PANAGIOTIS TSIOTRAS

School Aerospace Engineering
Institute for Robotics and Intelligent Machines
Georgia Institute of Technology
Atlanta, GA 30332-0150

http://dcsl.gatech.edu

https://scholar.google.com/citations?user=qmVayjgAAAAJ&hl=en

h-index: 64

I. Earned Degrees

Ph.D.	Aeronautics and Astronautics, Purdue University, 1993
M.S.	Mathematics, Purdue University, 1992
M.S.	Aerospace Engineering, Virginia Tech, 1987
Eng.Dipl.	Mechanical Engineering, National Technical Univ., Athens, Greece, 1986 (top 1%)

II. Professional Experience

Georgia Institute of Technology, Atlanta, Georgia
Institute for Robotics and Intelligent Machines (IRIM)

Associate Director, 2016–

Coordinated all campus activities in the area of autonomy. Administered the IRIM Seed Grants program, established and administered the IRIM Visiting Faculty and Resident Faculty Fellows programs, organized several campus visits by companies, served as representative/liaison of GaTech in Sandia's Academic Partnership in the area of autonomy, co-lead and promoted the Autonomous/Connected Living Lab initiative on campus, and worked closely with executive IRIM director to strengthen the ties between IRIM and GTRI and re-structure and re-launch the IRIM industrial affiliates program.

Georgia Institute of Technology, Atlanta, Georgia
School of Interactive Computing, College of Computing

Adjunct Professor, 2020–

In recognition for mentoring and advising students in Computer Science. Research in the area of artificial intelligence, robotics, and autonomous systems.

Georgia Institute of Technology, Atlanta, Georgia
School of Electrical and Computer Engineering

Adjunct Professor, 2019–

In recognition for mentoring and advising students in Electrical and Computer Engineering. Research in the area of control theory and autonomous systems.

Georgia Institute of Technology, Atlanta, Georgia
School of Aerospace Engineering

David and Andrew Lewis Endowed Chair Professor, 2019–

In recognition for accomplishments and contribution to the School of Aerospace Engineering and the aerospace profession. Research in the area of autonomous systems and in the intersection of control theory and AI.

College of Engineering Dean's Professor, 2012–2018

In recognition for accomplishments and contributions to the School of Aerospace Engineering and the aerospace profession. Research in the area of autonomous systems and in the intersection of control theory and AI.

Professor, 2005–2012

Research in the areas of wavelet optimization, multiple-rendezvous servicing of satellite constellation, autonomous aerial and ground vehicle guidance, experimental vision-based automated rendezvous and docking in space. Main funding sources include NSF, ARO, AFOSR, NASA, NRO, AFRL, DARPA, ARL, Ford Motor Co. Principal investigator of MURI award "Neuro-Inspired Adaptive Perception for Agile Mobility of Autonomous Ground Vehicles," from ARO.

Associate Professor, 1998–2005

Research in the areas of active magnetic bearing control design, high-speed vehicles, spacecraft control, friction modeling. Main funding sources include NSF, NASA, ARO, AFOSR, AFRL and private industry. Granted tenure in March 2001.

Director, Dynamics and Control Systems Laboratory, 1998–

Supervised research and educational programs both at graduate and undergraduate level in the area of Dynamics and Controls. Research in the area of control of nonlinear systems emphasizing mechanical and aerospace applications.

Massachusetts Institute of Technology, Cambridge, Massachusetts
Laboratory for Information and Decision Systems

Visiting Scholar, 2014–2015

Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California
Mobility and Robotic Systems Section, Autonomous Systems Division

Summer Visiting Faculty Fellow, June 2014, 2016, 2017, 2018

Ecole Nationale Superieure des Mines de Paris, Paris, France
Centre Automatique et Systémes

Visiting Research Scholar, May 2003–July 2003

Conducted research in the use of wavelets for control applications; in collaboration with Dr. F. Chaplais.

INRIA, Rocquencourt, France
Control of Complex Systems Group (SOSSO Projet)

Visiting Research Scholar, September 2002–May 2003

Conducted research in modeling and short-term control of the cardiovascular system; in collaboration with Dr. M. Sorine.

Visiting Research Scholar, November–December 2000

Conducted research in the area of time-delayed linear, parameter-varying systems; in collaboration with Dr. P.-A. Bliman.

School of Engineering and Applied Science, University of Virginia, Charlottesville, Virginia
Department of Mechanical and Aerospace Engineering

Assistant Professor, 1994–1998

Research in the areas of spacecraft control, nonholonomic motion planning, active magnetic bearing control, inverse optimality and passivity-based control for aerospace applications. Main funding sources included NSF, NASA and private industry. Received the NSF Faculty Early Career Development (CAREER) Award.

Director, Dynamics and Control Systems Laboratory, 1996–1998

Developed laboratory through NSF CAREER Award. Supervised research and educational programs both at graduate and undergraduate level in the area of Dynamics and Controls.

Purdue University, West Lafayette, Indiana
School of Aeronautics and Astronautics

Post-Doctoral Fellow, 1993–1994

Worked on developing robust and optimal control for rotating bodies. Performance requirements were measured in the $\mathcal{L}_2$ sense (with Dr. M. Corless and Dr. M. Rotea).

Research Assistant, 1989–1993

Developed analytic solutions for the equations of spinning rigid bodies for the case of constant and time-varying, body-fixed torques. Developed new kinematic formulations for the attitude kinematics and new control laws for underactuated rotating vehicles (with Dr. J. Longuski).

Teaching Assistant, 1989–1991

Assisted in teaching courses on *Analytical Dynamics* and *Vibrations*.

Virginia Polytechnic Institute and State University, Blacksburg, Virginia
Interdisciplinary Center of Applied Mathematics

Research Associate, 1989

Worked on closed-loop feedback laws for on-board trajectory guidance for the Advanced Launch System (ALS) using singular perturbations (with Dr. Eugene Cliff).

Department of Aerospace and Ocean Engineering

Research Assistant, 1986–1987

Worked on optimal control laws for trajectory optimization for aerospace vehicles. New switching structures were found for the well-studied Goddard problem of a rocket in vertical flight. A new method for determining the optimal switching structure for trajectories with singular arcs was proposed (with Dr. H. Kelley).

Teaching Assistant, 1986–1987

Assisted in courses on *Astromechanics* and *Stability and Control of Aerospace Vehicles*.

Hellenic Air Force, General Command, Athens, Greece

Computer Programmer, 1987–1988 (during military service)

III. Teaching

A. Individual Student Guidance

Current Post-Doctoral Students

Mohammad Afshari, December 2021–
Research in the area of stochastic games

Hemanth Manjunatha, February 2021–
Research in the area of RL for autonomous driving

Fengjiao Liu, September 2021–
Research in the area of stochastic optimal control (AE Post-doctoral Fellow)

Past Post-Doctoral Students

Ali Pakniyat August 2019– August 2021
Research in the area of stochastic optimal control
Currently, Assistant Professor, Department of Mechanical Engineering, University of Alabama

Katherine Skinner, August 2019–August 2020
Research in the area of vision-based space relative navigation
Currently, Assistant Professor, Department of Mechanical Engineering, University of Michigan

Dipankar Maity, August 2018–August 2020
Research in the area of bounded-rational stochastic games, communication-constrained control systems. Currently, Assistant Professor, Department of Electrical Engineering, University of North Carolina, Charlotte

Georgios Kotsalis, August 2015–June 2016
Research in the area multi-agent differential games with incomplete and asymmetric information
Currently, Post-doctoral fellow, Department of Mathematics, Georgia Tech

Michael Kontitsis, August 2013–February 2016
Research in the area of perception-based guidance
Currently, Research Engineer, ATK/Orbital corporation

Efstathios Bakolas, January 2012–August 2012
Research in the area of path-planning of autonomous vehicles subject to kinodynamic constraints
Currently, AssociateProfessor, Department of Aerospace Engineering,
University of Texas, Austin, TX.

Raghvendra Cowlagi, May 2011–November 2011 (jointly with MIT Aero-Astro department)
Research in the area of control and perception for wheeled vehicles under abnormal driving conditions. Currently Associate Professor, Department of Mechanical Engineering Worcester Polytechnic Institute, Worcester, MA

Annalisa Scacchioli, March 2008–February 2010
Research in the area of ground vehicle control under abnormal driving conditions
Currently, visiting Assistant Professor, Mech. Engineering, New York Polytechnic, New York

Dongwon Jung, December 2007–April 2009
Research in the area of emergency trajectory generation for aircraft
Currently, Assistant Professor at the Korea Aerospace University, Goyang, South Korea

Efstathios Velenis, May 2006–December 2007

Research in the area of analysis and control of high-speed land vehicles
Currently Lecturer, Department of Automotive Engineering, Cranfield University, Cranfield, UK

Alexander Lanzon, January 2001–September 2001
Research in the area of robust control of Linear, Parameter Varying (LPV) systems
Currently Professor, School of Electrical and Electronic Engineering, Univ. of Manchester, UK

Seddik Djouadi, January 1999–January 2000
Research in the area of robust control of Linear, Parameter Varying (LPV) systems
Currently Professor, Dept. of Electrical Eng. and Comp. Science, Univ. of Tennessee

Current Graduate Students

1. Mehregan Dor, Doctor of Philosophy (advised since August 2016), expected graduation date May 2024
2. Dongliang Zheng, Doctor of Philosophy (advised since August 2018), expected graduation date December 2023
3. Yue Guan, Doctor of Philosophy (advised since August 2019), expected graduation date August 2024
4. Matthew King-Smith (Robotics program), Doctor of Philosophy (advised since August 2017), expected graduation date August 2023
5. Nolan Wagener (Robotics program), Doctor of Philosophy, (co-advised since August 2019), primary advisor: Byron Boots, expected graduation date December 2023
6. Travis Driver (Robotics program), Doctor of Philosophy, (advised since August 2019), expected graduation date May 2024
7. Jacob Knaub (Robotics program), Doctor of Philosophy, (advised since August 2019), expected graduation date May 2024
8. Ji Yin (Robotics program), Doctor of Philosophy, (advised since August 2020), expected graduation date May 2024
9. Mahdi Ghanei (Robotics program), Doctor of Philosophy, (advised since August 2020), expected graduation date May 2024
10. Joshua Pilipovksy, Doctor of Philosophy, (advised since January 2020), expected graduation date May 2024
11. Lorenzo Ticozzi (Robotics program), Doctor of Philosophy, (advised since August 2021), expected graduation date May 2026
12. Zhiyuan Zhang, Doctor of Philosophy, (advised since August 2022), expected graduation date May 2025
13. Iason Velentzas (Robotics program), Doctor of Philosophy, (advised since August 2022), expected graduation date May 2028
14. Evangelos Psomiadis, Doctor of Philosophy, (advised since August 2022), expected graduation date May 2028
15. George Rapakoulias, Doctor of Philosophy, (advised since August 2022), expected graduation date May 2028
16. Nichlolas Brittain, Master of Science (ECE) (advised since August 2022), expected graduation date May 2024
17. Longxu Pan, Master of Science in Robotics (advised since August 2022), expected graduation date May 2023

Previous Graduate Students - Doctoral

1. Jihao Luo (1999), Thesis Title: "Control on Underactuated and Nonholonomic Systems," Currently with Garmin Electronics, Kansas City, MO
2. Jianrong Zhang (co-advisor with C. Knospe) (2000), Thesis Title: "Analysis of Systems with State Delay: A Comparison System Framework," First position after graduation: Lucent Technologies, Boston, MA. Current position unknown.
3. Haijun Shen (2003), Thesis Title: "Optimal Scheduling for Satellite Refueling in Circular Orbits," Currently with Analytical Mechanics and Associates, Inc., Hampton, VA
4. Xiping Zhang (2003), Thesis Title: "Parameter-Dependent Lyapunov Functions and Stability Analysis of Linear Parameter-Dependent Dynamical Systems," First position after graduation: Research Engineer, ASDL, Georgia Institute of Technology. Current position unknown.
5. Hyungjoo Yoon (2004) Thesis Title: "Spacecraft Attitude and Power Control Using Variable Speed CMGs," Currently at the Korea Aerospace Research Institute (KARI), Daejeon, South Korea
6. Brian Wilson (co-advisor with B. Heck) (2004), Thesis Title: "Control Design for Low-Loss Active Magnetic Bearings: Theory and Implementation," Currently with Draper Laboratory, Cambridge, MA.
7. Efstathios Velenis (2006), Thesis Title: "Analysis and Control of High-Speed Autonomous Vehicles," Currently Lecturer, Department of Automotive Engineering, Cranfield University, Cranfield, UK.
8. Dongwon Jung (2007), Thesis Title: "Hierarchical Path Control of a Small Fixed-wing UAV: Theory and Experimental Validation," First position after graduation: Korea Aerospace Research Institute (KARI), Daejeon Korea. Currently Assistant Professor, Aerospace Engineering, Korea Aerospace University.
9. Sachin Jain (2008), Thesis Title: "Multiresolution Strategies for the Numerical Solution of Optimal Control Problems," Currently with Aurora Flight Sciences, Cambridge, MA.
10. Atri Dutta (2009), Thesis Title: "Optimal Cooperative and Non-Cooperative Peer-to-Peer Maneuvers for Refueling Satellites in Circular Constellations," First position after graduation: Research Engineer, Air Transportation Center, Georgia Institute of Technology. Currently, Assistant Professor, Department of Aerospace Engineering, Wichita State University.
11. Raghvendra Cowlagi (2011), Thesis Title: "Hierarchical Motion Planning for Autonomous Aerial and Terrestrial Vehicles," Currently, Associate Professor, Department of Mechanical and Aerospace Engineering, Worcester Polytechnic Institute.
12. Efstathios Bakolas (2011), Thesis Title: "Optimal Steering for Kinematic Vehicles with Applications to Spatially Distributed Agents," Currently, Associate Professor, Department of Aerospace Engineering, University of Texas at Austin.
13. Yiming Zhao (2011), Thesis Title: "Efficient And Robust Aircraft Landing Trajectory Optimization," First position after graduation: Mitsubishi Electric Research Laboratories, Cambridge, MA.
14. Nuno Felipe (2014), Thesis Title: "Nonlinear Position and Attitude Control For Satellite Proximity Operations: An Approach Based on Dual Quaternions," First position after graduation: JPL
15. Oktay Arslan (2015 - Robotics program), Thesis Title: "Machine Learning and Dynamic Programming Algorithms for Motion Planning and Control," First position after graduation: JPL. Currently, Research Engineer, Tesla Autopilot
16. Sun Wei (2017), Thesis Title: "Pursuit-Evasion and Differential Games under Uncertainties," First position after graduation: Assistant Professor, School of Aerospace and Mechanical Engineering, University of Oklahoma

17. Ioannis Exarchos (2017), Thesis Title: "Stochastic Optimal Control - An FBSDE Sampling Approach," First position after graduation: Post-doctoral fellow, Department of Medicine, Emory University.
18. Alfredo Valverde (2018), Thesis Title: "Dynamic Modeling and Control of Spacecraft Robotic Systems using Dual Quaternions," First position after graduation: JPL.
19. Takuma Nakamura (co-advisor with E. Johnson) (2018), Thesis Title: "Multiple-Hypothesis Vision-Based Landing Autonomy," First position after graduation: Amazon Prime Air.
20. Florian Hauer (2019), Thesis Title: "Path-Planning Algorithms in High-Dimensional Spaces," First position after graduation: Zee-Aero.
21. Changxi You (2019), Thesis Title: "Autonomous Aggressive Driving: Theory And Experiments," First position after graduation: Tencent Technology.
22. Kazuhide Okamoto (2019), Thesis Title: "Optimal Covariance Steering: Theory and its Application to Autonomous Driving," First position after graduation: Zoox.
23. Jack Ridderhof (2021), Thesis Title: "Applied Stochastic Optimal Control for Spacecraft Guidance," First position after graduation: SpaceX.
24. Venkata Ramana Makkapati (2021), Thesis Title: "Games of Pursuit-Evasion with Multiple Agents and Subject to Uncertainties," First position after graduation: Honda Research Labs.
25. Kelsey Hawkins (2021 - Robotics program), Thesis Title: "Feynman-Kac Numerical Techniques for Stochastic Optimal Control," First position after graduation: Toyota Research Institute.
26. Matthew Brewer (2022), Thesis Title: "Planning for Satellite Actuator Failures: A Falsification Approach Towards Certification of Contingency Controllers," First position after graduation: AFRL.
27. Sagar Joshi (2022 - Robotics program), Thesis Title: "Informed Exploration Algorithms for Robot Motion Planning and Learning," First position after graduation: Aurora Innovation.
28. Jaein Lim (2022), Thesis Title: "Generalized Heuristic Search Algorithms with Applications to Motion Planning and Multi-Agent Path Finding Problems," First position after graduation: Draper Lab.
29. Gidado-Yisa Immanuel (co-advisor with E. Feron) (2023), Thesis Title: "Methods of Analysis and Design of Dynamical Systems Using Homogeneous Polynomial Lyapunov Functions," First position after graduation: Unknown.
30. Daniel Larsson (2023), Thesis Title: "An Information-Theoretic Framework for Resource-Aware Abstractionand Planning for Autonomous Agents," First position after graduation: Assistant Professor, Dept. of Aerospace and Mechanical Engineering, University of Arizona.

