Mitchell L. R. Walker II

Georgia Institute of Technology
School of Aerospace Engineering
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Professional Interests:

Advanced spacecraft and aircraft propulsion, plasma physics and rarefied gas dynamics, Hall thruster clustering and facility effects, electric propulsion plume diagnostics

Education:

- Ph.D. Aerospace Engineering, December 2004, University of Michigan
- MSE Aerospace Engineering, December 2000, University of Michigan
- BSE Aerospace Engineering, December 1999, University of Michigan

Ph.D. Thesis:

- Effects of Facility Backpressure on the Performance and Plume of a Hall Thruster
  Advisor: Alec D. Gallimore

Work Experience:

Georgia Institute of Technology — Atlanta, GA
Full Professor of Aerospace Engineering — July 2017 – Present
Associate Chair of Graduate Programs, Aerospace Engineering — July 2019 – Present
Associate Professor of Aerospace Engineering — July 2011 – June 2017
Assistant Professor of Aerospace Engineering — Jan. 2005 – June 2011

- Director of the High-Power Electric Propulsion Laboratory
- Electric propulsion engine development, engine-spacecraft interaction studies, and the development of diagnostic tools
- Member of Georgia Tech Cryo Lab

University of Michigan Plasmadynamics and Propulsion Laboratory — Ann Arbor, MI
Graduate Student Researcher — August 2000 – Dec. 2004

- Involved in dissertation research: Facility effects, Hall thruster clustering
- Assembled two 5-kW P5 Hall thrusters and cathodes
- Constructed a null-type inverted-pendulum thrust stand
- Set up and performed characterization tests on the Pratt & Whitney T-220HT 10-kW Hall thruster
- Set up and performed characterization tests of the Aerojet BPT-4000 4.5-kW Hall thruster

University of Michigan Academic Mentoring Program — Ann Arbor, MI
Academic Mentor — August 2002 – Dec. 2004

- Advised undergraduates in their terminal semester on approaches to reach their academic goals

University of Michigan Minority Engineering Program Office — Ann Arbor, MI
Physics Instructor — June 2003 – August 2003

- Presented lectures on introductory physics
- Evaluated student performance

Lockheed Martin Missiles & Space — Sunnyvale, CA
Engineering Intern — May 2000 – August 2000

- Performed tests on satellites in a clean room (1k) and ESD sensitive environment
- Analyzed arcjet performance data for the A2100 program
- Investigated arcjet bubble events for on-orbit satellites

Lockheed Martin Tactical Aircraft Systems — Fort Worth, TX
Engineering Intern (SECRET Clearance) — May 1999 – August 1999

- Tested turbojet sub-scale nozzles and presented data to engine manufacturers
- Presented an analysis of boundary layer profiles near secondary flow inlet on the F-16
- Conducted literature searches on supersonic secondary flow inlet performance
- Compiled CFD results into usable formats
- Created road maps of engine performance histories for marketing

Lockheed Martin Missiles & Space — Sunnyvale, CA
Engineering Intern — May 1998 – August 1998

- Performed tests on satellites in a clean room (1k) and ESD sensitive environment
- Analyzed flow of preliminary propulsion subsystem
- Created 3D models of preliminary propulsion subsystem components
- Analyzed on-orbit propulsion system telemetry
- Completed component qualification certificates for commercial satellite hardware

Lockheed Martin Missiles & Space — Sunnyvale, CA
Engineering Intern — May 1997 – August 1997

- Compiled electronic versions of propulsion subsystem drawings
- Incorporated design changes into current drawings
- Answered customer questions on propulsion subsystem performance
- Corresponded with vendors in respect to hardware

Journal Publications:

1. Bogorad, A. L., August, K., Lichtin, D., Pytel, J., Payne, K., Herschitz, R., Chad, S., Capots, L., Noakes, B., Dubisher, R., Walker, M. L. R., Mendez Ramos, E. D., Walker, J., Prestridge, N., Gomez, D. B., **"Long-Term Effect of Interactions between Spacecraft Arcjet Subsystem and Combined On-orbit Environments and Electric Propulsion Plume: Ground Test Results,"** IEEE Transactions on Plasma Science, July 2019. – In Review.

2. Walker, J. A., Walker, M. L. R., Khayms, V., King, D., Peterson, P., **"Time-Delay of Electrical Signals in a Hall Current Thruster Testing Environment,"** Journal of Propulsion and Power, April 2018. – In Review.

3. Frieman, J., Walker, M. L. R., **"Background Flow Model Evaluation of SPT-100 HET Facility Effects,"** Journal of Propulsion and Power, November 2017. – In Review.

4. Miller, S., Walker, M. L. R., Agolli, J., Dankanich, J., **"Survey and Performance Evaluation of Small Satellite Propulsion Technologies,"** Journal of Spacecraft and Rockets, August 2020 – Accepted.

5. Brown, N. P, Whittaker, C. B., Rimoli, J. J., Ready, W. J., Walker, M. L. R., **"Formation and Impact of Microcracks in Plasma Erosion of M26 Boron Nitride,"** Journal of Propulsion and Power, July 2020. – Accepted.

6. Brown, N., Walker, M. L. R., **"Review of Plasma-Induced Hall Thruster Erosion,"** Applied Sciences, Vol. 10, doi:10.3390/app1013775, May 2020.

7. Liu, C., Walker, M. L. R., Cohen, M., "**Time-resolved Measurements of Plasma Parameters for Nanosecond-pulsed Argon Plasmas,"** IEEE Transactions on Plasma Science, Vol. 48, No.4, April 2020, pg. 1060-1075.

8. Frieman, J. D., Liu, T. M., Walker, M. L. R., **"Background Flow Model Validation with a 6-kW Hall Effect Thruster,"** Journal of Propulsion of Power, Vol. 36, No. 2, March-April 2020, pp. 308-311.

9. Singletary, P., Cohen, M., Walker, M. L. R., Liu, C., Chan, C., **"Optical Analysis of Nanosecond-lifetime Plasma Parameters,"** IEEE Transactions on Plasma Science, Vol. 48, Issue 1, January 2020, pp. 179-188.

10. Sanborn, G. P., Singh, L. A., Turano, S. P., Selvamurugan, S., Walker, M. L. R., Ready, W. J., **"Field Emission Damage Modes of Carbon Nanotube Spindt Cathode Arrays,"** The Journal of The Minerals, Metals & Materials Society, Volume 72, Issue 1, January 2020, pp. 544-551.

