

VENKATA RAMANA MAKKAPATI

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🖥 <https://vrmakapati.github.io>

EDUCATION

- **Ph.D., Aerospace Engineering** *(Expected) 2021*
Georgia Institute of Technology
Advisor: Prof. Panagiotis Tsiotras
Focus: Differential games, Optimal control under uncertainties, Cognitive hierarchy theory
- **M.S., Computational Science and Engineering** *(Expected) 2021*
Georgia Institute of Technology
Focus: Machine Learning
- **M.Tech., Aerospace Engineering** *2016*
Indian Institute of Technology Kanpur
Advisor: Prof. Mangal Kothari
Focus: Flight dynamics and control
- **B.Tech., Aerospace Engineering** *2014*
Indian Institute of Technology Madras
Minor: Industrial Engineering

EXPERIENCE

- **Graduate Research Assistant** *Aug 2016 – present*
Mentor: Prof. Panagiotis Tsiotras
Georgia Institute of Technology
 - Sensitivity-based analysis to mitigate for control design 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*
Mentor: Dr. Matheen Siddiqui
Foresight AI Inc, San Jose, CA
 - POMDPs and RL based motion planning and driving decisions algorithms & software
- **Summer Intern** *May 2013 – July 2013*
Vehicle Integration Department
Mahindra & Mahindra, Chennai, India
 - Approximation methods for the modal analysis of an exhaust system

- **Summer Intern** *May 2012 – July 2012*
Flight Mechanics and Control Division
CSIR - National Aerospace Laboratories, Bangalore, India
 - Evaluation of free-to-roll test technique to study unsteady motions of an aircraft

CERTIFICATIONS

- **Private Pilot (Airplane Single Engine Land)** *Nov 2020*
Federal Aviation Administration (FAA)
- **Leading Flight Cadet** *2011*
4-TN Air Squadron, National Cadet Corps (NCC)
 - B Certificate in the NCC examination

PUBLICATIONS

Peer-reviewed

JOURNAL ARTICLES

- J1. Safe Optimal Control under Uncertainties
V. R. Makkapati, H. Sarabu, V. Comandur, P. Tsiotras, and S. Hutchinson
IEEE Robotics and Automation Letters (RA-L), 2020
- J2. Optimal Evading Strategies and Task Allocation in Multi-Player Pursuit-Evasion Problems
V. R. Makkapati and P. Tsiotras
Dynamic Games and Applications (DGAA), 2019
- J3. 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
- J4. Optimal Evading Strategies for Two-Pursuer/One-Evader Problems
V. R. Makkapati, W. Sun, and P. Tsiotras
Journal of Guidance, Control, and Dynamics (JGCD), 2018
- J5. 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
- J6. Pursuit-Evasion Games of High Speed Evader
M. V. Ramana and M. Kothari
Journal of Intelligent & Robotics Systems (JINT), 2017
- J7. 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. Reachability-based covariance control for pursuit-evasion in stochastic flow fields
V. R. Makkapati, J. Ridderhof, and P. Tsiotras
2022 AIAA Scitech Forum (under review)
- C2. Desensitized Trajectory Optimization for Hypersonic Vehicles
V. R. Makkapati, V. Comandur, H. Sarabu, P. Tsiotras, and S. Hutchinson
2021 IEEE Conference on Decision and Control (under review)
- C3. Desensitized Trajectory Optimization for Hypersonic Vehicles
V. R. Makkapati, J. Ridderhof, P. Tsiotras, J. Hart, and B. van Bloemen Waanders
IEEE Aerospace Conference, 2021
- C4. Covariance Steering for Discrete-Time Linear-Quadratic Stochastic Dynamic Games
V. R. Makkapati, T. Rajpurohit, K. Okamoto, and P. Tsiotras
IEEE Conference on Decision and Control (CDC), 2020
- C5. C-DOC: Co-state Desensitized Optimal Control
V. R. Makkapati, D. Maity, M. Dor, and P. Tsiotras
American Control Conference (ACC), 2020
- C6. 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
- C7. Trajectory Desensitization in Optimal Control Problems
V. R. Makkapati, M. Dor, and P. Tsiotras
IEEE Conference on Decision and Control (CDC), 2018
- C8. Pursuit-Evasion Problem Involving Two Pursuers and One Evader
V. R. Makkapati, W. Sun, and P. Tsiotras
AIAA Guidance, Navigation, and Control Conference (GNC), SciTech, 2018
- C9. 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
- C10. A Cooperative Pursuit Strategy for a High Speed Evader
M. V. Ramana and M. Kothari
AIAA Guidance Navigation and Control Conference (GNC), SciTech, 2016
- C11. 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. Tsiotras

Workshop on Heterogeneous Multi-Robot Task Allocation and Planning, Robotics: Science and Systems (RSS), 2020

INVITED TALKS

- **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-Robograde Virtual Student Seminar on Robot Planning** Oct 2020
Desensitization for Safe Planning under Parametric Uncertainties
- **International Symposium on Dynamic Games and Applications** July 2018
Optimal Strategies and Task Allocation in Multi-Pursuer Single-Evader Problems

TEACHING

- **Graduate Teaching Assistant**, Georgia Institute of Technology
 - *AE 6511: Optimal Guidance & Control* Spring 2019
 - *AE 6530: Multi-Variable Linear Systems and Control* Fall 2018
- **Teaching Assistant**, Indian Institute of Technology Kanpur
 - *AE647A: Flight Dynamics* Fall 2015
 - *AE648A: Flight Stability & Control* Spring 2016

AWARDS

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

INSTITUTE SERVICE

- **Graduate Representative** Jan 2020 - present
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**
Virtual event

Nov 2020 – Jan 2021

REVIEWER

- Automatica
- IEEE Transactions on Automatic Control
- IEEE Transactions on Robotics
- IEEE Robotics and Automation Letters
- Dynamic Games and Applications
- Journal of Aerospace Information Systems
- Journal of Air Transportation
- IEEE International Conference on Robotics and Automation
- IEEE Conference on Decision and Control
- American Control Conference
- AIAA SciTech Forum
- Advances in Control and Optimization of Dynamical Systems

OTHER

- **Consultant**
Office of the Principal Scientific Adviser to Government of India

June 2019 – present