed)

J9. H. Sridharan, N. Ramsai and **B. Vundurthy**, "Generative Models, Attention Mechanisms, and Adaptive Methods for Robot Navigation in Complex Environments—A Survey," in **IEEE Access**, vol. 13, pp. 132332-132365, 2025. ML [link] [PDF]

J8. C. Noren, **B. Vundurthy**, S. Scherer, H. Choset and M. Travers, "A Synchronized Task Formulation for Robotic Convoy Operations," in **IEEE Robotics and Automation Letters**, vol. 10, no. 7, pp. 6808-6815, July 2025. MAPS Robots MACO [link] [Postprint]

J7. C. Noren, **B. Vundurthy**, S. Scherer, and M. Travers, "Interaction-aware control for robotic vegetation override in off-road environments," in **Journal of Terramechanics**, vol. 117:101034, 2025. Robots MACO [link] [Postprint]

J6. **B. Vundurthy**, A. Kanellopoulos, V. Gupta, and K. G. Vamvoudakis, "Intelligent Players in a Fictitious Play Framework," in **IEEE Transactions on Automatic Control**, vol. 69, no. 1, pp. 479-486, Jan. 2024. Games MACO [link] [Postprint]

J5. U. S. Datla, **B. Vundurthy**, J. S. Hook, N. Menon, H. R. Bagtash, T. Shihabeddin, D. W. Schmidtke, J. G. Moreland, M. Z. Radic, and C. N. Jones, "Quantifying neutrophil extracellular trap release in a combined infection–inflammation NET-array device," in **Lab on a Chip**, vol. 24, no. 3, pp. 615-628, Jan. 2024. CV [link] [PDF]

J4. Z. Ren, A. K. Srinivasan, **B. Vundurthy**, I. Abraham and H. Choset, "A Pareto-Optimal Local Optimization Framework for Multiobjective Ergodic Search," in **IEEE Transactions on Robotics**, vol. 39, no. 5, pp. 3452-3463, Oct. 2023. MAPS Robots MACO [link] [Postprint]

J3. S. K. Singh, P. V. Reddy and **B. Vundurthy**, "Study of Multiple Target Defense Differential Games Using Receding Horizon-Based Switching Strategies," in **IEEE Transactions on Control Systems Technology**, vol. 30, no. 4, pp. 1403-1419, July 2022. Games Robots MACO [link] [Preprint]

J2. **B. Vundurthy** and K. Sridharan, "Protecting an Autonomous Delivery Agent Against a Vision-Guided Adversary: Algorithms and Experimental Results," in **IEEE Transactions on Industrial Informatics**, vol. 16, no. 9, pp. 5667-5679, Sept. 2020. MAPS Games Robots [link] [Postprint]

J1. **B. Vundurthy** and K. Sridharan, "Multiagent Gathering With Collision Avoidance and a Minimax Distance Criterion—Efficient Algorithms and Hardware Realization," in **IEEE Transactions on Industrial Informatics**, vol. 15, no. 2, pp. 699-709, Feb. 2019. MAPS Robots [link][Postprint]

Legend

MAPS Multi-Agent Planning and Scheduling
MACO Multi-Agent Control and Optimization
Games Game Theory
CV Computer Vision
Robots Robotic Systems
ML Machine Learning

Conferences (Peer Reviewed)

C18. C. Noren, **B. Vundurthy**, N. Bagree, and M. Travers, "A Max-min Tree Approach to the Automated Construction of Ad hoc Wireless Networks in Unknown Environments," Accepted for publication at the IEEE International Conference on Automation Science and Engineering (**CASE**), Los Angeles, USA, 2025. MAPS Robots [Postprint]

C17. K. Karumanchi, S. Pellegrini, A. Orekhov, Y. Gu, R. Boirum, **B. Vundurthy**, and H. Choset, "Novel Gaits for Snake Robot Navigation in Complex External Pipe Networks," Accepted for publication at the IEEE International Conference on Automation Science and Engineering (**CASE**), Los Angeles, USA, 2025. Robots MACO [Postprint]

