

HONORS

- **Samuel P. Capen Chair Professor**, '18
- **UB President Emeritus and Mrs. Meyerson Award for Distinguished Undergraduate Teaching and Mentoring**, '17
- **NASA iTech Semifinalist**, '17
- **Best Presentation in Session, AIAA Guidance, Navigation, and Control Conference**, '17
- **Collegiate Science Technology Program (CSTEP) Research Mentor Award**, '17
- **American Institute of Aeronautics and Astronautics and American Society for Engineering Education**, 2016 J. Leland Atwood Award
- **American Institute of Aeronautics and Astronautics**, 2015 Fellow Inductee
- **Dr. Richard T. Sarkin Award For Excellence In Teaching**, '14
- **American Astronautical Society**, 2014 Fellow Inductee
- **CUBRC Chaired Professor in Space Situational Awareness**, '13
- **Tau Beta Pi**, 2012 Eminent Engineer Inductee
- **American Institute of Aeronautics and Astronautics**, 2012 Mechanics and Control of Flight Award
- **Tau Beta Pi New York Nu Chapter**, 2012 Professor of the Year
- **American Institute of Aeronautics and Astronautics**, 2006 Sustained Service Award
- **Society of Automotive Engineers**, 2006 Ralph R. Teetor Educational Award
- **Best Paper Award**, 2003 AIAA Guidance, Navigation & Control Conference (out of 350 papers)
- **Best Paper Award**, 2001 AIAA Guidance, Navigation & Control Conference (out of 225 papers)
- **University at Buffalo**, Young Investigator Award, '02
- **National Aeronautics and Space Administration**-Summer Faculty Fellowship Award, '97-'98
- **National Aeronautics and Space Administration**-Postdoctoral Fellowship Award, administered by the **National Research Council**, '94-'96
- **United States Achievement Academy**-National Collegiate Engineering Award, '93
- **National Transportation Research Board**-Graduate Research Fellowship Award, administered by the **National Research Council**, '92-'93
- **SUNY at Buffalo**-Part Time Faculty Assistantship, '93
- **SUNY at Buffalo**-Graduate Teaching Assistantship, '90-'92
- **SUNY at Buffalo**-Graduate Research Assistantship, '90-'92
- **Greek Orthodox Scholarship Award**, '88-'89
- **Engineering Dean's List**, '87-'89 (undergraduate)

PROFESSIONAL SERVICE

Member, International Academy of Astronautics, Strategy and Feasibility Assessment of Collision Protection from Asteroids and Comets: Concept, Technology, and Prospect Group, '17-present

Deputy Director, AIAA Region 1 Honors and Awards, '15-present

Member, Air Force Space Command Astrodynamics (AFSPC) Innovation Committee, also MEMBER of the Transparency, Openness, and Collaboration Working Group within AFSPC, '13-'17

Guest Editor, AIAA Journal of Guidance, Control, and Dynamics, Special Issue on the Kalman Filter and its Aerospace Applications, Vol. 40, No. 9, Sept. 2017.

Book Series Co-Editor (with Dr. Mark Balas and Dr. Florian Holzapfel), *Dynamics and Control of Electromechanical Systems*, '14-'17

Deputy Editor, AIAA Journal of Guidance, Control, and Dynamics, '17-present

Associate Editor, AIAA Journal of Guidance, Control, and Dynamics, '05-'17

AIAA Publications Review Committee for Journal of Guidance, Control, and Dynamics, '17

Partnership Program Manager, Education Partnership Agreement – Air Force Research Laboratory, Directed Energy and Space Vehicles Directorates, and University at Buffalo, '09-present

Core Member, NASA Engineering and Safety Center (NESC) Guidance, Navigation and Control Technical Discipline Team, '09-present

Research Affiliate, Center for Orbital Debris Education and Research (CODER) at the University of Maryland, '14-present

Faculty Advisor, UB Student Pilots Association-University at Buffalo Section, '17-present

Advisory Board Member, National Technical Committee of the AIAA Guidance, Navigation and Control Committee, '09-present

Team Development Member, DARPA Prize Challenge for Optimal Estimation Algorithms, '10-'11

Advisory Board, StarVision Technologies, '04-'10

Faculty Co-Advisor, NASA Undergraduate Student Instrument Project, "BRIAN: Broad-spectrum Radio Interference Analyzing Nanosatellite," '16-present

Faculty Advisor, Air Force University Nanosat Program, "Spectrometry Observation for Reflectivity Analysis," '15-present

Faculty Advisor, Air Force University Nanosat Program, "Glint Analyzing Data Observation Satellite," '13-present

Faculty Advisor, Air Force University Nanosat Program, "Light-curve Analyzing NanoSat Calibration with Exospheric Testing," '11-'13

Faculty Advisor, NASA CubeSat Initiative, "Glint Analyzing Data Observation Satellite," '13-'16

Faculty Advisor, NASA Reduced Gravity Education Flight Program, "Line of Sight Relative Attitude Determination for Two Satellites," '10-'11

Faculty Advisor, NASA Reduced Gravity Education Flight Program, "Relative Attitude Determination for Satellite Formation Flying," '09-'10

Program Reviewer, NASA Engineering and Safety Center (NESC) Guidance, Navigation and Control Technical Discipline Team, '07-'09

Guest Editor, The Journal of the Astronautical Sciences, Special Issue: The F. Landis Markley Astronautics Symposium, Vol. 57, Nos. 1 & 2, Jan.-June '09

Guest Editor, The Journal of the Astronautical Sciences, Special Issue: The Malcolm D. Shuster Astronautics Symposium, Vol. 54, Nos. 3 & 4, July-Dec. '06

Faculty Advisor, AIAA-Texas A&M University Section, '99-'01

Committee Member and Judge, AIAA-Region IV Student Conference, '00

National Technical Committee of the AIAA Guidance, Navigation and Control Committee, '97-'08

- 1) Chair, '06-'08
- 2) Vice Chair, '04-'06
- 3) Secretary, '04-'06
- 4) Best Paper for GN&C Conference, Subcommittee Chair
- 5) GN&C Graduate Student Award, Subcommittee Chair
- 6) GN&C Undergraduate Student Competition, Subcommittee Chair
- 7) Education, Subcommittee Chair
- 8) Steering Subcommittee, Member

Chair, AIAA Guidance, Navigation and Control Committee Advisory Board, '08-'10

Member, AIAA Publication Ethical Standards Committee, '06

AIAA Congressional Visits Day, 3/98, 4/01

American Society of Mechanical Engineers (ASME)-Washington D.C. Section

- 1) Secretary, '97-'98
- 2) Director, '96-'97

American Institute of Aeronautics and Astronautics (AIAA)-Niagara Frontier Section

- 1) Council Member, '93-'94
- 2) Vice Chair, '09-present

Member, American Society of Engineering Education (ASEE), '98-present

Faculty Advisor, ASME-Catholic University Section, '96-'98

Member, Tau Beta Pi, '12-present

Fellow, American Astronautical Society (AAS), '14-present

Member, American Astronautical Society (AAS), '98-'13

Member, American Society of Mechanical Engineers (ASME), '87-present

Member, Society of Automotive Engineers (SAE), '89-present

Fellow, American Institute of Aeronautics and Astronautics (AIAA), '15-present

Associate Fellow, American Institute of Aeronautics and Astronautics (AIAA), '02-'14

Senior Member, American Institute of Aeronautics and Astronautics (AIAA), '97-'02

Member, American Institute of Aeronautics and Astronautics (AIAA), '88-'97

Conference Service

- Euro GNC 2017 – 4th CEAS Specialist Conference on Guidance, Navigation & Control, International Program Committee, '19
- Euro GNC 2017 – 4th CEAS Specialist Conference on Guidance, Navigation & Control, International Program Committee, '18
- Euro GNC 2017 – 4th CEAS Specialist Conference on Guidance, Navigation & Control, International Program Committee, '17
- 18th International Conference on Information Fusion, Technical Program Committee, '15
- 3rd European Aerospace Guidance, Navigation and Control Conference, Technical Program Committee, '14
- 17th International Conference on Information Fusion, Technical Program Committee, '14
- AIAA Guidance, Navigation, and Control Conference, Session Chair, '13
- 16th International Conference on Information Fusion, Session Chair, '13
- 2nd European Aerospace Guidance, Navigation and Control Conference, Technical Program Committee, '13
- The Bar-Itzhack Memorial Symposium on Estimation, Navigation, and Attitude Determination, Organizing Committee Member, '12
- 15th International Conference on Information Fusion, Technical Program Committee, '12
- AIAA Guidance, Navigation, and Control Conference, Technical Area Chair, '11
- 14th International Conference on Information Fusion, Technical Program Committee Member, '11
- AIAA Guidance, Navigation, and Control Conference, Session Chair, '10
- 8th International ESA Conference on Guidance, Navigation and Control Systems, Program Committee, '11
- AIAA Guidance, Navigation, and Control Conference, Session Chair, '09
- AAS F. Landis Markley Astronautics Symposium, General Chair, '08
- 7th International ESA Conference on Guidance, Navigation and Control Systems, Program Committee, '08
- AIAA Guidance, Navigation, and Control Conference, Session Chair, '07
- AIAA Guidance, Navigation, and Control Conference, Area Co-Chair, '06
- AIAA Guidance, Navigation, and Control Conference, Session Chair, '05
- 6th International ESA Conference on Guidance, Navigation and Control Systems, Program Committee, '05
- AAS/UB Malcolm D. Shuster Astronautics Symposium, General Chair, '05
- AIAA Guidance, Navigation, and Control Conference, Area Chair, '04
- AIAA Guidance, Navigation, and Control Conference, General Chair, Session Chair, '03
- AIAA Guidance, Navigation, and Control Conference, Session Chair, '02
- AIAA Guidance, Navigation, and Control Conference, Technical Co-Chair, '01
- AIAA Guidance, Navigation, and Control Conference, Session Chair, '01
- AIAA Guidance, Navigation, and Control Conference, Session Chair, '00
- AIAA International Space Station Service Vehicles Conference, Session Chair, '99
- AIAA Guidance, Navigation, and Control Conference, Session Chair, '97

