

UNIVERSITY COMMITTEES/ADMINISTRATIVE ASSIGNMENTS:**Department of Aerospace Engineering and Engineering Mechanics**

- AIAA student chapter faculty advisor: 2023/24, 2022/23, 2021/22, 2020/21, 2019/20
- Sigma Gamma Tau faculty advisor: 2018/19
- Member, Website Committee: 2020/21, 2019/20, 2017/18
- Controls Written Qualifying Exam Committee: 2022, 2021 (committee chair), 2020, 2019, 2018, 2017
- Computational Engineering Curriculum Committee: 2023/24, 2022/23
- Aerospace Engineering Faculty Search Committee: 2023/24, 2022/23

Cockrell School of Engineering

- Member, Engineering Awards Committee, 2017/18

PROFESSIONAL SOCIETY/GOVERNMENT SERVICE AND TECHNICAL COMMITTEES:**Outside Committees**

- Member, NASA Engineering and Safety Center (NESC) GN&C Technical Discipline Team, 2018-present
- Member, AIAA Astrodynamics Technical Committee, 2010-2022 (Committee Chair 2020-2022)
- Member, AAS Space-Flight Mechanics Technical Committee, 2023-2027, 2013-2017 (Committee Chair 2016-2017)
- Member, American Astronautical Society Executive Committee (2016-2017)
- Guest Associate Editor, Journal of the Astronautical Sciences, special issue on Optical Navigation (2019)
- Member, American Astronautical Society Fellows Selection Committee (2017)
- Reviewer NASA NSTRF/NSTGRO (2023, 2022, 2021, 2020, 2019, 2018, 2017)
- PDR panel member of “Safe and Precise Landing – Integrated Capabilities Evolution (SPLICE)”. NASA Johnson Space Center (2023)
- Panel member of “Small Spacecraft Attitude Determination and Control Sensors and Actuators topic -Utilizing Public-Private Partnerships to Advance Tipping Point Technologies”. NASA Headquarters (2015)
- Panel member of “Raven GN&C Engineering Peer Review”. NASA Goddard Satellite Servicing Capability Office (SSCO) (2014)
- Reviewer of the NASA Technology Roadmap area 5: Communications and Navigation (2014)
- Reviewer of the Osiris-Rex navigation design, NASA engineering and safety center (NESC) Final Assessment Report (2013)

Conference Activities

- Astrodynamics Topic Chair, 2021 AIAA ASCEND Forum, Las Vegas, NV, November 2021.
- AIAA Technical Chair, 2021 AAS/AIAA Astrodynamics Specialist Conference, January 31– February 4, 2021.
- AIAA General Chair, 2019 AAS/AIAA Astrodynamics Specialist Conference, Maui, HI, January 13–17, 2019.
- AAS Technical Chair, 2016 AAS/AIAA Space-Flight Mechanics Meeting, Napa Valley, CA, February 14–18, 2016.
- AIAA Technical Chair, 2014 AAS/AIAA Space-Flight Mechanics Meeting, Santa Fe, NM, January 26–30, 2014.
- AIAA Associate Editor, American Control Conference 2019, 2018, 2017
- National Chair, Exploring Frontiers - The Moon & Mars Session, 45th annual AAS Guidance, Navigation and Control Conference. Breckenridge, CO. January 31 – February 5, 2023.
- National Chair, Advanced Navigation Applications and Technologies Session, 42nd annual AAS Guidance, Navigation and Control Conference. Breckenridge, CO. January 31 – February 6, 2019.
- Chair of the Attitude Dynamics, Determination and Control I session at the AIAA/AAS Space-Flight Mechanics Meeting, AIAA SciTech Forum, January 6–9, 2020.
- Chair of the Relative Motion session at the AAS/AIAA Astrodynamics Specialist Conference, August 20–25, 2017, Stevenson, WA.
- Chair of the Navigation session at the AAS/AIAA Space-Flight Mechanics Meeting, February 5–9, 2017, San Antonio, TX.
- Chair of the Trajectory Optimization II session at the AIAA/AAS Astrodynamics Specialist Conference, September 12–16, 2016, Long Beach, CA.
- Co-chair of the Trajectory Design and Optimization session at the AAS/AIAA Astrodynamics Specialist Conference, August 9–13, 2015, Vail, CO.

- Chair of the Orbit Determination II session at the AAS/AIAA Space-Flight Mechanics Meeting, January 11–15, 2015, Williamsburg, VA.
- Chair of the Attitude Control and Dynamics I session at the AAS/AIAA Astrodynamics Specialist Conference, August 11–15, 2013, Hilton Head, SC.
- Chair of the Attitude Dynamics and Control I session at the AAS/AIAA Space-Flight Mechanics Meeting, February 10–14, 2013, Kauai, HI.
- Chair of the Attitude Dynamics and Control II session at the AAS/AIAA Astrodynamics Specialist Conference, July 31– August 4, 2011, Girdwood, AK.
- Chair of the Navigation and Orbit Determination session at the AAS/AIAA Spaceflight Mechanics Meeting, February 13–17, 2011, New Orleans, LA.
- Co-chair of the Attitude and Parameter Estimation I session at the AIAA Guidance, Navigation and Control Conference and Exhibit, August 18 – 21, 2008, Honolulu, HI
- Chair of the General Theory session at the F. Landis Markley Astronautics Symposium, June 30 – July 2, 2008, Cambridge, MD

Current Review Activities

Excellent Reviewer for the *Journal of Guidance, Control, and Dynamics* 2022, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2012, 2011, 2010, 2009, 2008.

- IEEE Transactions on Automatic Control
- Journal of Guidance, Control, and Dynamics
- IEEE Transactions on Aerospace and Electronic Systems
- Journal of the Astronautical Sciences
- Journal of Optimization Theory and Applications

PUBLICATIONS:

Refereed Journal Publications

- J42. F. D’Onofrio and R. Zanetti, “A Novel Approach to Autonomous Lunar Localization and Timing,” *Accepted for Publication by the Journal of Guidance, Control, and Dynamics*, 2023.
<https://doi.org/10.2514/1.G007613> pdf
- J41. S. P. A. Ram, M. R. Akella, and R. Zanetti, “Angular velocity estimation using rate-integrating gyro measurements,” *Journal of Guidance, Control, and Dynamics*, vol. 46, pp. 1513–1525, August 2023.
<https://doi.org/10.2514/1.G007344> pdf
- J40. B. S. Pogorelsky, R. Zanetti, J. Chen, and S. Jenkins, “Synthetic aperture radar based spacecraft terrain relative navigation,” *Journal of Spacecraft and Rockets*, vol. 59, pp. 1412–1424, September 2022.
<https://doi.org/10.2514/1.A35067> pdf
- J39. S. Yun, R. Zanetti, and B. A. Jones, “Kernel-based ensemble gaussian mixture filtering for orbit determination with sparse data,” *Advances in Space Research*, vol. 69, pp. 4179–4197, June 2022.
<https://doi.org/10.1016/j.asr.2022.03.041> pdf
- J38. S. Servadio, R. Zanetti, and R. Armellini, “Maximum a posteriori estimation of hamiltonian systems with high order taylor polynomials,” *The Journal of the Astronautical Sciences*, vol. 69, pp. 511–536, April 2022.
<https://doi.org/10.1007/s40295-022-00304-4> pdf
- J37. S. Yun and R. Zanetti, “Clustering methods for particle filters with gaussian mixture models,” *IEEE Transactions on Aerospace and Electronic Systems*, vol. 58, pp. 1109–1118, April 2022.
<https://doi.org/10.1109/TAES.2021.3117655> pdf
- J36. S. Servadio and R. Zanetti, “Estimation Of The Conditional State And Covariance with Taylor Polynomials,” *Journal of Advances in Information Fusion*, vol. 16, pp. 126–142, December 2021 pdf
- J35. S. Servadio and R. Zanetti, “Differential algebra-based multiple gaussians particle filter for orbit determination,” *Journal of Optimization Theory and Applications*, vol. 191, pp. 459–485, December 2021.
<https://doi.org/10.1007/s10957-021-01934-8> pdf
- J34. S. Servadio, R. Zanetti, and B. A. Jones, “Nonlinear Filtering with a Polynomial Series of Gaussian Random Variables,” *IEEE Transactions on Aerospace and Electronic Systems*, vol. 57, pp. 647–658, February 2021.
<https://doi.org/10.1109/TAES.2020.3028487> pdf
- J33. R. Moghe and R. Zanetti, “A deep learning approach to hazard detection for autonomous lunar landing,” *Journal of the Astronautical Sciences*, vol. 67, pp. 1811–1830, December 2020. DOI: 10.1007/s40295-020-00239-8 pdf

- J32. S. Yun, K. Tuggle, R. Zanetti, and C. D'Souza, "Sensor Configuration Trade Study for Navigation in Near Rectilinear Halo Orbits," *Journal of the Astronautical Sciences*, vol. 67, pp. 1755–1774, December 2020.
<https://doi.org/10.1007/s40295-020-00224-1> pdf
- J31. S. Yun and R. Zanetti, "Nonlinear filtering of light-curve data," *Advances in Space Research*, vol. 66, pp. 1672–1688, October 2020.
<https://doi.org/10.1016/j.asr.2020.06.024> pdf
- J30. M. M. de Almeida, D. Mortari, R. Zanetti, and M. Akella, "Quatera: The quaternion regression algorithm," *Journal of Guidance, Control, and Dynamics*, vol. 43, pp. 1600–1616, September 2020.
<https://doi.org/10.2514/1.G004375> pdf
- J29. S. Servadio and R. Zanetti, "Recursive Polynomial Minimum Mean Square Error Estimation With Applications To Orbit Determination," *Journal of Guidance, Control, and Dynamics*, vol. 43, pp. 939–954, May 2020.
<https://doi.org/10.2514/1.G004544> pdf
- J28. R. Moghe, R. Zanetti, and M. Akella, "Adaptive Kalman Filter for Detectable Linear Time Invariant Systems," *Journal of Guidance, Control, and Dynamics*, vol. 42, pp. 2197–2205, October 2019.
<https://doi.org/10.2514/1.G004359> pdf
- J27. S. Yun and R. Zanetti, "Sequential Monte Carlo Filtering with Gaussian Mixture Sampling," *Journal of Guidance, Control, and Dynamics*, vol. 42, pp. 2069–2077, September 2019.
<https://doi.org/10.2514/1.G004403> pdf
- J26. R. Zanetti, "Rotations, Transformations, Left Quaternions, Right Quaternions?," *Journal of the Astronautical Sciences*, vol. 66, pp. 361–381, September 2019.
<https://doi.org/10.1007/s40295-018-00151-2> pdf
- J25. C. D'Souza and R. Zanetti, "Information Formulation of the UDU Kalman Filter," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 55, pp. 493–498, February 2019.
<https://doi.org/10.1109/TAES.2018.2850379> pdf
- J24. R. Zanetti and K. J. DeMars, "Fully Multiplicative Unscented Kalman Filter for Attitude Estimation," *Journal of Guidance, Control, and Dynamics*, vol. 41, pp. 1183–1189, May 2018.
<https://doi.org/10.2514/1.G003221> pdf
- J23. K. Tuggle and R. Zanetti, "Automated Splitting Gaussian Mixture Nonlinear Measurement Update," *Journal of Guidance, Control, and Dynamics*, vol. 41, pp. 725–734, March 2018.
<https://doi.org/10.2514/1.G003109> pdf
- J22. R. Zanetti, G. N. Holt, R. S. Gay, C. D. D'Souza, J. Sud, H. Mamich, and R. Gillis, "Design and Flight Performance of the Orion Pre-Launch Navigation System," *Journal of Guidance, Control, and Dynamics*, vol. 40, pp. 2289–2300, September 2017.
<https://doi.org/10.2514/1.G002666> pdf
- J21. R. Zanetti, G. N. Holt, R. S. Gay, C. D. D'Souza, J. Sud, H. Mamich, M. Begley, E. King, and F. Clark, "Absolute Navigation Performance of the Orion Exploration Flight Test 1," *Journal of Guidance, Control, and Dynamics*, vol. 40, pp. 1106–1116, May 2017.
<https://doi.org/10.2514/1.G002371> pdf
- J20. F. De Dilectis, D. Mortari, and R. Zanetti, "Bezier Description of Space Trajectories," *Journal of Guidance, Control, and Dynamics*, vol. 39, pp. 2535–2539, November 2016.
<https://doi.org/10.2514/1.G000719> pdf
- J19. R. Armellin, P. Di Lizia, and R. Zanetti, "Dealing with uncertainties in angles-only initial orbit determination," *Celestial Mechanics and Dynamical Astronomy*, vol. 125, no. 4, pp. 435–450, 2016.
<https://doi.org/10.1007/s10569-016-9694-z> pdf
- J18. D. Mortari, C. D'Souza, and R. Zanetti, "Image Processing of Illuminated Ellipsoid," *Journal of Spacecraft and Rocket*, vol. 53, pp. 448–456, May–June 2016.
<https://doi.org/10.2514/1.A33342> pdf
- J17. R. Zanetti and C. D'Souza, "Observability Analysis and Filter Design for the Orion Earth-Moon Attitude Filter," *Journal of Guidance, Control, and Dynamics*, vol. 39, pp. 201–213, February 2016.
<https://doi.org/10.2514/1.G001217> pdf
- J16. D. Mortari, F. de Dilectis, and R. Zanetti, "Position Estimation using Image Derivative," *Aerospace*, vol. 2, pp. 435–460, September 2015.
<https://doi.org/10.3390/aerospace2030435> pdf
- J15. R. Zanetti, "Adaptable Recursive Update Filter," *Journal of Guidance, Control, and Dynamics*, vol. 38, pp. 1295–