C16. C. Noren, S. Chaudhary, B. Shirose, B. Vundurthy, and M. Travers, "Communication Network Construction Behaviors for Robotic Convoying", Accepted for publication at the Ground Vehicle Systems Engineering and Technology Symposium (GVSETS), Novi, Michigan, Aug. 12-14, 2025. MAPS Robots MACO [Postprint]

C15. A. Bhat, G. Gutow, **B. Vundurthy**, Z. Ren, S. Rathinam, and H. Choset, "A Complete and Bounded-Suboptimal Algorithm for a Moving Target Traveling Salesman Problem with Obstacles in 3D*," Accepted for publication at the IEEE International Conference on Robotics and Automation (**ICRA**), Atlanta, USA, 2025. MAPS [Postprint]
Nominated for Overall Best Paper Award
Also Nominated for Best Paper Award in Automation

C14. A. Xu, **B. Vundurthy**, G. Gutow, I. Abraham, J. Schneider, and H. Choset, "Measure Preserving Flows for Ergodic Search in Convoluted Environments", Accepted for publication at The Distributed Autonomous Robotic Systems (**DARS**) 2024. MAPS MACO [Postprint]
Nominated for Best Paper Award

C13. B. Shirose, A. Johnson, **B. Vundurthy**, H. Choset, and M. Travers, "GESCE: Graph-Based Ergodic Search in Cluttered Environments," 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), Abu Dhabi, United Arab Emirates, 2024, pp. 7611-7616. MAPS MACO [link] [Postprint]

C12. C. Noren, B. Shirose, **B. Vundurthy**, S. Scherer and M. Travers, "An interaction-aware two-level robotic planning and control system for vegetation override," 21st Conference of the International Society for Terrain-Vehicle Systems (**ISTVS**), Yokohoma, Japan, 2024. Robots MACO [link]

C11. A. Bhat, G. Gutow, **B. Vundurthy**, Z. Ren, S. Rathinam, and H. Choset, "A Complete Algorithm for a Moving Target Traveling Salesman Problem with Obstacles", Proceedings of the Sixteenth Workshop on the Algorithmic Foundations of Robotics, **WAFR** 2024. MAPS MACO [Postprint]

C10. A. Xu, J. Hsieh, **B. Vundurthy**, N. Kemp, E. Cohen, L. Li, and H. Choset, "Mathematical Justification of Hard Negative Mining via Isometric Approximation Theorem," The Twelfth International Conference on Learning Representations (**ICLR**), Vienna, Austria, 2024. ML [link] [Postprint]

C9. S. Singh, Z. Huang, A. K. Srinivasan, G. Gutow, **B. Vundurthy** and H. Choset, "Hierarchical Planning for Long-Horizon Multi-Agent Collective Construction," 2024 IEEE International Conference on Robotics and Automation (**ICRA**), Yokohama, Japan, 2024, pp. 9003-9009. MAPS [link] [Postprint]

C8. C. Noren, **B. Vundurthy**, S. Scherer and M. Travers, "Trajectory optimization for vegetation override in off-road driving," in Proceedings of the 16th European-African Regional Conference of the International Society for Terrain-Vehicle Systems (**ISTVS**), Lublin, Poland, 2023. Robots MACO [link]

C7. A. K. Srinivasan, S. Singh, G. Gutow, H. Choset and **B. Vundurthy**, "Multi-Agent Collective Construction Using 3D Decomposition," 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), Detroit, MI, USA, 2023, pp. 9963-9969. MAPS [link] [Postprint]

C6. A. K. Srinivasan, G. Gutow, Z. Ren, I. Abraham, **B. Vundurthy** and H. Choset, "Multi-Agent Multi-Objective Ergodic Search Using Branch and Bound," 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), Detroit, MI, USA, 2023, pp. 844-849. MAPS MACO [link] [Postprint]

C5. N. Bagree, C. Noren, D. Singh, M. Travers, **B. Vundurthy**, "Distributed Optimal Control Framework for High-Speed Convoys: Theory and Hardware Results," **IFAC**-PapersOnLine, Volume 56, Issue 2, 2023, pp. 2127-2133. Robots MACO [link] [Postprint]