UNIVERSITY AND COMMUNITY SERVICE

University at Buffalo

- President Emeritus and Mrs. Meyerson Award Committee, '18
- MAE Faculty Search Chair – Dynamics & Control, '17-'18
- MAE Faculty Search Chair – Dynamics & Control, '16-'17

- Director of the Center for Multisource Information Fusion (CMIF), '14-present
- Director of the University at Buffalo Nanosatellite Laboratory (UBNL), '13-present
- Faculty Review Committee Member, Digital Manufacturing and Design Innovation Institute: DMDII, '16-present
- Member, SEAS Alliances for Graduate Education and the Professoriate (AGEP), NSF, '16-present
- Associate Director of the Center for Multisource Information Fusion (CMIF), '07-'13
- Associate Department Chair, '12-'15, '16-present
- University Post-Baccalaureate Enrollment Committee on Master's Education, '15
- SEAS Faculty Search Guideline Committee, '13-'14
- Chair of MAE Faculty Search Committee, '13-'14
- University Graduate School Presidential Fellowship Committee, '13-'15
- Director of MAE Graduate Studies, '11-'13
- SEAS Faculty Personnel Committee (Promotion Committee), '11-'14, Chair, '13-'14
- University Graduate School Executive Committee, '12-'13
- MAE Faculty Search Chair – Dynamics & Control, '12-'13
- Member of Honors College Director Search Committee, '11-'12
- MAE Faculty Search Chair – Dynamics & Control and Design, '10-'11
- Director of Undergraduate Studies in Aerospace Engineering, '06-'11
- MAE Department Strategic Planning Committee, '08-present
- Member of Extreme Events Strategic Strength Committee, '06-'11
- Chair of MAE Faculty Search Committee, '10-'11
- MAE Faculty Search Committee, '06
- University Online Course Evaluation Committee, '05
- University Faculty Senate Alternate, '04-present
- University Faculty Mentor, '02-present
- Honors Program Mentor, '02-present
- MAE Ph.D. Comprehensive Examination, '01-present
- MAE Undergraduate Studies Committee, '01-'11

Texas A&M University

- Ph.D. Comprehensive Examination, '00
- Departmental Library Liaison, '99-'00
- Departmental Web Committee, 3/99

Catholic University of America

- Faculty Search Committee, 2/98
- Doctoral Academic Program Committee, 1/98
- Computer Assessment Committee, 9/97
- Faculty Search Committee, 7/97
- Academic Achievement Awards Committee, 4/97
- Organizer and Host, Student Paper Competition, ASME D.C. Section, 3/97
- Committee for Mechanical Engineering Chair Search, 2/97
- Mission Statement Committee in Mechanical Engineering, 10/96
- Undergraduate Curriculum in Mechanical Engineering Committee, 2/96

PROFESSIONAL DEVELOPMENT

- The National Science Foundation Regional Grants Conference, 3/98

MEDIA COVERAGE

NBC News MACH, Fox News, Wall Street Journal, U.S. News & World Report, National Public Radio, WIRED Magazine, AIAA Momentum Member Spotlight – Feb. 2017, Aerospace America, New York Times, International Business Times, Space Daily, space.com, MarsNews, Discover Magazine, Air & Space/Smithsonian Magazine, The Show About Science, The Verge, Atlas Obscura, Science World Magazine, Washington Examiner, SpaceRef, Space Safety Magazine, Space, German Public Radio MDR Jump, Scholastic's Classroom Magazine Scope, Lifestyle Magazine, Florida Sentinel, Military & Aerospace Electronics Magazine, Radio Metafora, Buffalo News, Machine Design, Satellite Today, Arkansas Business

COURSES INSTRUCTED

University at Buffalo

<i>Course</i>	<i>Title</i>	<i>Years Taught</i>
MAE 425/525	Spacecraft Dynamics and Control	Spring '19, Spring '18, Spring '16, Spring '15, Spring '14, Spring '13 Spring '12, Spring '11, Spring '10, Spring '09, Spring '08, Spring '07 Fall '09
EE 441	Space Exploration Topics	Fall '09
EAS 496	Co-Op	Summer '08, Summer '07
MAE 674	Optimal Estimation Methods	Fall '18, Fall '17, Fall '16, Fall '15, Fall '14, Fall '13, Fall '12 Spring '06, Spring '05, Spring '04, Spring '03
MAE 472	Guidance Navigation & Control	Spring '06, Spring '05, Spring '04, Spring '03, Spring '02
MAE 571	Systems Analysis 1	Fall '11, Fall '10, Fall '10, Fall '09, Fall '08, Fall '07, Fall '06, Fall '05 Fall '04, Fall '03, Fall '02, Fall '01
SYS 577	Optimal Control Systems	Spring '01
SYS 436	Digital Control Systems	Spring '93

Texas A&M University

<i>Course</i>	<i>Title</i>	<i>Years Taught</i>
AERO 689	Estimation of Dynamic Systems	Fall '00, Fall '99
AERO 310	Aerospace Dynamics	Fall '00, Spring '00, Fall '99, Spring '99, Fall '98

Catholic University of America

<i>Course</i>	<i>Title</i>	<i>Years Taught</i>
ME 334	System Dynamics	Spring '98, Spring '97
ME 510	Modern Control Systems	Spring '98, Spring '97, Spring '96
ME 507	Mechanical System and Control	Fall '97, Fall '96
ME 571	Optimum Design of Mech. Systems	Fall '97
ME 555	Spacecraft Dynamics and Control	Fall '96

RESEARCH SUPERVISION

Completed

Ph.D.

- Matthew Whittaker (Ph.D.), "Inertial Navigation Employing Common Frame Error Definition," (2/19).
- Adonis Pimienta-Peñalver (Ph.D.), "Attitude Dynamics, Stability, and Control of a Heliogyro Solar Sail," (9/17).
- Matthias Schmid (Ph.D.), "A New Control Paradigm for Stochastic Differential Equations," (5/17).
- Michael Andrieu (Ph.D.), "Geometric-Based Nonlinear Filtering with Applications to Attitude Estimation," (2/14).
- Richard Linares (Ph.D.), "Probabilistic Identification and Discrimination of Deep Space Objects via Astrometric and Photometric Data Fusion," (2/14).
- Christopher K. Nebelecky (Ph.D.), "New Variations of Multiple-Model Adaptive Estimation for Improved Tracking and Identification," (2/14).
- William Banas (Ph.D.), "Numerically Stable Covariance Intersection for Spacecraft Formation Flying," (2/14).
- Sean Semper (Ph.D.), "Optimal and Efficient Geolocation and Path Planning for Unmanned Aerial Vehicles using Uncertainty Measures," (9/11).
- Jemin George (Ph.D.), Co-Advised with Dr. Puneet Singla, "An Adaptive Disturbance Accommodation Approach for Robust Control and Fault Detection in Uncertain Stochastic Systems," (5/10).
- Hakjae Kim (Ph.D.), "Nonlinear Filtering Using the Complex-Step Derivative Approximation," (2/10).
- Badr N. Alsuwaidan (Ph.D.), "Generalized Multiple Model Adaptive Estimation," (9/08).
- Kok-Lam Lai (Ph.D.), "Generalizations of the Complex-Step Derivative Approximation," (9/06).
- Adam Fosbury (Ph.D.), "Control and Kalman Filtering for Relative Dynamics of a Formation of Uninhabited Autonomous Vehicles," (9/06).
- Keun Joo Park (Ph.D.), "GPS Receiver Self Survey and Attitude Determination Using Pseudolite Signals," (5/04).

- Jo-Ryeong Yim (Ph.D.), Co-Advised with Dr. John Junkins, “Autonomous Orbit Navigation of Interplanetary Spacecraft,” (12/02).
- Jongrae Kim (Ph.D.), “A New Approach to Robust Control: Model-Error Control Synthesis,” (8/02).
- Jong-Woo Kim (Ph.D.), “International Space Station Leak Localization Using Attitude Response,” (8/02).

