

GAURAV MISRA

CONTACT 58 Riverview Avenue
INFORMATION Piscataway, NJ 08854, USA

Phone: 575-495-0823
gaurav.misra@rutgers.edu
misraga.github.io

TECHNICAL • Nonlinear and robust optimization
INTERESTS • Dynamics and control of aerospace vehicles
 • Autonomous mobile robotics
 • Nonlinear, geometric, and optimal control
 • Machine learning

COMPUTER MATLAB, Simulink, Python, CVX, YALMIP, \LaTeX , modeFRONTIER, Satellite Toolkit (STK)
SKILLS

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

Doctor of Philosophy, Mechanical and Aerospace Engineering, *Expected* October 2019

- Thesis Topic: *Tractable Convex Optimization based Planning and Control Methods for Space-robotic Applications.*
- Advisor: Prof. Xiaoli Bai
- GPA: 3.78/4

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
- GPA: 3.83/4

Birla Institute of Technology and Science, Pilani, India

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

RESEARCH **Graduate Research Assistant**

Aug 2016 to Present

EXPERIENCE 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. "Output-feedback Stochastic Model Predictive Control for Glideslope Control during Aircraft Carrier Landing." *Journal of Guidance, Control, and Dynamics*, under review.
2. Wang, L., **Misra, G.**, and Bai, X. "A K Nearest Neighborhood Based Wind Estimation for Rotary-Wing VTOL UAVs." *Journal of Intelligent and Robotic Systems*, under review.
3. **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.
4. **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..
5. **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. "Nonlinear Disturbance Observer based Control for Polynomial Systems with Mismatched Uncertainties using Sum-of-Squares Programming", *IEEE American Control Conference (ACC), Philadelphia, 2019. under review*
2. Gao, T., **Misra, G.**, and Bai, X. "Modeling and Simulation of UAV Carrier Landings", *AIAA Modeling and Simulation Technologies Conference, San Diego, 2019. Accepted*
3. **Misra, G.**, Bai, X. "Stochastic Model Predictive Control for Gust Alleviation during Aircraft Carrier Landing", *IEEE American Control Conference (ACC), Milwaukee, 2018.*
4. **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.*
5. **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.
6. **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.
7. **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.
8. **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	<ul style="list-style-type: none"> • IEEE American Control Conference (ACC) • AIAA Guidance, Navigation, and Control Conference (GNC) • IEEE Conference on Advanced Intelligent Mechatronics (AIM) • IEEE Transactions on Aerospace and Electronic Systems • Celestial Mechanics and Dynamical Astronomy
AWARDS/ HONORS	<ul style="list-style-type: none"> • American Control Conference Travel Award, 2018. • Rutgers School of Graduate Studies (SGS) Conference Travel Award, 2017. • BITS Alumni Association (BITSAA) Conference Travel Award, 2010. • NASA/NSS Space Settlement Award, 2008.
WORKSHOPS/ SUMMER SCHOOLS	<ul style="list-style-type: none"> • First American Model Predictive Control Summer School, UW Madison, Wisconsin, 2017. • Sokendai Asian Winter School, Japanese Aerospace Exploration Agency (JAXA), 2015.
COURSEWORK	<ul style="list-style-type: none"> • Robotics, Convex Optimization, Advanced Control, Machine Learning, Stochastic Programming, Dynamic Programming, Calculus of Variations, Advanced Dynamics, Satellite Design, Nonlinear and Optimal Control
REFERENCES	<p>Xiaoli Bai Assistant Professor Mechanical and Aerospace Engineering Rutgers University, United States E-mail: xiaoli.bai@rutgers.edu Phone: 848-445-4760</p> <p>Amit K. Sanyal Associate Professor Mechanical and Aerospace Engineering Syracuse University, United States E-mail: aksanyal@syr.edu</p> <p>Nadipuram Prasad Associate Professor Electrical and Computer Engineering New Mexico State University, United States E-mail: naprasad@nmsu.edu</p>