- Brenton Myers Innovation in Engineering Education Award, *College of Engineering, Wichita State University*, 2017.
- Award for Research/Creative Projects in Summer, *O ce of Research, Wichita State University*, 2017.
- Multidisciplinary Research Project Award, *O ce of Research, Wichita State University*, 2016

2) **Prathyusha Karampudi**, *De-orbit times for low-Earth orbit debris removal using laser ablation*," Dec 2019.

1) **Suwat Sreesawet**, \\

- **Ramses Young** (2020{2021), conducted simulations for hybrid chemical-electric orbit-raising, supported by WSU/NASA JSP.

- **Shritha Jagadheeswaran** (Summer 2020), conducted simulations for hardware-in-the-loop attitude dynamics simulations, supported by CoE.

- **Linda Harl** (Summer 2020), conducted simulations on Lambert's problem, supported by WSU/NASA JSP.

- **Bryan Cline** (2019{2020), conducted Monte Carlo simulations for propagation of uncertainties associated with launch of all-electric satellites, supported by WSU/NASA JSP.

- **Dillon Whitmarsh** (2019{2020), analyzing cost of a heliocentric space mission, supported by WSU/NASA Jump Start Program.

- **Shireen Fikree** (2019{2020), conducted research related to system engineering tests for nano-satellites, supported through a NASA project.

- **Gaberial Booker** (2018), worked on designing weights for manual stabilization for air bearing platform, supported by WSU/NASA JSP and WSU Honors College Undergraduate Research and Creative Activity (URCA) program.

- **Skylar Dean** (2017{2018), conducted simulations for a heliocentric mission design, WSU/NASA JSP.

- (2018), conducted simulations related to maneuver design supported by WSU/NASA JSP (in his)

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Other Individual Student Supervision

- Kord Byers (2019{2020), Spacecraft attitude control.
- Akshay Tummala (2016{2018), Nanosatellite mission analysis.
- Manoj Panthi (2016), Spacecraft attitude control.
- Sainath Vijayan (2014{2015), All-electric satellite mission analysis.

Graduate Courses Developed

- **Nanosatellite Engineering** (AE-718, 3 credit hours) provides a fundamental understanding of spacecraft design applied to nano-satellite missions. Speci c topics covered in this course include mission analysis, attitude control, electrical power systems, propulsion subsystem, thermal system, telemetry, data handling/processing and systems engineering tests. The

Atri Dutta, Ph.D.

V   Research

External Research Grants

Journal Publications

(Student co-authors, working under direct supervision, have been underlined.)

J15) A. Mughal, P. Chadalavada, A. Munir, A. Dutta, M. Qureshi, "Design of deep neural networks for transfer time prediction of spacecraft electric orbit-raising," Elsevier Intelligent Systems with Applications, Vol. 15, 2022, Art no 200092.
https://doi.org/10.1016/j.iswa.2022.200092.

J14) P. Chadalavada and A. Dutta, "Regional CubeSat Constellation Design to Monitor Hurricanes," IEEE Transactions on Geoscience and Remote Sensing, vol. 60, pp. 1-8, 2022, Art no. 1001608.
doi: 10.1109/TGRS.2021.3124473.

J13) P. Chadalavada, T. Farabi, A. Dutta, "Sequential Low-Thrust Orbit-Raising of All-Electric Satellites," MDPI Aerospace, Special Issue on Electric Propulsion, Vol 7(6), No 74, pp. 1-27.
https://doi.org/10.3390/aerospace7060074

J12) S. Sreesawet, A. Dutta, "Fast and Robust Computation of Low-Thrust Orbit-Raising Trajectories," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 41, No. 9 (2018), pp. 1888{1905.
https://doi.org/10.2514/1.G003319

J11) Y. Zhao, A. Dutta, P. Tsiotras, M. Costello, "Optimal Aircraft Trajectories for Wind Energy Extraction," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 41, No. 2 (2018), pp. 488{496 (Engineering Note). http://dx.doi.org/10.2514/1.G003048

J10) A. Tummala, A. Dutta, "An Overview of Cube-Satellite Propulsion Technologies and Trends," *MDPI Aerospace*, Vol. 4, No. 58 (2017), pp. 1{30. http://dx.doi.org/10.3390/aerospace4040058

