Curriculum Vitae: James A. Nabity

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Dr. James A. Nabity is an Associate Professor in the Smead Aerospace Engineering Sciences department with research focus in the field of *Bioastronautics – the study and support of life in space*. Prior to joining CU in 2013, I was a Principal Engineer for TDA Research and before that an engineer at the Naval Air Warfare Center (NAWC) advancing the development of propulsion systems, burners and combustors, and environmental control and life support (ECLS) technologies for spacecraft and submarines. My current research builds upon that past work to advance robust space habitats and ECLS systems for human spaceflight. Specifically, I develop ionic liquid membranes for atmosphere revitalization and CO_2 capture, use ionic liquid solvents to extract minerals and oxygen from regolith, explore the effects of space radiation on habitat layout and crew performance, develop bioregenerative systems, and investigate heat transport and fluid flow in microgravity. I teach a graduate course on Spacecraft Life Support Systems, teach the undergraduate Foundations of Propulsion course, and advise student project teams. I am a NAWC Technical Fellow (1996) for contributions to combustion, an AIAA Associate Fellow (2016) and current Chair of the AIAA Life Sciences and Systems Technical Committee.

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

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

Environmental Control & Life Support (ECLS)

- Gravity-dependent effects on physical, chemical and biological processes for environmental control and life support
- Analytical modeling and numerical simulation methods
- ECLSS design for robotic maintenance and repair
- Freezable heat exchangers, thermal capacitors and radiators
- Regenerative recovery and reuse of in-space resources
- Biological closed-loop life support systems
- Waste remediation

Space Habitats

- Integration and automation of ECLSS into space habitats
- Habitat design to provide radiation shielding
- Crew performance

In situ Resource Utilization (ISRU)

- Solvated extraction of minerals and oxygen from regolith

Publications (student co-authors underlined)

Journal Articles (refereed, 24 total in print)

i. Matula, E.E., Nabity, J.A. and McKnight, D.M. (20XX), Supporting simultaneous air revitalization and thermal control in a crewed habitat with temperate *Chlorella vulgaris* and eurythermic Antarctic Chlorophyta, *Frontiers* [accepted]

ii. Wheeler, T., Bolin, R., Tata, B. and Nabity, J.A. (20XX), Extendable Origami Multilayer Insulation Thermal Characterization, *Journal of Spacecraft and Rockets,* [Working Title – In Prep]

iii. Case, D.E., Singleterry, R.C. and Nabity, J.A. (20XX), A Systems Engineering Overview of Space Radiation Protection: Enabling Human Spaceflight Beyond Low Earth Orbit, *Acta Astronautica,* [Working Title – In Prep]

iv. Case, D.E., Singleterry, R.C. and Nabity, J.A. (20XX), Layered Systems of Aluminum and Polyethylene as Space Radiation Protection for Human Spaceflight, *Acta Astronautica,* [Working Title – In Prep]

1. 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, pp. 406-415. https://doi.org/10.1016/j.actaastro.2021.07.003.
2. 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), pp. 1149-1156. https://doi.org/10.2514/1.A34883
3. 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

4. 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
5. 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
6. 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
7. 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
8. 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
9. 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
10. 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
11. 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
12. 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
13. 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
14. 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
15. 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
16. 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
17. 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
18. 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
19. 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

20. 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
21. 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
22. 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
23. 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
24. 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, 33 total)

1. Dorbecker, MC and Nabity, James A., Modeling Crew Performance Degradation Due to Radiation Exposure in Space, ICES 2021-237, 50th International Conference on Environmental Systems, July 2021
2. Nabity, James A., Tata, Bharath, Armstrong, Isaac and Escobar, Christine M., Supported Ionic Liquid Membrane for Selective CO_2 Capture, ICES-2021-117, 50th International Conference on Environmental Systems, July 2021
3. Nabity, James A., Aaron, Robert F., III and Wickham, David T., Integrated System Modelling for Spacecraft Atmospheric Revitalization Using a Supported Ionic Liquid Membrane, ICES-2021-262, 50th International Conference on Environmental Systems, July 2021
4. 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.

