Curriculum Vitae: James A. Nabity

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Academic Appointments

Since 2013 Associate Professor, Aerospace Engineering Sciences, University of Colorado Boulder

Professional Experience

2007-2013	Principal Engineer, TDA Research, Inc.
1999-2007	Senior Engineer, TDA Research, Inc.
1992-1999	Mechanical Engineer, Naval Air Warfare Center Weapons Division (NAWCWD)
1992	Branch Head, Acting, Airbreathing Propulsion, NAWCWD
1983-1992	Mechanical Engineer, NAWCWD

Education

2007	PhD	Mechanical Engineering	University of Colorado, Boulder
1998		Systems Engineering Certificate	NAWCWD
1989	MS	Aeronautics and Astronautics	Naval Postgraduate School, Monterey
1983	BS	Mechanical Engineering	University of Nebraska, Lincoln

Awards & Recognition

AIAA Distinguished Service Award – Jul 2022
CU Faculty Tenure – Aug 2020
CU College of Engineering and Applied Sciences Outstanding Faculty Advisor Award – May 2017
AIAA Class of 2016 Associate Fellows
NASA highly qualified candidate for the Astronaut Class of 2009
NAWC Letter of Appreciation from Capt. John Walsh, 13 Nov 1997
NAWCWD Technical Fellow for research in combustion, Jul 1996
NAWCWD Special Act Award Instrumentation Upgrade of Dock 18, Apr 1996
AF Letter of Appreciation via Col. Richard Garr, 31 Jul 1995
Rockwell International Letter of Appreciation, 6 Mar 1995
AF Letter of Appreciation via Lt. Col. Karl Eschmann, 1 Nov 1993
NAWCWD Invention Award, 21 Oct 1993
NWC Academic Long-term Training Fellowship, Sep 1988 – Sep 1989

RESEARCH

Research Themes

<u>Environmental Control & Life Support (ECLS)</u>

- Task-specific ionic liquids for atmosphere revitalization and selective gas separations
- Gravity-dependent effects on regenerative physicochemical and biological ECLS
- ECLS self-awareness including design for autonomous maintenance and repair
- Freeze-tolerant heat exchangers, thermal capacitors and radiators
- Recovery and use of in-space resources including solid waste

Space Habitats

- Integration and automation of ECLS systems into space habitats
- Virtual Habitat (V-Hab) for space habitat modeling and simulation
- Habitat design to mitigate dust and space radiation, and improve crew performance

In situ Resource Utilization (ISRU)

- Solvated extraction of minerals and oxygen from regolith
- Separation of volatiles

Publications (student co-authors underlined)

Journal Articles (refereed, 30 total in print)

i. Eshima, S.P. and Nabity, J.A., Sensor Suite Optimization Process for ML-based Anomaly Detection and Diagnostics of ECLSS, [In Review]
ii. Case, D.E., Singleterry, R.C. and Nabity, J.A., Layered Systems of Aluminum and Polyethylene as Space Radiation Protection for Human Spaceflight, [In Review]
iii. Case, D.E., Singleterry, R.C. and Nabity, J.A., Spacecraft Windows and Astronaut Radiation Protection: An Analysis and Commentary, [In Review]
iv. Eshima, S.P., Ibrahim, M., Gebraeel, N. and Nabity, J.A., Machine Learning-Based ECLSS Anomaly Response Informed by A Systematic Sensor Selection Process, [Working Title, In Prep]
v. Nabity, J.A., Laughton, K. and Escobar, C.M., Influence of ECLSS Performance on Spacecraft Habitability, [Working Title, In Prep]
vi. Singh, A., Schauss, G., Hayman, A. and Nabity, J., A Comprehensive Framework for Modeling Rocket Plume Induced Lunar Dust Ejecta Dynamics to Enable Mission Specific Risk Analysis, [Working Title, In Prep]

1. Eshima, S.P. and Nabity, J.A. (2024), Impact of Dormancy on ECLSS Design and Operation: A Review, *Acta Astronautica*, Volume 223, 2024, Pages 304-315, https://doi.org/10.1016/j.actaastro.2024.06.004
2. Wheeler, T.H., Bolin, R., Tata, B. and Nabity, J.A. (2024), Extendable Origami Multilayer Insulation Thermal Characterization, *Cryogenics,* 140 (2024) 103835, https://doi.org/10.1016/j.cryogenics.2024.103835
3. Maydan, J.V. and Nabity, J.A. (2024), Combined Cycle Nuclear Thermal System for Propulsion and Power of Crewed Spacecraft for Mars Exploration, *Journal of Propulsion and Power*, 2024 40:1, 3-13, https://arc.aiaa.org/doi/10.2514/1.B39149
4. Rexhepi, F., Woolever, M., Nabity, J., and Banerjee, S. (2023), Metal oxide solvation with ionic liquids: A solubility parameter analysis, *Journal of Molecular Liquids*, Volume 385, 2023, 122314, ISSN 0167-7322, https://doi.org/10.1016/j.molliq.2023.122314
5. Deng, Z., Eshima, S., Nabity, J., and Kong, Z. (2023), Causal Signal Temporal Logic for the Environmental Control and Life Support System's Fault Analysis and Explanation, *IEEE Access*, vol. 11, 26471-26482, 2023, doi: 10.1109/ACCESS.2023.3246512
6. Matula, E.E., Nabity, J.A. and McKnight, D.M. (2021), Supporting simultaneous air revitalization and thermal control in a crewed habitat with temperate *Chlorella vulgaris* and eurythermic Antarctic Chlorophyta, *Frontiers in Microbiology*, Vol. 12, 2021, 23-48. https://doi.org/10.3389/fmicb.2021.709746
7. Matula, E.E. and Nabity, J.A. (2021), Metabolic response of *Chlorella vulgaris* to a transient thermal environment for supporting simultaneous air revitalization and thermal control in a crewed habitat, *Acta Astronautica*, Vol. 187, 2021, 406-415. https://doi.org/10.1016/j.actaastro.2021.07.003