11. Schweigert, I.; Walker, M. L. R.; Keidar, M., **"Genesis of Non-Uniformity of Plasma Fluxes Over Emissive Wall in Low-Temperature Plasmas,"** Plasma Research Express, Volume 1, Number 4, December 2019

12. Caruso, N. R. S., Walker, M. L. R., **"Effects of Ingested versus Injected Propellant on Radio-Frequency Discharge Plasma Properties,"** Frontiers in Physics, Volume 6, Article 161, January 2019.

13. Kim, H., Golkowski, M., Golkowski, C., Stoltz, P., Cohen, M., Walker, M. L. R., **"Unexpected Post-pulse Secondary Ionization in Nanosecond Pulsed Argon Discharges,"** Plasma Sources Science and Technology, Volume 27, Number 5, April 2018, pp. 055011 1-10.

14. Frieman, J., Brown, N., Liu, C., Liu, T., Walker, M. L. R., Khayms, V., King, D., **"Impact of Propellant Species on Hall Effect Thruster Electrical Facility Effects,"** Journal of Propulsion and Power, Volume 34, Number 3, May-June 2018, pp. 600-613.

15. Schweigert, I., Burton, T., Thompson, G., Langendorf, S., Walker, M. L. R., Keidar, M., **"Plasma Interaction with Emissive Surface with Debye-Scale Grooves,"** Plasma Sources Science and Technology, Volume 27, Number 4, April 2018, pp. 045004 1-7.

16. Averett, R., Scogin, T., Walker, M. L. R., **"Electromagnetically Induced Distortion of a Fibrin Matrix with Embedded Microparticles,"** Journal of Mechanics in Medicine and Biology, Volume 18, Number 2, March 2018.

17. Levchenko, I., Xu, S., Walker, M. L. R., Keidar, M., **"Nano in Space: Big Expectations from Advanced Nanoscaled Materials,"** Nature Communications, Volume 9, 879, 2018.

18. Frieman, J. D., Brown, N. P., Liu, C. Y., Liu, T. M., Walker, M. L. R., Khayms, V., King, D. Q., **"Electrical Facility Effects on Faraday Probe Measurements,"**, Journal of Propulsion and Power, Volume 34, Number 1, January-February 2018, pp. 267-269.

19. Caruso, N. R. S., Walker, M. L. R., **"Neutral Ingestion Effects on Plume Properties of a Low-Power RF Plasma Discharge,"** Journal of Propulsion and Power, Volume 34, Number 1, January-February 2018, pp. 58-65.

20. Frieman, J. D., Liu, T. M., Walker, M. L. R., **"Background Flow Model of Hall Thruster Neutral Ingestion,"** Journal of Propulsion and Power, Volume 33, Number 5, September-October 2017, pp. 1087-1101.

21. Saleh, S. H., Geng, F., Ku, M., Walker, M. L. R., **"Electric Propulsion Reliability: Statistical Analysis of On-orbit Anomalies and Comparative Analysis of Electric versus Chemical Propulsion Failure Rates,"** Acta Astronautica, (139) July 2017, pp. 141-156.

22. Brown, D. L., Walker, M. L. R., Szabo, J., Huang, W., **"Recommended Practice for Use of Faraday Probes in Electric Propulsion Testing,"** Journal of Propulsion and Power, Volume 33, Number 3, May-June 2017, pp. 582-613.

23. Polk, J., Pancotti, A., Haag, T., King, S., Walker, M. L. R., Blakely, J., Ziemer, J., **"Recommended Practices for Thrust Measurement in Electric Propulsion Testing,"** Journal of Propulsion and Power, Volume 33, Number 3, May-June 2017, pp. 539-555.

24. Dankanich, J. W., Walker, M. L. R., Swiatek, M. W., Yim, J. T., "**Recommended Practice for Pressure Measurements and Calculation of Effective Pumping Speeds in Electric Propulsion Testing**," Journal of Propulsion and Power, Volume 33, Number 3, May-June 2017, pp. 668-680.

25. Snyder, S., Frieman, J. D., Walker, M. L. R., **"Recommended Practice for Flow Control and Measurement in Electric Propulsion Testing,"** Journal of Propulsion and Power, Volume 33, Number 3, May-June 2017, pp. 556–565.

26. Schinder, A., Rimoli, J., Walker, M. L. R., **"Investigation of Plasma Material Erosion Under Mechanical Stress,"** Journal of Propulsion and Power, Volume 33, Number 2, March-April 2017, pp. 433-447.

27. Walker, J. A., Langendorf, S. J., Walker, M. L. R., **"Electrical Facility Effects on Hall Current Thrusters: Electron Termination Pathway Manipulation,"** Journal of Propulsion and Power, Volume 32, Number 6, November-December 2016, pp. 1365-1377.

28. Walker, J. A. Frieman, J. D., Khayms, V., Peterson, P. Y., King, D., Walker, M. L. R., **"Electrical Facility Effects on Hall Effect Thruster Cathode Coupling: Discharge Oscillations and Facility Coupling,"** Journal of Propulsion and Power, Volume 32, Number 4, July-August 2016, pp. 844-855.

29. Langendorf, S. J., Walker, M. L. R., **"Hysteresis and mode transitions in plasma sheath collapse due to secondary electron emission,"** Journal of Applied Physics, Volume 119, March 2016, pp. 113305 1-5.

30. Frieman, J. D., Walker, J., A., Khayms, V., King, D. Q., Walker, M. L. R., **"Electrical Facility Effects on Hall Effect Thruster Cathode Coupling – Performance and Plume Properties,"** Journal of Propulsion and Power, Volume 32, Number 1, January-February 2016, pp. 251-264.

31. Walker, J, A., Langendorf, S., Walker, M. L. R., Polzin, P., Kimberlin, **"Velocimetry of Cathode Particles in a Magnetoplasmadynamic Thruster Discharge Plasma,"** Review of Scientific Instruments, Volume 86, Number 7, July 2015, pp. 073513 1-10.

32. Williams, L. T., Walker, M. L. R., **"Plume Structure and Ion Acceleration of a Helicon Plasma Source,"** IEEE Transactions on Plasma Science, Volume 43, Number 5, May 2015, pp. 1694-1705.

33. Singh, L. A., Walker, M. L. R., **"A Review of Research in Low Earth Orbit Propellant Collection,"** Progress in Aerospace Sciences, Volume 75, April 2015, pp. 15-25.