J9) A. Dutta, J. Kasdin, E. Choueiri, P. Francken, "Minimizing Proton Displacement Damage Dose during Electric Orbit-raising of Satellites," *AIAA Journal of Guidance, Control and Dynamics*, Vol. 39, No. 4 (2016), pp. 963{969 (Engineering Note).
https://doi.org/10.2514/1.G000503

J8) B. Du, Y. Zhao, A. Dutta, J. Yu, X. Chen, "Optimal scheduling of Multi-spacecraft Refueling Based on Cooperative Maneuver," *Elsevier Advances in Space Research*, Vol. 55, No. 12 (2015), pp. 2808{2819. http://dx.doi.org/10.1016/j.asr.2015.02.025

J7) P. Libraro, J. Kasdin, E. Choueiri, A. Dutta, "Quaternion-Based Coordinates for Non-Singular Modeling of High-Inclination Orbital Transfer,"

J3) A. Dutta and P. Tsiotras, \Hohmann-Hohmann and Hohmann-Phasing Cooperative Rendezvous Maneuvers," *AAS Journal of the Astronautical Sciences*, Vol. 57, No. 1{2 (2009), pp. 393{417.
https://doi.org/10.1007/BF03321510

J2) A. Dutta and P. Tsiotras, \An Egalitarian Peer-to-Peer Satellite Refueling Strategy," *AIAA Journal of Spacecraft and Rockets*, Vol. 45, No. 3 (2008), pp. 608{618.
https://doi.org/10.2514/1.31299

J1) A. Dutta and P. Tsiotras, \Asynchronous Optimal Mixed Peer-to-Peer Satellite Refueling Strategies," *AAS Journal of the Astronautical Sciences*, Vol. 54, No. 3{4 (2006), pp. 543{565.
https://doi.org/10.1007/BF03256505

Conference/Workshop Proceedings (Where Full Manuscript is Reviewed)

(Student co-authors, working under direct supervision, have been underlined.)

CP6) P. Chadalavada, A. Dutta, \CubeSat Formations for Monitoring Hurricanes," *IEEE Aerospace Conference*, Big Sky, MT, Mar 2022, pp. 1-12.
doi: 10.1109/AERO53065.2022.9843636.

CP5) S. Haridasan, A. Rattani, Z. Demisse, A. Dutta, \Multispectral Deep Learning Models for Wild re Detection," International Workshop on Data-driven Resilience Research, June 2022.

CP4) S. Kotha, S. Haridasan, A. Rattani , A. Bowen, G. Rimmington, A. Dutta, \Multimodal Combination of Text and Image Tweets for Disaster Response Assessment," International Workshop on Data-driven Resilience Research, June 2022.

CP3) S. Sreesawet, A. Dutta, \Receding Horizon Control for Spacecraft with Low-Thrust Propulsion," *American Control Conference*, Milwaukee WI, Jun 2018.
https://doi.org/10.23919/ACC.2018.8431788

CP2) A. Dutta, \Optimal Low-Thrust Orbital Transfers for Rendezvous Between Active Spacecraft with Return Position Constraints," *AIAA Guidance Navigation and Control Conference, AIAA SciTech Forum*, Kissimmee FL, Jan 2015 (AIAA 2015-2012).
https://doi.org/10.2514/6.2015-2012

CP1) A. Dutta, P. Libraro, J. Kasdin, E. Choueiri, P. Fracken, \Minimum-Fuel Electric OrbitRaising of Telecommunication Satellites Subject to Time and Radiation Damage Constraints," *American Control Conference*, Portland OR, Jun 2014, pp. 2943{2947.
https://doi.org/10.1109/ACC.2014.6859179

Conference/Symposium Proceedings (where extended abstract is reviewed)

(Student co-authors, working under direct supervision, have been underlined.)

C47) P. Chadalavada, A. Dutta, \Hybrid Constellation Design of CubeSats for Monitoring Hurricanes," AAS/AIAA Space Flight Mechanics Meeting, Austin TX, Jan 2023.

C46) A. Dasyam

C44) <u>P. Chadalavada</u>, A. Dutta, \Relative Coverage Analysis for Hurricane Monitoring Formations," AAS/AIAA Astrodynamics Specialist Conference, Charlotte NC, Aug 2022.