8. Rehmeier, J.K., Bell, K.J., Knoerr, S.A., Pitts, R.P., Power, G.J. and Nabity, J.A. (2021), Extendable Origami Multilayer Insulation Design and Thermal Performance Characterization, *Journal of Spacecraft and Rockets,* Vol. 58, No. 4 (2021), 1149-1156. https://doi.org/10.2514/1.A34883
9. Matula, E.E. and Nabity, J.A. (2021), Effects of stepwise changes in dissolved carbon dioxide concentrations on metabolic activity in *Chlorella* for spaceflight applications, *Life Sciences in Space Research* 29 (2021) 73–84. https://doi.org/10.1016/j.lssr.2021.03.005
10. Matula, E.E. and Nabity, J.A. (2021), Characterization of simultaneous heat, oxygen, and carbon dioxide transfer across a nonporous polydimethylsiloxane (PDMS) hollow fiber membrane, *Chemical Engineering Journal Advances*, Vol. 6, 2021. https://doi.org/10.1016/j.ceja.2021.100106
11. Lotto, M.A., Nabity, J.A. and Klaus, D.M. (2021), Low-Pressure CO2 Capture Using Ionic Liquids to Enable Mars Propellant Production, *Journal of Propulsion and Power*, Vol. 37, No. 1 (2021), pp. 100-107. doi: doi/abs/10.2514/1.B37782
12. Nabity, J.A., Killelea, J.V., Shaffer, B.A., Arquilla, K.S., Rundle, T.J., Fritz, T.J. and Phillips, D.D. (2020), Ionic Liquid-based Contactors for Carbon Dioxide Removal from Simulated Spacecraft Cabin Atmospheres, *Journal of Spacecraft and Rockets,* Vol. 57, No. 6 (2020), pp. 1350-1361. https://doi.org/10.2514/1.A34750
13. Matula, E.E. and Nabity, J.A. (2019), Failure modes, causes, and effects of algal photobioreactors used to control a spacecraft environment, *Life Sciences in Space Research,* Volume 20, p. 35-52, February 2019. https://doi.org/10.1016/j.lssr.2018.12.001
14. Nabity, J.A. and Daily, J.W. (2018), Effect of ionic liquid composition on colloid thruster emission and thrust performance, *Journal of Propulsion and Power,* **34(1)**, 260-266, January 2018. https://doi.org/10.2514/1.B36376
15. Cook, R., Nabity, J.A. and Daily, J.W. (2017), Characterizing propellants for variable-thrust/specific impulse colloid thrusters, *Journal of Propulsion and Power,* **33(6)**, 1325-1331, November 2017. https://doi.org/10.2514/1.B36495
16. Du Z.J., Kolarcik, C.L., Kozai, T.D.Y., Luebben, S.D., Sapp, S.A., Zheng, X.S., Nabity, J.A. and Cui, X.T. (2017), Ultrasoft microwire neural electrodes improve chronic tissue integration, *Acta Biomaterialia*, **53**, 46–58, April 2017. doi: 10.1016/j.actbio.2017.02.010
17. Massina, C.J., Nabity, J.A. and Klaus, D.M. (2017), Thermal vacuum evaluation of simulated spacecraft radiators with discretized emissivity surface properties, *Journal of Spacecraft and Rockets*, **54(2)** 368-375, Mar 2017. http://dx.doi.org/10.2514/1.A33654
18. Nabity, J., Holquist, J., Milanese, M., Lotto, M., and Klaus, D. (2016), Effect of gravity on ice-layer growth in a freezable heat exchanger, *Journal of Thermophysics and Heat Transfer*, **30(3)**, 499-512. https://doi.org/10.2514/1.T4737
19. Nabity, J.A. and Lee, J.M. (2015), Low temperature ozone oxidation of solid waste surrogates, *Advances in Space Research*, **56(5)**, 970–981, 1 September 2015. https://doi.org/10.1016/j.asr.2015.05.026
20. Kolarcik, C.L., Luebben, S.D., Sapp, S.A., Hanner, J., Snyder, N., Kozai, T.D.Y., Chang, E., Nabity, J.A., Nabity, S.T., Lagenaur, C.F. and Cui, X.T. (2015), Elastomeric and soft conducting microwires for implantable neural interfaces, *Soft Matter*, 2015 Jun 28, **11**, 4847-4861. doi: 10.1039/c5sm00174a
21. Nabity, J.A. (2014), Modeling a freezable water-based heat exchanger for use in spacecraft thermal control, *Journal of Thermophysics and Heat Transfer*, **28(4)**, 708-716, October 2014. https://doi.org/10.2514/1.T4351
22. Metts, J.G., Nabity, J.A., and Klaus, D.M. (2011), Theoretical performance analysis of electrochromic radiators for space suit thermal control, *Advances in Space Research*, **47(7)**, 1256-1264, 1 April 2011. https://doi.org/10.1016/j.asr.2010.11.018
23. Shimizu, T., Abid, A.D., Poskrebyshev, G., Wang, H., Nabity, J., Engel, J., Yu, J., Wickham, D., Van Devener, B., Anderson, S.L. and Williams, S. (2010), Methane ignition catalyzed by in situ

generated palladium nanoparticles, *Comb. Flame* **157(3)**, 421-435, Mar 2010. https://doi.org/10.1016/j.combustflame.2009.07.012

24. McGuire, N.E., Sullivan, N.P., Kee, R.J., Zhu, H., Nabity, J.A., Engel, J.R., Wickham, D.T. and Kaufman, M.J. (2009), Catalytic steam reforming of methane using Rh supported on Sr-substituted hexaaluminate, *Chemical Engineering Science*, **64(24)**, 5231-5239, 16 December 2009. https://doi.org/10.1016/j.ces.2009.08.030
25. Van Devener, B., Anderson, S.L., Shimizu, T., Wang, H., Nabity, J., Engel, J., Yu, J., Wickham, D. and Williams, S. (2009), In Situ Generation of Pd/PdO Nanoparticle Methane Combustion Catalyst: Correlation of Particle Surface Chemistry with Ignition, *Journal of Physical Chemistry C* 113(48):20632-20639 03 Dec 2009. https://doi.org/10.1021/jp904317y
26. Nabity, J., Mason, G., Copeland, R., and Trevino, L., A Freezable Heat Exchanger for Space Suit Radiator Systems, *SAE Int. J. Aerosp.* 1(1):355-363, 2009. https://doi.org/10.4271/2008-01-2111
27. Nabity, J.A., Andersen, E.A., Engel, J.R., Wickham, D.T., and Fisher, J.W. (2009), Development and design of a low temperature solid waste oxidation and water recovery system, *SAE Int. J. Aerosp*. 1(1):228-238, 2009. https://doi.org/10.4271/2008-01-2052
28. Krishnan, G., Daily, J.W. and Nabity, J. (2007), Simulation of an electrostatically driven microinjector, *Journal of Propulsion and Power*, **23(6)** 1321-1326. https://doi.org/10.2514/1.24334
29. Wickham, D.T., Cook, R., de Voss, S., Engel, J.R. and Nabity, J. (2006), Soluble nano-catalysts for high performance fuels, *Journal of Russian Laser Research*, **27(6)** 552-561. https://doi.org/10.1007/s10946-006-0034-8
30. Nabity, J.A., Lee, T., Natan, B. and Netzer, D.W. (1993), Combustion behavior of boron carbide fuel in solid fuel ramjets, *International Journal of Energetic Materials and Chemical Propulsion*, **2(1-6)**, 287-302. **DOI:** 10.1615/IntJEnergeticMaterialsChemProp.v2.i1-6.160

Patents

1. Alford, M., Diener, M., Nabity, J. and Karpuk, M. (2004, 2007), *Burners and combustion apparatus for fullerene production*, US 7,279,137 Oct 9, 2007. European Patent EP1448818 (A1), Aug 25, 2004. Japanese Patent # 3984956 Jul 13, 2007.
2. Diener, M.D., Alford, J.M., Nabity, J.A. and Hitch, B.D. (2007), *Combustion process for synthesis of carbon nanomaterials from liquid hydrocarbon*, US 7,157,066 January 2, 2007.
3. Nabity, J., Loundagin, J. and Netzer, D. (1997), *Axially Short and Stepped Combustor*, Navy Case No. 78341, 5-13-97.
4. Loundagin, J., Ayler, S. and Nabity, J. (1993), *Method and Apparatus for Fuel Injection and Controlled Fuel Distribution in a Combustion Device*, Pat. 08/140,905, 10-22-93.
5. Nabity, J. and Zarlingo, F. (1989), *Multi-step Fuel Grain*, Pat. 07/441,024, 11-24-89.

