

# VENKATA RAMANA MAKKAPATI

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🌐 <https://vrmakapati.github.io>

## EDUCATION

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- **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

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- **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

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- **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

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*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. Desensitized Trajectory Optimization for Hypersonic Vehicles  
**V. R. Makkapati**, J. Ridderhof, P. Tsiotras, J. Hart, and B. van Bloemen Waanders  
*IEEE Aerospace Conference*, 2021
- C2. 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
- C3. Desensitized Trajectory Optimization for Hypersonic Vehicles  
**V. R. Makkapati**, D. Maity, M. Dor, and P. Tsiotras  
*American Control Conference (ACC)*, 2020
- C4. 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
- C5. Trajectory Desensitization in Optimal Control Problems  
**V. R. Makkapati**, M. Dor, and P. Tsiotras  
*IEEE Conference on Decision and Control (CDC)*, 2018
- C6. 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
- C7. Desensitized Trajectory Optimization for Hypersonic Vehicles  
**M. V. Ramana**, S. A. Varma, and M. Kothari  
*Advances in Control and Optimization of Dynamical Systems (ACODS)*, 2016
- C8. A Cooperative Pursuit Strategy for a High Speed Evader  
**M. V. Ramana** and M. Kothari  
*AIAA Guidance, Navigation, and Control Conference (GNC), SciTech*, 2016
- C9. 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

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- **Desensitization for Safe Planning under Parametric Uncertainties**  
*IRIM-Robograds Virtual Student Seminar on Robot Planning*

Oct 2020

- **Optimal Strategies and Task Allocation in Multi-Pursuer Single-Evader Problems** *July 2018*  
*International Symposium on Dynamic Games and Applications*

## TEACHING

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- **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

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### 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

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### 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** *Nov 2020 – Jan 2021*  
*Virtual event*

### 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*