5. 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
6. 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
7. 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
8. 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
9. 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
10. 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
11. 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
12. 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
13. 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
14. 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
15. 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
16. 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
17. 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
18. 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
19. Larson, Kipp and Nabity, James (2017), Space Suit Thermal Control Using Thermoelectric Devices, ICES-2017-185, 47th International Conference on Environmental Systems, July 2017
20. 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

21. 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
22. 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
23. 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
24. 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
25. 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
26. 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
27. 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
28. 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
29. 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
30. 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
31. 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
32. 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
33. 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, 77 total)

1. Eshima, Samuel P., Nabity, James A. and Moroshima, Reiji (2020), Analysis of Fault Propagation of Environmental Control and Life Support System for Self-Awareness, AIAA-2020-4012, ASCEND 2020, https://doi.org/10.2514/6.2020-4012

2. Eshima, Samuel P. and Nabity, James A. (2020), Design of Sensory Information Network for Environmental Control and Life Support System Self-Awareness, IAC-20.A1.7.10, 71st International Astronautical Congress (IAC) – The CyberSpace Edition, 12-14 October 2020, https://dl.iafastro.directory/event/IAC-2020/paper/57597/
3. Knoerr, S., Power, G. and Nabity, J., *FRESR: Freezable Radiator for Efficient, Safe, and Robust Single Loop Thermal Control*, Final Report UCB, NASA SBIR Phase I (Contract # 80NSSC19C0588), Feb 16, 2020
4. Nabity, J., McCarty, J. and Aaron, R., *A Supported Liquid Membrane System for Steady State CO2 Control in a Spacecraft Cabin*, Final Report UCB, NASA STTR Phase I (Contract # 80NSSC18P2139), Aug 26, 2019
5. Nabity, J. and Woolever, M., *MarsOasis™ – An Efficient Autonomously Controlled Martian Crop Production System*, Final Report UCB, NASA STTR Phase I (Contract # 80NSSC18P2142), Aug 26, 2019
6. Nabity, J. (2018), *uG-LilyPond - Floating Plant Pond for Microgravity*, Final Report UCB-OCG6441B, NASA STTR Phase I (Contract # NNX17CK14P), June 5, 2018
7. Matula, E., Monje, O. and Nabity, J. (2016), Influence of Transient Heat Transfer on Metabolic Functions of Biological Systems used for Environmental Control and Life Support Systems of Long Duration Spaceflight, AIAA 2016-5463, AIAA SPACE 2016, SPACE Conferences and Exposition, Long Beach, CA, September 2016, https://doi.org/10.2514/6.2016-5463
8. Walter, S.F., Nabity, J. and Starkey, R.P. (2016), Optimized Probe Placement to Determine Inlet Flow Distortion, AIAA-2016-4606, 52nd AIAA/SAE/ASEE Joint Propulsion Conference, Salt Lake City, UT, July 2016, https://doi.org/10.2514/6.2016-4606
9. Nabity, James and David Klaus, *CU Environmental Control and Life Support System (ECLSS) Design Recommendations*, Final Report, NexSTEP Initial Cislunar Habitat (ICH) Conceptual Design and Analysis, June 30, 2016
10. Nabity, J. and Klaus, D. (2015), TDA Research *Self Regulating Freezable Heat Exchanger (SRFHX), University of Colorado Boulder – Final Report*, NASA STTR Phase II (Contract # NNX13CJ46C), August 25, 2015
11. Nabity, J. (2014), *A Non-fouling Greywater Treatment System to Produce Field-potable Water*, Final Report UCB-1551560, U.S. Army Contract # W9132T-14-C-0009, Aug 4, 2014
12. Nabity, J.A., Spatafore, B., Pinchak, M., Castle, N. and Gutmark, E. (2013), *Wall-Mounted Thermally Stable Catalysts For Augmentor Flame Stabilization*, Annual Report TDA-1096-A-2013, Contract FA8650-08-C-2851, June 2013
13. Nabity, J.A., Cook, R., Spatafore, B. and Daily, J.W. (2013), *Novel Propellants for Variable Thrust/Isp Colloid Thrusters*, STTR Phase II AFOSR Final Report TDA-1450-F, Contract # FA9550-11-C-0015, February 2013
14. Nabity, J.A., Alford, J.M. and Harrigan, M. (2012), *Energetic Nanoparticles for High Impulse Reduced Smoke Propellants*, SBIR Phase I Final Report TDA-1634-F, Contract # FA8651-12-M-0058, September 2012
15. Nabity, J.A. and Andersen, E. (2012), *Control of Solid Waste Using Low Temperature Oxidation: Onsite Setup, Operation and Training*, Final Report, Contract # NNA12AB15P, July 2012
16. Nabity, J.A., Spatafore, B., Jenson, R., Daily, J.W., Van Poppel, B., Desjardins, O., O'Loughlin, C. and Hertzberg, J. (2012), *A MEMS Pulsed Injection Electrostatic Atomizer for Small Engines*, STTR Phase II Technical Final Report TDA-1266-F, Contract # W911NF-09-C-0157, Mar 2012
17. Nabity, J.A., Wickham, D.T., Engel, J.R., Windecker, B.A., Yu, J., Wang, H. and Shimizu, T. (2011), *Additives to Improve Methane Combustion*, SBIR Phase II Final Report TDA-1748-F, Contract # FA8650-06-C-2673, February 2011
18. Czajkowski, M., Desjardins, O., Spatafore, B. and Nabity, J.A. (2011), Experimental and Numerical Investigation of Air-Blast n-Dodecane Injection, AIAA-2011-787, 49th AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition, January 2011, Orlando, FL, https://doi.org/10.2514/6.2011-787