C4. P. Sriganesh, N. Bagree, **B. Vundurthy** and M. Travers, "Fast Staircase Detection and Estimation using 3D Point Clouds with Multi-detection Merging for Heterogeneous Robots," 2023 IEEE International Conference on Robotics and Automation (**ICRA**), London, United Kingdom, 2023, pp. 9253-9259. MAPS Robots [link] [Postprint]

C3. Onkar Kulkarni, **B. Vundurthy**, and K. Sridharan, "Rendezvous of Heterogeneous Robots in Minimum Time - Theory and Experiments," Proceedings of the Advances in Robotics (**AIR** 2019), Association for Computing Machinery, New York, NY, USA, Article 38, pp. 1–6. MAPS Robots [link] [Postprint]

C2. **B. Vundurthy** and K. Sridharan, "Time Optimal Rendezvous for Multi-Agent Systems Amidst Obstacles - Theory and Experiments," **IECON** 2018 - 44th Annual Conference of the IEEE Industrial Electronics Society, Washington, DC, 2018, pp. 2645-2650. MAPS Robots [link] [Postprint]

C1. **B. Vundurthy**, A. More, S. V. V. Raju and K. Sridharan, "Rendezvous of heterogeneous robots amidst obstacles with limited communication," 2016 Indian Control Conference (**ICC**), Hyderabad, 2016, pp. 347-353. MAPS Robots [link] [Postprint]

Workshops

W7. S. Singh, G. Gutow, **B. Vundurthy**, and H. Choset, "Hierarchical Planner for the cuboid-Multi-Agent Collective Construction Problem," in the 1st International Workshop on Collaborative Strategies for Multi-agent Robotic Construction: Block by Block at IEEE **ICRA**, 2025. MAPS

Legend

MAPS Multi-Agent Planning and Scheduling
MACO Multi-Agent Control and Optimization
Games Game Theory
CV Computer Vision
Robots Robotic Systems
ML Machine Learning

W6. **B. Vundurthy**, G. Gutow, A. K. Srinivasan, A. Xu, B. Shirose, and H. Choset, "Generalized Multi-Agent Multi-Objective Ergodic Search," in the 6th International Workshop on Multi-Agent Path Finding at **AAAI**, 2025. MAPS

W5. A. Xu, **B. Vundurthy**, G. Gutow, I. Abraham, J. Schneider, and H. Choset, "Measure Preserving Flows for Ergodic Search in Convoluted Environments," in the 6th International Workshop on Multi-Agent Path Finding at **AAAI**, 2025. MAPS MACO

W4. A. Bhat, G. Gutow, **B. Vundurthy**, Z. Ren, S. Rathinam, and H. Choset, "Toward Multi-Agent Moving Target Traveling Salesman Problems," in the 6th International Workshop on Multi-Agent Path Finding at **AAAI**, 2025. MAPS

W3. P. Sriganesh, J. Maier, A. Johnson, B. Shirose, R. Chandrasekar, C. Noren, J. Spisak, R. Darnley, **B. Vundurthy**, and M. Travers. "Modular, Resilient, and Scalable System Design Approaches–Lessons learned in the years after DARPA Subterranean Challenge," in the Workshop on Field Robotics at **ICRA** 2024. MAPS Robots MACO [Link] [Preprint]

W2. S. Singh, G. Gutow, A. K. Srinivasan, **B. Vundurthy**, and H. Choset. "Hierarchical Propositional Logic Planning for Multi-Agent Collective Construction," in the 4th Workshop on Future of Construction: Safe, Reliable, and Precise Robots in Construction Environments, **ICRA** 2023. MAPS

W1. A. K. Srinivasan, S. Singh, G. Gutow, H. Choset and **B. Vundurthy**, "Multi-Agent Collective Construction Using 3D Decomposition," in the Multi-Agent Path Finding workshop at **AAAI**, 2023. MAPS

Research Pipeline

U5. H. R. Bagtash, N. Alatrash, U. S. Datla, **B. Vundurthy**, R. Koduri, K. Mutore, E. Salari, R. Wu, V. Nomellini, and C. N. Jones, "Sex Differences in Murine Neutrophil Chemotaxis Following Burn Injury with Poloxamer 188 Treatment in a Microfluidic Platform," revising a submission to the **Journal of Leukocyte Biology**. CV