- 1300, July 2015.
<https://doi.org/10.2514/1.G001031> pdf
- J14. T. Ainscough, R. Zanetti, J. Christian, and P. D. Spanos, “q-Method Extended Kalman Filter,” *Journal of Guidance, Control, and Dynamics*, vol. 38, pp. 752–760, April 2015.
<https://doi.org/10.2514/1.G000118> pdf
- J13. R. Zanetti and C. D’Souza, “Recursive Implementations of the Schmidt-Kalman Consider Filter,” *Journal of the Astronautical Sciences*, vol. 60, pp. 672–685, July–December 2013.
<https://doi.org/10.1007/s40295-015-0068-7> pdf
- J12. R. Zanetti and K. J. DeMars, “Joseph Formulation of Unscented and Quadrature Filters with Application to Consider States,” *Journal of Guidance, Control, and Dynamics*, vol. 36, pp. 1860–1864, November–December 2013.
<https://doi.org/10.2514/1.59935> pdf
- J11. R. Zanetti and C. D’Souza, “Dual Accelerometer Usage Strategy for Onboard Spacecraft Navigation,” *Journal of Guidance, Control, and Dynamics*, vol. 35, pp. 1899–1901, November–December 2012.
<https://doi.org/10.2514/1.58154> pdf
- J10. R. Zanetti, “Recursive Update Filtering for Nonlinear Estimation,” *IEEE Transactions on Automatic Control*, vol. 57, pp. 1481–1490, June 2012. doi:10.1109/TAC.2011.2178334 pdf
- J9. R. Zanetti, D. Woffinden, and A. Sievers, “Multiple Event Triggers in Linear Covariance Analysis for Spacecraft Rendezvous,” *Journal of Guidance, Control, and Dynamics*, vol. 35, pp. 353–366, March–April 2012.
<https://doi.org/10.2514/1.54965> pdf
- J8. R. Zanetti and R. H. Bishop, “Kalman Filters with Uncompensated Biases,” *Journal of Guidance, Control, and Dynamics*, vol. 35, pp. 327–330, January–February 2012.
<https://doi.org/10.2514/1.55120> pdf
- J7. R. Zanetti, “Optimal Glideslope Guidance for Spacecraft Rendezvous,” *Journal of Guidance, Control, and Dynamics*, vol. 34, pp. 1593–1597, September–October 2011.
<https://doi.org/10.2514/1.54103> pdf
- J6. R. Zanetti, K. J. DeMars, and R. H. Bishop, “Underweighting Nonlinear Measurements,” *Journal of Guidance, Control, and Dynamics*, vol. 33, pp. 1670–1675, September–October 2010.
<https://doi.org/10.2514/1.50596> pdf
- J5. R. Zanetti, “A Multiplicative Residual Approach to Attitude Kalman Filtering with Unit-Vector Measurements,” *The Journal of the Astronautical Sciences*, vol. 57, pp. 793–801, October–December 2009.
<https://doi.org/10.1007/BF03321530> pdf
- J4. R. Zanetti, M. Majji, R. H. Bishop, and D. Mortari, “Norm-Constrained Kalman Filtering,” *Journal of Guidance, Control, and Dynamics*, vol. 32, pp. 1458–1465, September–October 2009.
<https://doi.org/10.2514/1.43119> pdf
- J3. R. Zanetti, “Autonomous Midcourse Navigation for Lunar Return,” *Journal of Spacecrafts and Rockets*, vol. 46, pp. 865–873, July–August 2009.
<https://doi.org/10.2514/1.41769> pdf
- J2. R. Zanetti and R. H. Bishop, “A New Method to Introduce *A Priori* Information in QUEST,” *The Journal of the Astronautical Sciences*, vol. 55, pp. 451–461, October–December 2007.
<https://doi.org/10.1007/BF03256535> pdf
- J1. M. R. Akella, D. Seo, and R. Zanetti, “Attracting Manifolds for Attitude Estimation in Flatland and Otherlands,” *The Journal of the Astronautical Sciences*, vol. 54, pp. 635–655, July–December 2006.
<https://doi.org/10.1007/BF03256510> pdf

Submitted Journal Publications

- S1. C. L. Marcus, R. Zanetti, and J. S. McCabe, “Improving filter slam with the modified-half-normal distribution,” *Submitted for Publication*, 2023
- S2. A. A. Popov and R. Zanetti, “An adaptive covariance parameterization technique for the ensemble Gaussian mixture filter,” *Submitted for Publication*, 2022.
<https://doi.org/10.48550/arXiv.2212.10323>
- S3. A. A. Popov and R. Zanetti, “Ensemble-localized kernel density estimation with applications to the ensemble gaussian mixture filter,” *Submitted for Publication*, 2023.
<https://doi.org/10.48550/arXiv.2308.14143>

- S4. S. P. A. Ram and R. Zanetti, “Robocentric slam,” *Submitted for Publication*, 2023
- S5. C. L. Marcus and R. Zanetti, “Landing site mapping and selection with a quadtree map using planar elements,” *Submitted for Publication*, 2023
- S6. K. Michaelson, F. Wang, , and R. Zanetti, “Terrain-relative navigation with neuro-inspired elevation encoding,” *Submitted for Publication*, 2023

