

VENKATA RAMANA MAKKAPATI

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RESEARCH INTERESTS

Decision and control under uncertainties, Optimization, Multi-agent systems, and Machine learning with applications in *Aerospace systems & Robotics*

EXPERIENCE

- **Engineer, Advanced Research** *Jul 2021 – present*
Honda Aircraft Company, Greensboro, USA
Automatic Flight Control Systems (AFCS) / Advanced Research
Responsibilities:
 - Support research, design, development, integration, and certification of AFCS and advanced systems, including Augmented Steering Assistance System, Autothrottle, Emergency Autoland, and Flight Level Change
 - Development, modification, and validation of aircraft simulation models in support of advanced R&D
 - Support verification and validation testing, including laboratory (hardware-in-the-loop) and flight tests
 - Prepare system development and certification documents (requirements, interface documents, test plans, and reports)

- **Graduate Research Assistant** *Aug 2016 – May 2021*
Georgia Institute of Technology, Atlanta, USA
Projects:
 - Hyper-differential analysis to mitigate uncertainties for control of hypersonic vehicles
 - Safe, resilient, and efficient operation of autonomous aerial and ground vehicles
 - Optimal strategies for uncertain differential games with applications

- **Research Intern** *May 2019 – Aug 2019*
Foresight AI Inc, San Jose, USA
Project: Reinforcement learning based motion planning and driving decision algorithms & software

- **Summer Intern** *May 2013 – Jul 2013*
Mahindra & Mahindra, Chennai, India
Project: Approximation methods for the modal analysis of an exhaust system

- **Summer Intern** *May 2012 – Jul 2012*
CSIR - National Aerospace Laboratories, Bangalore, India
Project: Evaluation of free-to-roll test technique to study unsteady motions of an aircraft

EDUCATION

- **Ph.D., Aerospace Engineering** 2021
Georgia Institute of Technology
Advisor: Prof. Panagiotis Tsiotras
Thesis: *Games of pursuit-evasion with multiple agents and subject to uncertainties*
- **M.S., Computational Science and Engineering** 2021
Georgia Institute of Technology
Focus: *Machine Learning*
- **M.Tech., Aerospace Engineering** 2016
Indian Institute of Technology Kanpur
Advisor: Prof. Mangal Kothari
Thesis: *Pursuit-evasion games of high speed evaders*
- **B.Tech., Aerospace Engineering** 2014
Indian Institute of Technology Madras
Minor: *Industrial Engineering*

CERTIFICATIONS

- **Private Pilot (Airplane Single Engine Land)**
Federal Aviation Administration (FAA)
- **A License**
United States Parachute Association (USPA)
 - 38 jumps in total
- **Advanced Open Water Diver**
Professional Association of Diving Instructors (PADI)
- **Leading Flight Cadet**
4-TN Air Squadron, National Cadet Corps (NCC)
 - B Certificate in the NCC examination

PUBLICATIONS

(Google Scholar h-index: 11)

JOURNAL ARTICLES

- J1. Dependent reachable sets for the constant bearing pursuit strategy
V. R. Makkapati, T. Vechalapu, V. Comandur, and S. Hutchinson
Submitted to IEEE Robotics and Automation Letters (RA-L)

- J2. Desensitization and deception in differential games with asymmetric information
 V. Comandur, T. Vechalapu, **V. R. Makkapati**, P. Tsotras, and S. Hutchinson
Dynamic Games and Applications (DGAA), 2024
- J3. Safe optimal control under uncertainties
V. R. Makkapati, H. Sarabu, V. Comandur, P. Tsotras, and S. Hutchinson
IEEE Robotics and Automation Letters (RA-L), 2020
- J4. Optimal evading strategies and task allocation in multi-player pursuit-evasion problems
V. R. Makkapati and P. Tsotras
Dynamic Games and Applications (DGAA), 2019
- J5. Nested saturation based guidance law for unmanned aerial vehicles
 J. Patrikar, **V. R. Makkapati**, A. Pattanaik, H. Parwana, and M. Kothari
ASME Journal of Dynamic Systems, Measurement, and Control, 2019
- J6. Optimal evading strategies for two-pursuer/one-evader problems
V. R. Makkapati, W. Sun, and P. Tsotras
Journal of Guidance, Control, and Dynamics (JGCD), 2018
- J7. A comprehensive differential game theoretic solution to a game of two cars
 R. Bera, **V. R. Makkapati**, and M. Kothari
Journal of Optimization Theory and Applications (JOTA), 2017
- J8. Pursuit-evasion games of high speed evader
M. V. Ramana and M. Kothari
Journal of Intelligent & Robotics Systems (JINT), 2017
- J9. Pursuit strategy to capture high-speed evaders using multiple pursuers
M. V. Ramana and M. Kothari
Journal of Guidance, Control, and Dynamics (JGCD), 2016

CONFERENCE PROCEEDINGS

- C1. Optimization of camera placement for on-ground situational awareness
 M. Kadiyala and **V. R. Makkapati**
Submitted to AIAA Aviation Forum 2026
- C2. A game-theoretic model for one-on-one air combat
 V. Ramteke, V. Comandur, **V. R. Makkapati**, and M. Kothari
IFAC International Symposium on Automatic Control in Aerospace (ACA), 2022
- C3. Desensitized strategies for pursuit-evasion games with asymmetric information
V. R. Makkapati, V. Comandur, H. Sarabu, P. Tsotras, and Seth Hutchinson
IEEE Conference on Control Technology and Applications (CCTA), 2022
- C4. Reachability-based covariance control for pursuit-evasion in stochastic flow fields
V. R. Makkapati, J. Ridderhof, and P. Tsotras