M.S. Thesis

- Aniketh Kalur (M.S.), “Improved Data Association for Space-Object Identification Using Gating Methods and Planar Triangles,” (5/15).
- Paul Silversmith (M.S.), “Space-Object Identification Using Spatial Pattern Recognition,” (5/14).
- Arnab Ghosh (M.S.), “Fast and Optimal Solution for the Generalized Attitude Determination Problem,” (9/13).
- Adonis Pimienta-Peñalver (M.S.), “Accurate Kepler Equation Solver without Transcendental Function Evaluations,” (5/13).
- Andrew Hazlett (M.S.), “Differential Wheel Speed Integration with GPS/INS for Land Vehicle Navigation,” (5/13).
- Jeremy Marschke (M.S.), “Generalized Multiple Model Adaptive Attitude Estimation without Rate Gyros,” (5/11).
- Richard Linares (M.S.), “Constrained Relative Attitude Determination for Two Vehicle Formations,” (2/11).
- Shivaswamy Anirudh (M.S.), “Robust Attitude Estimation in the Presence of Magnetic Disturbances,” (2/11).
- Christopher Nebelecky (M.S.), “Improved Decentralized Attitude Estimates Using the Covariance Intersection Algorithm,” (9/09).
- Matthias Schmid (M.S.), “Robust Reduced Order Control for Nonlinear Distributed Systems of Burgers’ Class,” (2/09).
- Sean Semper (M.S.), “Decentralized Geolocation and Optimal Path Planning Using Unmanned Aerial Vehicles,” (5/08).
- Michael Andrie (M.S.), “Deterministic Relative Attitude Determination of Formation Flying Spacecraft,” (5/08).
- William Banas (M.S.), “Micro-Arcsecond Line-of-Sight Filtered Performance for Spacecraft Formation Flying,” (5/08).
- Shu Ting Goh (M.S.), “Unscented Kalman Filtering for Relative Attitude and Position Estimation,” (9/07).
- Frank Centinello (M.S.), “Analysis of the ECEF and NED Covariance Propagation for the Navigational Extended Kalman Filter,” (5/07).
- Jemin George (M.S.), “Kalman Filter Approach to Model-Error Control Synthesis,” (5/07).
- Anjani Kumar (M.S.), “Design of Colored-Noise Extended Kalman Filter for Vision-Based Navigation Applications,” (5/07).
- Badr Alsuwaidan (M.S.), “Robust Longitudinal Aircraft Control Using Model-Error Control Synthesis,” (2/06).
- Chaitanya Tapaswi (M.S.), “Determination of Vessel Sizes and Refinement of 3D Imaging Geometry from Biplane Images of the Coronary Vasculature,” (9/05).
- Agnar Kenneth Nygaard Nielsen (M.S.), “Helicopter Dynamics and Robust Control,” (9/05).
- Jasbir Singh Vig (M.S.), “Improved Navigation of Vehicle Using GPS/INS with Line of Sight Measurements,” (9/05).
- Brian Michael Haas (M.S.), “Sensitivity Study: The Affects of Beacon Errors on a Vehicle’s Position and Attitude Estimation for a Vision-Based Navigation System,” (5/05).
- Son-Goo Kim (M.S.), “Kalman Filtering for Relative Spacecraft Attitude and Position Estimation,” (5/05).
- Adam Fosbury (M.S.), “Control of Relative Attitude Dynamics of a Formation Flight Using Model Error Control Synthesis,” (5/05).
- Arun Natarajan (M.S.), “Spacecraft Attitude Maneuvers with Input Saturation Using Model Error Control Synthesis,” (9/04).
- Kaylan Kappagantula (M.S.), “Linearizing Assumptions and Control Design for Spacecraft Formation Flying Maneuvers,” (5/04).
- Craig Cole (M.S.), “Fast Star Pattern Recognition Using Spherical Triangles,” (2/04).
- Krishnakumar Ramamoorthy (M.S.), “Potential Functions for En-Route Air Traffic Management,” (2/04).
- Kok-Lam Lai (M.S.), “In-Space Autonomous Spacecraft Alignment Calibration,” (9/03).
- Randy Chugh (M.S.), “Model-Error Control Synthesis for Spacecraft Attitude Maneuvers,” (5/03).
- Puneet Singla (M.S.), “A New Attitude Determination Approach Using Split Field of View Star Camera,” (8/02).
- Curtis Webb (M.S.), “GPS Position Determination Using a Nonlinear Predictive Filter,” (5/02).
- Roberto Alonso (M.S.), “Relative Navigation for Formation Flying of Spacecraft,” (5/01).
- David Nestle (M.S.), “Adaptive Optimization of Motion-Based Simulator,” (8/01).
- Malak Anees Samaan (M.S.), “Studies in Robust Control Systems with Application to Various Spacecraft Attitude Control Systems,” (3/00).

M.S. Project

- Luke Miller, (M.S.), “Guidance Navigation and Control of a 29-Rotor Uninhabited Aerial Vehicle,” (2/18).
- Sean Rosney, (M.S.), “Extended Kalman Filtering for Individual, Relative, and, Constrained Relative Spacecraft Attitude Estimation,” (5/17).

- Eric Barton, (M.S.), “Pressure Foot Plate Modal Analysis and Signal Conditioning,” (9/13).
- Bharath Kumar Baburajan, (M.S.), “Space Attitude Tracking Control Using Sliding Mode Control,” (9/12).
- Supriya Singh, (M.S.), “Adaptive Cruise Control Systems: Possible Development Opportunities for Improved Driver Safety,” (9/12).
- Steven McDonald (M.S.), “Bipropellant Thrusters and Their Operation at Low Feed Pressure, High Propellant Temperature Conditions,” (2/11).
- Ryan McMahan (M.S.), “Aircraft Parameter Identification Using an Aircraft Model Simulation Toolkit,” (5/10).
- Brenna Stachewicz (M.S.), “A Graphical User Interface for Eigenstructure Assignment for Linear Systems,” (9/08).
- Yijia Sun (M.S.), “Robust Spacecraft Attitude Estimation using Multiple-Model Approaches,” (9/07).
- Min-Chang Tsai (M.S.), “Pitch Arm Control and Virtual Realization of T-Type Robot Helicopter,” (9/05).
- Hsieh Chang Keng (M.S.), “Simulating the Elevation and Azimuth Dynamics and the Trajectory Prediction for the Helicopter Model,” (5/05).
- Jayesh Minase (M.S.), “Unscented Filter for GPS Attitude Estimation,” (9/04).
- Garth Mathe (M.S.), “Aircraft Attitude and Gyroscope Drift Estimation Using Three Axis Magnetometer and Ground Reference Position Data,” (9/04).
- Paul Schifferle (M.S.), “In-Flight Simulation Capability of a Variable Stability Helicopter in the Longitudinal Axis,” (9/04).
- Ketan Churi, Kedar Deshpande, Anirudha Naik, and Jitesh Panicker (M.S.), “Simulation of Warfare Logistics in a Virtual Environment Using Motion-Based Object Tracking and Positional Coordinates Estimation,” (2/04).
- Guoshi Li (M.S.), “Application of Model-Error Control Synthesis to the Control of a Pneumatic Muscle Actuator System,” (9/03).

Postdoctoral Researchers

- Dr. Joanna Hinks ('12-'15)
- Dr. Yang Cheng ('03-'09)

Visiting Scholars

- Dr. Hao Wang, Zhejiang University, ('16-'17)
- Mr. Linqi Ye, *Tianjin University*, ('15-'16)
- Dr. Jesús García Herrero, *Universidad Carlos III de Madrid*, ('15-'16)
- Mr. Zhengshi Yu, *Harbin Institute of Technology*, ('14-'15)
- Dr. Zhonghua Zhao, *Shanghai Jiaotong University*, ('11-'12)
- Dr. Debo Sun, *Harbin Institute of Technology*, ('09-'10)

Undergraduate Supervision

- Christopher Gnam, Collegiate Science & Technology Entry Program (CSTEP), “Advanced Techniques for Attitude Estimation and Control Systems for Nanosatellites,” 2018.
- Priya Persaud, Collegiate Science & Technology Entry Program (CSTEP), “Satellite Design and Testing,” 2018.
- Nicholas Phillips, University at Buffalo Honors Program, “Satellite Modeling and Design,” 2018.
- Christopher Gnam, Collegiate Science & Technology Entry Program (CSTEP), “Investigation of Attitude Estimation and Control Systems for Nanosatellites,” 2017.
- Christopher Gnam, Collegiate Science & Technology Entry Program (CSTEP), “Nanosatellite Design to Study the Radio Frequency Noise Environment in Space,” 2016.
- Ali Al Qaraghuli, Collegiate Science & Technology Entry Program (CSTEP), “Design of Circuit Boards for a Nanosatellite,” 2016.
- Avery Bodenstein, Undergraduate Zimmer Fellowship, “Study of Multiband Photometric Data of Resident Space Objects in Geosynchronous Orbit,” 2015.
- William Roman, SUNY Louis Stokes Alliance for Minority Participation Program, “Structural Design Analysis of Nanosatellite,” 2015.
- Clarence Uzoho, Collegiate Science & Technology Entry Program (CSTEP), “Vibrational Testing of a Nanosatellite,” 2015.
- Joshua Bueno, SUNY Louis Stokes Alliance for Minority Participation Program, “Software System Design for a Nanosatellite,” 2014, 2015.
- Hamlet Spenser, Collegiate Science & Technology Entry Program (CSTEP), “Analysis of a Nanosatellite Thermal Design,” 2014.
- Ifechukwu Ononye, Undergraduate Zimmer Fellowship, “Orbit Estimation for a Nanosatellite,” 2014.