34. Langendorf, S., Walker, M. L. R., **"Effect of Secondary Electron Emission on the Plasma Sheath,"** Physics of Plasma, Volume 22, March 2015, 033515.

35. Schweigert, I., Langendorf, S., Walker, M. L. R., Keidar, M., **"Sheath Structure Transition Controlled by Secondary Electron Emission,"** Plasma Sources Science and Technology, Volume 24, Issue 2, February 2015, pp. 025012-9.

36. Langendorf, L., Xu, K., Walker, M. L. R., **"Effects of Wall Electrodes on Hall Effect Thruster Plasma,"** Physics of Plasmas, Volume 22, Number 2, February 2015, pp. 023508.

37. Singh, L. A., Sanborn, G., Turano, S., Walker, M. L. R., Ready, W. J., **"Operation of a Carbon Nanotube Field Emitter Array in a Hall Effect Thruster Plume Environment,"** IEEE Transactions on Plasma Science Special Issue - Plasma Propulsion, Volume 43, Issue 1, January 2015.

38. Frieman, J. D., King, S. C., Walker, M. L. R., Khayms, V., King, D., **"Role of a Conducting Chamber in the Hall Effect Thruster Electrical Circuit,"** Journal of Propulsion and Power, Volume 30, Number 6, November-December 2014, pp. 1471-1479.

39. Kwon, K., Walker, M. L. R., Mavris, D. N., **"Study on Anomalous Electron Diffusion in the Hall Effect Thruster,"** International Journal of Aeronautical & Space Sciences, Volume 15, Number 3, September 2014, pp. 320-334.

40. Schinder, A., Walker, M. L. R., Rimoli, J., "**3D Model for Erosion of a Hall Effect Thruster Discharge Channel Wall,"** Journal of Propulsion and Power, Volume 30, Number 5, September-October 2014, pp. 1373-1382.

41. King, S. T., Walker, M. L. R., Chianese, S. G., **"Atmospheric Electric Propulsion Mission Performance Tool,"** Journal of Spacecraft and Rockets, Volume 51, Issue 3, May 2014, pp. 931-937.

42. Williams, L. T., Walker, M. L. R., **"Initial Performance Evaluation of a Gridded RF Ion Thruster,"** Journal of Propulsion and Power, Volume 30, Number 3, May-June 2014, pp. 645-655.

43. Burton, T., Schinder, A. M., Capuano, G., Rimoli, J., Walker, M. L. R., Thompson, G. B., **"Plasma Induced Erosion Microstructures in Boron Nitride-Silica Composites,"** Journal of Propulsion and Power, Volume 30, Number 3, May-June 2014, pp. 690-695.

44. Xu, K., Walker, M. L. R., **"Effect of External Cathode Azimuthal Position on Hall Effect Thruster Plume,"** Journal of Propulsion and Power, Volume 30, Number 2, March-April 2014, pp. 506–513.

45. Martinez, R., Walker, M. L. R., **"Power Deposition into the Discharge Channel of a Hall Effect Thruster,"** Journal of Propulsion and Power, Volume 30, Number 1, January-February 2014, pp. 209-220.

46. Williams, L. T., Walker, M. L. R., **"Ion Production Cost of a Gridded Helicon Ion Thruster,"** Plasma Sources Science and Technology, August 2013, Volume 22, Number 5, October 2013, pp. 055019.

47. Singh, L., Walker, M. L. R., **"Charge Exchange Interactions on Near-Earth Proton Radiation for Orbit Perturbation of High Area-to-Mass Ratio Objects,"** Advances in Space Research, Volume 52, Issue 3, August, 2013, pp. 496-504.

48. Giannelli, S., Walker, M. L. R., Kieckhafer, A., **"Neutral Gas Expansion in a Cylindrical Helicon Discharge Chamber,"** Journal of Propulsion and Power, Volume 29, Number 3, May-June 2013, pp. 540-546.

49. Williams, L. T., Walker, M. L. R., **"Thrust Measurements of a Helicon Plasma Source,"** Journal of Propulsion and Power, Volume 29, Number 3, May-June 2013, pp. 520-527.

50. Martinez, R., Walker, M. L. R., **"Effect of Propellant Thermal Management on Neutral Residence Time in Hall Thrusters,"** Journal of Propulsion and Power, Volume 29, Number 3, May-June 2013, pp. 540-546.

51. Langendorf, S., Walker, M. L. R., **"Characterization of Hall Effect Thruster Propellant Distributors with Flame Visualization,"** Review of Scientific Instruments, Volume 84, Number 1, January 2013, pp. 013302 1-7.

52. Walker, M. L. R., Russell, R. P., Singh, L. A., **"Utilization of Residual Helium to Extend Satellite Lifetimes and Mitigate Space Debris,"** Journal of Propulsion and Power, Volume 28, Number 6, November 2012.

53. Xu, K., Dao, H., Walker, M. L. R., **"Potential Contour Shaping and Sheath Behavior with Wall Electrodes and Near-Wall Magnetic Fields in a Hall Thruster,"** Physics of Plasma, Volume 19, Number 10, October 2012, pp. 103502 1-6

54. Xu, K., Walker, M. L. R., **"Plume Characterization of an Ion Focusing Hall Thruster,"** Journal of Propulsion and Power, Volume 28, Number 5, September-October 2012.

55. Kwon, K., Walker, M. L. R., Mavris, D. N., **"Self-Consistent, One-dimensional Analysis of the Hall Effect Thruster,"** Plasma Sources Science and Technology, Volume 20, 2011 (045021).

56. Xu, K., Walker, M. L. R., **"Technique to Collimate Ions in a Hall Effect Thruster Discharge Chamber,"** Journal of Propulsion and Power, Volume 27, Number 3, May-June 2011.

57. Williams, L. T., Walker, M. L. R., Kumsomboone, V. S., Ready, W. J., "**Lifetime and Failure Mechanisms of an Arrayed Carbon Nanotube Field Emission Cathode,**" IEEE Transactions on Electron Devices, Volume 57, No. 11, August 2010.

58. Book, C., Walker, M. L. R., "**Effect of Anode Temperature on Hall Effect Thruster Performance**," Journal of Propulsion and Power, Volume 26, Number 5, September-October 2010.

59. Kieckhafer, A. W., Walker, M. L. R., **"RF Power System for Thrust Measurements of a Helicon Plasma Source,"** Review of Scientific Instruments, Volume 81, Issue 7, July 2010.

