**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, NC*
* **Graduate Research Assistant** *Aug 2016 – May 2021*

*Georgia Institute of Technology, Atlanta, GA*

* 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  
  Foresight AI Inc, San Jose, CA*
* POMDPs and RL based motion planning and driving decisions algorithms & software
* **Summer Intern** *May 2013 – Jul 2013*

*Mahindra & Mahindra, Chennai, India*

* Approximation methods for the modal analysis of an exhaust system
* **Summer Intern** *May 2012 – Jul 2012   
  CSIR - National Aerospace Laboratories, Bangalore, India*
* 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)** *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**

1. 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

1. Optimal evading strategies and task allocation in multi-player pursuit-evasion problems

**V. R. Makkapati** and P. Tsiotras

*Dynamic Games and Applications (DGAA)*, 2019

1. 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

1. 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

1. 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

1. Pursuit-evasion games of high speed evader

**M. V. Ramana** and M. Kothari

*Journal of Intelligent & Robotics Systems (JINT)*, 2017

1. 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**

1. Desensitized strategies for pursuit-evasion games with asymmetric information

**V. R. Makkapati**, V. Comandur, H. Sarabu, P. Tsiotras, and S. Hutchinson

*2022 IEEE Conference on Control Technology and Applications* (under review)

1. Reachability-based covariance control for pursuit-evasion in stochastic flow fields

**V. R. Makkapati,** J. Ridderhof, and P. Tsiotras

*AIAA SciTech Forum*, 2022

1. Desensitized trajectory optimization for hypersonic vehicles

**V. R. Makkapati,** J. Ridderhof, P. Tsiotras, J. Hart, and B. van Bloemen Waanders

*IEEE Aerospace Conference*,2021

1. 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

1. C-DOC: Co-state desensitized optimal control

**V. R. Makkapati**, D. Maity, M. Dor, and P. Tsiotras

*American Control Conference (ACC)*,2020

1. 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

1. Trajectory desensitization in optimal control problems

**V. R. Makkapati**, M. Dor, and P. Tsiotras

*IEEE Conference on Decision and Control (CDC)*,2018

1. 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

1. 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

1. A cooperative pursuit strategy for a high speed evader

**M. V. Ramana** and M. Kothari

*AIAA Guidance Navigation and Control Conference (GNC), SciTech*,2016

1. 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**

1. 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-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 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** *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** *Jun 2019 – present*

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