19. Nabity, J.A., Spatafore, B., Desjardins, O., Czajkowski, M., Hertzberg, J. and Daily, J. (2011), *The Direct Numerical / Large Eddy Simulation of Fuel Sprays into Combustors and Augmentors*, SBIR Phase I Final Report TDA-1399-F, Contract # N68335-10-C-0263, February 2011
20. Nabity, J.A., Jenson, R., Engel, J.R., Windecker, B. and Yu, J. (2011), *Wall-Mounted Thermally Stable Catalysts For Augmentor Flame Stabilization*, SBIR Phase II Final Report TDA-1096-F, Contract # FA8650-08-C-2851, February 2011
21. Wright, J.D., Nabity, J.A., Engel, J.R., Spatafore, B., Windecker, B., Jenson, R. and Wickham, A. (2010), *Design and Analysis of Emergency Oxygen Generators*, Royal Navy MET/20032, April 2010
22. Spatafore, B., Van Poppel, B., Daily, J. and Nabity, J. (2010), Fully-coupled Multiphysics Model to Simulate an Electrostatic Micropump, AIAA 2010-213, 48th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition, January 2010, Orlando, FL, https://doi.org/10.2514/6.2010-213
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27. Van Poppel, B.P., Spatafore, B.M., Daily, J.W. and Nabity, J.A. (2009), Simulation of an Electrostatically Driven MEMS Fuel Pump, AIAA 2009-445, 47th AIAA Aerospace Sciences Meeting including The New Horizons Forum and Aerospace Exposition, January 2009, Orlando, FL, https://doi.org/10.2514/6.2009-445
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36. Nabity, J.A., Rooney, S. and Srinivas, G. (2005), *Novel Membranes for Artificial Gills*, SBIR Phase II Final Report, Contract # DAAH01-00-C-R103, October 2005
37. Daily, J.W. and Nabity, J.A. (2005), Electrostatic Modeling of Colloid Droplet Motion, Paper # AIAA-2005-4390, 41st AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, July 2005, Tucson, AZ, https://doi.org/10.2514/6.2005-4390
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40. Krishnan, G., Daily, J.W. and Nabity, J.A. (2004), Simulation of an Electrostatically Driven Microinjector Pump, Paper # AIAA 2004-0305, 42nd AIAA Aerospace Sciences Meeting and Exhibit, Jan 2004, Reno, NV, https://doi.org/10.2514/6.2004-305
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50. Bossi, B. and Nabity, J. (1994), Single Side-Dump Ramjet Combustor Analysis (U), 31st JANNAF Combustion Subcommittee Meeting, Lockheed Missiles & Space Company, Sunnyvale, CA. CPIA Publication 620, Vol. IV, Oct 1994. (CONFIDENTIAL)
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53. Nabity, J., Frankenberger, C., Bossi, B., Carreno, D. and Loundagin, J. (1993), Requirements for Future Airbreathing Propulsion Systems and Components, 30th JANNAF Combustion Subcommittee Meeting, Naval Postgraduate School, Monterey, CA. CPIA Publication 606, Vol. V, Nov 1993. (CONFIDENTIAL)
54. Nabity, J. and Carreno, Jr., D. (1993), Assessment of Airbreathing Propulsion Performance for the AMRAAM Phase 3 Preplanned Product Improvement Technology Assessment Team (TAT) (U), NAWCWPNS CL Memorandum C2776/041, Propulsion Systems Division, Ordnance Department, Nov 1993. (CONFIDENTIAL)
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56. Nabity, J.A., Wilson, K.J., Schadow, K.C., and Gutmark, E. (1992), Mixing Enhancement in Particle-Laden Flows (U), 29th JANNAF Combustion Subcommittee Meeting, Hampton, VA. CPIA Publication 593, Vol. V, Oct 1992. (CONFIDENTIAL)
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58. Nabity, J. (1992), Stable High Performance Ramjet Combustion, 17th TTCP meeting, Australia, April 1992. (UNCLASSIFIED)
59. Nabity, J. and Burdette, W. (1992), Low-Cost Metallized SFRJ Fuels, 17th TTCP meeting, Australia, April 1992. (UNCLASSIFIED)
60. Nabity, J., Amarel, J., Barney, E., Burdette, G.W. and Lasell, R. (1992), Combustor Evaluation of a Gelled Fuel Loaded with Boron Carbide (U), 1992 JANNAF Propulsion Meeting, Indianapolis, IN, Feb 1992. (CONFIDENTIAL)
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62. Nabity, J., Lee, T.-H., Natan, B. and Netzer, D. (1990), Combustion Behavior of Boron Carbide Fuel in Solid Fuel Ramjets," 27th JANNAF Combustion Meeting, Cheyenne, Nov. 4-5, 1990, CPIA Pub. 557, Vol. II, pp. 371-390. (UNCLASSIFIED)
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65. Nabity, J., Loundagin, J., Ayler, S., Chun, P. and Matson, J. (1990), JP-10 Autoignition in a Blocked Duct, Naval Weapons Center, China Lake, CA, June, 1990
66. Nabity, J., Ayler, S., Matson, J., Loundagin, J. and Chun, P. (1989), Optimized Fuel Injection for Liquid Fuel Ramjets at High Altitude (U), 1989 JANNAF Propulsion Meeting, Cleveland, Ohio, May 1989. (CONFIDENTIAL)
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68. Chun, P.A., Loundagin, J.A., Nabity, J.A. and Ayler, S.E. (1988), Recent Developments in Ramjet Pressure Oscillation Technology, AGARD, Oct. 6 7, 1988, Bath, United Kingdom
69. Nabity, J. and Walls, T. (1988), Side Dump Solid Fuel Ramjet Combustor Evaluation, AIAA 88 3072, 24th Joint Propulsion Conference, https://doi.org/10.2514/6.1988-3072