60. Palmer, D. D., Walker, M. L. R., "**Operation of an Annular Helicon Plasma Source**," Journal of Propulsion and Power, Volume 25, Number 5, September-October 2009.

61. Xu, K., Walker, M. L. R., "**High-Power, Null-Type, Inverted Pendulum Thrust Stand**," Review of Scientific Instruments, Volume 80, Number 5, May 2009.

62. Walker, M. L. R., Gallimore, A. D., "**Hall Thruster Cluster Operation with a Shared Cathode,**" Journal of Propulsion and Power, Volume 23, Number 3, May 2007.

63. Yano, M., Walker, M. L. R., "**Generalized Theory of Annularly-Bounded Helicon Waves,**" Physics of Plasmas, Volume 14, Number 3, March 2007.

64. Walker, M. L. R., Gallimore, A. D., "**Performance Characteristics of a Cluster of 5-kW Laboratory Hall Thrusters**," Journal of Propulsion and Power, Volume 23, Number 1, January 2007.

65. Yano, M., Walker, M. L. R., "**Plasma Ionization by Annularly-Bounded Helicon Waves**," Physics of Plasmas, Volume 13, Number 6, June 2006.

66. Rovey, J. L., Walker, M. L. R., Peterson, P. Y., Gallimore, A. D., "**A Magnetically-Filtered Faraday Probe for Measuring the Ion Current Density Profile of a Hall Thruster**," Review of Scientific Instruments, Volume 77, Number 1, January 2006.

67. Walker, M. L. R., Hofer, R. R., Gallimore, A. D., "**Ion Collection in Hall Thruster Plumes**," Journal of Propulsion and Power, Volume 22, Number 1, Jan.-Feb., 2006.

68. Walker, M. L. R., Victor, A. L., Hofer, R. R., Gallimore, A. D., "**Effect of Backpressure on Ion Current Density Measurements in Hall Thruster**," Journal of Propulsion and Power, Volume 21, Number 3, May-June, 2005.

69. Walker, M. L. R., Gallimore, A. D., "**Neutral Density Map of Hall Thruster Plume Expansion in a Vacuum Chamber**," Review of Scientific Instruments, Volume 76, Number 5, May 2005.

70. Walker, M. L. R., Gallimore, A. D., Cai, C., Boyd, I. D., "**Vacuum Chamber Pressure Maps of a Hall Thruster Cold Flow Expansion**," Journal of Propulsion and Power, Volume 20, Number 6, Nov.–Dec. 2004.

71. Boyd, I. D., Cai, C., Walker, M. L. R., and Gallimore, A. D., **"Computation of Neutral Gas Flow From a Hall Thruster Into a Vacuum Chamber,"** Peer-reviewed Proceedings of the 23rd International Conference on Rarefied Gas Dynamics, Whistler, BC, Canada, Aug. 2002, 123-133.

Conference Papers:

1. Brown, N., Walker, M. L. R., **"Terahertz Time-Domain Spectroscopy as an electric Propulsion Plasma Diagnostic,"** IEPC-2019-408, 36th International Electric Propulsion Conference, Vienna, Austria, September 15-20, 2019.

2. Schweigert, I., Burton, T. S., Thompson, G. B., Langendorf, S., Walker, M. L. R., Keidar, M., **"Transition in Sheath Structure Near Emissive Grooved Surface in Discharge Plasma Controlled by Electron Beam,"** 70th Annual Gaseous Electronics Conference, Pittsburgh, Pennsylvania, November 6-10, 2017.

3. Bogorad, A. L., August, K., Lichtin, D., Pytel, J., Payne, K., Herschitz, R., Chad, S., Capots, L., Noakes, B., Dubisher, R., Walker, M. L. R., Mendez Ramos, E. D., Walker, J., Prestridge, N., **"Interaction of Spacecraft Arcjet Power Subsystem with Combined On orbit Environments and Electric Propulsion Plume: Ground**

Test Results," IEPC-2017-225, 35th International Electric Propulsion Conference, Atlanta, Georgia, October 8-12, 2017.

4. Frieman, J. D., Liu, T. M., Walker, M. L. R., **"Development of Background Flow Model of Hall Thruster Neutral Ingestion,"** IEPC-2017-008, 35th International Electric Propulsion Conference, Atlanta, Georgia, October 8-12, 2017.

5. Jovel, D. R., Sforzo, B. A., Manion, K. L., Brown, N. P., Wang, X., Wu, D. J., Walker, M. L. R., Yang, V., **"Research Capabilities in Propulsion and Combustion Science at the Georgia Institute of Technology,"** AIAA/SAE/ASEE 53rd Joint Propulsion Conference, Atlanta, GA, July 10-12, 2017.

6. Cohen, M. B., Thompson, L., Opalinski, N., Singletary, P., Walker, M. L. R., Chan, C., Golkowski, M., **"Broadband Electrically Short Transmitters via Hi-Speed Time-Varying Antenna Properties,"** 2017 IEEE AP-S Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, San Diego, CA, July 9-14, 2017.

7. Frieman, J. D., Brown, N. P., Liu, C. Y., Liu, T. M., Walker, M. L. R., Khayms, V., King, D. Q., **"Electrical Facility Effects on the Operation of a Low-Power Hall Effect Thruster,"** JANNAF Propulsion Meeting, Phoenix, AZ, December 5-8, 2016.

8. Frieman, J. D., Brown, N. P., Liu, C. Y., Liu, T. M., Walker, M. L. R., Khayms, V., King, D. Q., **"Impact of Propellant Selection on Hall Effect Thruster Electrical Facility Effects,"** JANNAF Propulsion Meeting, Phoenix, AZ, December 5-8, 2016.

9. Frieman, J. D., Liu, T. M., Walker, M. L. R., Makela, J., Mathers, A., Peterson, P. Y., **"Performance Evaluation of the T-40 Low-Power Hall Current Thruster,"** AIAA/SAE/ASEE 52nd Joint Propulsion Conference and Exhibit, Salt Lake City, Utah, July 25-27, 2016.

10. Schinder, A. M., Rimoli, J. J., Walker, M. L. R., **"Plasma Erosion of Stressed Fused Silica and M26 Borosil,"** AIAA/SAE/ASEE 52nd Joint Propulsion Conference and Exhibit, Salt Lake City, Utah, July 25-27, 2016.