Conference Publications

- C83. C. Marcus and R. Zanetti, “MHN-SLAM For Planetary Landing,” in *Proceedings of the 2023 AAS/AIAA Astrodynamics Specialist Conference*, American Astronautical Society, 2023. Paper Number AAS 23-319
- C82. F. D’Onofrio and R. Zanetti, “A Novel Approach to Autonomous Lunar Localization and Timing,” in *Proceedings of the 2023 AAS/AIAA Astrodynamics Specialist Conference*, American Astronautical Society, 2023. Paper Number AAS 23-319
- C81. D. Duran, A. A. Popov, and R. Zanetti, “MCMC EnGMF for Sparse Data Orbit Determination,” in *Proceedings of the 2023 AAS/AIAA Astrodynamics Specialist Conference*, American Astronautical Society, 2023. Paper Number AAS 23-356
- C80. A. A. Popov and R. Zanetti, “Ensemble gaussian mixture filtering with particle-localized covariances,” in *26th International Conference on Information Fusion*, (Charleston, SC), June 27–30 2023
- C79. B. L. Reifler, A. A. Popov, B. A. Jones, and R. Zanetti, “Large-scale space object tracking in a proliferated leo scenario,” in *26th International Conference on Information Fusion*, (Charleston, SC), June 27–30 2023
- C78. K. Michaelson, A. A. Popov, and R. Zanetti, “Ensemble kalman filter with bayesian recursive update,” in *26th International Conference on Information Fusion*, (Charleston, SC), June 27–30 2023
- C77. K. Michaelson, F. Wang, and R. Zanetti, “Terrain-relative navigation with neuro-inspired elevation encoding,” in *IEEE/ION Position Location and Navigation Symposium (PLANS)*, (Monterrey, CA), April 24–27 2023
- C76. B. Sunderland, S. Takahashi, S. Hesar, A. Garcia, M. Muktoyuk, R. Mamich, R. Zanetti, and M. Jah, “Autonomous Onboard Risk Mitigation for Spacecraft Proximity Operations; A Zero-SWaP Flight Software Enhancement,” in *Proceedings of the 2023 AAS Guidance, Navigation, and Control Conference*, American Astronautical Society, 2023. Paper Number AAS 23-126
- C75. Z. McLaughlin, B. A. Jones, and R. Zanetti, “Nonlinear Filtering with Intrusive Polynomial Chaos for Satellite Uncertainty Quantification,” in *Proceedings of the 2023 AAS/AIAA Spaceflight Mechanics Meeting*, American Astronautical Society, 2023. Paper Number AAS 23-370
- C74. K. A. Michaelson, A. A. Popov, and R. Zanetti, “Recursive Update Filtering: A New Approach,” in *Proceedings of the 2023 AAS/AIAA Spaceflight Mechanics Meeting*, American Astronautical Society, 2023. Paper Number AAS 23-321
- C73. C. D’Souza and R. Zanetti, “The Initial Orbit Determination (IOD) Problem with Range, Range-Rate and Angles,” in *Proceedings of the 2023 AAS/AIAA Spaceflight Mechanics Meeting*, American Astronautical Society, 2023. Paper Number AAS 23-304
- C72. R. E. Gold, S. G. Catalan, B. A. Jones, and R. Zanetti, “Extending capabilities of crater navigation and timing for autonomous lunar orbital operations,” in *3rd Space Imaging Workshop*, Georgia Tech, October 10-12 2022. Paper Number SIW22-30
- C71. S. Yun, N. Ravago, B. L. Reifler, R. Zanetti, and B. A. Jones, “Generalized labeled multi-bernoulli filter with kernel-based ensemble gaussian mixture filtering for orbit determination with sparse data,” in *Proceedings of the Advanced Maui Optical and Space Surveillance Technologies (AMOS) Conference*, (Maui, Hawaii), 27-30 September 2022 [pdf](#)
- C70. F. G. Grueso, R. Zanetti, and M. R. Simon, “Autonomous Anomaly Detection Via Unsupervised Machine Learning,” in *Proceedings of the 2022 AAS/AIAA Astrodynamics Specialist Conference*, no. AAS 22–666, August 2022 [pdf](#)
- C69. B. Pogorelsky, K. Michaelson, and R. Zanetti, “Particle Filter with LMMSE Importance Sampling,” in *Proceedings of the 25th International Conference on Information Fusion*, July 2022 [pdf](#)
- C68. Z. R. McLaughlin, R. E. Gold, S. G. Catalan, R. Moghe, B. A. Jones, and R. Zanetti, “Crater Navigation and Timing for Autonomous Lunar Orbital Operations in Small Satellites,” in *Proceedings of the AAS Guidance and Control Conference*, no. AAS 22-146, 2022 [pdf](#)
- C67. C. Marcus, T. Setterfield, and R. Zanetti, “Variable Resolution Quadtree Mapping for Planetary Landing Using Planar Elements,” in *Proceedings of the AAS Guidance and Control Conference*, no. AAS 22-104, 2022 [pdf](#)
- C66. R. Mamich and R. Zanetti, “Navigation Using Serendipitous Star-Tracker Observations and On-Board Data

- Processing,” in *Proceedings of the AAS Guidance and Control Conference*, no. AAS 22-071, 2022 [pdf](#)
- C65. S. Yun and R. Zanetti, “Bayesian Estimation with Artificial Neural Network,” in *Proceedings of the 24th International Conference on Information Fusion*, 1–4 November 2021 [pdf](#)
- C64. C. Marcus and R. Zanetti, “A novel gamma filter for positive parameter estimation,” in *Proceedings of the IEEE International Conference on Multisensor Fusion and Integration (MFI)*, (Karlsruhe, Germany), 23–25 September 2021 [pdf](#)
- C63. B. L. Reifler, S. Yun, B. A. Jones, and R. Zanetti, “Multi-target ensemble gaussian mixture tracking with sparse observations,” in *Proceedings of the Advanced Maui Optical and Space Surveillance Technologies (AMOS) Conference*, (Maui, Hawaii), 14-17 September 2021 [pdf](#)
- C62. A. Ram, M. R. Akella, and R. Zanetti, “Angular Velocity Estimation Using Rate-Integrated Gyro Measurements,” in *Proceedings of the 2021 AAS/AIAA Astrodynamics Specialist Conference*, no. AAS 21–699, 9–11 August 2021 [pdf](#)
- C61. S. Yun, R. Zanetti, and B. A. Jones, “Kernel-Based Ensemble Gaussian Mixture Filtering for Orbit Determination with Sparse Data,” in *Proceedings of the 2021 AAS/AIAA Astrodynamics Specialist Conference*, no. AAS 21–501, 9–11 August 2021 [pdf](#)
- C60. S. Servadio and R. Zanetti, “Uncertainty Estimation Through Polynomial Map Inversion,” in *Proceedings of the 2021 AAS/AIAA Astrodynamics Specialist Conference*, no. AAS 21–659, 9–11 August 2021 [pdf](#)
- C59. C. Marcus and R. Zanetti, “Direct Visual SLAM with a Filter Based Lidar Measurement Incorporation,” in *AAS/AIAA Space-Flight Mechanics Meeting*, no. AAS 21-347, 1–3 February 2021 [pdf](#)
- C58. B. S. Pogorelsky, R. Zanetti, J. Chen, and S. Jenkins, “Spacecraft terrain relative navigation with synthetic aperture radar,” in *AAS/AIAA Space-Flight Mechanics Meeting*, no. AAS 21-254, 1–3 February 2021 [pdf](#)
- C57. R. Moghe, M. R. Akella, and R. Zanetti, “Covariance estimation using geometric optimization on symmetric positive definite manifolds,” in *AAS/AIAA Space-Flight Mechanics Meeting*, no. AAS 21-353, 1–3 February 2021 [pdf](#)
- C56. S. Servadio and R. Zanetti, “Estimation of the conditional state and covariance with taylor polynomials,” in *AAS/AIAA Space-Flight Mechanics Meeting*, no. AAS 21-416, 1–3 February 2021 [pdf](#)
- C55. S. Servadio, R. Zanetti, and B. A. Jones, “Nonlinear Filtering with a Polynomial Series of Gaussian Random Variables,” in *Proceedings of the 23rd International Conference on Information Fusion*, 6–9 July 2020 [pdf](#)
- C54. S. Yun and R. Zanetti, “Nonlinear Filtering of Light-Curve Data,” in *AAS/AIAA Astrodynamics Specialist Conference*, no. AAS–20–406, 9–12 August 2020 [pdf](#)
- C53. S. Servadio and R. Zanetti, “DA-Based Multiple Gaussians Particle Filter for Orbit Determination,” in *Proceedings of the 2020 AAS/AIAA Astrodynamics Specialist Conference*, no. AAS 20–417, 9–12 August 2020 [pdf](#)
- C52. R. Moghe and R. Zanetti, “On-line hazard detection on lunar digital elevation maps using semantic segmentation,” in *AIAA Scitech 2020 Forum*, (Orlando, FL), AIAA 2020–0462, 6-10 January 2020 2020. doi: 10.2514/6.2020-0462 [pdf](#)
- C51. S. Yun, K. Tuggle, R. Zanetti, and C. D’Souza, “Sensor Configuration Trade Study for Navigation in Near Rectilinear Halo Orbits,” in *AAS/AIAA Astrodynamics Specialist Conference*, (Portland, Maine), August 11–15 2019. AAS 19-849 [pdf](#)
- C50. C. D’Souza, D. Woffinden, and R. Zanetti, “A Framework for Scaling in Filtering and Linear Covariance Analysis,” in *AAS/AIAA Astrodynamics Specialist Conference*, no. AAS–19–687, (Portland, Maine), August 11–15 2019 [pdf](#)
- C49. S. Servadio, R. Zanetti, and R. Armellin, “Maximum A Posteriori Estimation of Hamiltonian Systems with High Order Series Expansions,” in *AAS/AIAA Astrodynamics Specialist Conference*, no. AAS–19–875, (Portland, Maine), August 11–15 2019 [pdf](#)
- C48. M. M. de Almeida, D. Mortari, R. Zanetti, and M. Akella, “QuateRA: The Quaternion Regression Algorithm,” in *AAS/AIAA Astrodynamics Specialist Conference*, no. AAS–19–654, (Portland, Maine), August 11–15 2019 [pdf](#)
- C47. R. Zanetti, “Rotations, Transformations, Left Quaternion, Right Quaternion?,” in *AAS/AIAA Space-Flight Mechanics Meeting*, no. AAS–19–296, (Maui, Hawaii), January 13–17 2019 [pdf](#)
- C46. S. Servadio and R. Zanetti, “Recursive Polynomial Minimum Mean Square Error Estimation with Applications to Orbit Determination,” in *Proceedings of the 2019 AAS/AIAA Space Flight Mechanics Meeting*, no. AAS 19–445, 2019 [pdf](#)
- C45. R. Moghe, R. Zanetti, and M. Akella, “Covariance matching Kalman filter for observable LTI systems,” in *57th Conference on Decision and Control*, (Miami Beach, FL), Dec. 17–19 2018 [pdf](#)