- Jose Escobar, SUNY Louis Stokes Alliance for Minority Participation Program, “Miniature Satellite Dynamic Analysis,” 2014.
- Muhammad Khan, Collegiate Science & Technology Entry Program (CSTEP), “Analysis of a Nanosatellite Structure Design,” 2014.
- Kevin Carpio, SUNY Louis Stokes Alliance for Minority Participation Program, “Analysis of a Nanosatellite Structure Design,” 2013.
- Ifechukwu Ononye, SUNY Louis Stokes Alliance for Minority Participation Program, “Control System Design for a Nanosatellite,” 2013.
- Nikita Butakov, Faculty Mentor, UB Honors College, “Small Satellite Design,” 2012-2013.
- Joseph Materski, Faculty Mentor, UB Honors College, “Experimental Verification of Relative Navigation Using Line-of-Sight Observations,” 2012-2013.
- Andrew Dianetti, Faculty Mentor, UB Honors College, “Small Satellite Design,” 2011-2013.
- John McGreevy, Faculty Mentor, UB Honors College, “Relative Navigation Using Line-of-Sight Observations,” 2011-2012.
- Adonis Pimienta-Peñalver, Collegiate Science & Technology Entry Program (CSTEP), “Kepler Equation Solver,” 2010.
- Richard Linares, UB Ronald E. McNair Post-Baccalaureate Achievement Program, “Relative Attitude Determination Between Two Vehicles,” 2009.
- Souleymane Sow, UB Ronald E. McNair Post-Baccalaureate Achievement Program, “Large Angle Maneuvers of Spacecraft with Actuation Constraints,” 2009.
- Richard Linares, UB Ronald E. McNair Post-Baccalaureate Achievement Program, “Deterministic Attitude Determination Algorithm for Formation Flying Missions,” 2008.
- Jeremy Marschke, Undergraduate Zimmer Fellowship, “Kalman Filtering for Relative Navigation,” 2007.
- Christopher Nebelecky, Undergraduate Zimmer Fellowship, “Navigation using Line-of-Sight Observations,” 2007.
- Amanda Schmidt, Undergraduate Zimmer Fellowship, “Spacecraft Formation Flying Navigation,” 2006.
- Anne-Marsha Joseph, SUNY Louis Stokes Alliance for Minority Participation Program, “Thruster Control of a Spacecraft Testbed Using Fans,” 2006.
- Jeremy Marschke, Undergraduate Zimmer Fellowship, “Spacecraft Momentum Management,” 2006.
- Michael Andrlé, Undergraduate Zimmer Fellowship, “Spacecraft Attitude Control,” 2005-2006.
- Demissie Wolde-Gabriel, Collegiate Science & Technology Entry Program (CSTEP), “Robust Spacecraft Attitude Estimation,” 2004-2005.
- Krystine Santos, SUNY Louis Stokes Alliance for Minority Participation Program, “Construction of a Miniature Spacecraft,” 2005.
- Sean Semper, SUNY Louis Stokes Alliance for Minority Participation Program, “Construction of a Miniature Spacecraft,” 2004-2005.
- Adriana Crippen, SUNY Louis Stokes Alliance for Minority Participation Program, “Modeling of a Miniature Spacecraft,” 2003-2004.
- Adam Fosbury, Undergraduate Zimmer Fellowship, “3D Dynamics Experiments of Miniature Spacecraft,” 2003.
- Kok-Lam Lai, Undergraduate Zimmer Fellowship, “Development of a Miniature Spacecraft Testbed Model,” 2002.
- Curtis Webb, Undergraduate Summer Research Program, “Attitude Determination Using Pseudolites,” winner best paper presentation, 1999-2000.
- April Evans, Undergraduate Summer Research Program, “Vision-Based Navigation and Calibration,” winner best paper presentation, 2000.

Internship Programs

- Demissie Wolde-Gabriel, Collegiate Science & Technology Entry Program (CSTEP) Internship Program, 2004.

Committee Member

- Sharat Parameswaran Chidambaran (M.S.), “Neuroevolution in Control of Intelligent Systems: Benchmark Testing, Simulated and Physical Demonstrations,” *University at Buffalo* (9/18).
- Cheng Zeng (M.S.), “Conceptual Design and Optimization of a Tilt-Arm Hybrid Unmanned Aerial Vehicle,” *University at Buffalo* (2/18).
- Michael Moskal (Ph.D.), “Adaptive Unmanned Aerial Vehicle Routing Methods for Tactical Surveillance Operations,” *University at Buffalo* (2/16).
- Vinod Kumar (Ph.D.), “Autonomous Navigation and Station-Keeping of Geostationary Satellites in Formation Using Indian Regional Space-Based Navigation System,” *Indian Institute of Technology Bombay* (9/15).
- Martin Diz (Ph.D.), “Design, Development and Applications of a Framework for Autonomous Vehicle Operations,” *University at Buffalo* (5/15).

- Seungkook Jun (Ph.D.), “A Home-Based Rehabilitation for Deficient Knee Patients,” *University at Buffalo* (5/15).
- Jennifer Haggerty, (Ph.D.), “Minimum-Time Optimal Output Transitions Using Pre- and Post-Actuated Inputs: Impact of Zeros on the Structure of the Optimal Control Profile,” *University at Buffalo* (2/15).
- Reza Madankan (Ph.D.), “Model-Data Fusion and Adaptive Sensing for Large Scale Systems: Applications to Atmospheric Release Incidents,” *University at Buffalo* (5/14).
- John McGreevy (M.S.), “Calculation of an Optimal Two Impulse Earth-Moon Trajectory,” *University at Buffalo* (5/14).
- Shashank Shekhar (M.S.), “Simulation of an Aircraft Dynamics in a Virtual Environment,” *University at Buffalo* (9/13).
- Eric Salerno (M.S.), “Road Network Extraction and Uncertainty Analysis,” *University at Buffalo* (5/13).
- Eamonn J. Moyer (M.S.), “Feedback Control and Steering Laws for Spacecraft Using Canfield Joint Attitude Manipulators,” *University at Buffalo* (5/13).
- Brandon Brown (Ph.D.), “A Jacobian Singularity Based Controller Design for Structured Uncertainty Robustness,” *University at Buffalo* (2/13).
- Christopher Van Loon (M.S.), “The Analysis of Optical Flow Methods for Use with Tumor Motion,” *University at Buffalo* (5/12).
- Cheng Jin (Ph.D.), “Multiresolution Algorithms for Input-Output Data Modeling with Applications to Dynamic Systems,” *University at Buffalo* (5/12).
- Reza Madankan (M.S.), “Polynomial Chaos Based Method for State and Parameter Estimation,” *University at Buffalo* (9/11).
- Drew P. Woodbury (Ph.D.), “Accounting For Parameter Uncertainty in Reduced-Order Static and Dynamic Systems,” *Texas A&M University* (9/11).
- Max Rech (M.S.), “Uncertainty Characterization for Advection/Diffusion Equations,” *University at Buffalo* (2/11).
- Hrishi Shah (M.S.), “Kinematic, Dynamic and Workspace Analysis of a Novel 6-DOF Parallel platform Manipulator,” *University at Buffalo* (9/10).
- Umamaheswara Konda (Ph.D.), “Bayesian Inference and Uncertainty Propagation in Dynamical Systems,” *University at Buffalo* (2/10).
- Jennifer Haggerty (M.S.), “Minimax Control of Flexible Structures Using Quadratically Constrained Programming,” *University at Buffalo* (2/10).
- Brandon Brown (M.S.), “Global Optimization of Three Dimensional Maneuvers in a Field with Obstacles,” *University at Buffalo* (9/09).
- Asad Abbas Ali (M.S.), “Polynomial Chaos Based Approach for State Limited Robust Control of Systems with Parametric Uncertainty,” *University at Buffalo* (9/09).
- Chin Pei Tang (Ph.D.), “Design and Control Framework for Cooperative Mobile Robot Collectives,” *University at Buffalo* (2/09).
- Patrick T. Miller (M.S.), “Output Synchronization for Teleoperation of Robot Manipulators,” *University at Buffalo* (2/09).
- Amrith Kumar (M.S.), “Kinesthetic Mapping of RoSS: Robotic Surgical Simulator Using Inverse Kinematics,” *University at Buffalo* (9/08).
- Yao Wang (M.S.), “Symbolic Kinematics and Dynamics Analysis and Control of a General Stewart Parallel Manipulator,” *University at Buffalo* (9/08).
- Baro Hyun (M.S.), “State Estimation for Vision-Based Simultaneous Localization and Mapping of Unmanned Vehicles,” *University at Buffalo* (9/08).
- Qiushi Fu (M.S.), “Kinematics of Articulated Wheeled Robot: Exploiting Reconfigurability and Redundancy,” *University at Buffalo* (9/08).
- Satyanarayana Manyam (M.S.), “Adaptive Sequential Linear Programming for Optimal Control Profiles,” *University at Buffalo* (5/08).
- Aaron Dando (Ph.D.), “Robust Adaptive Control of Rigid Spacecraft Attitude Maneuvers,” *Queensland University of Technology* (5/08).
- Kevin L. Wyffels (M.S.), “Development of a Ground Truth Simulator and Application of a Generalized Multiple-Model Adaptive Estimation Approach to Tune a State Estimation Filter,” *Rochester Institute of Technology* (11/07).
- Matthew L. Vossler (M.S.), “Deformation Limited Time Optimal Control of Flexible Structures,” *University at Buffalo* (9/07).
- K. V. Umamaheswara Reddy (M.S.), “Data Assimilation for Dispersion Models,” *University at Buffalo* (5/07).
- Hemanth Satyanarayana (M.S.), “Image Guided Liver Surgery using Augmented Reality,” *University at Buffalo* (2/07).
- Venkatraghavan Gourishankar (M.S.), “HAPSTICK – A High Fidelity Haptic Simulation for Billiards,” *University at Buffalo* (2/07).
- Charles Wang (Ph.D.), “Single Antenna GPS Attitude Algorithm for Non-Uniform Antenna Gain Pattern,” *Queensland University of Technology* (2/07).