<u>Previous Graduate Students - Masters</u>

1. Stephen Mason (1997), Thesis Title: "Linear Parameter-Varying Controllers for Magnetic Bearings"
2. Haijun Shen (1998), Thesis Title: "Time-Optimal Control of Axisymmetric Spacecraft with Two Controls"
3. Byungmoon Kim (1999), Project Title: "Experimental Comparison of Controllers for Wheeled Mobile Robots"
4. Alexander Schleicher (1999), Project Title: "Partial Stabilization of a Rigid Body Spacecraft using Two Control Torques"
5. Viktoria Doumtchenko (2000), Project Title: "Control of Underactuated Spacecraft"

6. Efstathios Velenis (2000), Project Title: "Low-Bias Control of Active Magnetic Bearings"
7. David Richie (2001), Thesis Title: "Combined Attitude Control and Energy Storage Using VSCMG's"
8. Chandeok Park (2002), Project Title: "Numerical Solution of Optimal Control Problems using Wavelets"
9. Ancil Marshal (2002), Project Title: "Control of Underactuated Spacecraft"
10. Caroline Muller (2002), Project Title: "Haar Wavelets Applied to Linear Systems"
11. Arnaud de Nailly (2004), Project Title: "Coordinated Satellite Rendezvous"
12. Debao Zhou (2004), Project Title: "Development of Communication Algorithms Between a Ground Station and the UAV Platform"
13. Kenneth Dienmunsch (2004), Project Title: "Analysis of Low-Bias AMB Control via Describing Function Methods"
14. Atri Dutta (2005), Project Title: "Optimal Peer-to-Peer Refueling Strategies for Satellites in Circular Constellations"
15. Emmanuel Levy (2005), Project Title: "Autopilot Design for a UAV"
16. Mark Hunkele (2005), Project Title: "Relative Vision-Based Range and Attitude Determination"
17. Alexandros Salazar-Kardozo (2006), Thesis Title: "A High-Level Framework for the Autonomous Refueling of Satellite Constellations"
18. Efstathios Bakolas (2007), Thesis Title: "A Hierarchical On-Line Path Planning Scheme using Wavelets"
19. Imon Chakraborty (2011), Project Title: "Time-Optimal Control for Collision Mitigation at Intersections"
20. Daniel Kuheme (2011), Project Title: "Aggressive Maneuvers of Vehicles using Multi-Stage Control"
21. Spyros Zafeiropoulos (2013), Project Title: "Design of a Lane-Tracking Driver Steering Assist System and Its Interaction with a Two-Point Visual Driver Model"
22. Ioannis Exarchos (2013), Project Title: "Two-Player Pursuit-Evasion: An Asymmetric Two Car Game"
23. Su Yeon Choi (2016), Thesis Title: "Automatic Mass Balancing System For The 5-Dof Spacecraft Simulator"
24. Matthew Brewer (2016), Thesis Title: "Partial Synchronization of Underactuated Satellite Systems"
25. Jack Ridderhof (2019), Project Title: "Covariance Steering for Powered Descent Guidance"
26. Gerard Bennett (2019), Project Title: "Covariance Steering of a Quadrotor for Landing on Moving Targets"
27. Noe Monterossa (2019), Project Title: "Semi-Autonomous Perching with Quadrotor and 1-DoF Robotic Arm"
28. Julius Kortenbruck (ME, 2019), Project Title: "Development of a Tire-Road Friction Estimator" (Univ. of Stuttgart exchange program).
29. Qifan Zhang (IC, 2020), Thesis Title: "Learning Nash Equilibria in Zero-sum Stochastic Games via Entropy-regularized Policy Approximation".
30. Zhiyuan Zhang (2021), Project Title: "A Covariance Steering Design for Model Predictive Path Integral Control".
31. Joshua Shafran (2023), Master of Science in Robotics Project Title: "Robust Small Body Tracking in Harsh Lighting Conditions".

32. Nikolay Tranakiev (2022), Master of Science in Robotics, Project Title: "RACECAR Platform Autonomous Racing Capabilities Demonstration and Development".
33. Santosh Trantavahi (2023), Master of Science in Robotics, Project Title: "Spacecraft Mounted Manipulators: Dynamics and Control".
34. Ujjwal Gupta (2023), Master of Science in Robotics, Project Title: "Stochastic Optimal and Robust Control for UAVs Under Disturbances".

Current and Previous Visiting Graduate Students

- Lorenzo Ticozzi, Politecnico di Milano (2019-2020)
- Giovanni Corinaldesi, Politecnico di Milano (2019-2020)
- Andrea Antonello, University of Padova (2017)
- Giuseppe di Mauro, Politecnico di Milano (2012)

Current Undergraduate Students

- Noah Bruckner, "Scaled Autonomous RACECAR Platform," August 2022–.
- Albert Zheng "Scaled Autonomous RACECAR Platform," August 2023–.
- Carlton Cort "Scaled Autonomous RACECAR Platform," August 2023–.
- Patrick Shinners "Scaled Autonomous RACECAR Platform," August 2023–.
- Timophy Weigman "Scaled Autonomous RACECAR Platform," August 2023–.
- Yixiao Zhang "Scaled Autonomous RACECAR Platform," August 2023–.
- As part of a Vertically Integrated Project (VIP) course on "Active Safety Systems for Autonomous and Semi-Autonomous Vehicles" (Karen Feigh, co-advisor), started in the Fall of 2016 more than 25 undergraduate students each year, divided in several teams, participate in research while earning credit. The VIP program is an undergraduate education program by which undergraduate students joining VIP teams earn academic credit for their participation in design/discovery efforts that assist faculty and graduate students with research issues in their areas of expertise (for more details, see www.vip.gatech.edu). The teams are: multidisciplinary (drawing students from all disciplines on campus); vertically-integrated (maintaining a mix of sophomores through PhD students each semester); and long-term (each undergraduate student may participate in a project for up to three years and each graduate student may participate for the duration of their graduate career).
- As part of the Vertically Integrated Project (VIP) course on "Low-Cost Aerial Autonomy" (Ani Mazumbdar, co-advisor) started in January 2020, more than 15 undergraduate students have been involved in the design and construction of small, low-cost unmanned powered vehicles with gliding capability. The focus is on fixed-wing designs steming from a desire to exploit aggressive maneuvers and nonlinear dynamics.

Previous Undergraduate Students

1. Ashkar Awal, "Control and Operations Simulator of Multi-Spacecraft in Orbit," August 2021–May 2023.
2. Brooklyn Cantey, "Electronic upgrades of a Spacecraft Simulator," August 2021–December 2022.
3. Rohan Nandakumar, "Scaled Autonomous RACECAR Platform," August 2022–May 2023.
4. Wesley Ford, "Electronic upgrades of a Spacecraft Simulator," August 2022–December 2022.

5. Yuji Takobo, "Higher-Order Moments for Stochastic Control," August 2022–May 2023.
6. Jacob Gay, "Electronic upgrades of a Spacecraft Simulator," August 2021–May 2023.
7. Ryan Chen, "Control and Operations Simulator of Multi-Spacecraft in Orbit," August 2021–August 2022.
8. James Shin, "Infrared Sensor Integration for Multispectral Fusion Algorithms," August 2021–May 2023.
9. Nicholas Brittain, "Electronic and Computer upgrades of a Spacecraft Simulator," August 2019–August 2022.
10. MinGyu Kim, "Advanced Path Planning Algorithms for Distributing Tasks to Multiple Drones," August 2019–December 2021.
11. Yannis Sporidis, "Optimization of Off-Road Performance Vehicle Suspension," (PURA Undergraduate Research Fellowship), August 2021–December 2021.
12. Nicholas Heydinger, "Electronic and Computer upgrades of a Spacecraft Simulator," August 2020–May 2021.
13. Noah Egan, "Electronic and Computer upgrades of a Spacecraft Simulator," January 2021–May 2021.
14. Sabina Maranto "Mechanical Design for a Spacecraft Simulator Facility," January 2021–May 2021.
15. Jackson Stanthope, "Electronic and Computer upgrades of a Spacecraft Simulator" August 2018–Spring 2021.
16. Zhiyuan Zhang "Small Scale Autonomous Vehicle," (PURA Undergraduate Research Fellowship), January 2020–May 2020.
17. Mason Murray-Cooper, "Electronic and Computer upgrades of a Spacecraft Simulator" January 2019–December 2019.
18. Kumal Gangoli, "Experimental Testing of Proximity Operations in Space," August 2019–December 2019.
19. Binit Shah, "Shape from Motion from Asteroid Images," August 2019–December 2019.
20. Joshua Pilipovsky, "Covariance Steering Control of Dynamic Systems," January 2019–May 2019.
21. Justin Ma, "Electronics Integration for the ASTROS Spacecraft Simulation Platform," September 2016–May 2019.
22. Frank Zhou, "Electronics Integration for the ASTROS Spacecraft Simulation Platform," September 2017–May 2018.
23. Matthew Barulic, "AutoRally: An Platform for Autonomous Ground Vehicle Testing." US Army Undergraduate Research Opportunity Program (UROP), June 2016-August 2016.
24. Justin Zheng, "AutoRally: An Platform for Autonomous Ground Vehicle Testing." US Army Undergraduate Research Opportunity Program (UROP), June 2016-August 2016 & Development of Vision Based Tracking System using Two-Point Visual Driver Model and AutoRally Platform," (PURA Undergraduate Research Fellowship), August 2017–December 2017.
25. Nialah Wilson, "AutoRally: A Platform for Autonomous Ground Vehicle Testing." US Army Undergraduate Research Opportunity Program (UROP), August 2016.
26. Michael McCracken, "Extended Kalman Filter for a Quadrotor," January 2016–May 2016.
27. Dongha, Kang, "Quadrotor Path Optimization with Artificial Potential Field," January 2016–May 2016.

28. Gabriel Nakajima, "Development of Graphical Interfacing with AR Parrot Quadrotor," January 2016–May 2016.
29. Cecilia Liu, "Graphical User Interface for Scaled Autonomous Ground Vehicle Using ROS," January 2016–May 2016.
30. Jaein Lim, "Trajectory Optimization of Quadcopter by Receding Horizon Differential Dynamic Programming in Discrete Time,"January 2016–December 2016.
31. Jack Ridderhof, "Testing ROS with NVIDIA's Jetson Board" January 2016–August 2016.
32. Meet Patel, "Slope Measurement Calibration for Spacecraft Simulator Test Area," May 2014–August 2014.
33. Zach Braun, "Automatic Mass Balancing System for a 5DOF Spacecraft Simulator Platform," January 2014–May 2014.
34. Mateus de Freitas Virgilio Pereira, "Approximate Optimal Trajectory Generation using Gaussian Stochastic Processes," August 2013–May 2014 (exchange student from Federal University Of Minas Gerais, Brasil)
35. Bhanu Kumar, "Consensus Algorithms for Multi-Agent Systems," May 2012–December 2012.
36. Yuan Yuo, "Hardware-in-the-Loop UAV Autopilot," August 2012–December 2012.
37. Chris Richardson, "A Virtual Environment for Autonomous Rendezvous and Docking in Space," May 2012–December 2012, (PURA Undergraduate Research Fellowship)
38. Ricardo Sanz Diaz, "Optimal Aggressive Vehicle Maneuvering," August 2012–December 2012 (exchange student from University of Valencia, Spain).
39. David Miculescu, "An Optimal Control Interface", August 2011-December 2011
40. Johnny Worthy, "Small scale UAV Autopilot," January 2011–August 2011
41. Luis Ignacio Reyes Castro, "Generalized Consensus Algorithms in 2D and 3D Problems," August 2009–May 2011 (REU Undergraduate Research Fellowship).
42. David Chanin, "NorthStar Localization System for a 5dof Spacecraft Simulation Platform," June 2009–August 2009.
43. Daniel Kuheme, "Numerical Optimal Control for Aerospace Applications," May 2008–September 2008 (Dash Undergraduate Research Fellowship).
44. Katie Milway, "An Optical System for High-Resolution Angular Measurement for a 3-Axis Air-Bearing Platform" May 2008–Aug. 2008
45. William Gloss, "Development and Construction for a Small UAV," Sept. 2005–Jan. 2005
46. Sean Tamblyn, "Development and Construction for a Small UAV," May 2005–Aug. 2005.
47. Daniel Jegeman, "Development of PID Controllers for a Small UAV," Sept. 2006–Dec. 2006.
48. Eiji Ozawa, "A Virtual Environment for UAV Autopilot Design," Sept. 2005–May 2006.
49. Jeffrey Staub, "Development of a GUI for a UAV Ground Station," June 2006–Dec. 2006.
50. Phillip Hom, "Development for a Simulink GUI Interface for Simulating a Half-Car Model," May 2006–August 2006.
51. Andrew Earl, "Development and Construction for a Small UAV," March 2005–Dec. 2005.
52. Jason Yu, "Adaptive Wavelet Denoising", August 2005–December 2005.
53. Brandon Lunders, "Application of an Extended Kalman Filter in UAV Autopilot Design," June 2004–May 2005 (PURA Undergraduate Research Fellowship).
54. Aurelien Drevon, "Spacecraft Autonomous Rendezvous and Docking," Aug. 2004–May 2005
55. Maria Galvis, "Autopilot Software Development for a Small UAV," Oct. 2004–May 2005

56. Terry Williams, "Design of an Autopilot for a Radio-Controlled Airplane," Oct. 2003–Dec. 2004.
57. Rebecca Fink, "Design of an Autopilot for a Radio-Controlled Airplane," Oct. 2003–May 2005.
58. Jonathan Moshe, "Design of an Autopilot for a Radio-Controlled Airplane," Oct. 2003–Dec. 2004.
59. David Lambeth, "A MATLAB Interface for Solving Two Point Boundary Value Problems using BNDSCO," NSF - REU research grant, May 2002–Dec. 2002.
60. Kriengsiri Malasri, "Experimental Stiffness Determination of the REVOLVE Active Magnetic Bearing," NSF - REU research grant, March 2002–Aug. 2002.
61. Anne Bergeron, "Computer Interface for Control of Active Magnetic Bearings," NSF - REU research grant, Feb. 2001–April 2002.
62. Aromal Prasannan, "Design of a Crane Experiment for AE4525," NSF - REU research grant, Summer 2001; exchange student from IIT, Madras.
63. Pat Kriengsiri, "Design of a Spacecraft Simulator Facility," NSF - REU research grant, Oct. 2000–Dec. 2001.
64. Emmanuel Witrant, "Applications of Linear Matrix Inequalities in Control," June 2000 – May 2001.
65. Christopher Hanlon, "Aircraft Simulator for AE 3521," NSF - REU research grant, March 1999–Aug. 2000.
66. Ancil Marshal, "Attitude Control of Small Sats using Magneto-torquers," NSF - REU research grant, March 1999–Aug. 2000.
67. Jason Stauch, "Modelling of Geomagnetic Field for an Attitude Control System," Mar. 1999–June 1999.
68. Alejandro Morin, "A Preliminary Design for a Tethered Orbiting Interferometer to Observe High Radio Frequencies," senior thesis, May 1995, Univ. of Virginia.
69. Luke Simpson, "The Design and Modelling of an Attitude Control System for a Forest Fire Detection and Tracking Satellite," senior thesis, March 1995, Univ. of Virginia.
70. Felix Gablis-Reig, "A User-Friendly Environment for Numerical Solution of Optimal Control Problems," NSF - REU research grant, May 1997–Dec. 1997, Univ. of Virginia.
71. Andrew Turner, "Design of Autonomous and Semi-autonomous Aerospace Vehicles," Feb. 1998–Aug. 1998, Univ. of Virginia.
72. Melissa Snee, "Attitude Control of Small Sats using Magneto-torquers," NSF - REU research grant, March 1998–Aug. 1998, Univ. of Virginia.