- C44. R. Moghe, R. Zanetti, and M. Akella, "Covariance Matching for IMU Bias Estimation," in *AAS/AIAA Astrodynamics Specialist Conference*, no. AAS-18-449, (Snowbird, Utah), August 19-23 2018 [pdf](#)
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- C24. K. Mand, D. Woffinden, P. Spanos, and R. Zanetti, “Rendezvous and Proximity Operations At the Earth-Moon L2 Lagrange Point: Navigation Analysis for Preliminary Trajectory Design,” in *Proceedings of the 2014 Space-Flight Mechanics Meeting*, vol. 152 of *Advances in the Astronautical Sciences*, (Santa Fe, NM), pp. 2425–2444, January 26–30 2014. AAS 14-376 [pdf](#)
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https://doi.org/10.1007/978-1-4471-5102-9_100036-1
- B5. F. Topputo, A. J. Sinclair, M. P. Wilkins, and R. Zanetti, eds., *Proceedings of the 2019 AAS/AIAA Space Flight Mechanics Meeting*, vol. 168 of *Advances in the Astronautical Sciences*, 2019
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- B1. R. S. Wilson, R. Zanetti, D. L. Mackinson, and O. Abdelkhalik, eds., *Proceedings of the 2014 AAS/AIAA Space Flight Mechanics Meeting*, vol. 152 of *Advances in the Astronautical Sciences*, 2014

ORAL PRESENTATIONS:

- P37. *Statistical Estimation for Aerospace Applications*, Mechanical and Space Engineering Seminar, Georgia Tech, 30 January 2023
- P36. *Statistical Estimation for Aerospace Applications*, Mechanical and Aerospace Engineering Seminar, University of California Los Angeles, 13 January 2023
- P35. *Nonlinear Estimation for Space Applications*, Modeling and Computation Graduate Seminar Series, Carnegie Mellon University, 4 February 2022
- P34. *Nonlinear Estimation for Orbit Determination*, Mechanical and Aerospace Engineering Graduate Seminar Series, New Mexico State University, 19 November 2021
- P33. *Relative Navigation and Mapping*, Lockheed Martin Space Systems Seminar, 2 August 2021
- P32. *Terrain Relative Navigation with NeuroGrids Encoding*, Autonomy for Hypersonics Field Day, Sandia National