- Rajankumar Bhatt (Ph.D.), “Towards Modular Cooperation Between Multiple Nonholonomic Mobile Manipulators,” *University at Buffalo* (2/07).
- Abdul Kather Rephy Parely (M.S.), “Modified Approach to Pennestri’s Optimal Design of Dynamic Vibration Absorbers,” *University at Buffalo* (9/06).
- Michael Fattey (M.S.), “Time-Delay Control of an Undamped Two Mode System,” *University at Buffalo* (9/06).
- Wanseok Yang (M.S.), “Optimal Approach for Autonomous Parallel Parking of Nonholonomic Car-Like Vehicle,” *University at Buffalo* (2/06).
- Chi-Han Yang (M.S.), “Artificial Mechanical System Modeling and Simulation,” *University at Buffalo* (2/06).
- Thomas Concord (M.S.), “Linear Matrix Inequality Based Robust Control Synthesis,” *University at Buffalo* (2/06).
- Jaisung Lee (M.S.), “Different Optimal Controls of a Ducted Fan Model,” *University at Buffalo* (9/05).
- Daniel Fuglewicz (M.S.), “A Six Degree-of-Freedom Vehicular Performance Measurement System (VPMS) with Integral Engine Speed Measurement,” *University at Buffalo* (9/05).
- Rajaey Kased (M.S.), “Rest-to-Rest Motion of an Experimental Flexible Structure Subject to Friction,” *University at Buffalo* (2/05).
- Regeesh Britto (M.S.), “Diagnostics of Arterial Pressure Pulse Using Haptic Kymograph-Remote Diagnostics of Vital Signs Through a Vibrotactile Device,” *University at Buffalo* (2/05).
- Leng-Feng Lee (M.S.), “Decentralized Motion Planning within an Artificial Potential Framework (APF) for Cooperative Payload Transport by Multi-Robot Collectives,” *University at Buffalo* (2/05).
- Bertrand Douillard (M.S.), “Design and Implementation of a SLAM Algorithm on an Autonomous Robot,” *University at Buffalo* (9/04).
- Dirk Tenne (Ph.D.), “Statistics Based Sampling for Controller and Estimator Design,” *University at Buffalo* (5/04).
- Chin Pei Tang (M.S.), “Manipulability-Based Analysis of Cooperative Payload Transport by Robot Collectives,” *University at Buffalo* (5/04).
- Seung Kook Jun (M.S.), “Kinetostatic Design of an Articulated Leg-Wheel Locomotion Subsystem”, *University at Buffalo* (3/04).
- Jae-Jun Kim (Ph.D.), “Point-to-Point Control of Flexible Systems Subject to Friction,” *University at Buffalo* (12/03).
- Rajankumar Bhatt (M.S.), “Formation Motion Planning for Payload Transport by Modular Wheeled Mobile Manipulators,” *University at Buffalo* (12/03).
- Byungki Kim (M.S. Project), “Fuel and Time Optimal Slosh Control for an Open Container,” *University at Buffalo* (12/02).
- Nidal Al-Masoud (Ph.D.), “Active Control of Combustion Instabilities,” *University at Buffalo* (8/02).
- Hye-Young Kim (Ph.D.), “Novel Methods for Spacecraft Attitude Estimation,” *Texas A&M University*, (3/02).
- Anna Fleming (M.S.) “A Dynamics Model Suitable for Multi-Purpose Vehicle Simulation,” *University at Buffalo* (9/01).
- Jason, Kolodziej (Ph.D.), “A Robust Model Determination Algorithm for Nonlinear System Identification,” *University at Buffalo* (9/01).
- Bumsoo Kim (M.S.), “Vehicle Estimation and Control Using Global Positioning System and Inertial Navigation,” *University at Buffalo* (8/01).
- Kai Harth (M.S.), “Research on an Enabling Infrastructure for Distributed Simulation,” *University at Buffalo* (1/01).
- Praveen Sudhakar Joshi (M.S.), “Direct Comparison of Neural Network, Fuzzy Logic and Model Predictive Variable Structure Vortex Flow Controllers,” *Texas A&M University* (8/99).
- Jaeho Oh (Ph.D.), “Control of Static and Dynamic Characteristics of Passive Magnetic Composites,” *Catholic University* (8/98).
- Shehta El-Sayed Abdou (Ph.D.), “Vibration Control of Beams with Magnetic Constrained Layer Damping,” *Catholic University* (3/98).
- Abdel-Hady Kamal Ebrahim (Ph.D.), “Vibration Control of Plates Using Magnetic Constrained Layer Damping,” *Catholic University* (2/98).
- Adel Abdel-Razek Omer (Ph.D.), “Active Control of Compressional Constrained Layer Damping Treatments Using Electromagnetic Actuation,” *Catholic University* (2/98).
- Eleanor Ketchum Silverman (Ph.D.), “Autonomous Navigation Recovery for Fine Pointing Low Earth Orbiting Spacecraft,” *George Washington University* (1/98).
- Zheng Gu (Ph.D.), “Control of Precision Pointing System,” *Catholic University* (1/98).
- William A. LaPlante (Ph.D.), “Vibration Control of Fluid-Loaded Cylindrical Shells Using Active Constrained Layer Damping,” *Catholic University* (1/98).

RESEARCH CONTRACTS

Current

Principal Investigator: John Crassidis
Title: Novel Methods for Satellite Attitude Maneuver Detection
Sponsor: Air Force Office of Scientific Research, Defense University Research Instrumentation Program
Amount: \$53,491, 9/18-8/19

Principal Investigator: John Crassidis
Title: Information Requirement Identification for Threat Hypothesis Management (InRITHM)
Sponsor: Air Force Research Laboratory
Amount: \$438,939, 1/18-12/19 (Year 1 \$218,816, Year 2 \$220,123)

Principal Investigator: John Crassidis
Title: Attitude Mode Estimation from Computer Vision Data via Multiple Model Methods
Sponsor: Air Force Research Laboratory
Amount: \$154,958, 12/17-9/19 (Year 1 \$81,597, Year 2 \$73,361)

Principal Investigator: John Crassidis
Co-Investigators: Barry Smith, James Llinas
Title: Event Characterization Using Hard and Soft Data via Semantic Models
Sponsor: Air Force Office of Scientific Research
Amount: \$661,447, 6/18-6/22 (Year 1 \$159,962, Year 2 \$163,172, Year 3 \$167,402, Year 4 \$170,910)

Principal Investigator: Chase Murray
Co-Investigators: Chunming Qiao, John Crassidis, Krishna Rajan, Moises Sudit
Title: Meta-Autonomy
Sponsor: Office of Naval Research, Defense University Research Instrumentation Program
Amount: \$392,816, 6/18-6/19

Principal Investigator: Manoranjan Majji
Co-Investigator: John Crassidis
Title: Broad-spectrum Radio Interference Analyzing Nanosatellite (BRIAN)
Sponsor: NASA
Amount: \$100,000, 08/16-9/19

Past Awarded

Principal Investigator: John Crassidis
Title: Spectrometry Observation for Reflectivity Analysis Satellite (SORA)
Sponsor: Air Force Office of Scientific Research
Amount: \$110,000, 01/16-6/18

Principal Investigator: John Crassidis
Title: Robust Adaptive Sensor Filtering/Fusion for Shipboard Autolanding
Sponsor: Office of Naval Research
Amount: \$219,240, 9/15-12/17 (Year 1 \$146,313, Year 2, \$72,927)

Principal Investigator: John Crassidis
Title: Glint Analyzing Data Observation Satellite (GLADOS)
Sponsor: Air Force Office of Scientific Research
Amount: \$220,000, 02/15-12/17

Principal Investigator: John Crassidis
Co-Investigator: Barry Smith
Title: Space Analytics for Emerging Threat Identification (SAFETI)
Sponsor: Air Force Research Laboratory
Amount: \$4,000,262, 9/14-12/17 (Year 1 \$1,175,000, Year 2 \$1,284,000, Year 3 \$1,541,262)

Principal Investigator: John Crassidis
Title: Satellite Guidance Navigation and Control System Engineering Support for Cleopatra Program
Sponsor: Naval Research Laboratory
Amount: \$48,404, 6/17-9/17

Principal Investigator: Kemper Lewis
Co-Investigator: Timothy Leyh, Gary Dargush, John Crassidis, Kenneth English, Venkat Krovi, Rahul Rai, Lisa Stephens, Shambhu Upadhyaya and Chi Zhou
Title: DMDII: The Digital Manufacturing and Design Innovation Institute
Sponsor: Digital Manufacturing & Design Specialization (Online Course Series Development)
Amount: \$1,081,926, 9/16-8-17