11. Scogin, T., Liu, T. M., Walker, M. L. R., Polzin, K., Dankanich, J., Aanesland, A., **"Initial Thrust Measurements of Marshall's Ion-Ion Thruster,"** AIAA-2015-3723, 51st Joint Propulsion Conference and Exhibit, Orlando, FL, July 27-29, 2015.

12. Schweigert, I., Langendorf, S., Walker, M. L. R., Keidar, M., **"Plasma-Wall Interaction Controlled by Secondary Electron Emission,"** IEPC-2015-343, 34th International Electric Propulsion Conference, Kobe-Hyogo, Japan, July 4-10, 2015.

13. Walker, J. A., Langendorf, S., Walker, M. L. R., Khayms, V., "**Electrical Facility Effects on Hall Effect Thrusters: Electron Termination Pathway Manipulation through the Bias of a Downstream Electrode,"** 62nd JANNAF Propulsion Meeting, Nashville, TN, June 1-15, 2015.

14. Park, C-S., Walker M. L. R., Kim, S-O., **"Flexible microplasma thrusters using jet-to-jet coupling effect"**, The 8th International Workshop on Microplasmas (IWM 2015), Seton Hall University, Newark, NJ, May 11 – 15, 2015.

15. Schweigert, I., Langendorf, S. J., Keidar, Walker, M. L. R., **"Sheath Structure Transition Controlled by Secondary Electron Emission at Low Gas Pressure,"** 67th Annual Gaseous Electronics Conference, Raleigh, NC, November 2-7, 2014.

16. Schloeder, N., Liu, T., Polzin, K., Dankanich, J., Aanesland, A., Walker, M. L. R., **"Design and Preliminary Performance Testing of Electronegative Gas Plasma Thruster,"** 50th Joint Propulsion Conference and Exhibit, Cleveland, OH, July 28-30, 2014.

17. Schloeder, N., Frieman, J., Walker, M. L. R., **"Facility Effects on Helicon Plasma Source Operation,"** 50th Joint Propulsion Conference and Exhibit, Cleveland, OH, July 28-30, 2014.

18. Langendorf, S., Walker, M. L. R., **"Effects of Wall Material, Wall Temperature, and Surface Roughness on Plasma Sheath,"** 50th Joint Propulsion Conference and Exhibit, Cleveland, OH, July 28-30, 2014.

19. Walker, J., Frieman, J., Khayms, V., Walker, M. L. R., **"Impact of Cathode Position and Electrical Facility Effects on Hall Effect Thruster Performance and Discharge Current Behavior,"** 50th Joint Propulsion Conference and Exhibit, Cleveland, OH, July 28-30, 2014.

20. Frieman, J., King, S., Khayms, V., Walker, M. L. R., **"Preliminary Assessment of the Role of a Conducting Chamber in Hall Effect Thruster Electrical Circuit,"** 50th Joint Propulsion Conference and Exhibit, Cleveland, OH, July 28-30, 2014.

21. Langendorf, S., Walker, M. L. R., **"Effects of Wall Material, Wall Temperature, and Surface Roughness on the Plasma Sheath,"** 41st IEEE International Conference on Plasma Science (ICOPS), Washington DC, May 25-29, 2014.

22. Burton, T., Thompson, G. B., Walker, M. L. R., Rimoli, J., Schinder, A. M., Capuano, G., **"Microstructural Characterization of Eroded M26 HET Thruster Wall,"** TMS 2014 143rd Annual Meeting & Exhibition; February 16-20, 2014 San Diego, CA.

23. Liu, T. M., Walker, M. L. R., "**Integration of Electric Propulsion Systems with Spacecraft – An Overview**," 33rd International Electric Propulsion Conference, Washington, D.C., October 6-10, 2013.

24. Singh, L. A., Walker, M. L. R., Sanborn, G. P., Turano, S. P., Ready, W. J., "**Operation of Spindt-Type Carbon Nanotube Cold Cathodes in a Hall Effect Thruster Environment**," 33rd International Electric Propulsion Conference, Washington, D.C., October 6-10, 2013.

25. Dankanich, J. W., Walker, M. L. R., Swiatek, M. W., Yim, J. T., "**Recommended Practice for Pressure Measurements and Calculation of Effective Pumping Speeds during Electric Propulsion Testing**," 33rd International Electric Propulsion Conference, Washington, D.C., October 6-10, 2013.

26. Frieman, J. D., Walker, M. L. R., Snyder, S., "**Guide to Flow Measurement for Electric Propulsion Systems**," 33rd International Electric Propulsion Conference, Washington, D.C., October 6-10, 2013.

27. Brown, D. L., Walker, M. L. R., Szabo, J., "**Test Methodology and Analysis of Faraday Probes with Application to Plasma Plumes for Spacecraft Electric Propulsion**," 33rd International Electric Propulsion Conference, Washington, D.C., October 6-10, 2013.

28. Polk, J., Pancotti, A., Walker, M. L. R., Haag, T., Blakely, J., Ziemer, J., "**Recommended Practices in Thrust Measurements**," 33rd International Electric Propulsion Conference, Washington, D.C., October 6-10, 2013.

29. Langendorf, S., Walker, M. L. R., Rose, L., Brieda, L., Keidar, M., "**Effect of ion-neutral collisions on sheath potential profile**," 33rd International Electric Propulsion Conference, Washington, D.C., October 6-10, 2013.

30. Walker, J. A., Langendorf, S., Walker, M. L. R., Polzin, K., Kimberlin, A., "**High-Speed Imaging of the First Kink Mode Instability in a Magnetoplasmadynamic Thruster**," 33rd International Electric Propulsion Conference, Washington, D.C., October 6-10, 2013.

31. Schinder, A. M., Walker, M. L. R., Rimoli, J., **"3D Atomic Sputtering of Composite Material,"** 49th Joint Propulsion Conference and Exhibit, San Jose, CA, July 15-17, 2013.

32. Langendorf, S., Walker, M. L. R., Rose, L., Keidar, M., Breida, L., **"Wall Material Effects on Sheath Potential Profile,"** 49th Joint Propulsion Conference and Exhibit, San Jose, CA, July 15-17, 2013.

33. Burton, T., Schinder, A. M., Capuano, G., Rimoli, J., Walker, M. L. R., Thompson, G. B., **"Erosion Characteristics in a Composite BN-SiO_2 Hall Effect Thruster Chamber Wall,"** 37th Annual Conference on Composites, Materials, and Structures, Cocoa Beach, FL, January 28-31, 2013.