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71. Walls, T. and Nabity, J. (1987), Experimental Investigation of the Side Dump Solid Fuel Ramjet Combustor (U), 1987 JANNAF Propulsion Meeting, December 1987, San Diego, CA. (CONFIDENTIAL)
72. Nabity, J. and Loundagin, J. (1987), Implementation of a Semi Infinite, Nonresonant Tube Probe for High Frequency Measurement, NWC TM 6126, China Lake, CA, November 1987
73. Nabity, J.A. (1986), Combustor Modeling of a Solid Fuel Ramjet Engine, 23rd JANNAF Combustion Subcommittee Meeting, October 1986, Langley, VA. (UNCLASSIFIED)
74. Chun, P.A., Loundagin, J.A., Ayler, S.E. and Nabity, J.A. (1986), Experimental Techniques used to Analyze Combustion Stability of a Full Scale Liquid Fuel Ramjet Combustor, 23rd JANNAF Combustion Subcommittee Meeting, October 1986, Langley, VA. (UNCLASSIFIED)
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76. Schadow, K.C., Crump, J.E., Mahan, V.A., Nabity, J.A., and Wilson, K.J. (1985), Large-Scale Coherent Structures as Drivers of Ramjet Combustion Instabilities, Proceedings of the 1985 JANNAF Propulsion Meeting, CPIA Publication No. 425. (UNCLASSIFIED)
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Technical Presentations, Seminars & Workshops (non-refereed, 31 total)