Principal Investigator: John Crassidis
Title: Validation and Verification of RSO Shape Estimation from Non-Resolved Imagery
Sponsor: Air Force Research Laboratory
Amount: \$248,388, 06/13-11/15 (Year 1 \$124,259, Year 2 \$124,129)

Principal Investigator: Tarunraj Singh
Co-Investigators: Puneet Singla and John Crassidis
Title: Integrated Context-Aided Estimation/Inferencing and Sensor Resource Management for Naval Applications
Sponsor: Office of Naval Research
Amount: \$149,953, 7/14-8/15

Principal Investigator: John Crassidis
Title: Lightcurve Analyzing NanoSATellite (LANSAT)
Sponsor: Air Force Office of Scientific Research
Amount: \$110,000, 06/13-01/15

Principal Investigator: John Crassidis
Title: Awareness Simulator for Trajectories of Resident Objects in Space (ASTROS)
Sponsor: Air Force Research Laboratory
Amount: \$1,269,093, 1/12-12/14 (Year 1 \$318,218, Year 2 \$466,701, Year 3 \$484,174)

Principal Investigator: John Crassidis
Title: Relative Navigation for Automated Carrier Landings
Sponsor: Northrop Grumman Corporation
Amount: \$75,000, 1/14-9/14

Principal Investigator: John Crassidis
Title: Nonlinear Filtering for Relative Navigation
Sponsor: Northrop Grumman Corporation
Amount: \$29,855, 9/13-12/13

Principal Investigator: John Crassidis
Title: Intrinsic Property Estimation of Space Objects from Multi-Band Observations
Sponsor: Air Force Office of Scientific Research
Amount: \$397,462, 1/12-12/12 (Year 1 \$262,607, Year 2 \$134,855)

Principal Investigator: John Crassidis
Title: Resident Space Object Orbit, Attitude and Shape Characterization from Light Curve Data
Sponsor: Air Force Office of Scientific Research
Amount: \$587,804, 9/11-8/13 (Year 1 \$230,235, \$357,569)

Principal Investigator: John Crassidis
Title: University at Buffalo Nanosatellite Program, Light-Curve Analyzing NanoSat Calibration with Exospheric testing (UB-LANCE)
Sponsor: Air Force Office of Scientific Research
Amount: \$109,108, 1/11-12/12

Principal Investigator: John Crassidis
Co-Investigator: Puneet Singla
Title: Reducing Guidance, Navigation and Control System Design for Operational Responsive Space Missions Through Adaptive Estimation and Control
Sponsor: Air Force Research Laboratory
Amount: \$659,158, 7/09-10/12 (Year 1 \$158,897, Year 2 \$191,373, Year 3 \$308,888)

Principal Investigator: John Crassidis
Title: Simulation Development for Low Earth Orbiting Objects

Sponsor: Air Force Research Laboratory

Amount: \$57,000, 7/11-12/11

Principal Investigator: Moises Sudit

Co-Investigators: Rakesh Nagi and John Crassidis

Title: Intelligent Exchange (IntellEx)

Sponsor: Office of Naval Research

Amount: \$4,900,000, 2/08-8/11 (Year 1 \$1,633,333, Year 2 \$1,633,333, Year 3 \$1,633,333)

Principal Investigator: John Crassidis

Co-Investigator: Puneet Singla

Title: Realistic State and Measurement Error Uncertainty Computation and Propagation for Space Surveillance and Reconnaissance

Sponsor: Air Force Office of Scientific Research

Amount: \$40,000, 7/10-5/11

Principal Investigator: Mark Karwan

Co-Investigators: Moises Sudit, Rakesh Nagi and John Crassidis

Title: Optimization Planning and Tactical Intelligent Management of Aerial Sensors (OPTIMAS)

Sponsor: Office of Naval Research

Amount: \$1,171,255, 1/08-1/11 (Year 1 \$386,050, Year 2 \$392,585, Year 3 \$392,620)

Principal Investigator: John Crassidis

Co-Investigators: James Llinas and Mark Karwan

Title: Platform Routing and Data Fusion Technologies for Cooperative ISR

Sponsor: Air Force Research Laboratory

Amount: \$262,471, 9/08-11/10 (Year 1 \$131,215, Year 2 \$131,257)

Principal Investigator: John L. Crassidis

Title: Precise Attitude and Geolocation Determination for Closed-Loop Topology Spacecraft Formations

Sponsor: Air Force Research Laboratory

Amount: \$243,258, 6/08-5/10 (Year 1 \$119,413, Year 2 \$123,845)

Principal Investigator: John L. Crassidis

Title: NASA NESC Guidance, Navigation and Control Program Review

Sponsor: NASA

Amount: \$38,535, 9/07-12/09

Principal Investigator: John Crassidis

Title: Navigation of a Satellite Using Light Curve Measurements with Data Association and Multiple Target Tracking

Sponsor: Air Force Research Laboratory

Amount: \$46,219, 6/09-1/10

Principal Investigator: John L. Crassidis

Title: Mirco-Arcsecond Line-of-Sight Filtered Performance for Spacecraft Formation Flying

Sponsor: NASA-Goddard Space Flight Center

Amount: \$72,000, 7/05-10/09

Principal Investigator: James Llinas

Co-Investigators: Stuart Shapiro, John Crassidis and Tarunraj Singh

Title: Employing Context Information for L1 Fusion Approaches

Sponsor: Office of Naval Research

Amount: \$179,000, 1/08-1/09

Principal Investigator: John L. Crassidis

Title: Attitude Determination and Geolocation from a Formation of Spacecraft with Laser Communication Devices

Sponsor: Air Force Research Laboratory

Amount: \$40,181, 9/07-7/08

Principal Investigator: Moises Sudit

Co-Investigators: Rakesh Nagi, John L. Crassidis and Agamemnon L. Crassidis

Title: Hierarchical High Level Information Fusion Technologies

Sponsor: Office of Naval Research

Amount: \$448,410 1/06-5/08 (Year 1 \$224,205, Year 2 \$224,205)

Principal Investigator: John L. Crassidis

Title: Development of Robust Algorithms for Star Camera Attitude and Rate Estimation

Sponsor: StarVision Technologies

Amount: \$50,000, 6/06-9/07

Principal Investigator: John L. Crassidis

Title: Missile Modeling and Data Fusion

Sponsor: Missile Defense Agency

Amount: \$30,191, 5/07-9/07

Principal Investigator: John L. Crassidis

Co-Investigator: Yang Cheng

Title: Intelligent Sample Sensor Algorithms

Sponsor: L-3Communications

Amount: \$141,497, 1/06-12/06

Principal Investigator: Tarunraj Singh

Co-Investigators: John L. Crassidis and James Llinas

Title: A Proposal for Research, Design, and Validation of Fusion-Based Techniques for Tracking of Ground-Based Objects

Sponsor: Overwatch Systems

Amount: \$199,981 11/05-12/06

Principal Investigator: John L. Crassidis

Title: Development of Automated Alignment and Calibration Algorithms

Sponsor: NASA-Goddard Space Flight Center

Amount: \$149,981, 8/02-9/06 (Year 1 \$45,998, Year 2 \$49,997, Year 3 \$53,985)

Principal Investigator: John L. Crassidis

Title: Unscented Filtering for Undersampled Data Reconstruction

Sponsor: L-3Communications

Amount: \$33,380, 6/05-1/06

Principal Investigator: John L. Crassidis

Title: Kalman Filtering for GPS/INS Aircraft Applications

Sponsor: Calspan

Amount: \$7,158, 5/05-9/05

Principal Investigator: John L. Crassidis

Title: Robust Control of Nonlinear Systems Using Model-Error Control Synthesis

Sponsor: National Science Foundation

Amount: \$76,019, 8/02-8/04

Principal Investigator: John L. Crassidis

Title: NSTL Attitude Determination Pseudolite Task

Sponsor: NASA-Johnson Space Center

Amount: \$250,244, 1/00-12/04 (Year 1 \$72,248, Year 2 \$87,097, Year 3 \$89,227)

Principal Investigator: John L. Junkins

Co-Investigators: Thomas C. Pollock and John L. Crassidis

Title: Micro Spacecraft Attitude Sensing System

Sponsor: NASA-Langley Research Center

Amount: \$600,000 2/00-1/03 (Year 1 \$200,000, Year 2 \$200,000, Year 3 \$200,000)

Principal Investigator: John L. Junkins

Co-Investigators: Thomas C. Pollock and John L. Crassidis

Title: DIGISTAR Attitude Determination System for GIFTS

Sponsor: NASA-Langley Research Center

Amount: \$848,511 7/00-6/02 (Year 1 \$500,000, Year 2 \$348,511)

Principal Investigator: John L. Junkins
Co-Investigator: John L. Crassidis
Title: A New Sensor Concept for Vision-Based Navigation of Spacecraft, Aircraft, and Robots
Sponsor: Texas Higher Education Coordinating Board
Amount: \$191,911, 1/00-1/02

Principal Investigator: John L. Crassidis
Co-Investigator: Srinivas R. Vadali
Title: ISS Leak Localization Based on Attitude Response
Sponsor: United Space Alliance, LLC
Amount: \$158,506, 9/99-8/02