34. Singh, L., Walker, M. L. R., **"Orbit Perturbation of High Area-to-Mass Objects with High-Energy Neutrals from Charge Exchange Collisions with Near-Earth Protons,"** 39th COSPAR Scientific Assembly, Mysore, India, July 2012.

35. Xu, K., Walker, M. L. R., **"Potential Contours in Ion Focusing Thruster,"** 48th Joint Propulsion Conference & Exhibit, Atlanta, GA, July 2012.

36. Hoyt, R. P., Wrobel, J. S., *Walker, J., Langendorf, S.*, Walker, M. L. R., **"Thrust Performance of a MPD Thruster with a Ring-Cusp Magnetic Nozzle,"** JANNAF Propulsion Meeting, Huntsville, AL, December 5-8, 2011.

37. Kieckhafer, A. W., Walker, M. L. R., **"Recirculating Liquid Nitrogen System for Operation of Cryogenic Pumps,"** 32nd International Electric Propulsion Conference, Hamburg, Germany, September 2011.

38. Williams, L., Walker, M. L. R., **"Thrust Measurements of a Helicon Plasma Source"** AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, San Diego, CA, August 2011.

39. Xu, K. G., Walker, M. L. R., **"Plume Characterization of an Ion Focusing Hall Thruster,"** AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, San Diego, CA, August 2011.

40. King, S. T., Walker, M. L. R., **"Ambient Atmosphere Ion Thruster Proof-of-Concept Modeling,"** AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, San Diego, CA, August 2011.

41. Kwon, K., Mavris, D. N., Walker, M. L. R., **"New Approach to Numerical Analysis of the Hall Thruster,"** 46th Joint Propulsion Conference, Nashville, TN, July 25-28, 2010.

42. Xu, K., Walker, M. L. R., **"Evaluation of Technique to Focus Ions in Hall Effect Thruster Discharge Chamber,"** JANNAF Propulsion Meeting, Colorado Springs, CO, May 3-7, 2010.

43. Jones, C., Masse, D., Glass, C., Wilhite, A., Walker, M., **"PHARO-Propellant Harvesting of Atmospheric Resources in Orbit,"** IEEE Aerospace Conference, Big Sky, MT, March 6-13, 2010.

44. Williams, L., Walker, M. L. R., Kumsomboone, V. S., Ready, W. J., **"Experimental Characterization of Carbon Nanotube Cold Cathode Lifetime Operation,"** 45th Joint Propulsion Conference, Denver, CO, August 2-5, 2009.

45. Carlsson, J., Pavarin, D., Walker, M., **"Analytic Wave Solution with Helicon and Trivelpiece-Gould Modes in an Annular Plasma,"** B61, 18th Topical Conference on Radio Frequency Power in Plasmas, Gent, Belgium, June 24-26, 2009.

46. Williams, L., Walker, M. L. R., **"Experimental Characterization of a Carbon Nanotube Field Emission Cathode,"** AIAA-2008-5015, 44th Joint Propulsion Conference, Hartford, CT, July 20-23, 2008.

47. Palmer, D., Walker, M. L. R., **"Performance of an Annular Helicon Plasma Source,"** AIAA-2008-4926, 44th Joint Propulsion Conference, Hartford, CT, July 20-23, 2008.

48. Palmer, D., Walker, M. L. R., Manente, M., Carlsson, J., Bramanti, C., Pavarin, D., **"Experimental Analysis of a Low-Power Helicon Thruster,"** AIAA-2008-4925, 44th Joint Propulsion Conference, Hartford, CT, July 20-23, 2008.

49. Pavarin, D., Manente, M., Walker, M. L. R., Palmer, D., Carlsson, J., Bramanti, C., Saggin, B., **"Feasibility Study of a Medium-Power Helicon Thruster,"** AIAA-2008-4927, 44th Joint Propulsion Conference, Hartford, CT, July 20-23, 2008.

50. King, S. T., Walker, M. L. R., Kluever, C. A., **"Small Satellite LEO Maneuvers with Low-Power Electric Propulsion,"** AIAA-2008-4516, 44th Joint Propulsion Conference, Hartford, CT, July 20-23, 2008.

51. Palmer, D., Walker, M. L. R., Manente, M., Carlsson, J., Bramanti, C., Pavarin, D., **"Experimental Analysis of Low-Power Helicon Thruster,"** 5th International Spacecraft Propulsion Conference, Crete, Greece, May 5-9, 2008.

52. Manente, M., Walker, M. L. R., Carlsson, J., Bramanti, C., Pavarin, D., **"Feasibility Study of Low-Power Helicon Thruster,"** 5th International Spacecraft Propulsion Conference, Crete, Greece, May 5-9, 2008.

53. Palmer, D., Akinli, C., Walker, M. L. R., **"Characterization of an Annular Helicon Plasma Source,"** IEPC-2007-202, 30th International Electric Propulsion Conference, Florence, Italy, September 17-20, 2007.

54. Akinli, C., Palmer, D., Walker, M. L. R., **"Comparison of the Theoretical and Experimental Performance of an Annular Helicon Plasma Source,"** IEPC-2007-0236, 30th International Electric Propulsion Conference, Florence, Italy, September 17-20, 2007.

55. Stubbers, R, Jurczyk, B. E., Rovey, J. L., Walker, M. L. R., Alman, D. A. Coventry, M. D., **"Compact Toroid Formation Using an Annular Helicon Preionization Source,"** AIAA-2007-5307, 43rd Joint Propulsion Conference, Cincinnati, OH, July 8-11, 2007.

56. Yano, M., Williams, L., Walker, M. L. R. **"Design and Operation of an Annular Helicon Plasma Source,"** AIAA-2007-5309, 43rd Joint Propulsion Conference, Cincinnati, OH, July 8-11, 2007.

57. Gilland, J. H., Walker, M. L. R., Pencil, E. J., **"Thrust Stand for Applied Field MPD Thrusters,"** IEPC-2005-215, 29th International Electric Propulsion Conference, Princeton, NJ, Oct. 31-Nov. 4, 2005.

58. Walker, M. L. R., Gallimore, A. D., **"Performance Characteristics of a Cluster of 5 kW Laboratory Hall Thrusters,"** AIAA-2004-3767, 40th Joint Propulsion Conference, Fort Lauderdale, FL, July 11-14, 2004.