Book Chapters (Refereed)

1. Experimental and Analytical Methods for the Determination of Connected-Pipe Ramjet and Ducted Rocket Internal Performance (1994), Working Group 22, AGARD-AR-323, July 1994
2. Nabity, J.A., Lee, T.-H., Natan, B. and Netzer, D.W. (1993), Combustion Behavior of Boron Carbide in Solid Fuel Ramjets, in Combustion of Boron-Based Solid Propellants and Solid Fuels, K.K. Kuo and R. Pein, editors, CRC and Begell House, Boca Raton, 287-302

Conference Papers (Refereed, 51 total)

1. Cohen, M.M., Barker, D.C., Desjean, M., Metts, J. and Nabity, J. (2024), ECLSS-First Space Habitat Architecture, ICES-2024-193, 53rd International Conference on Environmental Systems, July 2024

2. Greaves, B., and Nabity, J. (2024), Applications of Hydrogels in Human Spaceflight, ICES-2024-148, 53rd International Conference on Environmental Systems, July 2024
3. Singh, A., Lonner, T., Buchner, S., Schauss, G., and Nabity, J. (2024), Modeling Ionic Liquid-based CO2 Removal with V-HAB, ICES-2024-343, 53rd International Conference on Environmental Systems, July 2024
4. Nakane, M. and Nabity, J. (2024), Effects of Transitioning to Physicochemical and Biological Hybrid System on ECLSS Material Circulation, ICES-2024-32, 53rd International Conference on Environmental Systems, July 2024
5. Bahan, Cody, Foote, Nathan, Laughton, Kathleen, Oswald, Adam, Panchal, Aanshi, Pflieger, Chad, Trux, Samuel, Tozer, Stuart and Nabity, James (2023), Human Landing System ECLSS Research and Design, ICES-2023-89, 52nd International Conference on Environmental Systems, July 2023
6. Singh, Amrita, Athannassova, Trayana, Nabity, James and Olthoff, Claas (2023), V-HAB Atmosphere Modeling and Simulation for a Crewed Polar Sortie, ICES-2023-74, 52nd International Conference on Environmental Systems, July 2023
7. Tata, Bharath, Bahan, Cody J. and Nabity, James A. (2023), CO2 Capture with Supported Ionic Liquid Membranes for ECLSS and ISRU: Progress, Performance, and Potential, ICES-2023-143, 52nd International Conference on Environmental Systems, July 2023
8. Baranowski, Lauryn, Peppel, Matthew, Kissounko, Denis, Singh, Amrita and Nabity, James (2023) Low temperature, durable siloxane/epoxy nanocomposite coating for drastic reduction in lunar particulate adhesion, ICES-2023-285, 52nd International Conference on Environmental Systems, July 2023
9. Nabity, James A. (2023), Integrating Hands-on Learning Modules into a Course on Life Support Systems, ICES-2023-307, 52nd International Conference on Environmental Systems, July 2023
10. Nitschke, Felix J. and Nabity, James A. (2023) Ionic Liquid-based CO2 Control of Plant Growth Chamber Atmospheres, ICES-2023-450, 52nd International Conference on Environmental Systems, July 2023
11. Woolever, Mitchell, Nabity, James, Cook, Ronald and Fox, Eric (2023), Ionic Liquid Parameter Prediction Leveraging Quantum Structure Property Relationships, ICES-2023-455, 52nd International Conference on Environmental Systems, July 2023
12. Eshima, Samuel P., Nabity, James A., Mohanty, Ayush, Rozas, Heraldo and Gebraeel, Nagi (2022), A Diagnostics Model for Detecting Leak Severity in a Regenerable CO2 Removal System, ICES-2022-303, 51st International Conference on Environmental Systems, July 2022
13. Eshima, Samuel P., Nabity, James A., Torralba, Monica G., Ivey, Daniela B. and Stephen K. Robinson (2022), Generating Anomalous Regenerable CO2 Removal System Data for Environmental Control and Life Support System Self-Awareness, ICES-2022-284, 51st International Conference on Environmental Systems, July 2022
14. Torralba, Monica, George, Cory A., Robinson, Stephen K., Eshima, Samuel P. and Nabity, James A. (2022), Estimation of System States for Non-Measured Parameters and Integration with a Digital Twin framework to Boost Spacecraft Autonomy and Awareness, ICES-2022-222, 51st International Conference on Environmental Systems, July 2022
15. Kaschubek, Daniel M. and Nabity, James A. (2022), Modeling and Simulation of Component Degradation and Faults in the Carbon Dioxide Removal Assembly, ICES-2022-221, 51st International Conference on Environmental Systems, July 2022
16. Nabity, James A., Laughton, Kathleen and Escobar, Christine M. (2022), Influence of ECLSS Performance on Spacecraft Habitability, ICES-2022-59, 51st International Conference on Environmental Systems, July 2022
17. Tata, Bharath, Sawicki, Pawel and Nabity, James A. (2022), Supported Ionic Liquid Membranes for Carbon Dioxide Capture in Spacecraft Cabin Atmospheres, ICES-2022-42, 51st International Conference on Environmental Systems, July 2022

18. Hardy, J. Matthew, Kociolek, Patrick, Massa, Gioia and Nabity, James (2022), Targeted Lighting Approaches for Controlled Environment Agriculture in Space Habitats, ICES-2022-6, 51st International Conference on Environmental Systems, July 2022
19. Dorbecker, MC and Nabity, James A. (2021), Modeling Crew Performance Degradation Due to Radiation Exposure in Space, ICES 2021-237, 50th International Conference on Environmental Systems, July 2021
20. Nabity, James A., Tata, Bharath, Armstrong, Isaac and Escobar, Christine M. (2021), Supported Ionic Liquid Membrane for Selective CO_2 Capture, ICES-2021-117, 50th International Conference on Environmental Systems, July 2021
21. Nabity, James A., Aaron, Robert F., III and Wickham, David T. (2021), Integrated System Modelling for Spacecraft Atmospheric Revitalization Using a Supported Ionic Liquid Membrane, ICES-2021-262, 50th International Conference on Environmental Systems, July 2021
22. Eshima, Samuel and Nabity, James A. (2020), Failure Mode and Effects Analysis for Environmental Control and Life Support System Self-Awareness, ICES-2020-488, July 2020.
23. Escobar, Christine M., Escobar, Adam C., Shaffer, Brett A., Power, Gabriel, and Nabity, James A. (2020), μG-LilyPond™: Preliminary Design of a Floating Plant Pond for Microgravity, ICES-2020-246, July 2020
24. Nabity, James A., Pitts, Ray P., Rehmeier, Jacob, Weislogel, Mark M., Escobar, Christine M., Shaffer, Brett A., and Escobar, Adam C. (2020), Capillary-driven provision of water and nutrients to plants grown in microgravity, ICES-2020-219, July 2020
25. Escobar, Christine, Escobar, Adam and Nabity, James A. (2019), Quantifying ECLSS Robustness for Deep Space Exploration, ICES-2019-239, 49th International Conference on Environmental Systems, July 2019
26. Wickham, David, Nabity, James, McCarty, Jordann, and Aaron, Robert, (2019), A Supported Liquid Membrane System for Steady State CO2 Control in a Spacecraft Cabin, ICES-2019-187, 49th International Conference on Environmental Systems, July 2019
27. Shaffer, Brett, Jonathan Eble, Christine Escobar and James Nabity (2018), Effects of additive manufacturing on capillary-driven fluid flow for provision of water and nutrients to free floating plants, ICES-2018-328, 48th International Conference on Environmental Systems, July 2018
28. Denton, Jacob, Jonathan Eble, Zachary Fester, Trevor Fritz, Lee Huynh, Mario Maggio, Thomas Pearson, Alan Sanchez, Grant Vincent, Mitchell Woolever, Christine Escobar, Jordan Holquist, Michael Lotto and James Nabity (2018), Development of a Water Cryocooler System for use in the Dehumidification of a Spacecraft Cabin Atmosphere, ICES-2018-133, 48th International Conference on Environmental Systems, July 2018
29. Lotto, Michael A., Jordan B. Holquist, David M. Klaus and James A. Nabity (2018), Considerations for Capturing and Converting Martian CO2 with Room Temperature Ionic Liquid-Based ISRU Systems, ICES-2018-31, 48th International Conference on Environmental Systems, July 2018
30. Holquist, Jordan B., David M. Klaus, James A. Nabity and Morgan B. Abney (2018), Design of a Vacuum-Assisted Product Removal, Ionic Liquid-based, Carbon Dioxide Electrolyzer, ICES-2018-32, 48th International Conference on Environmental Systems, July 2018
31. Matula, Emily and Nabity, James (2017), Review of Failure Modes of a Photobioreactor System Used for Long Duration Spaceflight Environmental Control and Life Support, ICES-2017-275, 47th International Conference on Environmental Systems, July 2017
32. Niederwieser, Tobias, Wall, Ryan, Nabity, James and Klaus, David (2017), Development of a test bed for flow-through measurements of algal metabolism under altered pressure for bioregenerative life support applications, ICES-2017-23, 47th International Conference on Environmental Systems, July 2017
33. Escobar, Christine M. and Nabity, James A. (2017), Past, Present, and Future of Closed Human Life Support Ecosystems - A Review, ICES-2017-311, 47th International Conference on Environmental Systems, July 2017