Principal Investigator: John L. Crassidis
Co-Investigator: John L. Junkins
Title: Vision-Based Navigation for Spacecraft Formation Flying
Sponsor: NASA-Goddard Space Flight Center
Amount: \$391,804 1/00-8/02 (Year 1 \$218,760, Year 2 \$173,044)

Principal Investigator: John L. Crassidis
Title: Attitude Determination Schemes for the CEGANS Sensor
Sponsor: NASA-Goddard Space Flight Center
Amount: \$5,900, 11/01-12/01

Principal Investigator: John L. Crassidis
Title: Autonomous Attitude Determination for ISS Applications Using Pseudolite Signals
Sponsor: NASA-Johnson Space Center
Amount: \$57,212, 2/99-10/99

Principal Investigator: John L. Crassidis
Co-Investigator: Carl Knospe (University of Virginia)
Title: Reaction Wheel Jitter Reduction Through Active Control of Magnetic Bearings
Sponsor: NASA-Goddard Space Flight Center
Amount: \$50,000, 3/98-11/98

Principal Investigator: John L. Crassidis
Title: Robust GPS Attitude Determination Scheme
Sponsor: NASA-Goddard Space Flight Center
Amount: \$15,373, 3/98-11/98

Principal Investigator: John L. Crassidis
Title: Robust Predictive Attitude Determination Using Global Positioning System Signal
Sponsor: NASA-ASEE Summer Faculty Fellowship Program
Amount: \$10,000, 6/98-8/98

Principal Investigator: John L. Crassidis
Title: Attitude Determination Using Global Positioning System Signal
Sponsor: NASA-ASEE Summer Faculty Fellowship Program
Amount: \$10,000, 6/97-8/97

CONSULTING: Teledyne Brown Engineering, Google, Leidos, BAE Systems, U.S. Army Materiel Systems Analysis Activity (USAMSAA), Army Research Laboratory, GCAS Inc., Integrity Applications Incorporated, Pacific Defense Solutions, IAVO Research and Scientific, National Satellite Technology Program, King Abdulaziz City for Science and Technology, NASA, Sierra Nevada Corporation, Space Photonics Inc., StarVision Technologies, Sunstream Scientific, Reichert Ophthalmic Instruments

PUBLICATIONS

Journal

- [1] Crassidis, J.L., and Cheng, Y., "Generalized Attitude Determination with One Dominant Vector Observation," *AIAA Journal of Guidance, Control, and Dynamics*, accepted for publication.
- [2] Hao, W., Chen, L., Jin, Z., and Crassidis, J.L., "Adaptive Momentum Distribution Jitter Control for a Micro-Satellite," *AIAA Journal of Guidance, Control, and Dynamics*, accepted for publication.

- [3] Baghdadi, A., Cavuoto, L., and Crassidis, J.L., "Hip and Trunk Kinematics Estimation in Gait through Kalman Filter Using IMU Data at the Ankle," *IEEE Sensors Journal*, Vol. 18, No. 10, 2018, pp. 4253-4260.
- [4] Ye, L., Zong, Q., Crassidis, J.L., and Tian, B., "Output Redefinition-Based Dynamic Inversion Control for a Nonminimum Phase Hypersonic Vehicle," *IEEE Transactions on Industrial Electronics*, Vol. 65, No. 4 April 2018, pp. 3447-3457.
- [5] Linares, R., and Crassidis, J.L., "Space Object Shape Inversion via Adaptive Hamiltonian Markov Chain Monte Carlo," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 41, No 1, Jan. 2018, pp. 47-58.
- [6] Dianetti, A.D., Weisman, R., and Crassidis, J.L., "Observability Analysis for Improved Space Object Characterization," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 41, No 1, Jan. 2018, pp. 137-148.
- [7] Yu, Z., Cui, P., and Crassidis, J.L., "Design and Optimization of Navigation and Guidance Techniques for Mars Pinpoint Landing: Review and Prospect," *Progress in Aerospace Sciences*, Vol. 94, Oct. 2017, pp. 82-94.
- [8] Crassidis, J.L., and Markley, F.L., "Three-Axis Attitude Estimation Using Rate-Integrating Gyroscopes," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 39, No. 7, July 2016, pp. 1513-1526.
- [9] Yu, Z., and Crassidis, J.L., "Accelerometer Bias Calibration Using Attitude and Angular Velocity Information," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 39, No. 4, April 2016, pp. 741-753.
- [10] Andrieu, M.S., and Crassidis, J.L., "Attitude Estimation Employing Common Frame Error Representations," *AIAA Journal of Guidance, Control, and Dynamics, Special Issue in Honor of Richard Battin*, Vol. 38, No. 9, Sept. 2015, pp. 1614-1624.
- [11] Semper, S.R., Crassidis, J.L., George, J., Mukherjee, S., and Singla, P., "Rao-Blackwellization for Adaptive Gaussian Sum Nonlinear Model Propagation," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 38, No. 7, July 2015, pp. 1290-1295.
- [12] Hinks, J.C., and Crassidis, J.L., "Covariance Analysis of Maximum Likelihood Estimation," *The Journal of the Astronautical Sciences*, Jan. 2015, pp. 1-25.
- [13] Crassidis, J.L., and Cheng, Y., "Error-Covariance Analysis for the Total Least Squares Problem," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 37, No. 4, July-Aug. 2014, pp. 1053-1063.
- [14] Linares, R., Jah, M.K., Crassidis, J.L., Leve, F.A., and Kececy, T., "Astrometric and Photometric Data Fusion for Inactive Space Object Mass and Area Estimation," *Acta Astronautica*, Vol. 99, June-July 2014, pp. 1-15.
- [15] Wetterer, C.J., Linares, R., Crassidis, J.L., Kececy, T.M., Ziebart, M.K., Jah, M.K., and Cefola, P.J., "Refining Space Object Radiation Pressure Modeling with Bidirectional Reflectance Distributions Functions," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 37, No. 1, Jan.-Feb. 2014, pp. 185-196.
- [16] Linares, R., Jah, M.K., Crassidis, J.L., and Nebelecky, C.K., "Space Object Shape Characterization and Tracking using Light Curve and Angles Data," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 37, No. 1, Jan.-Feb. 2014, pp. 13-25.
- [17] Andrieu, M.S., and Crassidis, J.L., "Geometric Integration of Quaternions," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 36, No. 6, Nov.-Dec. 2013, pp. 1762-1767.
- [18] Nebelecky, C.K., Crassidis, J.L., Fosbury, A.M., and Cheng, Y., "Efficient Covariance Intersection of Attitude Estimation Using a Local-Error Representation," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 35, No. 2, March-April, 2012, pp. 692-696.
- [19] Alsuwaidan, B.N., Crassidis, J.L., and Cheng, Y., "Generalized Multiple-Model Adaptive Estimation Using an Autocorrelation Approach," *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 47, No. 3, July 2011, pp. 2138-2152.
- [20] George, J., Crassidis, J.L., Singh, T., and Fosbury, A.M., "Anomaly Detection Using Context Aided Target Tracking," *Journal of Advances in Information Fusion*, Vol. 6, No. 1, June 2011, pp. 39-56.
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Book Reviews

- [1] Crassidis, J.L., “Statistical Orbit Determination,” *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 30, No. 2, March-April 2007, pp. 639-640.
- [2] Crassidis, J.L., “Applied Linear Optimal Control: Examples and Algorithms,” *AIAA Journal*, Vol. 41, No. 3, March 2003, pp. 560-561.

BOOK PROJECTS AND CHAPTERS

- [1] Fosbury, A.M., Crassidis, J.L., George, J., “Contextual Tracking in Surface Applications: Algorithms and Design Examples,” *Context-Enhanced Information Fusion, Boosting Real-World Performance with Domain Knowledge*, Snidaró, L., García, J., Llinas, J., and Blasch, E. (Eds.), Springer, New York, NY, 2016.
- [2] Markley, F.L., and Crassidis, J.L., *Fundamentals of Spacecraft Attitude Determination and Control*, (486 pages) Springer, New York, NY, 2014.
- [3] Crassidis, J.L., and Junkins, J.L., *Optimal Estimation of Dynamical Systems (Second Edition)*, (733 pages), Chapman & Hall/CRC, Boca Raton, FL, 2011.
- [4] Crassidis, J.L., and Junkins, J.L., *Optimal Estimation of Dynamical Systems*, (608 pages), Chapman & Hall/CRC, Boca Raton, FL, 2004.
- [5] Crassidis, J.L., Markley, F.L., Junkins, J.L., and Howell, K.C., editors, *The Malcolm D. Shuster Astronautics Symposium, Advances in the Astronautical Sciences*, published for the American Astronautical Society by Univelt, Inc., San Diego, CA, Vol. 122, 2006.
- [6] Crassidis, J.L., Junkins, J.L., Howell, K.C., Oshman, Y., and Thienel, J.K., editors, *The F. Landis Markley Astronautics Symposium, Advances in the Astronautical Sciences*, published for the American Astronautical Society by Univelt, Inc., San Diego, CA, Vol. 132, 2008.