U4. A. Bhat, G. Gutow, **B. Vundurthy**, Z. Ren, S. Rathinam, and H. Choset, "Parallel, Asymptotically Optimal Algorithms for Moving Target Traveling Salesman Problems," currently under review. MAPS Robots MACO

U3. H. R. Bagtash, **B. Vundurthy**, U. S. Datla, S. Shao, M. T. Phoo, J. Hook, R. Koduri, C. Llamas, J. Moreland, V. Nomellini, P. Mishra, C. N. Jones, "Microphysiological System for Quantifying Neutrophil Dysfunctional Migration in Septic Patients," to be submitted to **Nature Communications** in August, 2025. CV

U2. **B. Vundurthy**, G. Gutow, A. Xu, B. Shirose, A. K. Srinivasan, and H. Choset, "Generalized Multi-Agent Multi-Objective Ergodic Search (G-MA-MO-ES) using Branch and Bound," to be submitted to IEEE Transactions on Robotics (**T-RO**) in August, 2025. MAPS Robots MACO

U1. A. Xu, **B. Vundurthy**, J. Schneider, and H. Choset, "Learning a Unified Robot Shape Space," to be submitted to Robotics and Automation Letters (**RA-L**) in September, 2025. ML

RESEARCH FUNDING

Leading Research Initiatives as Co-Principal Investigator (Co-PI)

Tactical Behaviors for Autonomous Maneuver (TBAM) *Spring 2024*
Funding opportunity by the Development Command (DEVCOM) Army Research Laboratory (ARL)
Proposal Title: *Distributed Coalition-based Techniques to promote Collaborative Reconnaissance in Multi-agent Teams faced by Adversaries*

- Conceived and developed innovative, collaborative reconnaissance strategies for the proposed project
- Partnered with UT Austin to equip collaborative agents with learning capabilities
- Played a key role in crafting the proposal through ideation, research, and writing

Scalable, Adaptive, and Resilient Autonomy (SARA) *Spring 2024*
Funding opportunity by the Collaborative Research Alliance (CRA), DEVCOM, ARL
Proposal Title: *Hierarchical Distributed Task Allocation for Effective Teaming in Comms-denied Areas*

- Developed a game-theoretic approach for collaborative task-allocation in comms-denied scenarios
- Led proposal development through ideation, research, and writing

Assistance in Proposal Writing

Multidisciplinary University Research Initiatives (MURI) program *Spring 2023*
Proposal Title: *A Theoretically Validated Holistic Approach to Decentralized Learning-based Game-Theoretic Foundations for Mixed-Teams of Multi-Agent Systems*

- Managed a team of distinguished professors from multiple universities
- Created a cohesive narrative that highlights the contributions of each professor
- Aligned the narrative with the overall requirements of the funding agency

Non-destructive Fault Diagnosis and Predictive Maintenance *Spring 2023*
Proposal Title: *3D volumetric representation from 2D high-speed X-ray images to inform FEA models*

Defense Contract for Autonomous Mobile Robots *Fall 2022*
Proposal Title: *A Framework for Operator Enabled Teaming of High-Speed Mobile Robots*

Defense Contract for Autonomous Mobile Robots *Fall 2022*
Proposal Title: *Enhanced Situational Awareness and Human Augmentation through Robust and Adaptable Teaming with Heterogeneous Autonomous Systems*

Hardware for e-waste recycling *Fall 2022*
Proposal Title: *Automated Component Sorting for Electronics Waste Items*

Software for e-waste recycling *Fall 2022*
Proposal Title: *Informed Policies for Adaptive Fastener Removal*

Department of Science and Technology, Government of India *Spring 2016*
Proposal Title: *Rendezvous of Heterogeneous Robots satisfying distance constraints amidst obstacles.*

PROJECT LEADERSHIP AT CARNEGIE MELLON UNIVERSITY

P8. **Outmaneuvering Adversaries: Multi-Agent Search and Exploration** *2023-26*
Funding Agency: *Non-disclosable*