34. Escobar, Christine M., Nabity, James A. and Klaus, David M. (2017), Defining ECLSS Robustness for Deep Space Exploration, ICES-2017-280, 47th International Conference on Environmental Systems, July 2017
35. Nabity, J.A., Holquist, J.B. and Klaus, D.M. (2017), Freezable Single-loop Thermal Control Architecture Assessment and Potential Key Enabling Technologies, ICES-2017-243, 47th International Conference on Environmental Systems, July 2017
36. Case, Daniel E. and Nabity, James A. (2017), An Aerospace Engineering Guide to Space Radiation: Science and Strategies, ICES-2017-273, 47th International Conference on Environmental Systems, July 2017
37. Larson, Kipp and Nabity, James (2017), Space Suit Thermal Control Using Thermoelectric Devices, ICES-2017-185, 47th International Conference on Environmental Systems, July 2017
38. Arquilla, K., Rundle, T., Shaffer, B., Phillips, D., Lampe, A., Denton, J., Fritz, T., Lima, A., Dixon, J., Lotto, M., Holquist, J., and Nabity, J. (2017), Characterization of Carbon Dioxide Removal using Ionic Liquids in Novel Geometries, ICES-2017-234, 47th International Conference on Environmental Systems, July 2017
39. Matula, E.E. and Nabity, J.A. (2016), Feasibility of Photobioreactor Systems for use in Multifunctional Environmental Control and Life Support System for Spacecraft and Habitat Environments, ICES-2016-147, 46th International Conference on Environmental Systems, July 2016
40. Holquist, J.B., Klaus, D.M., Nabity, J.A. and Abney, M.B. (2016), Electrochemical Carbon Dioxide Reduction with Room Temperature Ionic Liquids for Space Exploration Missions, ICES-2016-314, 46th International Conference on Environmental Systems, July 2016
41. Nabity, J.A., Holquist, J.B., Milanese, M.J. and Klaus, D.M. (2015), Characterizing the Effect of Gravity on a Freezable Water Heat Exchanger with Respect to Flow Orientation, 45th International Conference on Environmental Systems, July 2015
42. Massina, C.J., Nabity, J.A., and Klaus, D.M. (2015), Modeling the Human Thermal Condition Balance in a Space Suit using a Full-Surface, Variable Emissivity Radiator, 45th International Conference on Environmental Systems, July 2015
43. Darnell, A., Azad, A., Borlaug, B., Case, D., Chamberlain, C., Fortier, K., Guerrie, P., Jethani, H., Marino, J., Soma, C., Srivastava, A., Wassenberg, A., Holquist, J. and Nabity, J.A. (2015), MarsOASIS: A predeployable miniature Martian greenhouse for crop production research, 45th International Conference on Environmental Systems, July 2015
44. Nabity, J., Spatafore, B., Mason, G., Hecht, J., Klaus, D.M. and Ewert, M.W. (2013), A Self-Regulating Freezable Heat Exchanger for Use in Spacecraft Thermal Control, AIAA 2013-3418, 43rd International Conference on Environmental Systems, July 2013, https://doi.org/10.2514/6.2013-3418
45. Hecht, J., Klaus, D.M., Nabity, J. and Ewert, M.K. (2013), Evaluation of Candidate Architectures for Incorporating a Self-Regulating Freezable Heat Exchanger into a Spacecraft Active Thermal Control System, AIAA 2013-3419, 43rd International Conference on Environmental Systems, July 2013, https://doi.org/10.2514/6.2013-3419
46. Nabity, J.A., Andersen, E.W., Engel, J.R. and Fisher, J.W. (2010), Low Temperature Ozone Oxidation of Solid Waste Streams, AIAA-6034-2010, 40th International Conference on Environmental Systems, July 2010, https://doi.org/10.2514/6.2010-6034
47. Nabity, J.A., Andersen, E.W., Engel, J.R., Wickham, D.W. and Fisher, J.W. (2009). A Pilot Scale System for Low Temperature Solid Waste Oxidation and Recovery of Water, SAE 2009-01-2365, 39th International Conference on Environmental Systems, July 2009
48. Nabity, J.A., Mason, G.R., Copeland, R.J. and Trevino, L.A. (2008), A Freezable Heat Exchanger for Space Suit Radiator Systems, SAE 2008-01-2111, 38th International Conference on Environmental Systems, July 2008

49. Nabity, J.A., Andersen, E.A., Engel, J.R., Fisher, J.W. and Wickham, D.T. (2008), Development and Design of a Low Temperature Solid Waste Oxidation and Water Recovery System, SAE-2008-01-2052, 38th International Conference on Environmental Systems, July 2008
50. Nabity, J.A., Mason, G.R., Copeland, R.J., Libberton, K.A., Trevino, L.A., Stephan, R.A. and Paul, H.L. (2007), Space Suit Radiator Performance in Lunar and Mars Environments, 37th International Conference on Environmental Systems, SAE Paper # 2007-01-3275, July 2007
51. Nabity, J., Copeland, R., Mason, G., Libberton, K., Paul, H., Trevino, L. and Stephan, R. (2006), Performance Testing of an Advanced Lightweight Freezable Radiator, 36th International Conference on Environmental Systems, SAE Paper # 2006-01-2232, July 2006

Technical Reports & Conference Proceedings (non-Refereed, 88 total)

1. Nabity, J., MarsOasis™ – An Efficient Autonomously Controlled Martian Crop Production System, Final Report UCB, NASA STTR Phase II (Contract # 80NSSC20C0038), May 23, 2023
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Technical Presentations, Seminars & Workshops (non-refereed, 40 total)