59. Rovey, J. L., Walker, M. L. R., Gallimore, A. D., Peterson, P. Y., **"Evaluation of a Magnetically-Filtered Faraday Probe for measuring the ion current density profile of a Hall thruster,"** AIAA-2004-3948, 40th Joint Propulsion Conference, Fort Lauderdale, FL, July 11-14, 2004.

60. Walker, M. L. R., Gallimore, A. D., "**Hot Flow Pressure Map of a Vacuum Facility as a Function of Flow Rate to Study Facility Effects,"** IEPC-0077-03, 28th International Electric Propulsion Conference, Toulouse, France, March 17-21, 2003.

61. Walker, M. L. R., Gallimore, A. D., Cai, C., Body, I. D., **"Pressure Map of a Facility as a Function of Flow Rate to Study Facility Effects,"** AIAA-2002-3815, 38th Joint Propulsion Conference, Indianapolis, IN, July 7-10, 2002.

62. Walker, M. L. R., Hofer, R. R., Gallimore, A. D., **"The Effects of Nude Faraday Probe Design and Vacuum Facility Backpressure on the Measured Ion Current Density Profile of Hall Thruster Plumes,"** AIAA-2002-4253, 38th Joint Propulsion Conference, Indianapolis, IN, July 7-10, 2002.

63. Hofer, R. R., Walker, M. L. R., Gallimore, A. D., **"A Comparison of Nude and Collimated Faraday Probes for Use with Hall Thrusters,"** IEPC-01-020, 27th International Electric Propulsion Conference, Pasadena, CA, October 15-19, 2001.

Other Publications:

1. B. Jorns, A. Yalin, M. Walker, J. Little, K. Hara, Y. Raitses, A. Smolyakov, I. Kaganovich, and M. Cappelli, **"Plasma Propulsion Research in Academia"** , National Academy of Sciences, 2020 Decadal Assessment of Plasma Science, 2019.
2. National Research Council. ***Reusable Booster System: Review and Assessment***. Washington, DC: The National Academies Press, 2012.
   Authors: D. M. Van Wie, E. H. Bock, Y. C. Brill, A. V. Burman, D. C. Byers, L. H. Caveny, R. S. Dickman, M. K. Jacobs, T. J. Lee, C. K. N. Patel, D. Roussel-Dupre, R. L. Sackheim, P. D. Spanos, M. L. R. Walker, B. T. Zinn
   http://www.nap.edu/catalog/13534/reusable-booster-system-review-and-assessment

3. Palmer, D., Yano, M., Beal, B., Walker, M. L. R., **"Characterization of Annular and Cylindrical Helicon Sources,"** 9th International Workshop on the Interrelationship between Plasma Experiments in Laboratory and Space, Cairns, Australia, August 5-8, 2007.

4. Walker, M. L. R., **"Electric Propulsion,"** Aerospace America, No. 12, December 15, 2005, pp. 54-55.

Invited Presentations:

1. Panel Member: "Space Propulsion," 2nd Annual John H. Glenn Memorial Symposium, Cleveland, Ohio, July 16, 2020. – Invited
2. "Challenges Predicting the Lifetime of Hall Effect Thrusters," University of Illinois, Urbana-Champaign, IL, October 28, 2019. – Invited.
3. Panel Member: "Space Propulsion," Inaugural John H. Glenn Memorial Symposium, Cleveland, Ohio, July 11, 2019. – Invited.
   https://www.youtube.com/watch?v=S-43vo1jpf0
   https://www.youtube.com/watch?v=De0ExjlDXQE&t=1012s
4. "Challenges Predicting the Lifetime of Hall Effect Thrusters," University of Maryland, College Park, MD, April 18, 2019. – Invited.
5. "Erosion Mechanisms in the Hall Effect Thruster," Pennsylvania State University, State College, PA, September 19, 2018. – Invited.
6. "Influence of Thermally Induced Cracking on Hall Thruster Wall Erosion," Micropropulsion Workshop, Washington, D.C., July 31-August 1, 2018.
7. "In-Space Propulsion: Strategic Choices and Options," Space Subcommittee Hearing, House of Representatives, Washington, D.C., June 29, 2017. – Invited.
   https://youtu.be/vF104TtYcmw
8. "Discharge Channel Erosion in the Hall Effect Thruster," Duke University, Durham, NC, November 20, 2017. – Invited.
9. "Material Erosion in the Hall Effect Thruster," University of Giessen, Germany, March 2, 2017. – Invited.
10. "Activities in Electric Propulsion," DLR, Gottingen, Germany, February 28, 2017. – Invited.
11. "Unique Applications of Electric Propulsion," 18th Brazilian Colloquium of Orbital Dynamics, Aguas de Lindoia, Brazil, December 1, 2016. – Invited.
12. "Enjoy the Journey," National Youth Leadership Forum: Engineering & Technology, Atlanta, GA, July 7, 2016. – Invited.
13. "Material Erosion in the Hall Effect Thruster," California Institute of Technology, Pasadena, CA, December 4, 2015. – Invited.
14. Panel Member - Electric Propulsion Technology Specialist: "Space Propulsion," 66th International Astronautics Congress, Jerusalem, Israel, October 12-16, 2015. – Invited.
15. "Government Investments Enabling Advancement of In-Space Propulsion," Panel Moderator of Forum 360 Session at the 51st AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Orlando, FL, July 27, 2015 – Invited.
    http://www.aiaa-propulsionenergy.org/GovtInvestments_PE2015/
16. "Satellite Insurance Providers Discuss - Risk Management for Electric Propulsion," Panel Moderator at 2015 International Electric Propulsion Conference, Kobe City, Japan, July 8, 2015 – Invited.
17. "Discharge Channel Erosion in the Hall Effect Thruster," Los Alamos National Laboratory, Los Alamos, NW, May 26, 2015. – Invited.
18. "Material Erosion in the Hall Effect Thruster" Exponent, Menlo Park, CA, December 9, 2014. – Invited.
19. "Why is EP Game Changing," Panel Moderator at 2013 International Electric Propulsion Conference, George Washington University, Washington, D.C., October 8, 2013. – Invited.
20. "Electric Propulsion Facility Design," SpaceX, Hawthorne, CA January 2013.
21. "Center of Excellence for Space Propulsion," Mr. Scott Correll, PEO Air Force Space Launch, Chantilly, VA May 2012. – Invited.
22. "Overview of Electric Propulsion Activities in Academia," JANNAF Meeting, Huntsville, AL, December 5, 2011. – Invited.
23. Walker, M. L. R., "Georgia Tech Research Activities," National Institute for Rocket Propulsion Systems, University of Alabama-Huntsville/NASA Marshall Space Flight Center, October 14, 2011 – Invited.
24. Walker, M. L. R., "Hall Effect Thrusters," Lockheed Martin, April 14, 2011 – Invited.
25. Walker, M. L. R., "High Thrust-to-Power Hall Thrusters," Purdue University, April 7, 2008 – Invited.
26. Walker, M. L. R., "High Thrust-to-Power Hall Thrusters," Virginia Tech, February 25, 2008 – Invited.