1. Nabity, J.A., Tata, B., Armstrong, I. and Escobar, C.M., Supported Ionic Liquid Membrane for Selective CO2 Capture, ICES-2021-117, 50th International Conference on Environmental Systems, July 2021, Virtual
2. Nabity, J.A., Aaron, R.F., III and Wickham, D.T., Integrated System Modelling for Spacecraft Atmospheric Revitalization Using a Supported Ionic Liquid Membrane, ICES-2021-262, 50th International Conference on Environmental Systems, July 2021, Virtual
3. Eshima, S.P. and Nabity, J.A., Analysis of Fault Propagation of Environmental Control and Life Support System for Self-Awareness, AIAA-2020-4012, ASCEND 2020, 16 November 2020.
4. Eshima, S.P. and Nabity, J.A., Design of Sensory Information Network for Environmental Control and Life Support System Self-Awareness, IAC-20.A1.7.10, 71st International Astronautical Congress (IAC) – The CyberSpace Edition, 12 October 2020.
5. Nabity, J., Woolever, M. and Christine Escobar, In-situ CO2 utilization with a supported ionic liquid membrane, ATS-2019 AIAA Rocky Mountain Section Annual Technical Symposium, November 19th, 2019
6. Clark, T.K., Anderson, A.P., Nabity, J.A., Braun, R., Banerjee, N.T., Eshima, S.P., Kintz, J.R., Rollock, A.E., Zaccarine, S., Pischulti, P.K., and Klaus, D.M. (2019, November 19) Smart Technology Infusion for Deep Space Exploration Habitats (conference presentation) 8th AIAA-RM Annual Technical Symposium, Boulder, CO.
7. 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
8. Nabity, J.A., Holquist, J.B. and Klaus, D.M., Freezable Single-loop Thermal Control Architecture Assessment and Potential Key Enabling Technologies, ICES-2017-243, 47th International Conference on Environmental Systems, July 2017, Charleston, SC

9. Nabity, J.A., A Summary of Bioastronautics Research Activities at CU Boulder, NASA Johnson Space Center, Houston, TX, June 24th, 2016
10. Nabity, J.A., Senior Projects: A Capstone Experience to Prepare Students for the Work Force, Panel Member at the 12th Annual Colorado Space Business Roundup (CSBR), December 2015
11. Nabity, J.A., Earth-to-Mars: An Opportunity for Interdisciplinary Teaming, Graduate STEMinar, October 2015
12. Nabity, J.A., ASEN 4018: Senior Projects Overview for AY 2015/2016, Faculty Presentation to the AES External Advisory Board (EAB), October 2015
13. Nabity, J.A., Holquist, J.B., Milanese, M.J. and Klaus, D.M., Characterizing the Effect of Gravity on a Freezable Water Heat Exchanger with Respect to Flow Orientation, 45th International Conference on Environmental Systems, July 2015, Bellevue, WA
14. Nabity, J.A., Faculty Research Presentation to the External Advisory Board, Environmental Control & Life Support Systems (ECLSS): Research Enabling Human Spaceflight Beyond Earth (2014), October 2014, Boulder, CO
15. 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
16. 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
17. 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
18. 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
19. 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
20. 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
21. 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
22. Nabity, J., Copeland, R., Mason, G. and Trevino, L., Advanced Lightweight Freeze Tolerant Radiator for the EMU, Habitation 2006 Conference, 5-8 Feb 2006.
23. 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
24. 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
25. 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.
26. Nabity, J. and Rooney, S., MEMS Technology for Jet Fuel Atomization, Turbine Engine Technology Symposium, August 30-September 2, 2004, Dayton, OH
27. Nabity, J. and Daily, J., A MEMS Fuel Atomizer for Advanced Engines, CANEUS 2004—Conference on Micro-Nano-Technologies, Nov 2004, Monterey, CA