Lab, 29 July 2021

- P31. *SLAM for Navigation*, AutonomyNM Bootcamp, Sandia National Laboratories, 28 June 2021
- P30. *Statistical Estimation: Model-Based, Data-Driven, and Hybrid approaches*, Plenary Talk, 2020 IEEE International Conference on Multisensor Fusion and Integration, 16 September 2020
- P29. *Closed-Loop Navigation Using SAR*, Autonomy for Hypersonics Field Day, Sandia National Lab, 6 August 2020
- P28. *Statistical Estimation: From Kalman Filters to Machine Learning*, Summer PhD Seminar Series, University of Rome, Department of Aerospace Engineering, 17 July 2020
- P27. *Statistical Estimation: From Kalman Filters to Machine Learning*, NASA Engineering and Safety Center GNC Technical Discipline Meeting, 15 July 2020
- P26. *Statistical Estimation: From Kalman Filters to Machine Learning*, AFRL Summer Seminar Series, 7 July 2020
- P25. *Advanced State Estimation*, AutonomyNM Bootcamp, Sandia National Laboratories, 1 July 2020
- P24. *UT Aerospace Engineering Contributions to Autonomous GNC for Deep Space Human Exploration* Looking Back, Looking Forward: Apollo at 50, Osher Lifelong Learning Institute at The University of Texas at Austin, 7 November 2019
- P23. *UT Aerospace Engineering Contributions to Autonomous GNC for Deep Space Human Exploration*, Looking Back, Looking Forward: Apollo at 50, Osher Lifelong Learning Institute at The University of Texas at Austin, 22 April 2019
- P22. *Closed-Loop Navigation Using SAR*, Autonomy for Hypersonics Field Day, Sandia National Lab, 17 April 2019
- P21. *Autonomous Orion GN&C*, Space Systems Seminar, Naval Postgraduate School, 7 March 2019
- P20. *Orbital Uncertainty Quantification Using Directional Splitting and Gaussian Mixture Models*, Aerospace Engineering Graduate Seminar Series, University of Illinois Urbana-Champaign, 22 October 2018
- P19. *Multiplicative Extended Kalman Filter*, invited lecture, Spacecraft Attitude Determination, Texas A&M University, 26 April 2018
- P18. *Onboard Navigation of Space Vehicles*, Navigation Seminar, Jet Propulsion Laboratory, 11 October 2017
- P17. *A Splitting Gaussian Mixture Formulation for a Nonlinear Measurement Update*, AFRL Summer Seminar Series, Air Force Research Lab, 27 July 2017
- P16. *Autonomous Orion GN&C*, Tech Talk Series, Sandia National Lab, 26 July 2017
- P15. *Onboard Navigation of Space Vehicles*, Aerospace Engineering Seminar, Politecnico di Milano, 10 July 2017
- P14. *Autonomous Orion GN&C*, Invited Tutorial Session, American Control Conference, 25 May 2017
- P13. *Consider Estimation for Onboard Navigation*, Space Systems Seminar, Applied Physics Laboratory, 3 May 2017
- P12. *Consider Estimation for Onboard Navigation*, Navigation Seminar, NASA Goddard Space Flight Center, 1 May 2017
- P11. *A Splitting Gaussian Mixture Formulation for a Nonlinear Measurement Update*, Texas Systems Day, Texas A&M University, 31 March 2017
- P10. *Autonomous Navigation for Robotic Space Missions*, Aerospace Engineering Seminar, University of Texas at Austin, 27 March 2016
- P9. *Navigation Design and Performance of the First NASA Orion Flight Test*, Graduate Seminar Series, Rice University, 28 October 2015
- P8. *Nonlinear Measurement Update for Onboard Navigation*, Guidance and Control Seminar, University of Texas at Austin, 7 November 2013
- P7. *Nonlinear Measurement Update for Onboard Navigation*, Aerospace Engineering Sciences Research Seminar, University of Colorado at Boulder, 4 February 2013
- P6. *Stochastic Estimation Theory*, four months course for Draper Laboratory employees, September to December 2012
- P5. *Dual Accelerometer Usage Strategy for Onboard Spacecraft Navigation*, AIAA Houston Section Annual Technical Symposium, 18 May 2012
- P4. *Multiplicative Extended Kalman Filter*, invited lecture, Spacecraft Attitude Determination, Texas A&M University, 23 April 2012
- P3. *Nonlinear Update Methodologies for Autonomous Onboard Stochastic Estimation*, The Aerospace Engineering Seminar Series, Texas A&M University, 16 June 2011
- P2. *Designing and Validating Proximity Operations Rendezvous and Approach Trajectories for the Cygnus Mission*, AIAA Houston Section Annual Technical Symposium, 20 May 2011

- P1. *Autonomous Mid-Course Navigation for Lunar Return*, The Aerospace Engineering Seminar Series, Texas A&M University, 17 April 2008

GRANTS AND CONTRACTS:

Active

- AG1. **R. Zanetti (UT PI)**, *Dual-Filter Approach to Trust in Hybrid Human-Machine System*. NASA award, 10/2/2023–9/4/2024.
This research collaboration with Infinity Labs proposes to (Phase I STTR, Infinity Labs serves as Prime Contractor, UT is a sub)
- AG2. **R. Zanetti (PI)** and U. Topcu (Co-PI), *Representations, Theory, and Algorithms for Autonomous Space Domain Awareness in the Cislunar Regime*. Air Force Office of Scientific Research award number FA9550-23-1-0646, 9/1/2023–8/31/2026.
This research collaboration with Texas A&M, Univ. of New Mexico, Univ. of Colorado Boulder, and Univ. of Washington proposes to develop a theoretical and computational foundation to support space situational awareness and autonomous operations in the cislunar regime. The resulting algorithms will support onboard, autonomous navigation, reachability, and control. (UT is the prime).
- AG3. **R. Zanetti (UT PI)** and K. Willcox (Co-PI), *Deep Learning Framework for Rapid Deployment of Autonomous Hypersonic Strike Weapons*. Joint Hypersonic Transition Office, 8/1/2022–7/31/2025.
This research collaboration with University of Arizona and Raytheon proposes to develop autonomous guidance and navigation systems for hypersonic systems. (University of Arizona serves as Prime Contractor, Dr. Roberto Furfaro is the overall PI, UT is a sub).
- AG4. **R. Zanetti (PI)** and R. Mamich (Key Personnel), *Autonomous Rendezvous and Docking with the Aid of Optical Maneuver Detection*. NASA STMD award number 80NSSC22K1204, 8/29/2022–8/28/2026.
This research collaboration with Ms. Rachel Mamich investigates navigation technology for spacecraft rendezvous with an uncooperative and maneuvering target. (NASA Space Technology Graduate Research Opportunity).
- AG5. K. Willcox (PI) and **R. Zanetti (Co-PI)**, *Predictive Digital Twins at Scale for Space Systems*. Air Force Office of Scientific Research award number FA9550-22-1-0419, 12/1/2021–11/30/2024.
This joint research collaboration with Dr. Karen Willcox supports the Air Force Office of Scientific Research to develop the mathematical and computational framework needed to create predictive digital twins for space systems.
- AG6. **R. Zanetti (PI)**, *Autonomous Deep-Space Navigation*. NASA Johnson Space Center award number 80NSSC20M0211, 9/1/2020–8/31/2024.
This research supports the NASA Johnson Space Center to broaden the capabilities of deep-space navigation. The main objectives are lunar crater-relative navigation and everywhere spacecraft rendezvous.
- AG7. **R. Zanetti (PI)** and C. Marcus (Key Personnel), *Direct Visual-Inertial-LIDAR SLAM and Autonomous Landing Site Selection and Guidance for Unknown Environments*. NASA STMD award number 80NSSC20K1195, 8/28/2020–8/27/2024.
This research collaboration with Mr. Corey Marcus investigates the fusion of camera and LIDAR data for autonomous descent and landing navigation and guidance. (NASA Space Technology Graduate Research Opportunity)

Completed

- CG1. **R. Zanetti (UT PI)** and Moriba Jah (Co-PI), *Autonomous Onboard Risk Mitigation for Spacecraft Proximity Operations*. Space Force award number FA8750-22-C-1018 , 8/20/2022–1/20/2023.
This research collaboration with Dr. Jah investigates guidance and navigation algorithms for spacecraft rendezvous to minimize the risk of impact/collision. (Phase I STTR, Kayhan Space serves as Prime Contractor, UT is a sub)
- CG2. U. Topcu (PI), D. Fridovich-Keil (Co-PI), S. Chinchali (Co-PI), and **R. Zanetti (Co-PI)**, *Testbed for Autonomy in Contested Environments*. Air Force Office of Scientific Research award number FA9550-22-1-0096, 3/1/2022–2/28/2024.
This DURIP grant (Defense University Research Instrumentation Program) is for the purchase of equipment to experimentally demonstrate and validate the investigators' algorithms to enable autonomy of vehicles in contested environments.