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2. Nabity, J.A., Integrating Hands-on Learning Modules into a Course on Life Support Systems, ICES-2023-307, 52nd International Conference on Environmental Systems, July 19, 2023
3. Baranowski, L., Peppel, M., Kissounko, D., Singh, A. and Nabity, J., Low temperature, durable siloxane/epoxy nanocomposite coating for drastic reduction in lunar particulate adhesion, ICES-2023-285, 52nd International Conference on Environmental Systems, July 19, 2023
4. Kaschubek, D.M. and Nabity, J.A., Modeling and Simulation of Component Degradation and Faults in the Carbon Dioxide Removal Assembly, ICES-2022-221, 51st International Conference on Environmental Systems, July 14, 2022
5. Hardy, J.M., Massa, G. and Nabity, J., Targeted Lighting Approaches for Controlled Environment Agriculture in Space Habitats, ICES-2022-6, 51st International Conference on Environmental Systems, July 13, 2022
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7. Nabity, J.A., Keeping People Alive & Healthy in Space, Invited Presentation by The Square Root of STEM for the event To Infinity and Beyond: Implications of Civilian Space Travel, December 14, 2021, Virtual
8. Nabity, J.A., Environmental Control & Life Support System (ECLSS) Design Drivers & Requirements, Invited Lecture for Technical University of Munich Lecture Series, November 2, 2021
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16. Shaffer, B., Eble, J., Escobar, C. and Nabity, J. (2018), Effects of additive manufacturing on capillary-driven fluid flow for provision of water and nutrients to free floating plants, ICES-2018-328, 48th International Conference on Environmental Systems, July 2018, Albuquerque, NM
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21. Nabity, J.A., ASEN 4018: Senior Projects Overview for AY 2015/2016, Faculty Presentation to the AES External Advisory Board (EAB), October 2015
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24. Nabity, J., Spatafore, B., Mason, G., Hecht, J., Klaus, D.M. and. Ewert, M.K., A Self-Regulating Freezable Heat Exchanger for Use in Spacecraft Thermal Control, 43rd International Conference on Environmental Systems, July 2013, Vail, CO
25. Nabity, J., Cook, R., Spatafore, B. and Daily, J., Novel Propellants for Variable Thrust / Isp Colloid Thrusters, 2012 Space Propulsion and Power Contractors Meeting, Contract # FA9550-11-C-0015, September 12, 2012
26. Nabity, J.A., Andersen, E.W., Engel, J.R., Wickham, D.T., and Fisher, J.W., A Pilot Scale System for Low Temperature Solid Waste Oxidation and Recovery of Water, 39th International Conference on Environmental Systems, July 2009, Savannah, GA
27. Nabity, J.A., Mason, G.R., Copeland, R.J. and Trevino, L.A., A Freezable Heat Exchanger for Space Suit Radiator Systems, 38th International Conference on Environmental Systems, July 2008, San Francisco, CA
28. Nabity, J.A., Andersen, E.A., Engel, J.R., Fisher, J.W. and Wickham, D.T., Development and Design of a Low Temperature Solid Waste Oxidation and Water Recovery System, 38th International Conference on Environmental Systems, July 2008, San Francisco, CA
29. Nabity, J.A., Mason, G.R., Copeland, R.J., Libberton, K.A., Trevino, L.A., Stephan, R.A. and Paul, H.L., Space Suit Radiator Performance in Lunar and Mars Environments, 37th International Conference on Environmental Systems, July 2007, Chicago, IL
30. Nabity, J., Copeland, R., Mason, G., Libberton, K., Paul, H., Trevino, L. and Stephan, R., Performance Testing of an Advanced Lightweight Freezable Radiator, the 36th International Conference on Environmental Systems, July 2006, Norfolk, VA

31. Nabity, J., Copeland, R., Mason, G. and Trevino, L., Advanced Lightweight Freeze Tolerant Radiator for the EMU, Habitation 2006 Conference, 5-8 Feb 2006.
32. Nabity, J.A., Mason, G., Engel, J.R., Daily, J.W., Lagumbay, R.S. and Kassoy, D., Studies of MEMS Colloid Thrusters, 44th AIAA Aerospace Sciences Meeting and Exhibit, January 2006, Reno, NV
33. Nabity, J., Rooney, S., Daily, J., Johnson, E. and Hertzberg, J., An Electrostatically Actuated MEMS Fuel Injector to Enhance Low-Pressure Atomization, Paper # AIAA-2006-0804, 44th AIAA Aerospace Sciences Meeting and Exhibit, January 2006, Reno, NV
34. Nabity, J., Copeland, R. and Trevino, L., A Lightweight, Freeze Tolerant Radiator for the EMU, presented at the Advanced EVA Technical Forum, 15-16 Nov 2005.
35. Nabity, J. and Rooney, S., MEMS Technology for Jet Fuel Atomization, Turbine Engine Technology Symposium, August 30-September 2, 2004, Dayton, OH
36. Nabity, J. and Daily, J., A MEMS Fuel Atomizer for Advanced Engines, CANEUS 2004—Conference on Micro-Nano-Technologies, Nov 2004, Monterey, CA
37. Nabity, J., Balducci, G. and Daily, J.W., Electrostatically Actuated Fuel Atomizer Design for the Pulse Detonation Engine, 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, July 2003, Huntsville, AL
38. Nabity, J., Hudson, P. and Loundagin, J., Developmental Testing of the Fasthawk Combustor, 37th AIAA Aerospace and Sciences Meeting, January 11-14, 1999, Reno, NV
39. Nabity, J., Hudson, P. and Moore, J., Low Cost Missile System or Fasthawk Nozzle Development, the 1998 JANNAF Propulsion Meeting, July 15-17, 1998, Cleveland, OH (UNCLASSIFIED)
40. Nabity, J. and Walls, T., Side Dump Solid Fuel Ramjet Combustor Evaluation, AIAA/ASME/SAE/ASEE 24th Joint Propulsion Conference, July 11 13, 1988, Boston, Massachusetts

Research Funding

Cumulative

Tenure Track: **$2,719,686 (PI), $842,978 (Co-I)**
Career: **$11,829,459**

Current Support

1. **PI, NSTGRO21 (for Bharath Tata, PhD student)**, Gas Separations for Lunar ISRU with Supported Ionic Liquid Membranes; 8/16/2021-5/30/24, 9/1/24-11/15/25.
2. **Co-I (CU), NASA Space Technology Research Institute (STRI)**, Habitats Optimized for Missions of Exploration (HOME), 9/1/2019-8/31/26.
3. **PI, 2023-2025 CEAS Graduate Projects I & II: ASEN 5018/6028**, Boeing, 8/15/23-6/30/25
4. **Institutional PI, NASA STTR Phase I**, SOSHA – Sensor Optimization for Space Habitat Awareness, Space Lab Technologies, 8/7/2024-9/6/2025
5. **Institutional PI, NASA SBIR Phase I**, An Efficient Freeze-Tolerant Radiator for Single-Phase Active Thermal Control Systems, Space Lab Technologies, 8/7/2024-2/6/25

Pending Proposals

1. PI, NASA HERO Appendix A, Astronaut Meal Optimization Tool (AMOT), 9/1/2025-8/31/26 – pending
2. PI, NASA HERO Appendix A, Quantifying Human Performance Degradation Due to Space Radiation Exposure, 9/1/2025-8/31/26 – pending

3. Faculty Mentor, TRISH Postdoctoral Fellowship, Quantifying the Effects of Space Radiation Exposure on Human Performance Degradation, 9/1/2025-8/31/27 - pending

Completed External Research Projects (since Aug 2013)