- C5. Desensitized trajectory optimization for hypersonic vehicles
V. R. Makkapati, J. Ridderhof, P. Tsotras, J. Hart, and B. van Bloemen Waanders
IEEE Aerospace Conference, 2021
- C6. Covariance steering for discrete-time linear-quadratic stochastic dynamic games
V. R. Makkapati, T. Rajpurohit, K. Okamoto, and P. Tsotras
IEEE Conference on Decision and Control (CDC), 2020
- C7. C-DOC: Co-state desensitized optimal control
V. R. Makkapati, D. Maity, M. Dor, and P. Tsotras
American Control Conference (ACC), 2020
- C8. Sequential auto-landing of multiple UAVs using control constrained path following
J. Patrikar, **V. R. Makkapati**, and M. Kothari
AIAA Guidance Navigation and Control Conference (GNC), SciTech, 2019
- C9. Trajectory desensitization in optimal control problems
V. R. Makkapati, M. Dor, and P. Tsotras
IEEE Conference on Decision and Control (CDC), 2018
- C10. Pursuit-evasion problem involving two pursuers and one evader
V. R. Makkapati, W. Sun, and P. Tsotras
AIAA Guidance, Navigation, and Control Conference (GNC), SciTech, 2018
- C11. Motion planning for a fixed-wing UAV in urban environments
M. V. Ramana, S. A. Varma, and M. Kothari
Advances in Control and Optimization of Dynamical Systems (ACODS), 2016
- C12. A cooperative pursuit strategy for a high speed evader
M. V. Ramana and M. Kothari
AIAA Guidance Navigation and Control Conference (GNC), SciTech, 2016
- C13. A cooperative pursuit-evasion game of a high speed evader
M. V. Ramana and M. Kothari
IEEE Conference on Decision and Control (CDC), 2015

WORKSHOP PAPERS

- W1. Apollonius allocation algorithm for heterogeneous pursuers to capture multiple evaders
V. R. Makkapati and P. Tsotras
Workshop on Heterogeneous Multi-Robot Task Allocation and Planning, Robotics: Science and Systems (RSS), 2020

INVITED TALKS

- **Guest Lecture, Mechanical Engineering Society, NIT Warangal** *Mar 2025*
Deception and risk-sensitive behaviors in games with asymmetric information - A pursuit-evasion case study
- **Workshop on Decision and Control: Optimal Planning, ML & Games, IIT Kanpur** *Feb 2021*
Introductory lectures on *optimal control, differential games, and pursuit-evasion games*
- **IRIM-Robograds Virtual Student Seminar on Robot Planning** *Oct 2020*
Desensitization for safe planning under parametric uncertainties
- **International Symposium on Dynamic Games and Applications** *Jul 2018*
Optimal strategies and task allocation in multi-pursuer single-evader problems

TEACHING

- **Graduate Teaching Assistant, Georgia Tech**
 - AE 6511: Optimal guidance & control *Spring 2019*
 - AE 6530: Multi-variable linear systems and control *Fall 2018*
- **Teaching Assistant, IIT Kanpur**
 - AE647A: Flight dynamics *Fall 2015*
 - AE648A: Flight stability & control *Spring 2016*

MENTORING

SENIOR CAPSTONE PROJECTS

- **Collision detection for on-ground taxi operations of Hondajet: Camera position optimization and Algorithms (Fac. Adv.: Prof. Brian Ritchie)** *2025 - 26*
Department of Mechanical and Aerospace Engineering, Ohio State University
- **Augmented reality app for aircraft pre/post-flight check (Fac. Adv.: Alan Gilbert)** *Fall 2025*
Department of Electrical and Computer Engineering, Ohio State University

AWARDS

- **Spirit of Honda Aircraft Award** *Apr 2024*
Nominated by Patrick Porter, Vice President, Flight Test & Flight Operations, Hondajet

LONG DISTANCE RUNNING

- **Bronze Medal** *Apr 2014*
Dean's Trophy Road Race, IIT Madras
- **Team Record – Longest Distance (87 km) on a Treadmill** *Mar 2014*
Treadathon, Chennai

SERVICE

INDUSTRY

- **Founder & President** *Apr 2024 - Present*
Aero Research Club, Honda Aircraft Company

ACADEMIA

- **Graduate Representative** *Jan 2020 - May 2021*
School of Aerospace Engineering Student Advisory Council (SAESAC), Georgia Tech
- **Senator (Aerospace Engineering)** *Jan 2020 – Aug 2020*
Graduate Student Government Association (Grad SGA), Georgia Tech

EVENT ORGANIZATION

- **Lectures Series on Learning and Control** *Nov 2020 – Jan 2021*
IIT Kanpur (Virtual event)

REVIEWER

Automatica
IEEE Transactions on Automatic Control
IEEE Transactions on Robotics
IEEE Robotics and Automation Letters
Dynamic Games and Applications
Journal of Intelligent & Robotics Systems
Journal of Aerospace Information Systems
Journal of Air Transportation
Journal of the Franklin Institute
Advances in Space Research
Frontiers in Control Engineering
Robotics and Autonomous Systems
Defense Technology
IEEE International Conference on Robotics and Automation
IEEE Conference on Decision and Control
American Control Conference
AIAA SciTech Forum
IFAC International Symposium on Automatic Control in Aerospace
Advances in Control and Optimization of Dynamical Systems