P7. **Breaking the Launch Once, Use Once Paradigm** *2022-25*
Funding Agency: *Space University Research Initiative (SURI), Air Force Office of Scientific Research*

P6. **A Comprehensive Dynamic Search Framework for Asynchronous Multi-Objective Multi-Agent Planning** *2021-25*
Funding Agency: *National Science Foundation*

P5. **Enhanced Situational Awareness and Human Augmentation through Robust and Adaptable Teaming with Heterogeneous Autonomous Systems** *2021-24*
Funding Agency: *Non-disclosable*

P4. **Modular Field Hospital: Multi-agent ground vehicles for earthmoving and site preparation of a field hospital** *2021-24*
Funding Agency: *Jack Buncher Foundation*

P3. **Deploying Online Classification and Internal Component Segmentation** *2022-23*
Funding Agency: *Non-disclosable*

P2. **Integrated Adaptive Fastener Removal for Disassembly** *2022-23*
Funding Agency: *Non-disclosable*

P1. **Hardware and Software for electronics waste recycling** *2021-22*
Funding Agency: *Non-disclosable*

ACADEMIC SERVICES

Journal Reviewer

- IEEE Transactions on Robotics (T-RO)
- IEEE Transactions on Control Systems Technology (TCST)
- IEEE Control Systems Letters (L-CSS)
- IEEE Robotics and Automation Letters (RA-L)

Conference Reviewer

- IEEE International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE International Conference on Automation Science and Engineering (CASE)
- Springer International Symposium on Distributed Autonomous Robotic Systems (DARS)
- Springer Workshop on the Algorithmic Foundations of Robotics (WAFR)
- IEEE Indian Control Conference (ICC)
- IEEE Industrial Electronics Society (IECON)
- SceinceDirect International Federation of Automatic Control (IFAC) Proceedings

Organization Assistance

- **Block by Block**: Collaborative Strategies for Multi-Agent Robotic Construction
  A full-day workshop at IEEE ICRA 2025 in Atlanta on May 23rd, 2025
- IEEE Indian Control Conference (ICC) 2015

Conference Session Chair

- **Chair**, "Autonomous Systems 3" session, IEEE CASE, 2025.
- **Co-Chair**, "Motion Planning 3" session, IEEE ICRA, 2025.

RESEARCH MENTORING AND LEADERSHIP

Ph.D. Candidates

6.
5. A. Bhat, "*Moving Target Traveling Salesperson Problems with Obstacles in 2D and 3D*" *Spring 2026*
4. C. Noren, "*Allocation, Planning, and Control in Off-road Automated Convoy Operations*" *Spring 2025*
3. H. R. Bagtash, "*Neutrophil Chemotaxis following burn injury in a microfluidic platform*" *Fall 2024*
2. S. K. Singh, "*Implementation of Pursuit-Evasion games amidst various constraints*" *Spring 2022*
1. N. C. Peddamallu, "*Design of a Soft Robotic Hand and applications to grasping*" *Spring 2021*

Master's Thesis Projects

13. K. Karumanchi, "*Generating Gaits for Snake Robots in complex pipe environments*" *2023-2025*
12. Adam Johnson, "*System Design Approaches for Heterogeneous Multi-Agent Systems*" *2023-2024*
11. Burhanuddin Shirose, "*Distributed Optimal Control Framework for Heterogeneous Convoys*" *2022-2024*
10. Joshua Spisak, "*Stochastic Optimization for Autonomous Navigation*" *2021-2023*
9. Akshaya Srinivasan, "*Multi-agent Multi-objective Ergodic Search*" *2021-2023*
8. Prasanna Sriganesh, "*Fast Staircase Detection and Estimation with Multi-View Merging*" *2021-2023*
7. Sam Lapides, "*CV-based Device-Agnostic Fastener Detection for e-waste Recycling*" *2021-2023*
6. Namya Bagree, "*Distributed Optimal Control Framework for High-Speed Convoys*" *2021-2023*
5. O. V. Kulkarni, "*Rendezvous of heterogeneous robots amidst distance constraints*" *2018-2019*
4. Vinayak S. P. and A. Devarakonda, "*Design of an Autonomous Underwater Vehicle*" *2016-2017*
3. V. G. Gupta and R. B. Takumi, "*Sliding mode control of a Quadcopter*" *2015-2016*
2. M. Yellalingh and V. M. Sonawane, "*Optimal union of mobile robots with limited sensing*" *2014-2015*
1. A. More and S. V. V. Raju, "*Rendezvous in multi-agent systems without communication*" *2013-2014*

The MathWorks Inc.