28. 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
29. 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
30. 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)
31. 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: **$2,118,850 (PI), $965,157 (Co-I)**
Career: **$11,249,726**

Current Support

1. **PI, NSTGRO** (for Bharath Tata, PhD student), Gas Separations for Lunar ISRU with Supported Ionic Liquid Membranes; 8/16/21-8/15/25
2. **PI, NASA STTR Phase I**, HEART (Habitat ECLSS Analytics for Resilience Tool) for Real Time Habitability Management, Space Lab Technologies, LLC, 5/15/21-6/14/22
3. **PI, NSTGRO20 (for J. Matthew Hardy, PhD student)**, Optimizing plant canopy photon capture efficiency for bioregenerative life support systems, 8/15/20-8/14/24
4. **PI, NASA STTR Phase II**, MarsOasis™ – An Efficient Autonomously Controlled Martian Crop Production System, Space Lab Technologies, 12/20/19-6/19/22.
5. **Co-I (CU), NASA Space Technology Research Institute (STRI)**, Habitats Optimized for Missions of Exploration (HOME), 9/1/19-8/31/24.
6. **PI, NASA STTR Phase II,** uG-LilyPond - Floating Plant Pond for Microgravit**y**, Space Lab Technologies, LLC, 9/14/18-9/13/21.
7. **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, 8/16/19-8/15/23.
8. **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, 8/1/18-7/31/22.

Pending Proposals

1. **PI, NASA Early Stage Innovations**, Radiant - A Carbon Fiber Space Radiator for Nuclear Powered Spacecraft, 1/15/2022-1/14/2025 - pending

Completed External Research Projects (since Aug 2013)

1. **PI, Harris Corporation**, MLI Heat Leak Characterization Testing, 8/1/17-6/30/21.
2. **PI, NSTRF16 (for Daniel Case, PhD)**; Passive Radiation Shielding: Integrating Multilayer and Multipurpose Materials into Space Habitat Design, 8/1/16-12/31/20.
3. **PI, NASA SBIR Phase I**, FRESR: Freezable Radiator for Efficient, Safe, and Robust Single Loop Thermal Control, Space Lab Technologies, 8/19/19-2/18/20.

4. **PI, NSTRF15 (for Emily Matula, PhD)**, Characterizing Biological Closed-Loop Life Support Systems for Thermal Control and Revitalization of Spacecraft Cabin Environments, 9/1/15-8/31/19.
5. **PI, NASA STTR Phase I,** A Supported Liquid Membrane System for Steady State CO2 Control in a Spacecraft Cabin, Reaction Systems LLC, 7/26/18-8/26/19.
6. **PI, NASA STTR Phase I,** MarsOasis™ – An Efficient Autonomously Controlled Martian Crop Production System, Space Lab Technologies LLC, 7/26/18-8/26/19.
7. **PI, NASA STTR Phase I,** uG-LilyPond - Floating Plant Pond for Microgravit**y**, Space Lab Technologies LLC, 7/1/17-6/8/18.
8. **PI, NASA eXploration Systems and Habitation (X-Hab) 2018 Academic Innovation Challenge**, A Dehumidification / Rehumidification System Design Study for Integration with Cryo CO2 Removal, 8/1/17-5/31/18.
9. **PI, NASA eXploration Systems and Habitation (X-Hab) 2017 Academic Innovation Challenge,** Design Study of Regenerable CO2 Removal Beds using Ionic Liquids, 8/1/16-5/31/17.
10. **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), 9/1/15-7/31/16.
11. **Co-I, NASA STTR Phase II,** A Self-Regulating Freezable Heat Exchanger for Spacecraft, TDA Research, Inc., PI (David Klaus), 9/1/13-7/10/15.
12. **PI, Army SBIR PhI,** A Non-fouling Greywater Treatment System to Produce Field-potable Water, TDA Research, Inc., 3/10/20-8/4/14.