C43) Y. Pillay, <u>M. Chace</u>, J. Steck, A. Dutta, \Neural Network for predicting unmodelled dynamics in multi-revolution transfers in cis-lunar missions," AAS/AIAA Astrodynamics Specialist Conference, Charlotte NC, Aug 2022.

C42) <u>P. Chadalavada</u>, A. Dutta, \Coverage Characteristics of Hurricane Monitoring CubeSat Constellations under Orbital Perturbations," AAS/AIAA Space Flight Mechanics Meeting (AIAA Scitech Forum), San Diego CA, Jan 2022.

C41) <u>P. Chadalavada</u>, A. Dutta, P. Ghosh, \An E cient Algorithm for the Longitude-Targeted

C30) A. Dutta and J. Raquepas, \Spacecraft Maneuver Detection using Optimal Control Problem and Relative Equation of Motion," *AAS/AIAA Astrodynamics Specialist Conference*, Snowbird UT, Aug 2018 (AAS 18-459).

C29) S. Chadalavada and A. Dutta, \Spacecraft Relative Equations of Motion using a New Set of Orbital Elements," *AAS/AIAA Astrodynamics Specialist Conference*, Snowbird UT, Aug 2018 (AAS 18-455).

C28) S. Sreesawet, A. Dutta, \"Mission Scenario Analysis for All-Electric Satellites," *AAS/AIAA Space Flight Mechanics Meeting, AIAA SciTech Forum*, Kissimmee FL, Jan 2018, pp 2996 { 3001.
https://doi.org/10.2514/6.2018-0722

C27) A. Dutta, \CubeSat Communication Network for Supporting Mars Surface Operations," *IAF International Workshop on Satellite Constellation and Formation Flying*, Boulder CO, Jun 2017.

C26) S. Sreesawet, A. Dutta, \A Novel Methodology for Fast and Robust Computation of Low-Thrust Orbit-Raising Trajectories," *AAS/AIAA Space Flight Mechanics Meeting*, San Antonio TX, Feb 2017 (AAS 17-510).

C25) P. Karampudi, A. Dutta, \De-Orbit Time Of On-Orbit Debris For Laser-Based Removal Methods," *AAS/AIAA Space Flight Mechanics Meeting*, San Antonio TX, Feb 2017 (AAS 17-501).

C24) A. Dutta, "Computational Performance of GRASP Algorithms for Spacecraft Multi-Rendezvous Mission Planning," *AIAA/AAS Astrodynamics Specialist Conference*, AIAA SPACE Forum, Long Beach CA, 2016 (AIAA 2016-5509). https://doi.org/10.2514/6.2016-5509

C23) A. Dutta, S. Vijayan, T. Olson, \Deployment of High Power Class All-Electric Satellites in the Geosynchronous Equatorial Orbit," *AIAA/AAS Astrodynamics Specialist Conference*, AIAA SPACE Forum, Long Beach CA, 2016. https://doi.org/10.2514/6.2016-5639

C22) A. Dutta, \GRASP Algorithm for Multi-Rendezvous Mission Planning for Optimized Trip Times," *AAS/AIAA Astrodynamics Specialist Conference*, Vail CO, Aug 2015.

C21) S. Sreesawet, V. Pappu, A. Dutta, J. Steck, \Neural Networks Based Adaptive Controller for Attitude Control of All-Electric Satellites," *AAS/AIAA Astrodynamics Specialist Conference*, Vail CO, Aug 2015 (AAS 15-754).

C20) S. Sreesawet

tion Satellite Systems Conference, San Diego CA, Aug 2014 (AIAA 2014-4243). https://doi.org/10.2514/6.2014-4243

C15) P. Libraro, J. Kasdin, A. Dutta, E. Choueiri, \Application of a Quaternion-Based Formulation to the Electric Orbit-Raising of GEO Satellites from High-Inclination Injection Orbits," *Astrodynamics Specialist Conference*, San Diego, Aug 2014 (AIAA 2014-4426). https://doi.org/10.2514/6.2014-4426

C14) A. Dutta, P. Libraro, J. Kasdin, E. Choueiri, P. Fracken, \Design of the Next-Generation All-Electric Telecommunication Satellites," *AIAA International Communications Satellite Systems Conference*, Florence, Italy, 2013 (AIAA 2013-5625). https://doi.org/10.2514/6.2013-5625

C13) A. Dutta, \Low-Thrust Egalitarian Peer-to-Peer Maneuvers for Servicing Satellites in Circular Constellations," *AAS/AIAA Space ight Mechanics Meeting*, Kauai, HI, 2013 (AAS 13-472).