1. **PI, NSTRF19 (for Mitchell Woolever, PhD pre-candidate)**, *In situ* Recovery of Oxygen and High Purity, Single Element Metals from Regolith using Task Specific Ionic Liquid Facilitated Electrochemical Solvent Extraction, 8/16/2019-5/19/24.
2. **Institutional PI, NASA STTR Phase II**, MarsOasis™ – An Efficient Autonomously Controlled Martian Crop Production System, Space Lab Technologies, 12/20/2019-6/19/23.
3. **Institutional PI, NASA SBIR Phase I**, Plant Habitat Ionic Liquid Membrane (PHILM) for CO2 Control, Space Lab Technologies, 7/25/2022-1/25/23.
4. **Institutional PI, NASA SBIR Phase I**, Low Temperature Durable Siloxane/epoxy Nanocomposite Coating for Drastic Reduction in Lunar Particulate Adhesion, TDA Research, Inc., 7/25/2022-1/25/23.
5. **PI, NSTRF18** (**for MaryCarmen Gonzalez-Dorbecker, PhD pre-candidate**), Modeling Human Performance Degradation from Radiation Exposure and Physiological Responses to Spaceflight During Long-Duration Missions, 8/1/2018-12/31/22.
6. **PI, NSTGRO20 (for J. Matthew Hardy, PhD pre-candidate)**, Optimizing plant canopy photon capture efficiency for bioregenerative life support systems, 8/15/2020-6/30/22.
7. **Institutional PI, NASA STTR Phase I**, HEART (Habitat ECLSS Analytics for Resilience Tool) for Real Time Habitability Management, Space Lab Technologies, LLC, 5/15/2021-6/14/22.
8. **Institutional PI, NASA STTR Phase II,** uG-LilyPond - Floating Plant Pond for Microgravity, Space Lab Technologies, LLC, 9/14/2018-9/13/21.
9. **PI, Harris Corporation**, MLI Heat Leak Characterization Testing, 8/1/2017-6/30/21.
10. **PI, NSTRF16 (for Daniel Case, PhD)**; Passive Radiation Shielding: Integrating Multilayer and Multipurpose Materials into Space Habitat Design, 8/1/2016-12/31/20.
11. **Institutional PI, NASA SBIR Phase I**, FRESR: Freezable Radiator for Efficient, Safe, and Robust Single Loop Thermal Control, Space Lab Technologies, 8/19/2019-2/18/20.
12. **PI, NSTRF15 (for Emily Matula, PhD)**, Characterizing Biological Closed-Loop Life Support Systems for Thermal Control and Revitalization of Spacecraft Cabin Environments, 9/1/2015-8/31/19.
13. **Institutional PI, NASA STTR Phase I,** A Supported Liquid Membrane System for Steady State CO2 Control in a Spacecraft Cabin, Reaction Systems LLC, 7/26/2018-8/26/19.
14. **Institutional PI, NASA STTR Phase I,** MarsOasis™ – An Efficient Autonomously Controlled Martian Crop Production System, Space Lab Technologies LLC, 7/26/2018-8/26/19.
15. **Institutional PI, NASA STTR Phase I,** uG-LilyPond - Floating Plant Pond for Microgravity, Space Lab Technologies LLC, 7/1/2017-6/8/18.
16. **PI, NASA eXploration Systems and Habitation (X-Hab) 2018 Academic Innovation Challenge**, A Dehumidification / Rehumidification System Design Study for Integration with Cryo CO2 Removal, 8/1/2017-5/31/18.
17. **PI, NASA eXploration Systems and Habitation (X-Hab) 2017 Academic Innovation Challenge,** Design Study of Regenerable CO2 Removal Beds using Ionic Liquids, 8/1/2016-5/31/17.
18. **Co-I, NextSTEP Technologies for Exploration Partnerships Program** in collaboration with Orbital Sciences Corporation; NASA Broad Agency Announcement NN15ZCQ001K Hab Design Program, PI (David Klaus), Co-Is (James Nabity, James Voss), 9/1/2015-7/31/16.
19. **Institutional Co-I, NASA STTR Phase II,** A Self-Regulating Freezable Heat Exchanger for Spacecraft, TDA Research, Inc., PI (David Klaus), 9/1/2013-7/10/15.
20. **Institutional PI, Army SBIR PhI,** A Non-fouling Greywater Treatment System to Produce Field-potable Water, TDA Research, Inc., 3/10/2020-8/4/14.

TEACHING

Courses Taught

Undergraduate

ASEN 4013 Foundations of Propulsion – *revised* Fall 2017, Fall 2018, AY19/20, Fall 2020, Fall 2022, Fall 2023, Fall 2024 (Instructor)
ASEN 4018/4028 Senior Projects I / II – *revised* AY2015/16, AY16/17 (Course Coordinator)
ASEN 4018/4028 Senior Projects I / II – AY2013/14, AY14/15 (Faculty Advisor)
ASEN 4849 Independent Study – *2 students*
ASEN 4859 Undergraduate Research – *20 students*

Graduate

ASEN 5018/6028 Graduate Projects – LifeLAB section, instructor/customer roles – AY2013/14 - AY2015/16, X-Hab section, instructor – AY2016/17 - AY17/18, Spacecraft MLI section, instructor – AY2017/18, Fall 2018, AY2019/20, AY2020/21, HERD HLS ECLSS section, mentor – AY2021/22, AY2022/23, CERES CO2 removal section, mentor – AY2023/24, instructor – AY2024/25
ASEN 5053 Space Propulsion – *major revision* Spr 2024
ASEN 6116 Spacecraft Life Support Systems – *new course* Spr 2015, Spr 2017, Spr 2019, Spr 2021, Spr 2023
ASEN 5849/6849 Independent Study - *14 students*

See link for FCQ data (*Student Evaluations*): https://fcq.colorado.edu/instr_summary.htm

Thesis Students

PhD Thesis Advisor / Co-advisor – current (7)

1. Christine (Chamberlain) Escobar, Aerospace PhD Candidate (beginning Aug 2015, prelims Sep 2016, comps Nov 2022), *co-advisor with D. Klaus*
   Research Topic: Robust ECLSS Design Methodology for Deep Space Exploration
   Funding: Women Forward in Technology, Startup, Graduate Research Assistantship, AES Graduate Fellowship, self
2. Bharath Tata, Aerospace PhD pre-candidate (beginning Aug 2021, prelims Sep 2022, comps May 2024)
   Research Topic: Gas Separations for Lunar ISRU with Supported Ionic Liquid Membranes
   Funding: NSTGRO21
3. Amrita Singh, Aerospace MS/PhD student (beginning Jun 2022, prelims Sep 2023)
   Research Topic: Evaluating Life Support Technology Performance Degradation from South Pole Lunar Dust Infiltration
   Funding: NSF GRFP, Graduate Research Assistantships, AES Departmental Fellowship
4. Danielle Carroll, Aerospace PhD student (beginning Aug 2022, prelims Sep 2023, comps Apr 2024)
   Research Topic: Optimizing Space Health Technologies to Mitigate Fluid Shifts and Prevent Spacesuit Glove-Associated Injuries for Upcoming Exploration-Class Missions
   Funding: self
5. Benjamin Greaves, Aerospace PhD student (beginning Aug 2023)
   Research Topic: TBD
   Funding: NASA STRI, AES Graduate Fellowship

6. Grace Robertson, Aerospace PhD student (beginning Aug 2024)
   Research Topic: Quantification of Metabolic Outputs of Mature Plants for Hybrid Life Support Systems
   Funding: self
7. Lucia White, Major USSF, Aerospace PhD student (beginning Aug 2024)
   Research Topic: TBD
   Funding: self

PhD Thesis Advisor / Co-advisor – completed (7)