B. Other Teaching Activities

Courses Taught

Georgia Institute of Technology, Atlanta, Georgia
School of Aerospace Engineering

AE 3500, *Aircraft Flight Mechanics*, W99

AE 3510 *Flight Mechanics and Controls Laboratory*, F98, W99, S99

AE 3515, *System Dynamics and Control*, S04, S05, S06, S11

AE 3521, *Aircraft and Spacecraft Flight Dynamics*, S00, S01, S02, F03, F06, S08, F13, F15

AE 3530, *System Dynamics and Vibrations*, S21, S23

AE 3531, *System Dynamics and Control*, S17

AE 4380, *Astronautics*, S01

AE 4525 *Control System Design Laboratory*, S05, F05, F06, F09, F10, S14

AE 4532, *Spacecraft Flight Dynamics*, F17

AE 4610 *Control System Design Laboratory*, S18, F20, F21, F22

AE 6511, *Optimal Guidance and Control*, F99, F01, F05, F07, F10, F11, S14, F16, S19, F21, F23

AE 6530, *Multivariable Linear Control Systems*, F12, F18

AE 6531, *Robust Control I*, S07, S10

AE 6580, *Aerospace Nonlinear Control*, F04, S09, S12, S16, S18, S20

AE 8123, *Nonlinear Control Systems*, S99

AE 6512, *Math. Principles of Planning and Decision-Making for Autonomy*, F19, F20, S22, F23

AE 8803TSI, *Advanced Nonlinear Control*, S08, F09, F12, F16

School of Engineering and Applied Science, University of Virginia, Charlottesville, Virginia
Department of Mechanical and Aerospace Engineering

ENGR 205, *Introduction to Solid Mechanics*, F94

MAE 651, *Linear Automatic Control Systems*, F97

MAE 692, *Linear State-Space Systems and Control*, F95, F96

MAE 756/EE 726, *Nonlinear Control Systems*, S95, S97

MAE 853/EE 823, *Optimal Control Systems*, S96, S98

Purdue University, West Lafayette, Indiana
School of Aeronautics and Astronautics

AAE 340, *Dynamics and Vibrations*, S90, (Teaching Assistant)

AAE 507, *Basic Mechanics III*, F89, F90, (Teaching Assistant)

Virginia Polytechnic Institute and State University, Blacksburg, Virginia
Department of Aerospace and Ocean Engineering

AOE 3134, *Stability & Control of Aerospace Vehicles*, F86, (Teaching Assistant)

AOE 4134, *Astromechanics*, S87, (Teaching Assistant)

Courses Developed

School of Aerospace Engineering, Georgia Institute of Technology

AE 3521 *Aircraft and Spacecraft Flight Dynamics*

Four-credit course intended to introduce students in the flight dynamics of spacecraft and aircraft. Topics covered include: review of Keplerian orbits; longitudinal statics and stability; rigid-body rotational kinematics; orientation parameters; rigid-body rotational dynamics; Euler's equations; torque-free motion; effects of energy dissipation; attitude determination and control; spin-stabilization, gravity-gradient stabilization, momentum-bias satellites; attitude sensors and actuators; gyroscopic instruments; static and dynamic stability of aircraft; small disturbance theory; stability derivatives; longitudinal static stability and control; directional stability and control; roll stability and control; stability of uncontrolled motion; stick-fixed longitudinal motion; longitudinal approximations; lateral/yaw modes of motion and

approximations; longitudinal and lateral flying qualities.

AE 8123/AE 6580 *Nonlinear Control Systems*

Graduate-level course whose objective is to introduce fundamental concepts and tools for analyzing and controlling nonlinear systems. Topics covered include: nonlinear differential equations and equilibrium points; review of linear stability theory; Lyapunov stability theory; $\mathcal{L}_p$ spaces and input-output stability; small-gain theorem; relationships between I/O and Lyapunov stability; passivity concepts; absolute stability criteria; singular perturbations; variable structure control; geometric methods; input-to-state and input-output feedback linearization; control design for nonlinear systems.

AE 8803TSI *Advanced Nonlinear Control*

Advanced research-oriented graduate-level course for students specializing in nonlinear control. Topics covered include: review real analytical and topological concepts; review of Lyapunov stability theory using $\mathcal{K}$ and $\mathcal{L}$ functions; nonlinear controllability, accessibility, observability; control Lyapunov functions; input-to-state stability; dissipativity; stabilization of cascade systems; backstepping and forwarding; Jurdjevic-Quinn approach to stabilization; necessary conditions for smooth stabilization, Brockett's condition; control of nonholonomic and underactuated systems; dilations and homogeneous norms; control of homogeneous systems; geometric methods; Lie brackets, Frobenius theorem; zero dynamics and feedback linearization; input-output linearization; center manifold theory; control of singularly perturbed systems; Hamilton-Jacobi theory; inverse optimal control.

AE 6512I *Mathematical Principles of Planning and Decision-Making for Autonomy*

Dual level graduate/advanced undergraduate level course covering all the fundamental theory to support the development of algorithms to support AI systems and intelligent machines that operate autonomously. Topics covered include: definition of an intelligent agent; reactive vs. deliberative agents; model-based vs model-free decision-making; Hamilton-Jacobi theory, the principle of optimality; LQR, DDP/iLQR, MPC methods for solving optimal control problems; search space representations, state partitioning, cell and Voronoi decompositions; elements of graph theory; uninformed graph search algorithms, depth-first and breadth-first search; informed graph search algorithms, A*, Dijkstra, D*, LPA*; sampling-based methods: PRM, RRT, RRT*; probabilistic inference, graphical models, Hidden Markov Models (HMMs); probabilistic reasoning; decision-making under uncertainty, stochastic search; Markov decision processes (MDP), partially observable MDP (POMDP); dynamic programing, value and policy iteration; approximate dynamic programing; reinforcement learning and inverse reinforcement learning; adversarial agents, stochastic games, competitive MDPs; Nash and correlated equilibria; games of incomplete information, Bayesian games, bounded rationality; differential games, games of pursuit and evasion.

VIP Course on Active Safety for Autonomous Automotive Vehicles

A *Vertically Integrated Project Team (VIP)* was developed in collaboration with Prof. K. Feigh to involve undergraduate students in research. The VIP program is an undergraduate education program by which undergraduate students joining VIP teams earn academic credit for their participation in design/discovery efforts that assist faculty and graduate students with research issues in their areas of expertise (for more details, see www.vip-program.gatech.edu). The VIP teams are multidisciplinary (drawing students from all disciplines on campus); vertically-integrated (maintaining a mix of sophomores through PhD students each semester); and long-term (each undergraduate student may participate in a project for up to three years

and each graduate student may participate for the duration of their graduate career). The VIP program is supported by a track of three courses, one each at the sophomore, junior and senior levels.

VIP Course on Low Cost Aerial Autonomy

A VIP team was established with the collaboration of Prof. A. Mazumdar from the School of Mechanical Engineering to investigate how small, low cost unmanned aerial vehicles can be used to deliver items, operate in constrained environments, and maximize efficiency. The team focuses on developing gliding vehicles that are catapult launched.

Department of Mechanical and Aerospace Engineering, University of Virginia

MAE 692 *Introduction to State-Space Systems and Control*

A dual-level graduate and advanced undergraduate course in the modeling and control of linear systems. The main objective of the course is to introduce the current techniques and tools for the analysis, description and feedback control of multivariable linear systems. Emphasis is given to linear algebra concepts and the use of computer packages (e.g. MATLAB) for the solution of these problems. Topics covered include: models of physical systems; equilibrium points, solutions and linearization; state-space vs. transfer function matrix models; vectors and vector spaces; linear mappings and adjoint operators; eigenvalues, eigenvectors, Jordan normal forms; null space and range of a matrix; linear matrix equations and least squares theory; realizations, Kalman canonical forms; stability, Lyapunov equation; controllability and observability grammians; state feedback; output feedback and observer design; model reduction.

Laboratory Developed

DYNAMICS AND CONTROL SYSTEMS LABORATORY. Through an NSF CAREER award, DCSL was established in 1996 to train both graduate and undergraduate students in the analysis and control of dynamical systems. A variety of software is available (MATLAB, SIMULINK, DSTOOLS, STK, FLIGHT GEAR, etc) running on high-end workstations. Electronic instrumentation includes standard equipment (power supplies, oscilloscopes, function generators, multimeters) and specialized dSPACE 1103 controller boards with the associated software. Experiments include a 15,000 rpm flexible shaft supported on active magnetic bearings, a flywheel supported on active/passive magnetic bearings, a wheeled mobile robot and an unmanned aerial vehicle (UAV) platform. The lab also has a Flight Simulator for evaluating flight control system responses.

SPACECRAFT ROBOTICS LABORATORY. Through two AFOSR DURIP awards totalling approximately $500K, a 5-dof experimental rendezvous and docking facility was established in 2008 in the basement of the Montgomery Knight Building (MK-111). The spacecraft platform floats on a set of three linear and a hemispherical air-bearing, allowing unrestricted translation along the x and y axes, and $\pm 30 \text{ deg}$ rotations about the x and y axes, and $\pm 360 \text{ deg}$ rotation about the z axis. The test arena, made of hardened epoxy, has dimensions 14 ft $\times$ 14 ft. A plethora of sensors (rate gyros, magnetometer, 3-axes acceleromaters, IMU, CCD cameras, lidars) and actuators (12 thrusters, 4 variable speed CMGs) onboard the spacecraft platform allow for the realistic validation of a wide variety of space proximity operations scenarios. A 7-dof manipulator tests various spacecraft robotic tasks.

Instructional Material Developed

AE 4520/AE4525: Feedback Control Systems Lab: An updated, significantly improved, laboratory manual was developed for the laboratory part of the course. A 3-axis spacecraft simulator was designed and included in the lab series experiments.

AE 3521: Spacecraft and Aircraft Flight Dynamics: An aircraft simulator was incorporated in the class via funds provided by the School of Aerospace Engineering and the Teaching Fellows Program at GIT.

Graduate Student Advisory Committees

Georgia Institute of Technology

Zachary Goddard, Doctor of Philosophy/ME (August 2023)
Joseph Meyers, Doctor of Philosophy (August 2022)
Matthew Abate, Doctor of Philosophy/ECE (August 2022)
Corbin Klett, Doctor of Philosophy (December 2021)
Geordan Gutow, Doctor of Philosophy (May 2021)
Mark Mote, Doctor of Philosophy/ME (December 2021)
Vahid Azimi, Doctor of Philosophy/ECE (May 2021)
Jared Elinger, Doctor of Philosophy (December 2020)
Julian Brew, Doctor of Philosophy (December 2019)
Brian Goldfein, Doctor of Philosophy/CS (May 2019)
Raphael Cohen, Doctor of Philosophy (December 2018)
Patrick Hyun, Doctor of Philosophy/ECE (May 2018)
Emmanuel Boidot, Doctor of Philosophy (December 2017)
Guangcong Zhang, Doctor of Philosophy/ECE (December 2015)
Daniel Magree, Doctor of Philosophy (May 2015)
Timothy Wang, Doctor of Philosophy (May 2015)
Claus Christmann, Doctor of Philosophy (May 2015)
Sang Gyun Park Doctor of Philosophy (August 2014)
Duy-Nguyen Ta, Doctor of Philosophy/CS (May 2014)
Gaurav Agrawal, Doctor of Philosophy/ChBE (December 2014)
Richard Roberts, Doctor of Philosophy/CS (May 2014)
Jason Bentley, Doctor of Philosophy/ChBE (May 2013)
Brad Steinfeldt, Doctor of Philosophy (December 2013)
Clayton Tino, Doctor of Philosophy (May 2013)
Yibiao Lu, Doctor of Philosophy/ISyE (December 2012)
McClain Evan, Doctor of Philosophy (December 2012)
Peter Kingston, Doctor of Philosophy/ECE (May 2012)
Michael Grant, Doctor of Philosophy (May 2012)
Tansel Yucelen, Doctor of Philosophy (May 2012)
Girish Chowdhary, Doctor of Philosophy (December 2010)
Konstantyn Volyanskyy, Doctor of Philosophy (May 2010)
Kristina Alemany, Doctor of Philosophy (December 2009)
Qing Hui, Doctor of Philosophy (December 2008)
Keumjin Li, Doctor of Philosophy (December 2007)

Yoko Watanabe, Doctor of Philosophy (December 2007)
Shannon Twigg, Doctor of Philosophy (May 2007)
John Huey, Doctor of Philosophy/ME (August 2006)
Ali Kutay, Doctor of Philosophy (December 2005)
Sergei Nesterov, Doctor of Philosophy (August 2005)
Julide Topsakal, Master of Science (May 2005)
Gregory Dukeman, Doctor of Philosophy (December 2004)
David May, Doctor of Philosophy (May 2002)
David W. Way, Doctor of Philosophy (December 2001)
Manu Sharma, Doctor of Philosophy (May 2001)
Erika Ooten, Master of Science (December 2000)
Irene Budianto, Doctor of Philosophy (August 2000)
Joseph Corrado, Doctor of Philosophy (August 2000)
Eric Johnson, Doctor of Philosophy (December 2000)
Flavio Nardi, Doctor of Philosophy (December 2000)

University of Virginia

James Masters, Doctor of Philosophy (August 1998)
Edward Weller, Doctor of Philosophy (May 1998)
Stephen Fedigan, Doctor of Philosophy (May 1998)
Yi Ling, Doctor of Philosophy (Aug. 1998)
Xiao Yang, Master of Science (July 1997)
Zhenghong Wu, Doctor of Philosophy (May 1997)
Ming Tian, Doctor of Philosophy (May 1997)
Ravichandran Vancheeswaran, Doctor of Philosophy (May 1996)
Shannon Young, Master of Science (May 1996)

External Reader

Barbara Savini, Doctor of Philosophy, Polytecnico di Milano (May 2007)
Perdo Pereira, Doctor of Philosophy, KTH (February 2019)
Marco Baur, Doctor of Philosophy, Polytecnico di Milano (October 2019)
Ramon Andreu Altava, Airbus/ENAC (February 2020)

IV. Scholarly Accomplishments

A. Books and Book Chapters

1. Bernstein D. S. and Tsiotras, P., *A Course in Classical Optimal Control*, (in preparation).
2. Tsiotras, P., "Invariant Manifold Techniques for Control of Underactuated Mechanical Systems," in *Modelling and Control of Mechanical Systems*, Eds: A. Astolfi, D. Limebeer, C. Melchiorri, A. Tornambe, and R. Vinter, World Scientific, London, 1997, pp. 277–292.
3. Tsiotras, P., "Attitude Controls," in *Encyclopedia of Electrical and Electronics Engineering*, John Wiley & Sons, New Jersey, 1999; revised and updated in 2014.
4. Canudas de Wit, C., R. Horowitz, and P. Tsiotras, "Model-Based Observer for Tire/Road Contact Friction Prediction," in *New Directions in Nonlinear Observer Design*, Eds: Nijmeijer, H. and T.L. Fossen, *Lecture Notes in Control and Information Science*, Vol. 244, Springer-Verlag, London, May 1999, pp. 23–42.

5. C. Canudas-de-Wit, P. Tsiotras, X. Claeys, J. Yi, and R. Horowitz, "Friction Tire/Road Modeling, Estimation and Optimal Braking Control," in *Nonlinear and Hybrid Systems in Automotive Control*, Eds: Rolf Johansson and Anders Rantzer, *Lecture Notes in Control and Information Science*, Springer-Verlag, London, October 2002, pp. 165–229.
6. Tsiotras, P. and Reyes Castro L. I., "A Note on the Consensus Protocol with Some Applications to Agent Orbit Pattern Generation," in *Distributed Autonomous Robotic Systems*, Eds: A. Martinoli, F. Mondada, N. Correll, G. Mermoud, M. Egerstedt, M. Ani Hsieh, L. E. Parker, and K. Støy, *Springer Tracts in Advanced Robotics*, Vol. 83, Springer-Verlag, Berlin, 2013, pp. 345–358, doi: 10.1007/978-3-642-32723-0_25
7. Tsiotras, P. and Reyes Castro L. I., "The Artistic Geometry of Consensus Protocols," in *Controls and Art*, Eds: M. Egerstedt and A. LaViers, *Springer Lectures Notes on Computer Science*, 2014, pp. 129–153, doi: 10.1007/978-3-319-03904-6_6
8. Tsiotras, P. and Sanz-Diaz R. "Real-Time Near-Optimal Feedback Control of Aggressive Vehicle Maneuvers," in *Optimization and Optimal Control in Automotive Systems*, Eds: H. Waschl, I. Kolmanovky, M. Steinbuch and L. del Re, *Springer Lecture Notes in Control and Information Sciences*, Vol. 455, March 2014, pp. 109–129, doi: 10.1007/978-3-319-05371-4_7
9. Delahaye, D., Puechmorel, S., Feron, E., and Tsiotras, P., "Mathematic Models for Aircraft Trajectory Design : A Survey," in *Air Traffic Management and Systems*, Eds: Electronic Navigation Research Institute, *Lecture Notes in Electrical Engineering*, February 2014, Vol. 290, pp. 205–247, Springer, Japan, doi: 10.1007/978-4-431-54475-3_12
10. Filipe, N., Kontitsis, M., and Tsiotras, P., "From Attitude to Pose Estimation Using Dual Quaternions," in *Recent Advances on Multisensor Attitude Estimation: Fundamental Concepts and Applications*, Ed: Hassen Fourati, *Devices, Circuits and Systems Series*, CRC Press, June 2016.
11. Tsiotras, P., "Bounded Rationality in Learning, Perception, Decision-Making, and Stochastic Games," in *Handbook of Reinforcement Learning and Control*, Eds: K. Vamvoudakis, Y. Wan, F. Lewis, D. Cansever, *Studies in Systems, Decision and Control Series*, Vol. 325, pp. 491–523, Springer, 2021. doi:10.1007/978-3-030-60990-0
12. Larsson, D., Maity, D., and Tsiotras, P., "A Linear Programming Approach for Resource-Aware Information-Theoretic Tree Abstractions," in *Computation-aware Algorithmic Design for Cyber-Physical Systems*, Eds: M. Prandini and R. Sanfelice, Birkhäuser, 2021.