- CG3. **R. Zanetti (PI)**, *Autonomous Threat Detection via Supervised Machine Learning*. Air Force Research Laboratory award number FA9453-21-1-0045, 9/1/2021–12/31/2022.
This work supports the Air Force Research Laboratory to investigate autonomous, data-driven approaches to detection of system faults and external threats using indirect measurements.
- CG4. **R. Zanetti (UT PI)** and B. Jones (Co-PI), *Sparse Information Orbit Estimation for Proliferated LEO*. DARPA award number W31P4Q-21-C-0032, 3/18/2021–9/7/2023.
This research collaboration with Dr. Brandon Jones and Tau Technologies proposes to address ground tracking of proliferating LEO constellations/objects using novel estimation algorithms without the need to expand or improve the current Space Surveillance Network configuration. (Phase II STTR, Tau Technology serves as Prime Contractor, UT is a sub)
- CG5. **R. Zanetti (PI)** and M. Jah (Co-PI), *Autonomous Onboard Angles-Only Orbit Determination*. Ball Aerospace sponsored research agreement number UTA20-000950, 1/16/2021–12/30/2021.
This joint research collaboration with Dr. Moriba Jah supports Ball Aerospace to investigate how to use images derived from star trackers for autonomous onboard navigation.
- CG6. **R. Zanetti (PI)**, *Autonomous Localization in GPS-Denied Environments with SAR-Aided Inertial Navigation*. Sandia National Laboratory, 1/6/2021–9/30/2023.
This research supports Sandia National Lab in the developing a terrain relative navigation system using ranging measurements in GPS-denied environments.
- CG7. **R. Zanetti (UT PI)**, *GPU-Enabled Large Scale State Estimation*. Air Force Research Laboratory award number FA9302-20-C-0009, 11/5/2020–12/30/2022.
This joint research collaboration with Lynntech supports the Air Force Research Lab in the developing a parallel batch estimation algorithm deployed to a Graphic Processor Unit for use in dynamic systems with a large number of states. (Phase II SBIR, Lynntech serves as Prime Contractor, UT is a sub)
- CG8. **R. Zanetti (UT PI)** and B. Jones (Co-PI), *Sparse Information Orbit Estimation for Proliferated LEO*. DARPA contract number 140D0420C0062, 6/1/2020–1/15/2021.
This research collaboration with Dr. Brandon Jones and Tau Technologies proposes to address ground tracking of proliferating LEO constellations/objects using novel estimation algorithms without the need to expand or improve the current Space Surveillance Network configuration. (Phase I STTR, Tau Technology serves as Prime Contractor, UT is a sub)
- CG9. **R. Zanetti (PI)**, *Navigation and Mapping for Autonomous Satellite Servicing*. Air Force Research Laboratory award number FA9453-20-1-0001, 5/1/2020–5/31/2023.
This research supports the AFRL Space Vehicle Directorate to develop the capabilities of relative navigation and mapping in support of autonomous satellite servicing.
- CG10. B. Jones (PI) and **R. Zanetti (Co-PI)**, *On-Orbit Demonstration of Surface Feature-Based Navigation and Timing*. NASA Small Spacecraft Technology award number 80NSSC20M0087, 7/1/2020–8/31/2025.
The goal of this research collaboration with Dr. Brandon Jones is to develop the technology required to provide absolute navigation and timing services in lunar orbit via optical-based tracking of surface features.
- CG11. **R. Zanetti (UT PI)**, *GPU-Enabled Large Scale State Estimation*. Air Force Research Laboratory, 4/12/2019–12/31/2019.
This joint research collaboration with Lynntech supports the Air Force Research Lab in the developing a parallel batch estimation algorithm deployed to a Graphic Processor Unit for use in dynamic systems with a large number of states. (Phase I SBIR, Lynntech serves as Prime Contractor, UT is a sub)
- CG12. **R. Zanetti (PI)**, *RSGS Navigation Algorithm Design and Development*. Draper Laboratory, 9/1/2018–1/30/2020.
This research supports Draper in the design and development of the relative navigation system for DARPA's Robotic Servicing of Geosynchronous Satellites (RSGS). The goal of RSGS is to research technologies to enable cooperative inspection and servicing in GEO and demonstrating these technologies on orbit. Originally the project was supposed to last until 1/31/2020; the RSGS mission and the grant were cancelled in January 2019.
- CG13. **R. Zanetti (PI)** and J. Chen (Co-PI), *Synthetic Aperture Radar Image Formation and Feedback to Navigation Subsystem in Global Position System Denied and Degraded Environments*. Sandia National Laboratory, 10/1/2018–9/30/2020.
This joint research collaboration with Dr. Ann Chen supports Sandia National Lab in the developing a terrain relative navigation system able to generate and use Synthetic Aperture Radar images in GPS-denied environments.
- CG14. M. Jah (PI) and **R. Zanetti (Co-PI)**, *Refinement and Validation of Radiation Pressure Models for High Area-*

To-Mass Ratio Space Objects for Improved Characterization, Tracking, and Orbit Prediction. Air Force Office of Scientific Research award number FA9550-18-1-0351, 5/1/2018–8/31/2021.

This joint research collaboration with Dr. Moriba Jah supports the Air Force Office of Scientific Research to investigate how to model high area-to-mass ratio space objects and to develop nonlinear estimation techniques to track them.

- CG15. **R. Zanetti (PI)**, *Autonomous Onboard Space Navigation in the Absence of GPS*. NASA Johnson Space Center award number NNX17AI35A, 3/16/2017–7/31/2020.

This research supports the NASA Johnson Space Center to broaden the capabilities of autonomous nonlinear onboard space navigation in the absence of GPS. One of the main goals is the support of the relative navigation system development of the NASA Orion vehicle.

PH.D. SUPERVISION COMPLETED:

1. Kirsten Tuggle, Ph.D. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: Model Selection for Gaussian Mixture Model Filtering and Sensor Scheduling. August 2020. Co-advised with Dr. Maruthi Akella. Following graduation joined Draper in Cambridge, MA.
2. Simone Servadio, Ph.D. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: New Developments In Nonlinear Filtering Using Differential Algebra. May 2021. After graduation joined MIT as a PostDoc in Cambridge, MA, followed by a tenure track faculty position at Iowa State University in Ames, Iowa.
3. Rahul Moghe, Ph.D. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: Adaptive Algorithms for Identification of Symmetric and Positive Definite Matrices. May 2021. Co-advised with Dr. Maruthi Akella. Following graduation joined Amazon Robotics in Seattle, WA.
4. Sehyun Yun, Ph.D. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: Sequential Monte Carlo Filtering with Gaussian Mixture Models for Highly Nonlinear Systems. May 2021. Following graduation continued as a Post-Doctoral Fellow.
5. Arjun Ram S.P., Ph.D. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: Onboard Control, Tracking and Navigation for Autonomous Systems. May 2023. Co-advised with Dr. Maruthi Akella. Following graduation joined Apple Maps in Cupertino, CA.