1. Mitchell Woolever, PhD Aerospace, July 2024
   Research Topic: Ionic Liquid Property Prediction via Quantitative Structure Property Relationships with Application to Electrochemical Bosch Carbon Formation Catalyst Renewal
   Funding: NSTRF19, Graduate Research Assistantship, Teaching Assistantship
   Employment: SpaceX
2. Samuel Eshima, PhD Aerospace, Dec 2023
   Research Topic: Sensor Suite Optimization Process for Environmental Control and Life Support Systems that Utilize Machine Learning for Anomaly Detection and Diagnostics
   Funding: NASA STRI
   Employment: Blue Origin
3. Kipp Larson, PhD Aerospace, May 2023
   Research Topic: Space Suit Thermal Control with a Gas-Gap Heat Switch
   Funding: AES Graduate Fellowship
   Employment: Ball Aerospace Corporation
4. Marycarmen Gonzalez-Dorbecker, PhD Aerospace, May 2023
   Research Topic: Modeling Human Performance Degradation from Radiation Exposure and Physiological Responses to Spaceflight During Long Duration Missions
   Funding: NSTRF18, Teaching Assistantship
   Employment: University of Colorado Anschutz
5. Daniel Case, PhD Aerospace, Jul 2021
   Research Topic: Passive Radiation Shielding: Integrating Multilayer and Multipurpose Materials into Space Habitat Design
   Funding: NSTRF16, AES Startup funds, Teaching Assistantship, Dean's Fellowship
   Employment:
6. Emily Matula, PhD, PhD Aerospace, Dec 2019
   Dissertation Title: Characterizing Photobioreactor Technology for Simultaneous Thermal Control and Air Revitalization of Spacecraft and Surface Habitats
   Funding: NSTRF15, Dean's Assistantship, Dean's Fellowship, Brown/Udick/Ricketts Scholarship, UGGS Travel Grant
   Employment: Leidos
7. Sibylle Walter, PhD, PhD Aerospace, Aug 2016, (*co-advisor R. Starkey*)
   Dissertation Title: Optimization of Pressure Probe Placement and Data Analysis of Engine-Inlet Distortion
   Funding: NSTRF, Teaching Assistantship
   Employment: Venus Aerospace

PhD Thesis Committee Member – current (3)

1. Gabriella Schauss, PhD Aerospace (*advisor, A. Anderson*)
   Research Topic: The Development of Analytical and Fabrication Methodologies for Mechanical Counter Pressure to Address Current Challenges of Planetary Exploration Garments
2. Amin Taziny, PhD Aerospace (*advisor, Iain Boyd*)

Research Topic: Multiscale Modeling of Electrospray Ionic Emission

3. Isaac Armstrong, PhD Chemical and Biological Engineering (*advisor, Hendrik Heinz*)
   Research Topic: Virtual Design of Low-Volatility Liquid Solvents for Spacecraft CO2 Separations

PhD Thesis Committee Member –completed (13)

1. Patrick Pischulti, PhD Aerospace, Aug 2024 (*advisor, D. Klaus*)
   Research Topic: Strategies for Enabling Self-Sufficient Anomaly Response in Deep Space Habitats
2. Nicolas Gratius, PhD Civil and Environmental Engineering, Aug 2024 (*advisors, M. Berges and B. Akinci, Carnegie Mellon University*)
   Research Topic: A Modeling Framework to Process Onboard Simulation Queries Enabling Operation Under Uncertainty of Life-Support Systems in Crewed Habitats for Deep-Space Exploration
3. Manoj Settipalli, PhD Aerospace, Aug 2023 (*advisor, S. Neogi*)
   Research Topic: Characterization of Electronic Properties of Silicon and Germanium Based Phonon-Engineered Structures
4. Heather Hava, PhD Aerospace, Dec 2022 (*advisor, N. Correll*)
   Research Topic: Development and Application of a Living Systems Centered Design Framework to Improve Habitability, Diet, Well-Being, Crew Performance and Automation Strategies
5. Daniel Markus Kaschubek, PhD Astronautics, Dec 2021 (*advisor, U. Walter, Technische Universität München*)
   Research Topic: Hybrid Life Support Systems
6. Michael Lotto, PhD Aerospace, Dec 2020 (*advisor, D. Klaus*)
   Research Topic: Assessing the Feasibility of using Co-electrolysis with Task-Specific Ionic Liquids to Produce Methane and Oxygen for Martian In-Situ Resource Utilization
7. Tobias Niederwieser, PhD Aerospace, Dec 2018 (*advisor, D. Klaus*)
   Research Topic: Bioregenerative Air Revitalization in Space Habitats Using Algae Under Variable Pressures and Compositions
8. Jordan Holquist, PhD Aerospace, Dec 2018 (*advisor, D. Klaus*)
   Research Topic: Direct Generation of Oxygen via Electrocatalytic Carbon Dioxide Reduction in an Ionic Liquid
9. Christine Fanchiang, PhD Aerospace, May 2017 (*advisor, D. Klaus*)
   Research Topic: Human - Systems Integration in Complex Aerospace Systems
10. Robert Ocampo, PhD Aerospace, May 2016 (*advisor, D. Klaus*)
    Research Topic: Defining, Characterizing, and Establishing "Safe Enough" Risk Thresholds for Human Space Flight
11. Christopher Massina, PhD Aerospace, May 2016 (*advisor, D. Klaus*)
    Research Topic: Characterization of Dynamic Thermal Control Schemes and Heat Transfer Pathways for Incorporating Variable Emissivity Electrochromic Materials into a Space Suit
12. Jonathan Metts, PhD Aerospace, Dec 2010 (*advisor, D. Klaus*)
    Research Topic: Assessing Feasibility of Electrochromic Space Suit Radiators for Reducing Extravehicular Activity Water Consumption
13. Bret Van Poppel, PhD Mechanical, May 2010 (*advisor, J. Daily*)
    Research Topic: Numerical Methods for Simulating Multiphase Electrohydrodynamic Flows with Application to Liquid Fuel Injection

MS Thesis Advisor – current (1)

1. **Supervisor** for Jonas Holl, Aerospace MS, University of Stuttgart (*Advisor, C. Mayer*)
   MS Thesis Title: Initial Assessment of Machine Learning Methods for Life Support System Control

MS Thesis Advisor – completed (3)

1. **Supervisor** for Felix Nitschke, Aerospace MS, Technische Universität München, Dec 2022 (*Advisor, L. Grill*)
   MS Thesis Title: Supported Ionic Liquid Membrane CO2-Control System for a Space Habitat Atmosphere
2. Jack Maydan, Aerospace MS, May 2020
   MS Thesis Title: System Architecture Analysis for the Use of Combined Cycle Nuclear Thermal Rockets in Manned Mars Exploration
3. **Supervisor** for Jose Maria Mabres Anter, Visiting Scholar, Polytechnic University of Catatonia, Jul 2018
   MS Thesis Title: Computational Modeling and Experimental Study of a Water-Based Freezable Heat Exchanger for Use in Human Spacecraft Thermal Control

MS Thesis Committee – completed (5)