B. Journal Publications

1. Tsiotras, P., and Kelley, H. J., "Drag-Law Effects in the Goddard Problem," *Automatica*, Vol. 27, pp. 481–490, May 1991.
2. Tsiotras, P., and Kelley, H. J., "The Goddard Problem with Constrained Time-of-Flight," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 15, No. 2, pp. 289–296, March-April 1992.
3. Tsiotras, P., and Longuski, J. M., "A Complex Analytic Solution for the Attitude Motion of a Near-Symmetric Rigid Body Under Body-Fixed Torques," *Celestial Mechanics and Dynamical Astronomy*, Vol. 51, pp. 281–301, 1991.
4. Longuski, J. M., and Tsiotras P., "Analytic Solutions for a Spinning Rigid Body Subject to Time-Varying Body-Fixed Torques. Part I: Constant Axial Torque," *ASME Journal of Applied Mechanics*, Vol. 60, pp. 970–975, 1993.
5. Tsiotras, P., and Longuski, J. M., "Analytic Solutions for a Spinning Rigid Body Subject to Time-Varying Body-Fixed Torques. Part II: Time-Varying Axial Torque," *ASME Journal of Applied Mechanics*, Vol. 60, pp. 976–981, 1993.
6. Tsiotras, P., and Longuski, J. M., "New Kinematic Relations for the Large Angle Problem in Rigid Body Attitude Dynamics," *Acta Astronautica*, Vol. 32, No. 3, pp. 181–190, 1994.

7. Tsiotras, P., and Longuski, J.M., "Spin-Axis Stabilization of Symmetric Spacecraft with Two Control Torques," *Systems & Control Letters*, Vol. 23, pp. 395–402, 1994.
8. Tsiotras, P., Corless M., and Longuski, J. M., "A Novel Approach to the Attitude Control of an Axisymmetric Spacecraft," *Automatica*, Vol. 31, No. 8, pp. 1099–1112, 1995.
9. Longuski, J.M., Puig-Suari, J., Tsiotras, P., and Tragesser, S., "Optimal Mass for Aerobraking Tethers," *Acta Astronautica*, Vol. 35, No. 8, pp. 489–500, 1995.
10. Longuski, J. M., and Tsiotras, P., "Analytic Solution of the Large Angle Problem in Rigid Body Attitude Dynamics," *Journal of the Astronautical Sciences*, Vol. 43, No. 1, pp. 25–46, 1995.
11. Schaub, H., Tsiotras, P., and Junkins, J.L., "Principal Rotation Representations of Proper $N \times N$ Orthogonal Matrices," *International Journal of Engineering Science*, Vol. 33, No. 15, pp. 2277–2295, 1995.
12. Tsiotras, P., and Longuski, J.M., "A New Parameterization of the Attitude Kinematics," *Journal of the Astronautical Sciences*, Vol. 43, No. 3, pp. 243–262, 1995.
13. Tsiotras, P., and Longuski, J.M., "Analytic Solution of Euler's Equations of Motion for an Asymmetric Rigid Body," *ASME Journal of Applied Mechanics*, Vol. 63, No. 1, pp. 149–155, 1996.
14. Tsiotras, P., Rotea, M., and Corless, M., "Counter-example to a Recent Result on the Stability of Nonlinear Systems," *IMA Journal of Mathematics, Control & Information*, Vol. 13, No. 2, pp. 129–130, 1996.
15. Tsiotras, P., "Stabilization and Optimality Results for the Attitude Control Problem," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 19, No. 4, pp. 772–779, 1996.
16. Wan, C.J., Tsiotras, P., Bernstein, D.S., and V.T. Coppola, "Global Asymptotic Stabilization of a Spinning Top with Torque Actuators using Stereographic Projection," *Dynamics and Control*, Vol. 7, No. 3, pp. 215–233, 1997.
17. Tsiotras, P., "Optimal Regulation and Passivity Results for Axi-Symmetric Rigid Bodies with Two Controls," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 20, No. 3, pp. 457–463, 1997.
18. Tsiotras, P., Junkins, J. L., and Schaub, H., "Higher Order Cayley-Transforms with Applications to Attitude Representations," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 20, No. 3, pp. 528–534, 1997.
19. Tsiotras, P., and Luo, J., "Reduced Effort Control Laws for Underactuated Rigid Spacecraft," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 20, No. 6, pp. 1089–1095, 1997.
20. Rotea, M., Tsiotras, P., and Corless, M., "Suboptimal Control of Rigid Body Motion with a Quadratic Cost," *Dynamics and Control*, Vol. 8, No. 1, pp. 55–81, 1998.
21. Tsiotras, P., Corless, M., and Rotea, M., "Optimal Control of Rigid Body Angular Velocity with Quadratic Cost," *Journal of Optimization Theory and Applications*, Vol. 96, No. 3, pp. 507–532, 1998.
22. Tsiotras, P., Corless, M., and Rotea, M., "An $\mathcal{L}_2$ Disturbance Attenuation Solution to the Nonlinear Benchmark Problem," *International Journal of Robust and Nonlinear Control*, Vol. 8, pp. 311–330, 1998.
23. Tsiotras, P., "Further Passivity Results for the Attitude Control Problem," *IEEE Transactions on Automatic Control*, Vol. 43, No. 11, pp. 1597–1600, 1998.
24. Yang, C., Knospe, C., and Tsiotras, P., "Optimal Control of a Magnetic Bearing without Bias and Saturating Voltages," *Optimal Control Applications and Methods*, Vol. 19, pp. 227–246, 1998.
25. Luo, J., and Tsiotras, P., "Exponentially Convergent Control Laws for Nonholonomic Systems in Power Form," *Systems & Control Letters*, Vol. 35, pp. 87–95, 1998.

26. Krstić, M., and Tsiotras, P., "Inverse Optimal Stabilization of a Rigid Spacecraft," *IEEE Transactions on Automatic Control*, Vol. 44. No. 5, pp. 1042–1049, 1999.
27. Shen, H., and Tsiotras, P., "Time-Optimal Control of Axi-symmetric Spacecraft with Two Controls ," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 22, No. 5, pp. 682–694, 1999.
28. Luo, J., and Tsiotras, P., "Control Design for Chained-Form Systems with Bounded Inputs," *Systems & Control Letters*, Vol. 39, pp. 123–131, 2000.
29. Tsiotras, P. and Luo, J., "Control of Underactuated Spacecraft with Bounded Inputs," *Automatica*, Vol. 36, No. 8, pp. 1153–1169, 2000.
30. Tsiotras, P. and Doumtchenko, V., "Control of Spacecraft Subject to Actuator Failures: State-of-the-Art and Open Problems," *Journal of the Astronautical Sciences*, Vol. 48, Nos. 2 and 3, pp. 337–358, 2000, doi:10.1007/BF03546283
31. Tsiotras, P. "A Discussion on the paper 'Attitude Control of Underactuated Spacecraft' by K. Spindler," *European Journal on Control*, Vol. 6, No. 3, pp. 243, 2000.
32. Tsiotras, P., Shen, H. and Hall, C., "Satellite Attitude Control and Power Tracking with Momentum Wheels," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 24, No. 1, pp. 23-34, 2001.
33. Zhang, J., Knospe, C. and Tsiotras, P., "Stability of Time Delay Systems: Equivalence Between Lyapunov and Scaled Small-Gain Conditions," *IEEE Transactions on Automatic Control*, Vol. 46, No. 3, pp. 482–486, 2001, doi:10.1109/9.911428.
34. Zhang X., Tsiotras, P., and Knospe, C., " Stability Analysis for LPV Time-Delayed Systems," *International Journal of Control*, Vol. 75, No. 7, pp. 538-558, 2002.
35. Kim, B., and Tsiotras, P., "Controllers for Unicycle-Type Wheeled Robots: New Theoretical Results and Experimental Validation" *IEEE Transactions on Robotics and Automation*, Vol. 18, No. 3, pp. 294-307, 2002, doi:10.1109/TRA.2002.1019460.
36. Yoon, H. and Tsiotras, P. "Spacecraft Adaptive Attitude Control And Power Tracking With Single-Gimballed Variable Speed Control Moment Gyroscopes," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 25, No. 6, pp. 1081–1090, 2002.
37. Canudas de Wit, C., Tsiotras, P., Velenis, E., Basset, M. and Gissinger, G., "Dynamic Friction Models for Road/Tire Longitudinal Interaction," *Vehicle System Dynamics*, Vol. 39, No. 3, pp. 189-226, 2003.
38. Shen, H. and Tsiotras, P., "Optimal Two-Impulse Rendezvous Between Two Circular Orbits Using Multiple-Revolution Lambert's Solutions," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 26, No. 1, pp. 50–61, 2003.
39. Hall, C., Tsiotras, P. and Shen, H., "Tracking Rigid Body Motion Using Thrusters and Momentum Wheels," *Journal of the Astronautical Sciences*, Vol. 50, No. 3, pp. 311–323, 2003.
40. Kim, B., Velenis, E., Kriengsiri, P. and Tsiotras, P., "Designing a Low-Cost Spacecraft Simulator," *IEEE Control Systems Magazine*, Vol. 23, No. 3, pp. 26–37, 2003, doi:10.1109/MCS.2003.1213601.
41. Zhang, J., Knospe C., and Tsiotras, P., "New Results for the Analysis of Linear Systems with Time-Invariant Delays," *International Journal on Robust and Nonlinear Control*, Vol. 13, No. 12, pp. 1149–1175, 2003, doi:10.1002/rnc.834
42. Tsiotras, P. and Wilson, B.C., "Zero- and Low-Bias Control Designs for Active Magnetic Bearings," *IEEE Transactions on Control Systems Technology*, Vol. 11, No. 6, pp. 889–904, 2003, doi:10.1109/TCST.2003.819593.
43. Yoon, H. and Tsiotras, P., "Singularity Analysis of Variable Speed Control Moment Gyros," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 27, No. 3, pp. 374–386, 2004.
44. Tsiotras, P., Velenis E. and Sorine, M., "A LuGre Tire Friction Model with Exact Aggregate Dynamics," *Vehicle System Dynamics*, Vol. 42, No. 3, pp. 195–210, 2004.

45. Tsiotras, P., "The Relation Between the 3-D Bode Plot and the Root Locus," *IEEE Control Systems Magazine*, Vol. 25, No. 1, pp. 88–96, 2005, doi:10.1109/MCS.2005.1388807
46. Tsiotras, P. and Arcak, M., "Low-Bias Control of AMB Subject to Voltage Saturation: State-Feedback and Observer Designs," *IEEE Transactions on Control Systems Technology*, Vol. 13, No. 2, pp. 262–273, 2005, doi:10.1109/TCST.2004.839562
47. Velenis, E., Tsiotras, P., Canudas de Wit, C. and Sorine, M., "Dynamic Tire Friction Models for Combined Longitudinal and Lateral Vehicle Motion," *Vehicle System Dynamics*, Vol. 43, No. 1, pp. 3–29, 2005.
48. Lanzon, A. and Tsiotras, P., "A Combined Application of $\mathcal{H}_\infty$ Loop-Shaping and μ-Synthesis to Control High Speed Flywheels," *IEEE Transactions of Control Systems Technology*, Vol. 13, No. 5, pp. 766–777, 2005, doi:10.1109/TCST.2005.847344
49. Shen H. and Tsiotras, P., "Peer-to-Peer Refueling for Circular Satellite Constellations," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 28, No. 6, pp. 1220–1230, 2005.
50. Tsiotras, P. and P.-A. Bliman, "An Exact Stability Analysis Test for Single-Parameter Polynomially-Dependent Linear Systems," *IEEE Transactions on Automatic Control*, Vol. 51, No. 7, pp. 1161–1164, 2006.
51. Dutta, A., and Tsiotras, P., "Asynchronous Optimal Mixed P2P Satellite Refueling Strategies," *Journal of the Astronautical Sciences*, Vol. 54, No. 3-4, pp. 543–565, 2006.
52. Zhang, X., Lanzon, A. and Tsiotras, P., "An Approach for Computing the Exact Stability Domain for a Class of LTI Parameter Dependent Systems," *International Journal of Control*, Vol. 79, No. 9, pp. 1046–1061, 2006, doi:10.1080/00207170600747283
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214. Okamoto, K., Goldshtein, M., and Tsiotras, P., "Optimal Covariance Control for Stochastic Systems Under Chance Constraints," *57th IEEE Conference on Decision and Control*, Miami, FL, Dec. 17–19, 2018, pp. 266–271. doi: 10.1109/LCSYS.2018.2826038
215. Larsson, D., Kotsalis, G., and Tsiotras, P., "Nash and Correlated Equilibria for Pursuit-Evasion Games Under Lack of Common Knowledge," *57th IEEE Conference on Decision and Control*, Miami, FL, Dec. 17–19, 2018, pp. 3579–3584. doi: 10.1109/CDC.2018.8619168
216. Makkapati, V. R., Dor, M., and Tsiotras, P., "Trajectory Desensitization in Optimal Control Problems," *57th IEEE Conference on Decision and Control*, Miami, FL, Dec. 17–19, 2018, pp. 2478–2483. doi: 10.1109/CDC.2018.8619577
217. Hawkins, K., and Tsiotras, P., "Anticipating Human Collision Avoidance Behavior for Safe Robot Reaction," *57th IEEE Conference on Decision and Control*, Miami, FL, Dec. 17–19, 2018, pp. 6301–6306. doi: 10.1109/CDC.2018.8619849
218. Ridderhoff, J., and Tsiotras, P., "Minimum-fuel Powered Descent in the Presence of Random Disturbances," *AIAA SciTech Forum, Guidance, Navigation, and Control*, San Diego, CA, Jan. 7–11, 2019 (**best student paper award**). doi: 10.2514/6.2019-0646
219. Antonello, A., Valverde, A., and Tsiotras, P., "Free-flying Spacecraft-mounted Manipulators: A Tool for Simulating Dynamics and Control," *AIAA SciTech Forum, Guidance, Navigation, and Control*, San Diego, CA, Jan. 7–11, 2019. doi: 10.2514/6.2019-1912
220. Okamoto, K. and Tsiotras, P., "Optimal Stochastic Vehicle Path Planning Using Covariance Steering," *International Conference on Robotics and Automation*, Montreal, Canada, May 20–24, 2019, pp. 2276–2281. doi: 10.1109/LRA.2019.2901546
221. Joshi, S. and Tsiotras, P., "Non-Parametric Informed Exploration for Sampling-Based Motion Planning," *IEEE International Conference on Robotics and Automation*, Montreal, Canada, May 20–24, 2019, pp. 5915–5921. doi: 10.1109/ICRA.2019.8793933
222. Okamoto, K. and Tsiotras, P., "Input Hard Constrained Optimal Covariance Steering," *58th IEEE Conference on Decision and Control*, Nice, France, Dec. 11–13, 2019, pp. 3497–3502. doi: 10.1109/CDC40024.2019.9029353
223. Ridderhof, J., Okamoto, K. and Tsiotras, P., "Nonlinear Uncertainty Control with Iterative Covariance Steering," *58th IEEE Conference on Decision and Control*, Nice, France, Dec. 11–13, 2019, pp. 3484–3490. doi: 10.1109/CDC40024.2019.9029993
224. Ridderhof, J., and Tsiotras, P., "Stochastic Atmosphere Modeling for Risk-Adverse Aerocapture Guidance," *IEEE Aerospace Conference*, Big Sky, Montana, March 7–14, 2020. doi: 10.1109/AERO47225.2020.9172724

225. Lim, J., and Tsiotras, P., "MAMS-A*: Multi-Agent Multi-Scale A*," *International Conference on Robotics and Automation*, Paris, France, May 31–June 4, 2020, pp. 5583-5589. doi: 10.1109/ICRA40945.2020.9197045

226. Makkapati, V. R., Maity, D., Dor, M., and Tsiotras, P., "C-DOC: Co-State Desensitized Optimal Control," *American Control Conference*, Denver, CO, July 1–3, 2020, pp. 1761–1766. doi: 10.23919/ACC45564.2020.9147274

227. Ridderhof, J., Pilipovsky, J., and Tsiotras, P., "Chance-Constrained Covariance Control for Low-Thrust Minimum-Fuel Trajectory Optimization," *AIAA/AAS Astrodynamics Specialists Conference*, South Lake Tahoe, CA, August 9-13, 2020.

228. Driver, T., Dor, M., Skinner, K., and Tsiotras, P., "Shape Carving in Space: A Visual SLAM Approach to 3D Shape Reconstruction of a Small Celestial Body," *AIAA/AAS Astrodynamics Specialists Conference*, South Lake Tahoe, CA, August 9-13, 2020.