C12) A. Dutta, P. Libraro, J. Kasdin, E. Choueiri, \Satellite Power Subsystem Requirements for Time-Constrained Electric Orbit-Raising with Minimal Radiation Impact," *AAS/AIAA Space ight Mechanics Meeting*, Kauai, HI, 2013 (AAS 13-256).

C11) A. Dutta, P. Libraro, J. Kasdin, E. Choueiri, \Minimizing Radiation Fluence during Time Constrained Electric Orbit-Raising," *International Symposium of Space Flight Dynamics Symposinposin*

C1) A. Dutta and P. Tsiotras, \Asynchronous Optimal Mixed Peer-to-Peer Satellite Refueling Strategies," *AAS Malcom D. Shuster Astronautics Symposium*, Bu alo, NY, 2005 (AAS 05-474).

Technical Reports and Dissertation

T6) A. Dutta, \Uncertainty Propagation Applied to Spacecraft Maneuver Detection," Final Report, Visiting Faculty Research Program (VFRP), Air Force Research Laboratory, Rome NY, Aug 2019.

T5) A. Dutta, \Spacecraft Maneuver Detection," Final Report, Visiting Faculty Research Program (VFRP), Air Force Research Laboratory, Rome NY, Aug 2018.

T4) N. Solomey, A. Dutta, \Technology Development for a Deep Space Dark Matter Search Experiment," Final Report, Multidisciplinary Research Project Award, Wichita State University, Sep 2016.

T3) A. Dutta, \Kansas NASA EPSCOR Program Seed Research Initiative: Multi-Objective Low-Thrust Optimization Framework for Spacecraft Low-Thrust Orbit-Raising," Final Report, Kansas NASA EPSCOR Program, NASA in Kansas, Nov 2015.

T2) J. Kasdin, E. Choueiri, A. Dutta, P. Libraro, \Potential of Electric Propulsion on Future

- Older Presentations

    - { Industrial and Manufacturing Engineering, Wichita State University, 2017.
    - { International Conference and Exhibition on Satellite, Houston, TX, Aug, 2015.
    - { Department of Mechanical Engineering, *Worcester Polytechnic Institute*, Worcester, MA, 2013.
    - { Department of Mechanical and Aerospace Engineering, *Missouri University of Science and Technology*, Rolla MO, 2012.
    - { Department of Aerospace Engineering, *Indian Institute of Technology*, Kanpur India, 2011 (Webinar).
    - { Department of Mechanical and Aerospace Engineering, *West Virginia Univ*, Morgantown WV, 2010.
    - { *Optimal Synthesis*, Palo Alto CA, 2008.
    - { Department of Aerospace Engineering, *Mississippi State University*, Starkville MS, 2008.
    - { *General Electric Global Research Center*, Niskayuna NY, 2008.

Research Impact

- Number of Citations as per Google Scholar = 571.
- Dynamic model developed in [J12] was ranked among the best for spacecraft trajectory optimization (rst for geocentric mission and third for asteroid mission) by Junkins and Taheri in their 2019 study published in AIAA Journal of Guidance Control and Dynamics.
- Paper [J10] is the third-most cited among all papers published in MDPI Aerospace.
- Number of countries from where work has been cited = 12.

VI   Service

Professional Society Memberships

- Senior Member, American Institute of Aeronautics and Astronautics (AIAA).
- Member, AIAA Astrodynamics Technical Committee, 2017{Current (Secretary since 2018).
- Member, American Astronautical Society (AAS).
- Member, Control Systems Society, Institute of Electrical and Electronic Engineers (IEEE).

VII   Service to Local Professional Society

- Outgoing Chair, AIAA Wichita Section, 2022-23.
- Chair, AIAA Wichita Section, 2021-22 (served as the State Captain on AIAA Congressional Visits Day, organized monthly section meetings, represented the section at Region-V meetings, represented the section at meetings of the Wichita Council of Engineering Societies, helped with the organization of two dinner meetings and a virtual stem camp, represented the section at two engineering fairs (one prior to WCES Annual Banquet and one during SWE Engineering Expo).
- Vice Chair, AIAA Wichita Section, 2020-21.
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- *Judge*, AIAA Region-V Student Conference, 2015.
- *Judge*, AIAA Region-I Student Conference, 2012{2013.