PH.D. SUPERVISION IN PROGRESS:

1. Corey Marcus, completed Ph.D. Written Qualifying Exam.
2. Kristen Michealson, completed Ph.D. Written Qualifying Exam.
3. Rachel Mamich, completed Ph.D. Written Qualifying Exam.
4. Felipe Giraldo Grueso, completed Ph.D. Written Qualifying Exam.
5. Dalton Durant, completed Ph.D. Written Qualifying Exam.
6. Fabio D’Onofrio, completed Ph.D. Written Qualifying Exam.

M.S. SUPERVISION COMPLETED:

1. James Bell, M.S. in Aerospace Engineering, The University of Texas at Austin. Report Title: “Estimation for Spacecraft Docking with a Known Target”. May 2019. Co-advised with Dr. Maruthi Akella. Following graduation joined Tau Technologies in Albuquerque, NM.
2. Bryan Pogorelsky, M.S. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: “Spacecraft Terrain Relative Navigation with Synthetic Aperture Radar”. August 2020. Co-advised with Dr. Ann Chen. Following graduation joined Northrop Grumman in Washington, DC.
3. Corey Marcus, M.S. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: “Direct Monocular SLAM Augmented with LIDAR Range Measurements”. December 2020. Following graduation continued as a Ph.D. student.
4. Kristen Michealson, M.S. in Aerospace Engineering, The University of Texas at Austin. Report Title: “A Multiplicative Multi-State Constraint Kalman Filter”. December 2020. Following graduation continued as a Ph.D. student.
5. Dalton Durant, M.S. in Aerospace Engineering, The University of Texas at Austin. Report Title: “A Non-linear Batch Information Filter with Auto-tuning”. December 2022. Following graduation continued as a Ph.D. student.
6. Felipe Giraldo Grueso, M.S. in Aerospace Engineering, The University of Texas at Austin. Report Title: “Autonomous Anomaly Detection Via Physics-Regularized Machine Learning”. May 2023. Following graduation

continued as a Ph.D. student.

POST DOCTORAL FELLOWS SUPERVISION IN PROGRESS:

1. Andrey Popov, September 2022–Present.

POST DOCTORAL FELLOWS SUPERVISION COMPLETED:

1. Sehyun Yun, June 2021–April 2022. Upon completion joined Hyundai in Seoul, South Korea.

OTHER STUDENT COMMITTEES:

1. Enrico Zucchelli, Ph.D in Aerospace Engineering, The University of Texas at Austin. Thesis Title: *Bayesian Approaches to Low-Thrust Maneuvering Spacecraft Tracking*; December 2023.
2. Siddarth Kaki, Ph.D in Aerospace Engineering, The University of Texas at Austin. Thesis Title: *Computationally Efficient Algorithms for Spacecraft Relative Navigation and Rendezvous*; May 2023.
3. Sean McArdle, Ph.D. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: *Gravity Modeling for Lunar Orbits*. August 2022. August 2022.
4. Nicholas Ravago Ph.D. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: *Applications of Random Finite Set-Based Multi-Target Filters in Space Situational Awareness*. August 2022.
5. Alaa Abdulghafoor, Ph.D. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: *Distributed Coverage Control, Motion Coordination and Path Planning for multi-Agent Networks and Multi-Target Tracking in Complex and Dynamic Environments*. May 2022.
6. Alaa Abdulghafoor, M.S. in Aerospace Engineering, The University of Texas at Austin. Report Title: *Distributed Control of Multi-Agent Networks*. December 2020.
7. Siddarth Kaki, M.S. in Aerospace Engineering, The University of Texas at Austin. Report Title: *On-Orbit Pose and Angular Velocity Estimation*; December 2020
8. Arjun Ram S.P., M.S. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: *Uniform Exponential Stability Results for the Rigid-Body Attitude Tracking Control Problem*. May 2020.
9. Marcelino Almeida, Ph.D. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: *Quaternion Regression and Finite-Time Controllers for Attitude Dynamics*; December 2019
10. Dimitrios Pylorof, Ph.D. in Aerospace Engineering, The University of Texas at Austin. Thesis Title: *Optimization-Based Feedback Control of Nonlinear Systems Subject to Input Constraints*; December 2018
11. Jacob Darling, Ph.D. in Aerospace Engineering, Missouri University of Science and Technology. Thesis Title: *Manifold-based Bayesian inference for rigid-body pose estimation*; December 2016.
12. Thomas Ainscough, M.S. in Mechanical Engineering, Rice University. Thesis title: *Spacecraft Attitude Estimation Integrating the Q-Method into an Extended Kalman Filter*, May 2013. (Mentored thesis' research performed at Draper Laboratory)
13. Eric Herbort, M.S. in Mechanical Engineering, Rice University. Thesis title: *Trade Study of Decommissioning Strategies for the International Space Station*, May 2012. (Mentored thesis' research performed at Draper Laboratory)
14. Adam Sievers, M.S. in Mechanical Engineering, Rice University. Thesis title: *Multiple Event Triggers in Linear Covariance Analysis for Spacecraft Rendezvous*, May 2010. (Mentored thesis' research performed at Draper Laboratory)
15. Matthew Fritz, M.S. in Aerospace Engineering, Texas A&M University. Thesis title: *A Comparative Study of Kalman Filter Implementations for Relative GPS Navigation*, December 2009. (Mentored thesis' research performed at Draper Laboratory)
16. Brian Crouse, M.S. in Mechanical Engineering, Rice University. Thesis title: *Autonomous Optical Navigation for Lunar Missions*, May 2009. (Mentored thesis' research performed at Draper Laboratory)

Renato Zanetti, Assistant Professor

The University of Texas at Austin
Department of Aerospace Engineering and Engineering Mechanics

Dr. Renato Zanetti specializes in estimation of complex dynamical systems and autonomous onboard navigation. He joined the UT faculty in 2017. Prior to joining UT he worked at the C.S. Draper Laboratory and at the NASA Johnson Space Center for more than nine years, where he contributed to the successful design and flight of numerous autonomous space navigation systems. His current research includes on-board image processing and optical navigation, non-linear estimation of non-Gaussian/non-linear systems, simultaneous localization and mapping, and autonomous spacecraft GN&C. Dr. Zanetti is a Fellow of the American Astronautical Society (AAS), an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA), a Senior Member of the Institute of Electrical and Electronics Engineers, a former chair of both the AIAA Astrodynamics Technical Committee and the AAS Space-Flight Mechanics Technical Committee. His work contributed to a successful NASA Orion EFT-1 flight and the selection of the Orion EFT-1 GN&C flight-software as the recipient of the 2015 NASA software of the year award. He also received a NASA Technical Excellence Award (2012), several NASA Group achievement awards, and two NASA On The Spot Awards.