27. Sharma, J., Walker, M. L. R., "START: Utilizing Near-Earth Asteroids with Tether Technologies," NASA Institute of Advanced Concepts, Atlanta, GA, March 7, 2007.
28. "Electric Propulsion Research Activities at the University of Michigan" at the University of Pisa, Sept. 2003.

Courses Taught:

Introduction to Aerospace Engineering (AE 1601)
Thermodynamics and Compressible Flow (AE 2010)
Low-speed Aerodynamics (AE 2020)
Introduction to Experimental Methods (AE2610)
Experiments in Fluid and Solid Mechanics (AE 3610)
Technical Writing (AE2611)
Jet and Rocket Propulsion (AE 4451)
High-Temperature Gasdynamics (AE 6050)
Rockets (AE 6450)
Electric Propulsion (AE 6451)

Teaching Interests:

Aerospace Propulsion, Gas Dynamics, Plasma Physics, Viscous Flows, Low-speed Aerodynamics

Awards & Honors:

- Leadership Atlanta, Class of 2020
- Georgia Power Professor of Excellence Award, Georgia Institute of Technology, 2017
- Provost's Emerging Leadership Program, Georgia Institute of Technology, 2017
- Selected for the National Academies of Science, Engineering and Medicine's Symposium on Exploring a New Vision for Center-Based, Multidisciplinary Engineering Research, 2016
- Invited to serve on the National Academy of Engineering Frontiers of Engineering Symposium Organizing Committee, Co-organizer for session "Engineering the Search for Earth-like Exoplanets," 2015
- Selected for the National Academy of Engineering US Frontiers of Engineering Symposium, 2014
- NASA Marshall Space Flight Center – Reverse Mentoring Program, 2013
- AIAA Associate Fellow, 2011
- AIAA Lawrence Sperry Award, 2010
- Air Force Office of Scientific Research Young Investigator Program Award, 2006
- NASA Faculty Fellow, 2005
- Class of 1969 Teaching Fellow, 2005
- Who's Who in Engineering Education, 2005
- Arnold M. Kuethe Aerospace Engineering Fellowship, 2004
- MEPO Academic Achievement Award, University of Michigan, 2001
- Michigan Space Grant Consortium Graduate Fellowship, 2001, 2003
- Rackham Merit Fellowship, University of Michigan (NSF sponsored), 2000
- GEM Fellowship, 1999
- Aerospace Engineering Distinguished Achievement Award, University of Michigan, 1998

Professional Society Membership:

- Editorial Board – Frontiers in Physics and Astronomy and Space Sciences – Plasma Physics
- Associate Editor – AIAA Journal of Spacecraft and Rockets
- AIAA Associate Fellow, Electric Propulsion Technical Committee
- Electric Rocket Propulsion Society – Board Member, Secretary of the Board
- American Society for Engineering Education (ASEE)

- American Society of Mechanical Engineers (ASME)
- Hydraulic Institute – Rotodynamic Design & Application Committee

Professional Society/Conference Service:

ASME

- Track Co-chair: Heat Transfer and Thermal Engineering, 2014 International Mechanical Engineering Congress & Exposition

American Physical Society (APS)

- Ethics Committee, 2019 – Present
- Committee on Scientific Publications, 2018 – Present
- Strategic Planning Subcommittee, "Ensuring a Role in Scientific Research Dissemination", 2018 – Present
- Program Committee, 58th Annual Meeting of the APS Division of Plasma Physics, San Jose, CA, October 31 – November 4, 2016.
- Local Coordinator, 57th Annual Meeting of the APS Division of Plasma Physics, Savannah, GA, November 16-20, 2015.

American Institute of Aeronautics and Astronautics (AIAA)

- AIAA Deputy Director for Space Rockets and Advanced Propulsion, 2019 – Present
- Chair – Wyld Award Selection Committee, 2019 – Present
- Member – Wyld Award Selection Committee, 2015 – 2018
- Chair – Electric Propulsion Technical Committee, 2018 – Present
- Vice Chair – Electric Propulsion Technical Committee, 2015 – 2017
- Electric Propulsion Test and Measurement Standards Committee, 2012 – Present
- Subcommittee for Best Paper in Electric Propulsion Award, 2010, 2012, 2013
- Chair of Subcommittee for Technical Achievement Award, 2010
- Young Professional Committee - Subcommittee for Honors and Awards, 2010
- Subcommittee for Technical Achievement Award, 2009
- Subcommittee for Best Paper in Electric Propulsion Award, 2009
- Subcommittee for Best Paper in Electric Propulsion Award, 2008
- Wrote Review of Electric Propulsion Activity for *Aerospace America*, 2005

Department of Energy

- Fusion Energy Sciences Advisory Committee, 2017-Present

NASA

- NASA Advisory Council – Technology, Innovation, and Engineering Committee, 2020 – Present
- NASA Asteroid Retrieval Mission Solar Electric Propulsion Analysis of Alternatives, 2013
- NASA International Space Station Electric Propulsion Testbed Study Committee, 2011

Other

- General Chair, 35th International Electric Propulsion Conference (IEPC), Atlanta, GA, October 2017.
- Electric Propulsion Operation in the Space Environment Working Group, 2015 – Present
- International Electric Propulsion Conference – Technical Committee, 2013, 2015
- NRC ASEB Air Force Reusable Booster System Study, 2011 – 2012
- National Institute for Rocket Propulsion Systems, Solutions Provider Committee, 2011 – Present

Honor Societies:

- Tau Beta Pi
- Sigma Gamma Tau
- Golden Key National Honor Society
- Phi Kappa Phi National Honor Society
- Kappa Kappa Psi (Honorary Music Fraternity)