1. Peter Brehm, Aerospace MS, Aug 2022 (*Advisor, A. Anderson*)
   MS Thesis Title: Model of Woven Textile Electrode Designed for Long Term Capture of Electrocardiograph
2. Kyle Marquis, Aerospace MS, Aug 2021 (*Advisor, F. Jimenez*)
   MS Thesis Title: A Novel Deployable Radiator Architecture for High-Power Spacecraft Missions by Connecting Tapered and Layered Panels with Thin Kinked Tubes
3. Tobias Niederweiser, Aerospace MS, May 2015, (*Advisor, D. Klaus*)
   MS Thesis Title: Evaluation of a Flow-Through Test Bed for Algal Atmosphere Revitalization in Spaceflight Applications
4. Joshua Hecht, Aerospace MS, Dec 2012, (*Advisor, D. Klaus*)
   MS Thesis Title: First Order Feasibility Evaluation of a Water-based Freezable Heat Exchanger for use in Human Spacecraft Thermal Control
5. Bradley Spatafore, Mechanical MS, May 2009 (*Advisor, J. Daily*)
   MS Thesis Title: Operational Modeling of an Electrostatic Micro-atomizer

Student Design Competition Teams Advised

1. NASA L'SPACE Program, NASA Proposal Writing and Evaluation Experience Academy (NPWEE), Microfluidic Irrigation System, A. Klein et al., 2024
2. NASA 2024 HuLC Competition, Lunar Surface Assessment Tool (LSAT): A Simulation of Lunar Dust Dynamics for Risk Analysis, Amrita Singh and Gabriella Schauss, 2024
3. NASA STEM Gateway 2024 Undergraduate Student Launch Initiative, CU in Space, Leya Shaw et al., AY2023/24
4. WSGC First Nations Launch High-powered Rocket Competition, CU Rocket Buffaloes, Bruno Armas, Aaron Ashley, Joel Funtanilla, Alyvia Hildebrand, Mason Moran, AY2017/18

Misc. Graduate Research Supervised

1. Noah McCreight, MS student, *Evaluation of a Space Suit Automatic Pressure Regulator in a Thermal Vacuum Chamber*, Engineering Excellence Fund (EEF) Minor, March 2016
2. Jonathan Anthony, MS student, *Design and Performance Evaluation of an Electrodynamic Dust Shield System*, EEF Minor, March 2015
3. LifeLAB Graduate Project team, *Atmospheric Test Rig Upgrade*, EEF Major, Spring 2014
4. LifeLAB Graduate Project team, *Atmospheric Rig Data Acquisition System*, EEF Minor, March 2014

Undergraduate Research Supervised

DLA - Discovery Learning Apprenticeship
SPUR - Summer Program for Undergraduate Research
UROP - Undergraduate Research Opportunity Program

1. M. Lucas Chernoff, Gas Separations with Ionic Liquid Membranes for Space Applications, **SPUR**, 5/28/2024-8/2/2024
2. Trayana Athannassova, *Human Landing System Atmosphere Modeling and Simulation*, **DLA** 8/22/2022-5/15/2023
3. Victoria Hurd, *Environmental Control and Life Support System Diagnostics and Prognostics*, **DLA** 8/23/2021-5/17/2022
4. Madisen Purifoy-frie, *Habitats Optimized for Missions of Exploration*, **DLA** 8/24/2020-5/10/2021
5. Charles MacCraiger, *uG-LilyPond - Floating Plant Pond for Microgravity*, **SPUR** 6/3/2019-8/9/2019
6. Jacob Killelea, *Space Habitat CO2 Sequestration*, **DLA** 8/26/18-12/21/2018
7. Eric Bergman, *Space Habitat Thermal Control System Test Facility - TVAC Cooling Shroud*, **DLA** 8/28/2017-5/4/2018
8. Ryan Wall, *Closed-Loop Algal Oxygen Production for Life Support Systems*, **UROP** 2016 summer grant
9. Alexander Potter, Smith Johnston, Daniel Flora, *STATIS: Systematic Test Apparatus for Thermal Infrared Sensors – Sensor Selection*, **UROP** 2014 AY Team grant

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SERVICE

National / Professional

International Conference on Environmental Systems (ICES)

Steering Committee Member, Jul 2022 – date
AIAA LS&S Technical Program Chair, ICES Sessions 500-513, Jul 2022 - date
Session Co-chair, ICES501 Life Support Systems Engineering and Analysis, Jan 2021 – date

American Institute of Aeronautics and Astronautics (AIAA)

Executive Lead, Life Sciences and Systems Technical Committee, May 2022 – Apr 2024
ASCEND Conference Topic Administrator, Feb 2020 – Dec 2021
Chair, Life Sciences and Systems Technical Committee, May 2019 – Apr 2022
Vice-chair, Life Sciences and Systems Technical Committee, May 2018 – May 2019
Secretary, Life Sciences and Systems Technical Committee, May 2017 – May 2018
Member, Life Sciences and Systems Technical Committee, Feb 2016 - date
Associate Fellow, Class of 2016
Senior Member, 2008-2016
Session Chair, 2006, Hydrogen Peroxide
Member, continuous since 1998

Frontiers in Space Technologies
Review Editor, the Editorial Board of Space Exploration, Dec 2020 - date

Advisory Group for Aerospace Research and Development (AGARD)

Working Group 22 Member, 1989-1994. Experimental and Analytical Methods for the Determination of Connected-Pipe Ramjet and Ducted Rocket Internal Performance, AGARD-AR-323, July 1994

Boulder Campus

Faculty-Student Mentor Program, Fall 2014

College

Engineering Gold Shirt Program, 2014-2015

Department

Advisor, CU in Space, 2024-date
Advisor, Sounding Rocket Laboratory (previously known as Colorado Boulder Rocketry Association (COBRA)), 2016-date
Advisor, NASA Undergraduate Space Launch Initiative, CU in Space, 2023-2024
AES Executive Committee, 2020-date
AES Undergraduate Committee, 2015-2017, 2018-2022
AES Bioastronautics Focus Area Lead, 2014-2016, 2022-date
AES Graduate Committee, 2013-2016, 2022-date
AES Faculty Search Committee, 2014-2015, 2022-2023
Advisor, WSGC First Nations Launch High-powered Rocket Competition, CU Rocket Buffaloes, 2017-2018
AES Facilities and Computing Committee, 2014

Reviewer (ad hoc)

Manuscripts

AIAA Lecture Series
Acta Astronautica
Advances in Space Research
Cryogenics
Energies
Entropy
Frontiers
International Conference on Environmental Systems
Journal of Geophysical Research - Earth Surface
Journal of Propulsion and Power
Journal of Public Health and Disease Preventive
Journal of Residuals Science & Technology
Journal of Spacecraft and Rockets
Journal of Space Safety Engineering
Journal of Thermophysics and Heat Transfer
Surveys in Geophysics

MISCELLANEOUS

Laboratory On-Boarding Training (CU EH&S), 9/25/2024
Conducting an Inclusive Faculty Search (CU), 9/19/2024
Respirator Protection Training (CU EH&S), renewed 7/30/2024
Hazardous Waste Management (CU EH&S), renewed 4/18/2024
CU: Information Security Awareness, 12/18/2023
Gift Fund Management Training, 3/12/2021
Collaborative Institutional Training Initiative (CITI) Program courses, Human Research, Biomedical Research Investigators and Key Personnel, Part 2 - Refresher Course, 1/5/2023; Social Behavioral Research Investigators and Key Personnel, Part 2 – Refresher Course, 1/6/2023
The National Institutes of Health (NIH) Office of Extramural Research training course "Protecting Human Research Participants," 6/18/2015
Biosafety Training (CU EH&S), renewed 2014
Firing Officer, Skilled Certification (NAWCWD), 1985-1999
Engineer Intern (EIT), State Board of Registration for Professional Engineers of Nebraska, 1983