GAURAV MISRA

Contact Information	58 Riverview Avenue Piscataway, NJ 08854, USA	Phone: 575-495-0823 gaurav.misra@rutgers.edu

Research Interests Space Systems, Robotics, Nonlinear Control, Nonlinear Optimization

Technical Skills Model Predictive Control- Linear, Nonlinear, Stochastic; Optimization- Convex, Polynomial, Stochastic; Optimal Control; Flight Dynamics and Control; Robot Motion Planning

Computer Skills Matlab, Simulink, CVX, YALMIP, Python, LaTeX, modeFRONTIER

Education

Rutgers, The State University of New Jersey, New Brunswick, NJ, USA

Doctor of Philosophy, Mechanical and Aerospace Engineering, *Expected* December 2018

- Thesis Topic: *Tractable Convex Optimization based Planning and Control Methods for Aerospace Applications.*
- Advisor: Prof. Xiaoli Bai

New Mexico State University, Las Cruces, NM, USA

Master of Science, Aerospace Engineering, May 2015

- Thesis Topic: *Dynamics and control of rigid body spacecraft near small solar system bodies*
- Advisor: Prof. Amit Sanyal

Birla Institute of Technology and Science, Pilani, India

Bachelor of Engineering (Honors), Electronics and Instrumentation, July 2013

Research Experience

Graduate Research Assistant Aug 2016 to Present
Dept. of Mechanical and Aerospace Engineering, Rutgers University

- Research on real-time trajectory planning, control, and optimization for aerial and space robots in uncertain environments.

Graduate Research Assistant Jan 2014 to May 2015
Dept. of Mechanical and Aerospace Engineering, New Mexico State University

- Research on coupled orbit-attitude dynamics of spacecraft near small bodies, and its implications on spacecraft proximity operations including hovering, and landing trajectories.

Research Intern Jan 2013 to June 2013
IMCCE, Observatoire de Paris, France
Topic: Solar sail dynamics near asteroids with applications to asteroid hazard mitigation
Supervisor: Florent Deleflie

Bachelor Thesis Student July 2012 to Dec 2012
French Space Agency (CNES), Toulouse, France
Topic : Asteroid hazard mitigation via Yarkovsky effect modification
Supervisor: Jean-Yves Prado

Summer Research Intern May 2011 to July 2011
German Aerospace Center (DLR), Bremen, Germany
Topic : Target selection for human missions to Near Earth Asteroids
Supervisor: Dominik Quantius

Journal Publications

1. **Misra, G.**, Bai, X. "Task-Constrained Trajectory Planning of Space-Robotic Systems using Convex Optimization." *Journal of Guidance, Control, and Dynamics*, Vol. 40, No. 11 (2017), pp. 2857-2870.
2. **Misra, G.**, Bai, X. "Optimal Path Planning of Free-flying Space Manipulators using Sequential Convex Programming", *Journal of Guidance, Control, and Dynamics*, Vol. 40, No. 11 (2017), pp. 3026-3033..
3. **Misra, G.**, Izadi, M., Sanyal, A. K., and Scheeres, D. J. "Coupled orbit-attitude dynamics and relative state estimation of spacecraft near small bodies." *Advances in Space Research*, Vol. 57, No. 8 (2016), pp 1747-1761.

Conference proceedings

1. **Misra, G.**, Bai, X. "Autonomous post-capture stabilization of space debris using sequential convex optimization", *Submitted to the American Control Conference, 2018.*
2. **Misra, G.**, Bai, X. "Stochastic Model Predictive Control for Gust Alleviation during Aircraft Carrier Landing", *Submitted to the American Control Conference, 2018.*
3. **Misra, G.**, Peng, H, and Bai, X. "Halo Orbit Station-keeping using Nonlinear MPC and Polynomial Optimization", *28th AIAA/AAS Spaceflight Mechanics Meeting, Kissimmee, FL, 2018.*
4. **Vishawanathan S. P.**, Sanyal, A. K., and Misra, G. "Controllability analysis of spacecraft with only attitude actuation near small solar system bodies", *10th IFAC Symposium on Nonlinear Control Systems (NOLCOS)*, Monterey, CA, 2016.
5. **Misra, G.**, Samiei, E., and Sanyal, A. K. "Asteroid landing guidance design in the framework of coupled orbit-attitude spacecraft dynamics." *25th AAS/AIAA Spaceflight Mechanics Meeting*, Williamsburg, VA, 2015.
6. **Misra, G.**, and Sanyal, A. K. "Analysis of orbit-attitude coupling of spacecraft near small solar system bodies." *AIAA Guidance, Navigation and Control Conference*, Kissimmee, FL, 2015.
7. **Sanyal, A. K.**, Izadi, M., Misra, G., Samiei, E., and Scheeres, D. J. "Estimation of dynamics of space objects from visual feedback during proximity operations." *AIAA Astrodynamics Specialist Conference*, San Diego, CA, 2014.

Conference Presentations (without proceedings)

1. **Quantius, D.**, Misra, G., Löscher, M., and Maiwald, V. "List of potential target Near Earth Objects (NEOs) for human missions." *64th International Astronautical Congress*, Beijing, China 2013.
2. **Misra, G.** "Asteroid hazard mitigation via Yarkovsky effect reduction." *IAA Planetary Defense Conference*, Flagstaff, Arizona 2013.

Reviewer Activities

- IEEE Transactions on Aerospace and Electronic Systems
- Celestial Mechanics and Dynamical Astronomy

Workshops/ Summer Schools

- First American Model Predictive Control Summer School, UW Madison, Wisconsin, 2017.
- Sokendai Asian Winter School, Japanese Aerospace Exploration Agency (JAXA), 2015.

References

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CNES Heliophysics Programme Manager
Division of Space Science and Micro-gravity
French Space Agency (CNES), Toulouse, France
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