1. Directed a collaborative team of 27 Application Support Engineers *Feb. 2020 - May 2020*

Awards and Honors

Nominated for the university-wide **'Andy Award'** in the "Commitment to Students" category by the students I mentored at the Carnegie Mellon University. *Fall 2024*

TEACHING EXPERIENCE

Authoring and Instructing Course Materials

- Digital Electronics *Summer 2013*
- Engineering Mathematics *Summer 2013*
- Control Systems *Summer 2012*
- Instrumentation Theory *Summer 2012*

Designing Experiments for a Lab Course and Teaching

- Control and Dynamics Lab *Fall 2014 and Fall 2016*
  This lab course focused on designing experiments with mobile robots and inverted pendulums to help graduate students grasp concepts in robot motion planning and control theory.

Teaching Assistant for graduate and undergraduate courses

- Digital Electronics (Lecture and lab classes) *Fall 2017*
- Basic Electrical Engineering *Spring 2016 and Spring 2018*
- Digital Signal Processing Architecture (Lecture and lab classes) *Spring 2015*
- Control Engineering *Spring 2014 and Spring 2017*
- Synthesis of Control Systems *Fall 2013 and Fall 2015*

Awards and Honors

Recognized with the **'Best Teaching Assistant (TA) Award'** for the academic year 2016-17 by the Electrical Engineering Department at IIT Madras.

OUTREACH ACTIVITIES

1. **SURA** (*Summer Undergraduate Research Apprenticeship*) fellows at CMU (Mentor) *Summer 2024*
2. Practice school for **undergraduate research scholars** at CMU (Mentor) *Fall 2022 - Fall 2024*
3. **HURAY** fellows at CMU (Mentor) *Spring and Fall 2023*
   (*Highway to Undergraduate Research in the Academic Year*)
4. Insights into robotics careers for **Pittsburgh high school students** (Speaker and mentor) *Fall 2023*
5. Created science enrichment videos for kindergarteners in Virginia *Fall 2020*
   (*Part of the Girls Launch! series to provide female scientist role models to kindergarteners*)
6. Empowering children in the Lamani slums of Goa with free education through Abhigyaan *2006-2010*

INVITED TALKS

3. **Department of Electrical and Computer Engineering, University of Rochester, NY.**
   "Navigating the Nexus of Conflict and Cooperation: Strategic Planning in Adversarial Multi-Agent Systems" *Dec. 18, 2024*

2. **The MathWorks Inc., Bengaluru, India.** *Fall 2019*
   "Latest Trends in Robotics"

1. **The GATE Academy, Bengaluru, India.** *Spring 2013*
   "Career Paths in Instrumentation Engineering", a live Q&A session for aspiring graduate students

PRESS AND MEDIA

1. Tribune Review: "The Enigma of AI" *Sept. 2024*
2. Next Pittsburgh: "The Robots in the CMU Basement" *Aug. 2022*

SCHOLASTIC ACHIEVEMENTS

1. Secured an All India Rank (AIR) **7** in Graduate Aptitude Test in Engineering (GATE) 2011, Instrumentation Engineering.
   GATE is a prestigious national-level engineering exam for undergraduates in India that attracts over 600,000 participants annually, including about 16,000 from Instrumentation Engineering.
2. Honored with a three-year research fellowship from the Department of Science and Technology (DST), Government of India. October 2016 - July 2019
   Project: Rendezvous of Heterogeneous Robots satisfying distance constraints amidst obstacles.
3. Received personal appreciation from CMU President Dr. Farnam Jahanian for the innovative heterogeneous multi-agent systems demo, showcasing our team's technical thought leadership and spirit.