229. Lawson, R. C, Wills, L., and Tsiotras, P., "GPU Parallelization of Policy Iteration RRT#" *International Conference on Intelligent Robots and Systems*, Las Vegas, NV, Oct. 25–29, 2020. doi: 10.1109/IROS45743.2020.9341411

230. Joshi, S., and Tsiotras, P., "Relevant Region Exploration on General Cost-Maps for Sampling-Based Motion Planning," *IEEE/RJS International Conference on Intelligent Robots and Systems*, Las Vegas, NV, Oct. 25–29, 2020, pp. 6689–6695. doi: 10.1109/IROS45743.2020.9340806

231. Makkapati, V. R., Sarabu, H., Comandur, V., Tsiotras, P., and Hutchinson, S., "Safe Optimal Control under Parametric Uncertainties," *International Conference on Intelligent Robots and Systems*, Las Vegas, NV, Oct. 25–29, 2020, pp. 5725–5731. doi: 10.1109/LRA.2020.3010491

232. King-Smith, M., Dor, M., Valverde, A., and Tsiotras, P., "Nonlinear Dual Quaternion Control of Spacecraft-Manipulator Systems," *International Symposium on Artificial Intelligence, Robotics and Automation in Space*, Pasadena, CA, Oct. 18–21, 2020.

233. Makkapati, V. R., Rajpurohit, T., Okamoto, K., and Tsiotras, P., "Covariance Steering for Discrete-Time Linear-Quadratic Stochastic Dynamic Games," *59th IEEE Conference on Decision and Control*, Jeju Island, South Korea, Dec. 8–11, 2020, pp. 1771–1776. doi: 10.1109/CDC42340.2020.9303947

234. Ridderhof, J., Okamoto, K., and Tsiotras, P., "Chance Constrained Covariance Control for Linear Stochastic Systems With Output Feedback," *59th IEEE Conference on Decision and Control*, Jeju Island, South Korea, Dec. 8–11, 2020, pp. 1758–1763. doi: 10.1109/CDC42340.2020.9303731

235. Ridderhof, J., and Tsiotras, P., "Planetary Entry in a Randomly Perturbed Atmosphere," *AIAA SciTech Forum, Guidance, Navigation, and Control*, Nashville, TN, Jan. 11–15, 2021 (**best student paper award, 2nd place**), doi: 10.2514/6.2021-1218

236. Lang, K., Klett, C., Hawkins, K., Feron, E., Tsiotras, P., and Phillips, S., "Formal Verification Applied to Autonomous Spacecraft Attitude Control," *AIAA SciTech Forum, Guidance, Navigation, and Control*, Nashville, TN, Jan. 11–15, 2021. doi: 10.2514/6.2021-1126

237. Zheng, D., and Tsiotras, P., "Near-Optimal Finite-Time Feedback Controller Synthesis Using Supervised and Unsupervised Learning," *AIAA SciTech Forum, Guidance, Navigation, and Control*, Nashville, TN, Jan. 11–15, 2021, doi: 10.2514/6.2021-1950

238. Zheng, D., and Tsiotras, P., "Sampling-based Kinodynamic Motion Planning Using a Neural Network Controller," *AIAA SciTech Forum, Guidance, Navigation, and Control*, Nashville, TN, Jan. 11–15, 2021. doi: 0.2514/6.2021-175

239. Goddard, Z., Wardlaw, K., Krishnan, R., Tsiotras, P., Smith, M., Sena, M. R., Parish, J., and Mazumdar, A., "Utilizing Reinforcement Learning to Continuously Improve a Primitive-Based Motion Planner," *AIAA SciTech Forum, Guidance, Navigation, and Control*, Nashville, TN, Jan. 11–15, 2021. doi: 10.2514/6.2021-1752

240. Makkapati, V. R., Ridderhof, J., Hart, J., van Bloemen Waanders, B., and Tsiotras, P. "Desensitized Trajectory Optimization for Hypersonic Vehicles," *IEEE Aerospace Conference*, Big Sky, Montana, March 6–13, 2021. doi: 10.1109/AERO50100.2021.9438511

241. Guan, Y., Maity, D., Kroninger, C., and Tsiotras, P., "Bounded-Rational Pursuit-Evasion Games," *American Control Conference*, New Orleans, LA, May 26–28, 2021, pp. 3216–3221. doi: 10.23919/ACC50511.2021.9483152

242. Pilipovsky, J. and Tsiotras, P., "Chance-Constrained Optimal Covariance Steering with Iterative Risk Allocation," *American Control Conference*, New Orleans, LA, May 26–28, 2021, pp. 2011–2016. doi: 10.23919/ACC50511.2021.9483133

243. Brewer, J. M., Tsiotras, P., Lang, K., and Phillips, S., "Falsification-based Verification for Spacecraft Attitude Control Systems," *American Control Conference*, New Orleans, LA, May 26–28, 2021. doi: 10.23919/ACC50511.2021.9483271

244. Pakniyat, A., and Tsiotras, P., "Steering the State of Linear Stochastic Systems: A Constrained Minimum Principle Formulation," *American Control Conference*, New Orleans, LA, May 26–28, 2021. doi: 10.23919/ACC50511.2021.9483276

245. Lim, J., and Tsiotras, P., "A Generalized A* Algorithm for Finding Globally Optimal Paths in Weighted Colored Graphs," *International Conference on Robotics and Automation*, Xi'an, China, May 30–June 5, 2021. doi: 10.1109/ICRA48506.2021.9561135

246. Joshi, S., Hutchinson, S., and Tsiotras, P., "TIE: Time-Informed Exploration for Robot Motion Planning," *International Conference on Robotics and Automation*, Xi'an, China, May 30–June 5, 2021. doi: 10.1109/LRA.2021.3064255

247. Zhang, Q., Guan, Y., and Tsiotras, P., "Learning Nash Equilibria in Zero-Sum Stochastic Games via Entropy-Regularized Policy Approximation," *30th International Joint Conference on Artificial Intelligence*, Montreal, Canada, Aug. 21–26, 2021.

248. Ticozzi, L., Corinaldesi, G., Massari, M., Cavenago, F., King-Smith, M., and Tsiotras, P., "Coordinated Control of Spacecraft-Manipulator with Singularity Avoidance using Dual Quaternions," *72nd International Astronautical Congress*, Dubai, United Arab Emirates, Oct. 25–29, 2021.

249. Zheng, D., and Tsiotras, P., "Accelerating Kinodynamic RRT* through Dimensionality Reduction," *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Prague, Czech Republic, Sept. 27–Oct. 1, 2021. doi: 10.1109/IROS51168.2021.9636754

250. Lim, J., Salzman, O., and Tsiotras, P., "Class-Ordered LPA*: An Incremental-Search Algorithm for Weighted Colored Graphs," *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Prague, Czech Republic, Sept. 27–Oct. 1, 2021. doi: 10.1109/IROS51168.2021.9636736

251. Dor, M., Driver, T., Skinner, K., and Tsiotras, P., "Visual SLAM for Asteroid Relative Navigation," *Conference on Computer Vision and Pattern Recognition*, Workshop on *AI for Space (AI4Space)*, June 19–25, 2021 (virtual).

252. Hawkins, K., Pakniyat, A., Theodorou, E., and Tsiotras, P., "Forward-Backward Rapidly-Exploring Random Trees for Stochastic Optimal Control," *60th IEEE Conference on Decision and Control*, Austin, TX, Dec. 13–15, 2021, pp. 912–917. doi: 10.1109/CDC45484.2021.9683281

253. Hawkins, K., Pakniyat, A., and Tsiotras, P., "On Time Discretization of the Feynman-Kac Forward-Backward Stochastic Differential Equations for Value Function Approximation," *60th IEEE Conference on Decision and Control*, Austin, TX, Dec. 13–15, 2021, pp. 892–897. doi: 10.1109/CDC45484.2021.9683583

254. Pakniyat, A., and Tsiotras, P., "Partially Observed Steering the State of Linear Stochastic Systems," *60th IEEE Conference on Decision and Control*, Austin, TX, Dec. 13–15, 2021, pp. 3780–3785. doi: 10.1109/CDC45484.2021.9683692

255. Makkapati, V. R., Ridderhof, J., and Tsiotras, P., "Reachability-based Covariance Control for Pursuit-Evasion in Stochastic Flow Fields," *AIAA SciTech Forum, Guidance, Navigation, and Control*, San Diego, CA, Jan. 3–7, 2022. doi: 10.2514/6.2022-1382

256. Ridderhof, J., Tsiotras, P., Albert, S., and Schaub, H., "Linear Covariance Analysis of Entry and Aerocapture Trajectories in an Uncertain Atmosphere," *AIAA SciTech Forum, Guidance, Navigation, and Control*, San Diego, CA, Jan. 3–7, 2022. doi: 10.2514/6.2022-1216

257. Zheng, D., Ridderhof, J., Tsiotras, P., and Agha-mohammadi, A., "Belief Space Planning: A Covariance Steering Approach," *International Conference on Robotics and Automation*, Philadelphia, PA, May 23–27, 2022, pp. 1051–1057 doi: 10.1109/ICRA46639.2022.9811560

258. Yin, J., Zhang, Z., Theodorou, E., and Tsiotras, P., "Trajectory Distribution Control for Model Predictive Path Integral Control using Covariance Steering," *International Conference on Robotics and Automation*, Philadelphia, PA, May 23–27, 2022, pp. 1478–1484 (**finalist for Outstanding Planning paper**), doi: 10.1109/ICRA46639.2022.9811615

259. King-Smith, M., Tsiotras, P., and Dellaert, F., "Simultaneous Control and Trajectory Estimation for Collision Avoidance of Autonomous Robotic Spacecraft Systems," *International Conference on Robotics and Automation*, Philadelphia, PA, May 23–27, 2022, pp. 257–264, doi: 10.1109/ICRA46639.2022.9811875

260. Sivaramakrishnan, V., Pilipovsky, J., Oishi, M., and Tsiotras, P., "Distribution Steering for Discrete-Time Linear Systems with General Disturbances using Characteristic Functions," *American Control Conference*, Atlanta, GA, June 8–10 , 2022, pp. 4183–4190, doi: 10.23919/ACC53348.2022.9867212

261. Guan, Y., Zhou, M., Pakniyat, A., and Tsiotras, P. "Shaping Large Population Agent Behaviors Through Entropy-Regularized Mean-Field Games," *American Control Conference*, Atlanta, GA, June 8–10 , 2022, pp. 4429–4435, doi: 10.23919/ACC53348.2022.9867358

262. Brewer, M. J., and Tsiotras, P., "Exponential Stabilization of the Complete Attitude of an Underactuated Spacecraft," *American Control Conference*, Atlanta, GA, June 8–10 , 2022, pp. 1139–1144, doi: 10.23919/ACC53348.2022.9867346

263. Manjunatha, H., Ghanei, M., Pak, A., and Tsiotras, P., "Improving Autonomous Driving Policy Generalization via Auxiliary Tasks and Latent Modeling," *5th Multi-disciplinary Conference on Reinforcement Learning and Decision Making*, Providence, RI, June 8–11, 2022.

264. Makkapati, V. R., Comandur, V., Sarabu, H., Tsiotras, P., and Hutchinson, S., "Desensitized Strategies for Pursuit-Evasion Games with Asymmetric Information," *6th IEEE Conference on Control Technology and Applications*, Trieste, Italy, Aug. 22–25, 2022, pp. 219–224, doi: 10.1109/CCTA49430.2022.9966171

265. Manjunatha, H., Pak, A., and Tsiotras, P., "Improving Autonomous Driving Policy Generalization via Neural Network Over-Parameterization," *International Conference on Machine Learning*, Workshop on *Safe Learning for Autonomous Driving*, Baltimore, MD, July 22, 2022.

266. Lim, J., Srinivasa, S., and Tsiotras, P., "Lazy Lifelong Planning for Efficient Replanning in Graphs with Expensive Edge Evaluation," *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Kyoto, Japan, October 23–27, 2022, pp. 8778–8783, doi: 10.1109/IROS47612.2022.9981389

267. Guan, Y., Afshari, M., Zhang, Q., and Tsiotras, P., "Hierarchical Decompositions of Stochastic Pursuit-Evasion Games," *61th IEEE Conference on Decision and Control*, Cancun, Mexico, Dec. 6–9, 2022. pp. 5062–5067, doi: 10.1109/CDC51059.2022.9992967

268. Driver, T., and Tsiotras, P., "Efficient Feature Description for Small Body Relative Navigation using Binary Convolutional Neural Networks," *45th Annual AAS Guidance, Navigation and Control (GN&C) Conference Conference*, Breckenridge, CO, Feb. 2–8, 2023.

269. Tomita, K., Driver, T., Ho, K., and Tsiotras, P., "Deep Monocular Hazard Detection for Safe Small Body Landing," *AAS/AIAA Space Flight Mechanics Meeting*, Austin, TX, Jan. 15–19, 2023.
270. Joshi, S., Hutchinson, S., and Tsiotras, P., "LES: Locally Exploitative Sampling for Robot Path Planning," *International Conference on Robotics and Automation*, London, UK, May 29–June 2, 2023, pp. 1551–1557, doi: 10.1109/ICRA48891.2023.10160279
271. Larsson, D., Asgharivaskasi, A., Lim, J., Atanasov, N., and Tsiotras, P., "Information-Theoretic Abstractions for Semantic Perception Representation Graphs for Planning," *International Conference on Robotics and Automation*, London, UK, May 29–June 2, 2023, pp. 6937–6943, doi: 10.1109/ICRA48891.2023.10160407
272. Yin, J., Zhang, Z., and Tsiotras, P., "Risk-Aware Model Predictive Path Integral Using Conditional Value-at-Risk," *International Conference on Robotics and Automation*, London, UK, May 29–June 2, 2023, pp. 7937–7943, doi: 10.1109/ICRA48891.2023.10161100
273. Guan, Y., Pan, L., Shishika, D., and Tsiotras, P., "On the Adversarial Chasing Convex Body Problem," *American Control Conference*, San Diego, CA, May 31–June 2, 2023, pp. 435–440, doi: 10.23919/ACC55779.2023.10156405
274. Renganathan, V., Pilipovsky, J., and Tsiotras, P., "Distributionally Robust Covariance Steering with Optimal Risk Allocation," *American Control Conference*, San Diego, CA, May 31–June 2, 2023, pp. 2607–2614, doi: 10.23919/ACC55779.2023.10156030
275. Pilipovsky, J., Sivaramakrishnan, V., Oishi, M., and Tsiotras, P., "Probabilistic Verification of ReLU Neural Networks via Characteristic Functions," *5th Annual Learning for Dynamics & Control Conference*, Philadelphia, PA, June 15-16, 2023, *Proceedings of Machine Learning Research*, Vol. 211, pp. 966–979.

Accepted Conference Proceedings

276. Knaup, J., and Tsiotras, P., "Computationally Efficient Covariance Steering for Systems Subject to Parametric Disturbances and Chance Constraints," *62nd IEEE Conference on Decision and Control*, Singapore, Dec. 13–15, 2023.
277. Rapakoulias, G., and Tsiotras, P., "Discrete-time Optimal Covariance Steering via Semidefinite Programming," *62nd IEEE Conference on Decision and Control*, Singapore, Dec. 13–15, 2023.
278. Pilipovsky, J., and Tsiotras, P., "Data-Driven Covariance Steering Control Design," *62nd IEEE Conference on Decision and Control*, Singapore, Dec. 13–15, 2023.
279. Knaup, J., and Tsiotras, P., "Covariance Steering for Systems Subject to Unknown Parameters", *62nd IEEE Conference on Decision and Control*, Singapore, Dec. 13–15, 2023.

D. Other Publications

Book Reviews

1. *Dynamics and Control* by G. Leitmann, F. E. Udwadia, and A. V. Kryazhimskii (eds.), Gordon Breach, in *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 25, No. 2, p. 415–416, 2002.
2. *Optimal Control with Engineering Applications* by H. P. Geering, Springer, in *IEEE Control Systems Magazine*, Vol. 31, No. 5, p. 115–117, 2011, doi: 10.1109/MCS.2011.942047.

Position Papers and Reports

1. "Trains, Planes, and Automobiles," (with E. Feron and M. Wolf) *2011 Workshop for Developing Dependable and Secure Automotive Cyber-Physical Systems from Components*, Tory, MI, March 17–18, 2011.

2. "The Case for Passenger Customized Automotive Active Safety Systems: Motivation, Challenges, Opportunities," *2014 National NSF Workshop on Transportation Cyber-Physical Systems*, Arlington, VA, January 22–23, 2014.