SHORT COURSES

- [1] “An Overview of Orbital Dynamics and Satellite Maneuvers,” *NASA Glenn Research Center, Air Force Research Laboratory*, Rome, NY, Dec. 2018.
- [2] “An Overview of Spacecraft Attitude Determination and Estimation,” *NASA Glenn Research Center*, May, 2017.
- [3] “An Overview of Spacecraft Attitude Determination and Estimation,” *NASA Engineering and Safety Center*, Webcast, Jan. 2013.
- [4] “Introduction to Orbital Dynamics and Determination,” *Air Force Research Laboratory*, Rome, NY, Sept. 2011.
- [5] “Optimal Estimation Methods with Application to Attitude Estimation,” *Air Force Research Laboratory*, Albuquerque, NM, May 2010.
- [6] “L1 Fusion Approaches,” *L3 Communications*, Greenville, TX, July 2007.
- [7] “An Overview of Particle Filters with Applications to Aerospace Systems,” *The Charles Stark Draper Laboratory*, Cambridge, MA, Nov. 2005.

INVITED PRESENTATIONS

- [1] “Inertial Navigation Employing Common Frame Error Representations,” *University of California, Los Angeles*, Los Angeles, CA, Jan. 2019.
- [2] “Data/Information Fusion for Advanced Space Situational Awareness of Resident Space Objects,” *NASA Goddard Space Flight Center*, Greenbelt, MD, Oct. 2018.
- [3] “Data/Information Fusion for Advanced Space Situational Awareness of Resident Space Objects,” *Los Alamos National Laboratory*, Los Alamos, NM, Aug. 2018.
- [4] “Attitude Estimation Employing Common Frame Error Representations,” *Syracuse University*, Syracuse, NY, Oct. 2017.
- [5] “Attitude Estimation Employing Common Frame Error Representations,” *Georgia Tech*, Atlanta, GA, April 2017.
- [6] “Introduction to Data/Information Fusion with an Overview of UB’s Center for Multisource Information Fusion Center,” *Sandia National Laboratories*, Albuquerque, NM, Feb. 2017.
- [7] “Attitude Estimation Employing Common Frame Error Representations,” *University of Texas*, Austin, TX, Feb. 2017.
- [8] “Attitude Estimation Employing Common Frame Error Representations,” *Texas A&M University*, College Station, TX, Jan. 2017.
- [9] “Space Debris: It’s Just Floating Space Junk, So Why Do We Care?” *New York State Master Teacher Program*, April 2016.
- [10] “Attitude Estimation Using Rate-Integrating Gyroscopes?” (with F. Landis Markley) *Texas A&M University, Society of Engineering Science, 52nd Annual Technical Meeting*, College Station, TX, Oct. 2015.
- [11] “Has 45 Years of Attitude Estimation Been Wrong?” *Rutgers University*, New Brunswick, NJ, Sept. 2015.
- [12] “An Introduction to Data/Information Fusion” *Rochester Institute of Technology*, Rochester, NY, March 2015.
- [13] “Space Debris: It’s Just Floating Space Junk, So Why Do We Care?” *American Institute of Aeronautics and Astronautics-Niagara Frontier Section*, Buffalo, NY, April 2012.
- [14] “Sensor, Data, and Information Fusion: Facing Modern Challenges,” (with James Llinas, Moises Sudit and Jason Corso) *National Reconnaissance Office*, Chantilly, VA, March 2012.
- [15] “Astrometric and Photometric Data Fusion for Resident Space Object Orbit, Attitude, and Shape Determination,” *Rochester Institute of Technology*, Rochester, NY, Dec. 2011.
- [16] “Astrometric and Photometric Data Fusion for Resident Space Object Orbit, Attitude, and Shape Determination,” *Cornell University*, Ithaca, NY, Nov. 2011.
- [17] “Deterministic Relative Attitude Determination of Formation Flying Vehicles,” *University of Texas*, Austin, TX, Oct. 2011.
- [18] “Research in Attitude and Orbit Estimation for Space Situational Awareness,” *Moog, Inc.*, East Aurora, NY, Oct. 2010.

- [19] "Research in Attitude and Orbit Estimation for Space Situational Awareness," *Orbital Sciences Corporation*, Dulles, VA, Sept. 2010.
- [20] "Deterministic Relative Attitude Determination of Formation Flying Vehicles," *University of Glasgow*, Glasgow, Scotland, UK, July 2010.
- [21] "Exploring the Moon and Beyond," *Clarence Center Elementary School*, Clarence Center, NY, Dec. 2009.
- [22] "Deterministic Relative Attitude Determination of Formation Flying Vehicles," *Michigan Technological University*, Houghton, MI, March 2009.
- [23] "Deterministic Relative Attitude Determination of Formation Flying Vehicles," *Rochester Institute of Technology*, Rochester, NY, Jan. 2009.
- [24] "ISS Leak Localization Based on Attitude Response," *Worcester Polytechnic Institute*, Worcester, PA, March 2008.
- [25] "ISS Leak Localization Based on Attitude Response," *Erie-Niagara Chapter of The New York State Society of Professional Engineers, National Engineers Week Seminar Series*, Buffalo, NY, Feb. 2008.
- [26] "Generalized Multiple Model Adaptive Estimation," *Texas A&M University*, College Station, TX, June 2007.
- [27] "Why NASA is Important," *Mill Middle School*, Williamsville, NY, March 2004.
- [28] "ISS Leak Localization Based on Attitude Response," *Virginia Polytechnic Institute*, Blacksburg, VA, Oct. 2002.
- [29] "Unscented Filtering for Spacecraft Attitude Estimation," *Jet Propulsion Laboratory*, Pasadena, CA, Aug. 2002.
- [30] "ISS Leak Localization Based on Attitude Response," *Rochester Institute of Technology*, Rochester, NY, Nov. 2001.
- [31] "Attitude Determination and Control of Spacecraft," *University at Buffalo*, Amherst, NY, June 2000.
- [32] "New Methods for GPS Attitude Determination," *NASA-Johnson Space Center*, Houston, TX, Sept. 1998.
- [33] "New Methods for GPS Attitude Determination," *NASA-Goddard Space Flight Center*, Greenbelt, MD, July 1998.
- [34] "Predictive Attitude Determination of Spacecraft," *Computer Sciences Corporation*, Seabrook, MD, July 1998.
- [35] "Predictive Attitude Determination of Spacecraft," *Applied Physics Laboratory*, Laurel, MD, June 1998.
- [36] "Predictive Attitude Determination of Spacecraft," *University of Rhode Island*, Kingston, RI, March 1998.
- [37] "Predictive Attitude Determination of Spacecraft," *Calspan Corporation*, Buffalo, NY, March 1998.
- [38] "Predictive Attitude Determination of Spacecraft," *NASA-Wallops Flight Facility*, Wallops Island, VA, March 1998.
- [39] "Predictive Attitude Determination of Spacecraft," *NASA-Langley Research Center*, Hampton, VA, Jan. 1998.
- [40] "Predictive Attitude Determination of Spacecraft," *Texas A&M University*, College Station, TX, Jan. 1998.
- [41] "Predictive Attitude Determination of Spacecraft," *University of Maryland*, College Park, MD, Dec. 1997.
- [42] "Predictive Attitude Determination of Spacecraft," *State University of New York at Buffalo*, Buffalo, NY, Aug. 1997.
- [43] "Attitude Determination Using Global Positioning System Signals," *NASA-Goddard Space Flight Center*, Greenbelt, MD, June 1997.
- [44] "Robust Predictive Filtering for Nonlinear Systems," *University of Virginia*, Charlottesville, VA, Oct. 1995.
- [45] "Robust Predictive Filtering for Nonlinear Systems," *Catholic University of America*, Washington, D.C., Oct. 1995.
- [46] "Contingency Designs for Attitude Determination of TRMM," *Howard University*, Washington, D.C., Sept. 1995.
- [47] "A Real-Time Model Error Filter and State Estimator," *Old Dominion University*, Norfolk, VA, Nov. 1993.
- [48] "Robust Identification and Vibration Suppression of a Flexible Structure-Theory and Experiments," *Eastman Kodak*, Rochester, NY, Sept. 1993.
- [49] "Integrated Estimation and Identification for Robust Control of Multivariable Systems," *Rochester Institute of Technology*, Rochester, NY, April 1993.
- [50] "Robust Tracking and Control Laws for an Automatic Carrier Landing System," *Carrier Suitability Division*, U.S. Naval Air Station at Patuxent River, MD, March 1992.

REVIEWER

ASEE Postdoctoral Fellowship Program
AIAA Journal of Guidance, Control, and Dynamics
AIAA Journal of Spacecraft and Rockets
AIAA Journal
IEEE Transactions on Automatic Control
IEEE Transactions on Education
IEEE Transactions on Control Systems Technology
ASME Journal of Vibration and Acoustics
ASME Journal of Dynamic Systems, Measurement and Control
AAS Journal of the Astronautical Sciences
Journal of Sound and Vibration
Journal of Applied Mathematics
Journal of Systems and Control Engineering
Measurement Science and Technology
Aerospace Science and Technology
Journal of the Franklin Institute
International Journal of Aerospace Engineering
International Journal of Modelling and Simulation
Canadian Foundation for Innovation
The Natural Sciences and Engineering Research Council of Canada
Canada First Research Excellence Fund
National Science Foundation
Israel Science Foundation
AIAA Atmospheric Flight Mechanics Conference, '99
Decision and Control Conference, '00-'09
American Control Conference, '98-'16
8th Biennial Conference on Mechanical Vibration and Control, '01
AIAA Guidance, Navigation, and Control Conference, '98-'16