Conference Organization

- AIAA Technical Chair, AAS/AIAA Astrodynamics Specialist Conference, Charlotte NC, Aug 7{11, 2022.
- Co-organizer of a public, free to attend, 1-day symposium on \Celebrating The Scienti c Legacy of NASA and Apollo" held on WSU campus on 2019.

Conference Session Organization

- *Session Chair*, \Session: Orbital Dynamics, Perturbations, and Stability" at AAS/AIAA Space Flight Mechanics Meeting, Austin TX, Jan 2023.
- *Session Chair*, \Session 11: Cislunar - II" at AAS/AIAA Astrodynamics Specialist Conference, held virtually, Aug 2021.
- *Session Chair*, \Session 27: Guidance and Control" at AAS/AIAA Space Flight Mechanics Meeting, held virtually, Feb 2021.
- *Session Chair* (jointly with Dr. R. Anderson), \Session 25: Orbital Dynamics, Perturbations, and Stability - II" at AAS/AIAA Astrodynamics Specialist Conference, held virtually, Aug 2020.
- *Session Chair*, \Session 453-SFM-20: Low-Thrust Trajectory Design and Optimization I" at AAS/AIAA Space Flight Mechanics Meeting (AIAA SciTech Forum), Orlando FL, Jan 2020.
- *Session Chair*, \Attitude Dynamics and Control I" at AAS/AIAA Astrodynamics Specialist Conference, Portland ME, Aug 2019.
- *Session Chair*, \Session 20: Trajectory Design and Optimization IV" at AAS/AIAA Space Flight Mechanics Meeting, Ka'anapali HI, Feb 2019.
- *Session Chair*, \Session 6: Attitude Dynamics and Control-III" at AAS/AIAA Astrodynamics Specialist Conference, Snowbird UT, Aug 2018.
- *Session Chair*, \Session 3: Astrodynamics-IV" at AAS/AIAA Astrodynamics Specialist Conference, Snowbird UT, Aug 2018.
- *Session Co-Chair*, \Optimization II" at American Control Conference, Jun 2018.
- *Session Chair*, \SFM-04 Low-Thrust Trajectory Optimization" at AAS/AIAA Space Flight Mechanics Meeting (part of AIAA SciTech Forum), Kissimmee FL, Jan 2018.
- *Session Chair*, \SFM-02 Trajectory Optimization I" at AAS/AIAA Space Flight Mechanics Meeting, San Antonio TX, Feb 2017.

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Atri Dutta, Ph.D.

Service to University

- *Faculty Advisor*, Wichita State Rocket Club (undergraduate student organization), 2016{.
- *Member* of the WSU committee for hosting the TVIW Interstellar Workshop and NASA Interstellar Propulsion Symposium, 2019.
- *Advisor* for undergraduate students majoring in Aerospace Engineering, 2016{.
- *Judge*, WSU Wallace Invitational for Scholarship in Engineering Competition, 2014{18, 2021{22.
- *Member*, AE Departmental Committee on two-year associate degree students, 2017.
- *Member*, AE Certi cate Ideas Committee, 2017.
- *Notebook Judge*, Kansas BEST Robotics Competition, 2016{17.
- *Poster Judge*, WSU Graduate Research and Scholarly Projects Symposium, 2017.
- *Observer*, WSU Distinguished Scholarship Invitational, 2015.
- *Judge*, WSU Undergraduate Research and Creative Activity Forum, 2015.
- *Mission Judge*, Mindstorms, Wichita State University, 2015.
- *Judge*, Princeton Graduate Research Symposium, Princeton University, 2011.
- *Jury*, Faculty Status and Grievance Committee, Georgia Tech, 2011.

Journal Review Service

- AIAA Journals: Guidance, Control and Dynamics, Journal of Spacecraft and Rockets
- Elsevier Journals: Advances in Space Research, Acta Astronautica, Aerospace Science and Technology
- ASCE Journal of Aerospace Engineering
- IEEE Transactions: Automation Science and Engineering, Intelligent Transportation Systems
- Springer Journal of Optimization Theory and Applications

CV Last Updated: 04/17/2023.