E. Presentations

Invited Seminars

- Dept. of Eng. Mech. and Astronautics, Univ. of Wisconsin, Madison, WI, April 6, 1993
- Dept. of Aeronautics and Astronautics, Stanford University, Stanford, CA, June 1, 1993
- Dept. of Mechanical and Aerospace Eng., Univ. of California, Irvine, CA, June 7, 1993
- Guidance and Control Branch, Jet Propulsion Laboratory, Pasadena, CA, June 8, 1993
- Dept. of Aerospace Engineering, Univ. of Michigan, Ann Arbor, MI, July 7, 1993
- Dept. of Mechanical, Aerospace and Nuclear Eng., Univ. of Virginia, Charlottesville, VA, April 13, 1994
- Dynamics and Controls Branch, NASA LaRC, Hampton, VA, April 7, 1995
- Dept. of Aerospace Eng., Univ. of Illinois, Urbana-Champaign, IL, Sept. 25, 1995
- Dept. of Electrical Engineering, Univ. of Virginia, Charlottesville, VA, Oct. 27, 1995
- Guidance and Control Branch, NASA GSFC, Greenbelt, MD, Nov. 9, 1995
- Electromechanical Systems Branch, NASA GSFC, Greenbelt, MD, Feb. 14, 1996
- Dept. of Mechanical Engineering, Univ. of Maryland, College Park, MD, Sept. 24, 1996
- Guidance and Control Branch, Jet Propulsion Laboratory, Pasadena, CA, Dec. 15, 1997
- Guidance and Control Group, Hughes Space Systems, El Segundo, CA, Dec. 12, 1997
- Dept. of Aerospace and Ocean Eng., Virginia Tech, Blacksburg, VA, Feb. 16, 1998
- School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, April 13, 1998
- Dept. of Aerospace Engineering, Univ. of Michigan, Ann Arbor, MI, May 11, 1998
- Spacecraft Engineering Dept., NRL, Washington, DC, Oct. 14, 1998
- Dept. of Mechanical Engineering, University of Houston, Houston, TX, March 22, 2000
- Controls Group (Projet SOSSO), INRIA Rocquencourt, France, November 27, 2000
- Controls Group (Projet SOSSO), INRIA Rocquencourt, France, November 29, 2000
- Magnetic Bearings Center, ETH Zürich, Switzerland, June 21, 2001
- Centre Autom. et Systemes, Ecole de Mines, Fontainebleau, France, March 15, 2003
- Surrey Space Center, University of Surrey, Guildford, United Kingdom, April 17, 2003
- Centre de Mathématiques Appliquées, Ecole des Mines de Paris, Sophia Antipolis, France, May 12, 2003
- Space Vehicles Directorate, AFRL, Kirtland AFB, Albuquerque, NM, October 14, 2003
- Space Vehicles Directorate, AFRL, Kirtland AFB, Albuquerque, NM, October 15, 2003
- Guid., Nav. and Control Systems Eng., NASA GSFC, Greenbelt, MD, Nov. 18, 2003
- Guid., Nav. and Optimization Branch, NASA MSFC, Huntsville, AL, April 20, 2005
- Dept. of Mechanical and Process Engineering, ETH Zürich, Switzerland, Dec. 20, 2006
- Space Vehicles Directorate, AFRL, Kirtland AFB, Albuquerque, NM, February 16, 2006
- Dept. of Mechanical Engineering, The University of New Mexico, *Mechanical Engineering Excellence Seminar Speaker* series, February 17, 2006

- Dept. of Mechanical and Aerospace Engineering, UCLA, June 9, 2006
- Guidance and Control Branch, Jet Propulsion Laboratory, Pasadena, CA, May 9, 2007
- Dept. of Electrical, Computer and Systems Engineering, Rensselaer Polytechnic Institute, Troy, NY, October 22, 2007
- Active Safety Group, Ford Motor Company, Dearborn, MI, September 3, 2008
- Control Systems Laboratory, Department of Mechanical Engineering, National Technical University of Athens (NTUA), Greece, November 27, 2008
- Dept. of Aerospace Engineering, UIUC, Champaign, IL, October 19, 2009
- Dept. of Aeronautics and Astronautics, Purdue Univ., West Lafayette, IN, Oct. 20, 2009
- Dept. of Electrical Engineering and Computer Sciences, University of California at Berkeley, Berkeley, CA, November 3, 2009
- Decision and Control Seminar Series, Georgia Inst. of Tech., Atlanta, GA, Jan. 22, 2010
- Air Transportation Center, School of Industrial and Systems Engineering, Georgia Inst. of Tech., GA, April 27, 2010
- Dept. of Mechanical and Aerospace Engineering, Rutgers University, Oct. 6, 2010
- Dept. of Mechanical and Aerospace Engineering, Cornell University, Feb. 10, 2012
- Dept. of Aerospace Engineering, University of Michigan, March 19, 2012
- Army Research Lab, Vehicle Technology Directory, Aberdeen, Maryland, May 24, 2012
- Centre Automatique et Systèmes, Mines-ParisTech, France, June 13, 2013
- PSA Peugeot-Citroën Research Center, Velizy, France, June 17, 2013
- Laboratoire d'Analyse et d'Architecture des Systèmes (LAAS), Humanoid Motion Group, Toulouse, France, July 10, 2013
- Robotics and Mobility Branch, JPL, Pasadena, CA, June 13 & 18, 2014
- Laboratory of Information and Decision Systems, Inference and Control seminar series, MIT, Cambridge, MA, October 2, 2014
- Oak Ridge National Laboratory, Knoxville, TN, October 5, 2014
- ATK Spacecraft Systems and Services, Washington, DC, November 20, 2014
- Boston University, Center for Information and Systems Engineering, Boston, MA, December 5, 2014
- The Charles Stark Draper Laboratory, Guidance and Control and Division, Dec. 19, 2014
- Mitsubishi Electric Research Laboratories, Cambridge, MA, February 3, 2015
- Dept. of Mechanical and Aerospace Engineering, Worcester Polytechnic Institute, Worcester, MA, February 4, 2015
- The Charles Stark Draper Laboratory, Guidance and Control and Division, Feb. 23, 2015
- Laboratory for Information and Decision Systems, LIDS seminar series, MIT, Cambridge, MA, April 14, 2015
- United Technologies Research Center, Embedded Systems & Networks Group, Hartford, CT, May 14, 2015
- Dept. of Mechanical Engineering, MIT, Cambridge, MA, May 22, 2015
- Naval Research Laboratory, Washington, DC, August 13, 2015
- Space Vehicles Directorate, AFRL, Kirtland AFB, Albuquerque, NM, August 19, 2015
- Institute for Human and Machine Cognition, Pensacola, FL, October 20, 2015
- Guidance & Controls Section, JPL, Pasadena, CA, June 12, 2017
- Decision and Control Seminar Series, Georgia Inst. of Tech., Atlanta, GA, Oct. 20, 2017

- Dept. of Aeronautics and Astronautics, *Distinguished Speaker* series, University of Washington, Seattle, WA, November 20, 2017
- Dept. of Aerospace Engineering and Engineering Mechanics, Univ. of Texas at Austin, TX, March 29, 2018
- Dept. of Aerospace Engineering and Engineering Mechanics, Univ. of Texas at Austin, TX, May 17, 2018
- Dept. of Aerospace Engineering, Texas A&M, College Station, TX, October 10, 2018
- NASA Goddard Space Flight Center, November 17, 2018
- Dept. of Electrical and Computer Engineering, Royal Institute of Technology (KTH), Stockholm, Sweden, February 22, 2019
- Dept. of Aerospace Engineering, *Chair's Distinguished Seminar Speaker* series, University of Michigan, Ann Arbor, MI, February 28, 2019
- Dept. of Electrical and Computer Engineering, University of Southern California, Los Angeles, CA, April 5, 2019
- Ecole Nationale de l'Aviation Civile, Toulouse, France, February 18, 2020
- Michigan State University, Robotics and Controls Seminar Series, November 13, 2020
- Dept. of Aerospace Engineering, Univ. of Illinois at Urbana Champaign, November 15, 2021
- Dept. of Robotics and Mechatronics, Kennesaw State University, February 2, 2022
- Dept. of Aerospace Engineering, Texas A&M, College Station, TX, November 1, 2022
- Dept. of Computer Science, Rice University, Houston, TX, November 2, 2022
- Dept. of Mechanical Engineering, *Distinguished Department Seminar*, University of Houston, Houston, TX, November 3, 2022
- Dept. of Aerospace Engineering, *Chair's Distinguished Seminar Speaker* series, University of Michigan, Ann Arbor, MI, November 10, 2022
- Dept. of Aerospace Engineering, *Distinguished Seminar Speaker* series, University of Maryland, College Park, MD, February 22, 2022.

Conference, Workshop and Keynote Presentations

- "The Effect of Coordinates on SO(3) for Attitude Analysis, Stabilization, and Control Problems," *2nd World Congress of Nonlinear Analysis*, Athens, Greece, July 10-17, 1996. (invited).
- "Spacecraft/Aircraft Control under Actuator and Sensor Failures," *Virginia Consortium of Engineering and Sciences Universities Conference*, Old Dominion University, June 11-12, 1997
- "Control of Energy/Momentum Storage Flywheels," *Virginia Consortium of Engineering and Sciences Universities Conference*, Old Dominion Univ., June 11-12, 1997
- "Robust Control Design for an Active Magnetic Bearing/Flywheel System," with S. Djouadi, P. Allaire, and R. Bartlett, *Aerospace Flywheel Workshop*, Glenn Research Center, Cleveland, OH, Oct. 18-20, 1999
- "Robust Control of High-Speed Flywheels on Active Magnetic Bearings for Spacecraft Applications," with J. Luo, Space Power Workshop, Torrance, CA, April 10–13, 2000.
- "Flywheel Battery Magnetic Bearing Controller Design and Verification," with J. Luo, S. Djouadi, R. Bartlett, P. Allaire, E. Hilton, and U. Schönhoff, Space Power Workshop, Torrance, CA, April 10–13, 2000 (invited).
- "Zero and Low-Bias AMB Flywheel Control: Theory and Experimental Setup," with B. Wilson, *Aerospace Flywheel Workshop*, Glenn Research Center, Cleveland, OH, March 14–15, 2002.

- "An Experimental Test-Bed for Low-Loss Control Design of AMBs," with B. Wilson and J. Fausz, *Aerospace Flywheel Workshop*, Fort MacArthur, Los Angeles AFB, CA, Aug. 6–8, 2003.
- " Aggressive Maneuvering of Ground Vehicles over Rough Terrain and Uncertain Environments: Key Issues and Possible Approaches," *ARO/MIT Workshop on Mobility and Control in Challenging Environments*, Olin College, MA, Oct. 5–6, 2006.
- "Advanced Methods for Intelligent Flight Guidance and Planning in Support of Pilot Decision Making," *NASA Aviation Safety Technical Conference*, Denver, CO, Oct. 21-23, 2008.
- "Achieving Increased Mobility And Autonomy For Ground Vehicles Over Rough Terrain," with R. Cowlagi, *26th Army Science Conference*, Orlando, FL, Dec. 1–4, 2008.
- "Robust Aircraft Optimal Trajectory Generation," Tutorial Workshop on Methods for Optimal Trajectory Design, *5th International Conference on Research in Air Transportation*, Berkeley, CA, May 22-25, 2012.
- "Robust Aircraft Optimal Trajectory Generation," *5th Aerospace Decision and Control Workshop*, Atlanta, GA, June 11-12, 2012.
- "Fast and Furious: The Next Generation of (Semi-)Autonomously Driving Vehicles," *France-Atlanta Symposium on Optoelectronics and Robotics in Automotive*, Atlanta, GA, October 26, 2012.
- "Linking High-Level Planning Specifications with Low-Level Motion Primitives Using Transition Histories in Cell Decomposition Graphs," R. Cowlagi and P. Tsiotras, *2nd NSF Workshop on Formal Composition of Motion Primitives*, part of the Cyber-Physical Systems Week (CPSWeek) 2013, Philadelphia, PA, April 8, 2013.
- "Robust and Numerically Efficient Aircraft Optimal Trajectory Generation for Emergency Landing," keynote speaker, *2nd International Conference on Interdisciplinary Science for Air Traffic Management*, Toulouse, France, July 8–10, 2013.
- "Real-Time Near-Optimal Feedback Control of Aggressive Vehicle Maneuvers," Workshop on *Optimization and Optimal Control in Automotive Systems*, Linz, Austria, July 15–16, 2013.
- "Intelligent Systems" invited panelist, *Army Science Planning and Strategy Meeting on Intelligent Systems*, Potomac, Maryland, November 12–13, 2013.
- "Advances in Autonomous Vehicle Control," Workshop on *Intelligent Vehicles*, PSA Peugeot Citroën Technical Center, Vélizy, France, November 14, 2013.
- "Connected Vehicles and Automation," keynote speaker, *NSF 2014 Transportation CPS Workshop*, Arlington, VA, January 23–24, 2014.
- "Machine Learning and Dynamic Programming Algorithms for Motion Planning and Control," with O. Arslan, *New England Machine Learning Day*, Microsoft Corporation, Cambridge, MA, May 18, 2015.
- "Towards an Algorithmic Control Theory for Control," *NSF Workshop on Control, Perception and Learning*, Arlington, VA, August 25–26, 2015.
- "Dynamic Programming Principles for Sampling-Based Motion Planners," with O. Arslan, *Optimal Robot Motion Planning Workshop* in the *IEEE International Conference on Robotics and Automation*, Seattle, WA, May 30, 2015.
- "Satisficing Mechanisms for Enabling Real-Time Perception and Action in Vehicle Autonomy," *ONR Unmanned Maritime Systems Technology Forum*, Miramar Beach, FL, February 1–4, 2016.
- "Computing Optimal Trajectories: From Continuous to Discrete and from Deterministic to Stochastic and Back," Allerton Conference pre-symposium tutorial, Allerton, IL, September 27, 2016.

- "Application of ORB-SLAM to Spacecraft Non-Cooperative Rendezvous," with M. Dor, *Space Robotics and Systems Workshop on Space Robotics*, Boston, MA, July 15, 2017.
- "Computing Optimal Trajectories: From Continuous to Discrete and from Deterministic to Stochastic and Back," GT-MAP Workshop on Dynamics and Control, Atlanta, GA, August 18, 2017.
- "Recent Advances in Hierarchical and Sampling-Based Motion Planning," IROS 2017 Workshop on "Complex Collaborative Systems: Closing the Loop, Learning, and Self-Confidence," Vancouver, Canada, September 28, 2017.
- "The Next Frontier: The Challenges in Developing Truly Autonomous Space Robots," Keynote address, *5th IEEE International Conference on Wireless for Space and Extreme Environments (WiSEE 2017)*, Montreal, Canada, October 12, 2017
- "Dual Quaternions as a Tool for Modeling, Control, and Estimation for Spacecraft Robotic Servicing Missions," with A. Valverde, *John L. Junkins Dynamical Systems Symposium*, Texas A&M University, College Station, TX, May 20-21, 2018.
- "Minimum-Fuel Powered Descent In The Presence Of Uncertainty," with J. Ridderhof, *2018 International Planetary Probe Workshop*, Boulder, CO, June 11–15, 2018.
- "Optimal Strategies and Task Allocation in Multi-Pursuer Single-Evader Problems," with R. Makkapati, *18th International Symposium on Dynamic Games and Applications*, Grenoble, France, July 9–12, 2018.
- "Fast and Furious: Controlling Vehicles at the Limits of Performance," Workshop honoring John Hauser's 60th birthday, *American Control Conference*, Milwaukee, WI, June 26, 2018.
- "High-Fidelity Multi-Spacecraft Guidance Navigation and Control Simulation and Testing," with M. King-Smith, M. Dor, J. Stanhope, and J. Ma, *Space Innovation Symposium*, Atlanta, GA, Nov. 13-14, 2018.
- "Minimum-Fuel Powered Descent In the Presence of Uncertainty," with J. Ridderhof, *Space Innovation Symposium*, Atlanta, GA, Nov. 13-14, 2018.
- "Decision-Making for Intelligent CPS Systems Subject to Computational Constraints: Hierarchical Abstraction Approach," Workshop on *Computation-aware Algorithmic Design for Cyber-Physical Systems*, *57th IEEE Conference on Decision and Control*, Miami, FL, Dec. 16, 2018.
- "Covariance Steering as a Tool for Planning in the Presence of Uncertainty," Workshop on *Uncertainty Synthesis*, *58th IEEE Conference on Decision and Control*, Nice, France, Dec. 10, 2019.
- "Time-Informed Exploration for Robot Motion Planning," with S. Joshi and S. Hutchinson, Workshop on *Machine Learning in Planning and Control Robot Motion*, *International Conference on Robotics and Automation*, Paris, France, May 31, 2020.
- "Apollonius Allocation Algorithm for Heterogeneous Pursuers to Capture Multiple Evaders," with V. R. Makkapati, Workshop on *Heterogeneous Multi-Robot Task Allocation and Coordination*, *Robotics Science and Systems*, Corvalis, OR, July 12-16, 2020.
- "Information-Theoretic Abstractions for Resource-Constrained Agents via Mixed-Integer Linear Programming," with D. Larsson and D. Maity, Workshop on *Computation-Aware Algorithmic Design for Cyber-Physical Systems*, *24th ACM International Conference on Hybrid Systems: Computation and Control*, May 18–21, 2021.
- "Off-Road Robotic Racing," Workshop on *Opportunities and Challenges with Autonomous Racing*, *International Conference on Robotics and Automation*, Xi'an, China, May 31, 2021.
- "Recent Advances in Optimal Motion Planning for Autonomous Systems," *KAUST Research Conference on Robotics and Autonomy*, Feb. 28–Mar. 2, 2022 (virtual).
- "Deep Feature Detection and Description for Small Body Relative Navigation," with T. Driver, *3rd Space Imaging Workshop*, Atlanta, GA, Oct. 10–12, 2022.

- "Realistic Small-Body Imagery Data Generation for Relative Navigation in a Controlled Lab Environment," with M. Dor, *3rd Space Imaging Workshop*, Atlanta, GA, Oct. 10–12, 2022.
- "Control of Uncertainty or Control with Uncertainty? A New Control Design Paradigm for Stochastic Systems," Keynote speaker, *International Conference on Informatics in Control, Automation and Robotics (ICINCO)*, Lisbon, Portugal, July 16, 2022.
- "Improving Autonomous Driving Policy Generalization via Neural Network Over-Parameterization," with H. Manjunatha and A. Pak, "Safe Learning for Autonomous Driving (SL4AD) Workshop, *39th International Conference on Machine Learning (ICML)*, Baltimore, MD, July 17–23, 2022.
- "Dynamic Adversarial Resource Allocation: A Complete Characterization," with Shishika, D., Guan, Y., Marden, J., and Kumar, V., *22nd International Conference on Autonomous Agents and Multiagent Systems*, Workshop on *Multiagent Sequential Decision Making under Uncertainty*, London, UK, May 29-30, 2023.
- "Abstract Representations for Efficient Planning and Decision-Making for Agents with Limited Computational Resources," with D. Larsson and S. Guan, 3rd Workshop on *Computation-Aware Algorithmic Design for Cyber-Physical Systems*, *Cyber-Physical Systems and Internet-of-Things Week*, May 9, 2023.

F. Other Scholarly Accomplishments

Patents

(a) "Control of Magnetic Bearing-Supported Rotors," R. Bartlett, P. Tsiotras, and P. Allaire, U.S. Patent No. 6,267,876 B1, (issued July 31, 2001).

(b) "System For Vehicle Control To Mitigate Intersection Collisions And Method Of Using The Same," J. Lu, P. Prasad, P. Tsiotras, E. Velenis, and D. Filev, US Patent No. 8577550 (issued November 8, 2013).

(c) "Dual Quaternions for Dynamics & Control of Spacecraft with Robotic Arms," D. S. Bayard, P. Tsiotras, A. Valverde, US Patent Application No. 62/591,927 (filled November 29, 2017).

(d) "Autonomous Vehicle Research System," B. Goldfain, P. Drews, G. Williams, E. Theodorou, J. Rehg, P. Tsiotras, US Patent No. 10,296.003 (issued May 21, 2019).

V. Service

A. Professional Contributions

Associate Editorships

- *Encyclopedia of Systems and Control*, Section Editor, 2019–2020.
- *Frontiers in Robotics and AI*, Specialty Chief Editor in the area of Space Robotics, 2015–
- *Dynamic Games and Applications*, Associate Editor, 2019–
- *Entropy*, special issue on "Information Theory for Path Planning and Control," Guest Editor, 2020–2022
- *AIAA Journal of Guidance, Control, and Dynamics*, special issue on "Computational Guidance and Control," Guest-Editor, 2015–2016
- *International Journal of Vehicle Autonomous Systems*, special issue on "Autonomous and Semi-Autonomous Control for Safe Driving of Ground Vehicles," Guest-Editor, 2008–2009
- *IEEE Transactions on Automatic Control*, Associate Editor, 2009–2011.
- *IEEE Control Systems Magazine*, Associate Editor, 2003–2009.

- *AIAA Journal of Guidance, Control, and Dynamics*, Associate Editor, 1999–2007.
- *Dynamics and Control: An International Journal* (merged with the *Journal of Dynamical and Control Systems*), Associate Editor, 2000–2002.

Membership to Professional Societies

American Institute of Aeronautics and Astronautics (AIAA) – Fellow
Institute of Electrical and Electronics Engineers (IEEE) – Fellow
American Astronautical Society (AAS) – Fellow
Society of Professional Engineers of Greece (TEE) – Member

Professional Consulting

- Expert technical evaluator of self-driving vehicle technology for investment banks (2018-2020)
- Mentor for Creative Destruction Lab (Space stream) (2022-2023)

Session and Workshop Organizer

- IEEE/RSJ International Conference on Intelligent Robots and Systems (with M. Gombolay, Y. Guan, E. Seraj), workshop on "Decision Making in Multi-Agent Systems," Oct. 23–27, 2022, Kyoto, Japan.
- American Control Conference (with J. Marden, and D. Shishika), invited session on "Adversarial Dynamic Games and Team Strategies," June 8–10, 2021, Atlanta, GA.
- American Control Conference (with E. Bakolas, Y. Chen, and A. Halder), workshop on "Control of Distributions: Theory and Applications," May 24, 2021, New Orleans, LA.
- Joint ARL/UPenn/GaTech workshop on "Games in Multi-Agent Environments," January 16, 2020, Georgia Tech, Atlanta, GA.
- 58th IEEE Conference on Decision and Control (with E. Bakolas, Y. Chen, and T. Georgiou), workshop on "Uncertainty Synthesis," December 10, 2019, Nice Acropolis, France.
- 57th IEEE Conference on Decision and Control (with M. Mesbahi), invited session on "Algorithmic Control Theory I & II," December 16, 2018, Miami, FL.
- 56th IEEE Conference on Decision and Control (with M. Mesbahi), invited session on "Algorithmic Control Theory," December 12, 2017, Melbourne, Australia.
- 55th IEEE Conference on Decision and Control (with E. Feron and E. Theodorou), workshop on "Perception, Control and Planning for Agile Autonomous Agents," December 11, 2016, Las Vegas, NV.
- IEEE International Conference on Robotics and Automation (with A. Censi and S. Soatto), invited workshop on "Task-driven Perceptual Representations: Sensing, Planning and Control under Resource Constraints," May 16–21, 2016, Stockholm, Sweden.
- 51th IEEE Conference on Decision and Control (with J. Lu and S. Di Cairano), invited session on "Integrated Vehicle Dynamics and Control", Dec. 10–13, 2012, Maui, HI.
- 5th International Conference on Research in Air Transportation (with E. Feron, D. Delahaye and S. Puechmorel), Workshop on "Methods for Optimal Trajectory Design", May 22, 2012, Berkeley, CA.
- 50th IEEE Conference on Decision and Control (with J. Lu), invited session on "Integrated Vehicle Dynamics and Control - I and II", Dec. 12–15, 2011, Orlando, FL.
- 49th IEEE Conference on Decision and Control (with J. Lu and F. Borelli, invited session on "Integrated Vehicle Dynamics and Control", Dec. 15–17, 2010, Atlanta, GA.

- 48th IEEE Conference on Decision and Control (with J. Lu, Z. Lin, X.-Y. Lu), invited session on "Integrated Vehicle Dynamics and Control - I and II", Dec. 16–18, 2009, Shanghai, China.
- American Control Conference, (with C. Canudas de Wit), invited session on "Control Techniques for Improved Vehicle Handling and Stability", June 28–30, 2000, Chicago, IL.
- Workshop on the Integration of Engineering Research and Education, NSF, Session on "Partnership with Industry: Benefits and Pitfalls" (session facilitator), Nov. 9–10, 1998, Arlington, VA.

Review Panels

- National Science Foundation (NSF)
- National Aeronautics and Space Administration (NASA)
- Army Research Office (ARO)
- Air Force Office for Scientific Research (AFOSR)
- Office of Naval Research (ONR)
- Israel Science Foundation (ISF)
- National Academy of Engineering (NAE), Panel on Review of Laboratory Independent Research in Computational Sciences at the Army's Research, Development, and Engineering Centers

Professional Committees and Service

- Program Committee, Member, Workshop on Computation-Aware Algorithmic Design for Cyber-Physical Systems, 2022
- AIAA Aerospace Autonomy Summit, participant (invited), November 2021.
- NAE Workshop on Autonomy, participant (invited), November 2021.
- Program Committee, Member, Workshop on Computation-Aware Algorithmic Design for Cyber-Physical Systems, 2021
- AAS Fellow Selection Committee, Member, 2020
- Faculty Hiring Evaluation Committee, External Member, Dept. of Aerospace Science and Technology, University of Athens, 2020.
- IEEE Connected and Automated Vehicles Symposium, Technical Program Co-Chair, 2019.
- International Conference on Robotics and Automation (ICRA), Associate Editor, 2018.
- 18th Towards Autonomous Robotic Systems (TAROS) Conference, Program Committee Member, 2016–2017
- AIAA Space Automation and Robotics (SAR) Technical Committee, Member, 2015 –
- Best Student Paper Selection Committee, American Control Conference, Member, 2014
- External Evaluation Committee, Dept. of Mechanical Engineering and Aeronautics, University of Patras, Chairman, 2013
- AIAA Fellow Selection Committee, Member, 2010
- AIAA Guidance, Navigation and Control (GNC) Technical Committee, Member, 2008 – 2011
- MAG'97 Magnetic Bearings and Dry Gas Seals Conference and Exhibition, Organizing Committee Member, 1996–1997
- 6th International Symposium on Magnetic Bearings, International steering committee member, 1997–1998

- ASME Dynamic Systems and Control Committee, Automotive Transportation Panel, Member, 1999 – 2011
- 13th IEEE Mediterranean Conference on Control and Automation International program committee member, 2004–2005
- 1st International Conference on Robot Communication and Coordination (ROBOCOMM), International program committee member, 2007
- 9th Annual Historically Black Colleges and Universities Undergraduate Program (HBCU-UP), National Research Conference, Judge, October 22–26, 2008
- 2nd International Conference on Robot Communication and Coordination (ROBOCOMM), International program committee member, 2009
- IEEE Senior Member Selection Committee, Member, 2009
- 19th IEEE Mediterranean Conference of Control and Automation, organizing committee member (invited workshops chairman), 2010–2011

B. Campus Contributions

Georgia Institute of Technology

- College of Engineering, Research Faculty Promotion Committee, Member, 2022–2023
- ECE School, Julian Hightower Jr., Faculty Search Committee, Member, 2022
- AE School, Periodic Performance Review Committee, Chair, 2020–2021
- AE School, Reappointment, Tenure and Promotion Review Committee, Member, 2019–2022
- ECE School, Julian Hightower Jr., Faculty Search Committee, Member, 2018–2019
- Sigma Xi Best PhD Thesis Award Institute Committee, Member, 2018
- AE School, Autonomy Area Faculty Search Committee, Chairman, 2017–2018
- AE School, Flight Mechanics and Control Area Faculty Search Committee, Chairman, 2017–2018
- Associate Director for Research, Institute for Robotics and Intelligent Machines, 2016–
- AE School, Graduate Curriculum Committee, Member, 2016–2021
- AE School, Space Systems Area Faculty Search Committee, Member, 2016–2017
- AE School, Autonomy Area Faculty Search Committee, Member, 2016–2017
- AE School, Strategic Plan Committee, Member, 2013–2014
- AE School, Autonomy Area Faculty Search Committee, Chairman, 2013–2014
- ChBE School, Reappointment, Tenure and Promotion Internal Review Committee, Member, 2013
- AE School, Flight Mechanics and Control Area Faculty Search Committee, Member, 2012–2013
- Sigma Xi Undergraduate Research Award Institute Committee, Member, 2012
- AE School, Space Systems Area Faculty Search Committee, Member, 2011–2012
- AE School, Reappointment, Tenure and Promotion Committee, Member, 2011–2014
- College of Engineering, Research Faculty Promotion Committee, Member, 2010–2012
- AE School, Graduate Quality Enhancement Committee, Member, 2010–2012
- AE School, Reappointment, Tenure and Promotion Internal Review Committee, Member, 2010–2011

- College of Engineering, Reappointment, Tenure and Promotion Committee, Member, 2008–2010
- AE School, Space Systems Area Faculty Search Committee, Member, 2006–2009
- AE School, Reappointment, Tenure and Promotion Internal Review Committee, Chairman, 2007–2009
- AE School, Periodic Peer Review Committee, Chairman, 2005–2006
- AE School, Dutton/Ducoffe Endowed Chair Faculty Search Committee, Chairman, 2004–2005
- AE School, Five-Year Strategic Plan Committee, Member, 2005–2007
- AE School, Propulsion Area Faculty Search Committee, Member, 2004
- AE School, FMC Honors Curriculum Committee, Member, 1998–
- AE School, FMC Ph.D. Qualifying Examination Committee, Member, 1998–
- AE School, FMC Curriculum Committee, Member, 1998–
- AE School, Undergraduate Education Enhancement Committee, Member, 2000–2005
- AE School, Student Honors Program Committee, Member, 2001–2018
- AE School, Graduate Committee, Member, 2000–
- AE School, Laboratory Facilities Committee, Member, 2000–2010
- AE School, Andrew and David Lewis Endowed Chair Faculty Search Committee, Member, 1999–2002

University of Virginia

- MANE Department, Dynamics and Control Committee, Member, 1994–1998
- MANE Department, Dynamics and Control Comprehensive Examination Committee, Member, 1994–1998
- MANE Department, Computer Committee, Member, 1996–1998
- SEAS, ENGR 207 Undergraduate Curriculum Committee, Member, 1997–1998

VI. Grants and Contracts

A. As Principal Investigator

1. "A User-Friendly Environment for Numerical Solution of Optimal Control Problems," amount $5,000, NSF (REU Program), May 1997–Sept. 1997.
2. Carlos E. Farrar Fellowship (for Haijun Shen), amount $6,000, SEAS, Univ. of Virginia, Sept 1997–May 1998.
3. "CAREER: Robust and Optimal Control of Nonlinear Mechanical Systems with Rotating Components," amount $220,000, NSF, June 1996 – May 2000.
4. "Robust and Optimal Control of Nonlinear Mechanical Systems with Rotating Components," amount $107,000, NSF, June 1996 – May 1999, (supplement to CAREER award).
5. "Nonlinear Control Laws for Low Loss Magnetic Bearings," amount $25,000, AFS, Inc., June 1998–May 1999.
6. "Advanced Control Techniques for Energy Storage Flywheel Magnetic Bearings," amount $128,592, AFS, Inc., Jan. 1999–Dec. 2000.
7. "Non-smooth Feedback Control of Nonholonomic Systems with Applications to Mobile Robots," amount $16,000, NSF, (France-NSF Cooperation Program), Mar. 1998 – Feb. 2001.

8. "Attitude Control of Small Sats using Magneto-Torquers," amount $5,000, NSF (Research Experience for Undergraduates Program), Mar. 1998–May 1999.
9. "Analysis and Control of High-Speed Wheeled Mobile Robots," amount $235,000, Army Research Office, June 2000–May 2003.
10. "Robust Gain-Scheduling Control for High-Speed Gyroscopic Rotors Supported on Magnetic Bearings" amount $250,000, American Flywheel Systems, Inc., June 2000–December 2001.
11. "Nonlinear Spacecraft Control with Applications to Combined Attitude Tracking and Energy Storage," amount $300,000, AFOSR, August 2000–July 2003.
12. "Numerical Nonlinear and Optimal Control Using Wavelets," amount $175,000, NSF/CMS, September 2000–August 2003.
13. "Upgrade of AE4520 Undergraduate Controls Laboratory," amount $25,100, Technology Fee Program, Georgia Tech, October 2000.
14. "A Spacecraft Simulator for Undergraduate Education," amount $10,000, Technology Fee Program, Georgia Tech, October 2001.
15. "DURIP: A Simulator Facility for Attitude Control and Energy Storage of Spacecraft," amount $230,000, AFOSR, April 2001–March 2002.
16. "Experimental Validation of Zero- and Low-Bias Control Algorithms for Active Magnetic Bearings," amount $45,000, AFRL/AFOSR, January 2002–December 2002.
17. "Coordinated Resource Allocation Among Multiple Agents with Application to Autonomous Refueling and Servicing of Satellite Constellations," amount $303,027, AFOSR, Jan. 2004–Dec. 2007.
18. "On-Line Path Generation and Tracking for High-Speed Wheeled Autonomous Vehicles," amount $325,366, ARO, Feb. 2005–Feb. 2008.
19. "Control of Vehicles at High-Speed over Rough Terrain: The Effect of Vehicle Modalities," amount $100,000, Army Research Office, Sept. 2007–Feb. 2009.
20. "Wavelets in Control and Optimization," amount $160,000, NSF/CMS, Sept. 2005-Aug. 2007.
21. "Control and Recovery of Vehicles During High-Speed and Other Abnormal Conditions," amount $120,000, Ford Motor Co., Jan. 2006–Dec. 2008.
22. "DURIP: A 5-DOF Test-Bed for Autonomous Spacecraft Rendezvous and Docking," amount $237,500, AFOSR, April 2006–March 2007.
23. "GOALI: Next Generation Active Safety Control Systems for Crash-Avoidance of Passenger Vehicles Using Expert Driver Knowledge," (Co-PIs: J. Lu and E. Velenis), amount $274,000, NSF/CMII, Sept. 2007–Aug. 2010.
24. "Advanced Methods for Intelligent Flight Guidance and Planning in Support of Pilot Decision Making," (Co-PI: E. Johnson) amount $701,858 ($350,000), NASA, Oct. 2007–Sept. 2010.
25. "High Performance Satellite Pointing Algorithm Development and Testing," amount $90,000, SAIC, Feb. 2008-Dec. 2008.
26. "Synthetic Automotive Virtual Environments," amount $290,000, US Army, ERDC-CRREL and Vehicle Control Training, LLC, Sept. 2008-Aug. 2010.
27. "Multiscale, Beamlet-Based Data Processing for the Solution of Shortest-Path Problems with Applications to Embedded Vehicle Autonomy," (Co-PI: X. Huo), amount $185,000 ($95,000), NSF, Oct. 2009-Aug. 2011.

28. "Advanced Algorithm Development and Testing for Autonomous Operation of Small Satellites in Space," amount $500,000, Star Technologies, May 2010-March 2011.
29. "MURI: Neuro-Inspired Adaptive Perception and Control for Agile Mobility of Autonomous Vehicles in Uncertain and Hostile Environments," (Co-PIs: J. Rehg, F. Dellaert, E. Feron, L. Itti, USC, E. Frazzoli, MIT, K. Iagnemma, MIT) amount $6,250,000 ($750,000), ARO, Oct. 2010-Sept. 2015.
30. "DURIP: A Scaled Automotive Platform for Validation and Testing of Perception and Control Algorithms for Unmanned Ground Vehicles Operating Under Extreme Driving Conditions," amount $98,000, ARO, July 2012-June 2013.
31. "GOALI: Advanced Driver Assistance and Active Safety Systems through Driver's Controllability Augmentation and Adaptation," (Co-PIs: L. Itti, USC, J. Lu, Ford Motor Co.), amount $375,550 ($225,550), NSF/CMMI, Sept. 2012-Aug. 2015.
32. "Environment-Agent Interaction in Autonomous Networked Teams with Applications to Minimum-Time Coordinated Control of Multi-Agent Systems," amount $240,000, NSF/CMMI, Sept. 2012-Aug. 2015.
33. "Autonomous, Vision-Based Satellite Proximity Operations for Inspection, Health Monitoring and Surveillance in Orbit," (Co-PIs: P. Vela, R. Russell, UTA), amount $820,000 ($375,000), AFRL, Nov. 2012–Oct. 2015.
34. "A Framework for Bounded Rationality Autonomy Using Neuromorphic Decision and Action Models," (Co-PIs: L. Itti, USC, S. Schaal, USC, S. Soatto, UCLA), amount $1,755,000, ($480,000), ONR, June 2013–May 2017.
35. "Autonomous Energy-Projecting Systems for Robotic Exploration of Extreme Environments," amount $27,000, C-STAR/JPL, May-June 2014.
36. "NRI: Information-Theoretic Trajectory Optimization for Motion Planning and Control with Applications to Space Proximity Operations," (Co-PI: E. Theodorou), amount $700,000 ($400,000), NSF, September 2014–August 2017.
37. "CPS: Synergy: Collaborative Research: Adaptive Intelligence for Cyber-Physical Automotive Active Safety - System Design and Evaluation," (Co-PIs: K. Feigh, L. Itti, USC), amount $800,000 ($300,000), NSF, September 2015–August 2018.
38. "Driver Behavior Characterization using Ford's BDD Data and its Usage for Discovery Project 20029," amount $25,000, Ford Motor Co., November 2015–May 2018.
39. "HSAP/URAP: Development and Implementation of Perception and Control Algorithms for Off-Road Autonomous Rally Driving Using a Scaled Automotive Platform," $12,000, ARO, May 2016–Sept. 2016.
40. "Covariance Steering Theory for Precise GN&C Terrain Relative Navigation during Entry, Descent and Landing," $25,000, C-STAR/JPL, May-June 2016.
41. "Statistical Mechanics for Learning Algorithmic-Based Controllers: The Role of Physics in New Computational Models for Real-Time Control," (Co-PIs: E. Theodorou, S. Karaman (MIT)), $350,000 ($130,000) , ARO, July 2016–June 2017.
42. "RI: Incremental Sampling-Based Algorithms and Stochastic Optimal Control on Random Graphs," $335,757, NSF, May 2016–April 2019.
43. "Dynamic Modeling of Articulated Space Robotic Spacecraft Using Dual Quaternions," $75,000, JPL/SURP, Nov. 2016–Oct. 2019.
44. "DURIP: A Testbed for Large-Scale Multi-Vehicle Autonomous Research," (Co-PIs: E. Theodorou and J. Rehg), $160,000, ONR, July 2017–June 2018.

45. "Covariance Steering Theory for Precise GN&C Terrain Relative Navigation during Entry, Descent and Landing," $27,000, C-STAR/JPL, June 2017.
46. "Stochastic Optimal Control for Powered Descent Guidance," $210,000, NASA Space Technology Research Fellowship (for Jack Ridderhof), Aug. 2017–Aug. 2021.
47. "Enabling Predictable Driving of Autonomous Vehicles in Highway Traffic," $50,000, Ford Motor Co., April 2017–May 2018.
48. "Safe, Resilient and Efficient Operation of Autonomous Aerial and Ground Vehicles" $396,000, NSF, June 2017–May 2020.
49. "Artificial Intelligence/Machine Learning to Improve Maneuvers of Robotic/Autonomous Systems," $60,000, Autonomous Solutions, Inc., Sept. 2017–Mar. 2018.
50. "Persistent Platform in Geosynchronous Earth Orbit," $27,258, Spaceworks, Sept. 2017–Dec. 2018
51. "Autonomous Multi-Spectral Relative Navigation, Active Localization, and Motion Planning in the Vicinity of an Asteroid," $500,000, NASA, Jan. 2018–Dec. 2020.
52. "Virtual Driver Path Planning/Following Using Reinforcement Learning and Learning from Demonstration," $216, 000, Ford Motor Co., Jan. 2018–Dec. 2019.
53. "Bounded-Rational Decision-Making Hierarchical Models for Autonomous Agents," $560,000, ONR, April 2018–March 2021.
54. "Support of VIP team on Active Safety for Autonomous Vehicles," $15,000, Sandia, Aug. 2018–July 2019.
55. "SA&S: Decision-Making for Autonomous Systems with Limited Resources," $422,797, NSF, February 2019–January 2022.
56. "Verification and Validation of Algorithms for Resilient Complex Software Spacecraft Control Systems," (Co-PI: E. Feron), Verus Research, $225,000 ($125,000) , Aug. 2019–July 2021.
57. "Support of VIP team on Active Safety for Autonomous Vehicles," $20,000, Sandia, Aug. 2019–July 2020.
58. "Hyper-Differential Analysis to Mitigate Uncertainties for Control of Hypersonic Vehicles," $225,000, Sandia, Oct. 2019–Sept. 2022.
59. "Covariance Steering MPC Theory for Control Design of Off-Road Autonomous Vehicles," Autonomous Solutions, Inc., $350,000, Jan. 2020–May 2021.
60. "Behavior Cloning with Structure for Decision Making in Traffic through Reinforcement Learning," $212,000, Ford Motor Co., Jan. 2020–Dec. 2022.
61. "RI: Small: Robust Autonomy for Uncertain Systems using Randomized Trees," $448,508, NSF, August 2020–July 2023.
62. "Resilient and Fail Safe Motion Planning Using Covariance Steering and Machine Learning," $205,000, Ford Motor Co., Jan. 2021–Dec. 2023.
63. "Visual SLAM-based 3D Shape Reconstruction for Autonomous Characterization and Relative Navigation of Small Bodies," $280,000, NASA Space Technology Research Fellowship (for Travis Driver), Aug. 2021–Aug. 2025.
64. "FRR: AstroSLAM - A Robust and Reliable Visual Localization and Pose Estimation Architecture for Space Robots in Orbit," (Co-PI: F. Dellaert), $760,000, NSF, Mar. 2021–Feb. 2024

65. "In-Situ Symbiotic Robotic ProxOps Technology Demonstration," $225,000, Georgia Tech Research Institute (Co-PIs: F. Dellaert, Z. Kira, A. Konrad), Dec. 2021–June 2022.
66. "CPS: Learning-Enabled Assistive Driving: Formal Assurances during Operation and Training," (Co-PIs: S. Coogan, M. Gombolay), $1,045,286, NSF, June 2022–May 2025.
67. "Continuum Robotics for Autonomous Space Servicing," $11,745, Institute for Robotics and Intelligent Machines Seed Grant (Co-PI: Y. Chen), Jan. 2023–June 2023.
68. "Factor Graph Trajectory Estimation, Planning, and Navigation for Spacecraft Autonomy," $60,000, Aerospace Corporation, Jan. 2023–Aug. 2023.
69. "STAR Teams: Coordinated Relative Navigation of Multiple Spacecraft in Orbit," $220,000, Verus Research, Jan. 2023–Dec.2024.
70. "Hierarchical Abstractions for Sequential Decision-Making withApplications to Stochastic Games," $575,000, ONR, May 2023-April 2026.

B. As Co-Principal Investigator or Investigator[1]

71. "Energy Momentum Wheels (EMW's) for Satellites and Other Applications with Gain-Scheduled Controllers" (Co-PI), amount $91,000 ($45,000), AFS, Inc., (NASA SBIR – Phase I), Feb. 1997 – July 1997.
72. "Design of a Magnetic Bearing Test Rig," (PI: P. Allaire), amount $24,000 ($10,000), RDC, Inc., Oct. 1995–Apr. 1996.
73. "Magnetic Bearings for Flywheel Systems," (PI: P. Allaire), amount $38,000 ($12,000), RDC, Inc., Jan. 1997–June 1997.
74. "Energy Momentum Flywheels for Satellites: Theoretical and Experimental Investigation of Gain-Scheduled Controllers," (PI: P. Allaire), amount $600,000 ($110,000), AFS, Inc., (NASA SBIR – Phase II), Feb. 1998–Jan. 2000.
75. "Integrated Lab Project," amount $30,000 ($10,000), (Co-PIs: J. Seitzman and J. Craig), GTF, July 1999–September 2000.
76. "Gain-Scheduled Control of Magnetic Bearing Milling Spindles," (PI: C. Knospe), amount $250,000 ($100,000), NSF, Nov. 1997-Oct. 2000.
77. "NIA: Experimental Validation of Advanced Nonlinear Concepts in Spacecraft Control," (PI: D. Schrage), amount $500,000, ($20,000), NIA/NASA LaRC, June 2004–May 2005.
78. "Prototype Controller for Elastic Spacecraft ," (PI: W. Singhose) amount $69,000 ($10,000), Northop-Grumman, Dec. 2003–May 2005.
79. "Flight Algorithms for Nocturnal Atmospheric Wind Energy Extraction," (PI: M. Costello), amount $100,950 ($50,000), DARPA (Subcontract from Simpson Weather Associates), Nov. 2008-Mar. 2009.
80. "Rapid Reconnaissance and Response (R^3) Mission," (PI: D. Spencer), amount $110,000, AFOSR (University NanoSat Program), Jan. 2009–Dec. 2010.
81. "Satellite Tracking Station and Mission Operations Center," (Co-PIs: R. Russell and D. Spencer), Technology Fee Funds, College of Engineering, Georgia Institute of Technology, amount $100,000, Jan. 2009-June. 2009.
82. "Motion Coordination and Adaptation Using Deception and Human Interactions," (PI: M. Egerstedt), amount $620,000 ($320,000), AFOSR, Jan. 2013–Dec. 2015.
83. "Learning Optimal Control using Forward-Backward SDEs," (PI: E. Theodorou), amount $350,000 ($157,500), NSF/CMMI, June 2017–May 2020.

[1]The amount in parenthesis shows level of responsibility.

84. "ARCHES: Autonomous Resilient Cognitive Heterogeneous Swarms," (PI: M. Egerstedt), ARL/UPenn, $9,600,000 ($2,423,000), Nov. 2017–Oct. 2027.
85. "Verification and Validation of Algorithms for Resilient Complex Software Controlled Systems," (PI: E. Feron), Verus Research $60,000 ($20,000), Mar. 2018-Dec. 2018.
86. "RAIDER: Resilient Actionable Intelligence for Distributed Environment understanding and Reasoning," (PI: J. Cortes, UCSD), ONR, $2,000,000 ($500,000), Aug. 2018–July 2022.
87. "Curiosity Lab at Peachtree Corners," (PI: Debra Lam), City of Peachtree Corners, $100,000, May 2019–April 2020.
88. "Safe Aviation Autonomy with Learning-Enabled Components in the Loop: From Formal Assurances to Trusted Recovery Methods," NASA ULI, (PI: M. Pavone, Stanford), $8,000,0000 ($600,000), Sep. 2020–Aug. 2024.
89. "Safe, Fluent, and Generalizable Outdoor Autonomy," ARL, (PI: B. Boots, Univ. of Washington), $750,000 ($87,000), April 2020–Dec. 2020.
90. "Factor Graph Trajectory Planning and Navigation for Collision Avoidance of Autonomous Robotic Spacecraft Systems," Aerospace Corporation, (PI: F. Dellaert), $50,000 ($25,000), February 2022-August 2022.
91. "RAPID: Resilient multi-Agent Perception and Planning In Dynamic Domains," (PI: J. Cortes, UCSD), ONR, $1,500,000 ($365,700), April. 2023–March 2026.

VII. Honors, Awards and Recognition

Awards and Recognition

- Outstanding Planning paper award finalist, International Conference on Robotics and Automation, Philadelphia, 2022.
- Best student paper award 2nd place (advisor of Jack Ridderhof), AIAA SciTech, San Diego, 2021
- American Astronautical Society (AAS), Fellow, 2019
- Institute of Electrical and Electronics Engineers (IEEE), Fellow, 2019
- IEEE Award for Technical Excellence in Aerospace Control, IEEE Control Systems Society, 2018
- Best student paper award 1st place (advisor of Jack Ridderhof), AIAA SciTech, San Diego, 2019
- Best student paper award finalist (advisor of Kazuhide Okamoto), IEEE Conference on Systems, Man and Cybernetics, Budapest, Hungary, 2016
- Sigma Xi Best PhD Thesis Award (advisor of Nuno Filipe), Sigma Xi Society, Georgia Institute of Technology, 2015
- Purdue University 2014 School of Aeronautics and Astronautics' Outstanding Aerospace, Engineer (OAE) award (highest honor bestowed on that school's alumni)
- Best student paper award 1st place (advisor of Nuno Filipe), AIAA Guidance, Navigation and Control Conference, Boston, 2013
- Appointed College of Engineering Dean's Professor, College of Engineering, Georgia Institute of Technology, 2012
- Sigma Xi Best Undergraduate Research Award (advisor of Luis Reyes Castro), Sigma Xi Society, Georgia Institute of Technology, 2011
- Best conference paper award finalist, 10th Symposium on Distributed Autonomous Robotic Systems (DARS), Lausanne, Switzerland, 2010
- American Institute of Aeronautics and Astronautics (AIAA), Fellow, 2009

- Best student paper award 1st place (advisor of Raghvendra Cowlagi), American Control Conference, St. Louis, Missouri, 2009
- Luther Long Award, 2006, for best doctoral thesis at Georgia Tech in the area of Engineering Mechanics (advisor of E. Velenis)
- Top Ten Best Paper list, AIAA Paper 03-5654, AIAA Guidance, Navigation and Control Conference, Austin, 2003
- Tibetts Award for Outstanding Research (leading member of SBIR team), NASA Goddard Space Flight Center, Technology Commercialization Office, 1999
- Faculty Early Career Development (CAREER) Award, National Science Foundation, 1996
- Sigma Xi President and Visitors' Award for Excellence in Research, Sigma Xi Society, University of Virginia, 1996
- Teaching Fellow, 1998-1999, Georgia Institute of Technology
- Best Student Paper, 2nd place (advisor of Ancil Marshall), AIAA Southeastern Region Student Conference, Savannah, Georgia, 1999
- Best student paper award, finalist (advisor of Jihao Luo), American Control Conference, Philadelphia, Pennsylvania, 1998
- Best student paper award, finalist (advisor of Jihao Luo), American Control Conference, Albuquerque, New Mexico, 1997
- Top Ten Best paper list, AIAA Paper 96-3791, AIAA Guidance, Navigation and Control Conference, San Diego, 1996
- Outstanding International Community Student Award, Purdue Student Government, 1992

Scholarships and Fellowships

- Scholarship to attend Summer School in Control Theory, Centre de Recherches Mathématiques, Université de Montréal, 1992
- Fellowship for Doctoral Studies, Bakala Institute, Athens, Greece, 1992
- David Ross Research Fellowship, Purdue University, 1989-1991
- NATO Research Fellowship for Doctoral Studies, Greek State, 1989-1992
- Yearly Fellowship for Academic Excellence, Greek National Fellowship Institute, 1981-1986

Honor Societies

- Phi Kappa Phi, Honor Society
- Tau Beta Pi, Engineering Honor Society
- Sigma Gamma Tau, Aerospace Engineering Honor Society