TEACHING

Courses Taught

Undergraduate

ASEN 4013 Foundations of Propulsion – *revised* Fall 2017, Fall 2018, AY19/20, Fall 2020 (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 – *1 student*

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
ASEN 6116 Spacecraft Life Support Systems – *new course* AY2015, AY17, AY19
ASEN 5849/6849 Independent Study - *12 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 pre-candidate (beginning Aug 2015, prelims Sept 2016)
   Research Topic: Robust Design of a Duckweed Growth Chamber for Bioregenerative Life Support
   Funding: TRISH/BRASH1801 grant, Women Forward in Technology, Startup, Graduate Research Assistantship, AES Graduate Fellowship
2. Kipp Larson, Aerospace PhD pre-candidate (beginning Aug 2015, prelims Sep 2016, comps Jul 2020)

Research Topic: Feasibility for Spacesuit Thermoelectric Generators to Produce Electricity from Astronaut Metabolic Heat during EVA
Funding: AES Graduate Fellowship, tuition and fees reimbursed by Ball Aerospace Corporation

3. Marycarmen Gonzalez-Dorbecker, Aerospace PhD pre-candidate (beginning Aug 2018, prelims Sept 2018)
Research Topic: Modeling Human Performance Degradation from Radiation Exposure and Physiological Responses to Spaceflight During Long Duration Missions
Funding: NSTRF18, Teaching Assistantship,
4. Mitchell Woolever, Aerospace PhD student (beginning Aug 2018, prelims Sept 2018)
Research Topic: *In situ* Recovery of High Purity Single Element Metals and Oxygen from Regolith using Task Specific Ionic Liquid Facilitated Electrochemical Solvent Extraction
Funding: NSTRF19, Graduate Research Assistantships, Teaching Assistantship
5. Samuel Eshima, Aerospace PhD student (beginning Aug 2019, prelims Sept 2019)
Research Topic: Feasibility for self-aware Environmental Control and Life Support Systems
Funding: NASA STRI, Graduate Research Assistantship
6. J. Matthew Hardy, Aerospace PhD student (beginning Aug 2020)
Research Topic: Optimizing plant canopy photon capture efficiency for bioregenerative life support systems
Funding: NSTGRO20
7. Bharath Tata, Aerospace MS/PhD student (beginning Aug 2021)
Research Topic: Gas Separations for Lunar ISRU with Supported Ionic Liquid Membranes
Funding: NSTGRO21

PhD Thesis Advisor / Co-advisor – completed (3)

1. Daniel Case, Aerospace Engineering Sciences, 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
2. Emily Matula, PhD, Aerospace Engineering Sciences, 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
3. Sibylle Walter, PhD, Aerospace Engineering Sciences, 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: Northrop Grumman

PhD Thesis Committee Member – current (1)

1. Heather Hava, PhD Aerospace (*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

PhD Thesis Committee Member –completed (8)

1. Michael Lotto, PhD Aerospace, 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

2. Tobias Niederwieser, PhD Aerospace, 2018 (*advisor, D. Klaus*)
   Research Topic: Bioregenerative Air Revitalization in Space Habitats Using Algae Under Variable Pressures and Compositions
3. Jordan Holquist, PhD Aerospace, 2018 (*advisor, D. Klaus*)
   Research Topic: Direct Generation of Oxygen via Electrocatalytic Carbon Dioxide Reduction in an Ionic Liquid
4. Christine Fanchiang, PhD Aerospace, 2017 (*advisor, D. Klaus*)
   Research Topic: Human - Systems Integration in Complex Aerospace Systems
5. Robert Ocampo, PhD Aerospace, 2016 (*advisor, D. Klaus*)
   Research Topic: Defining, Characterizing, and Establishing "Safe Enough" Risk Thresholds for Human Space Flight
6. Christopher Massina, PhD Aerospace, Dec 2015 (*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
7. Jonathan Metts, PhD Aerospace, 2010 (*advisor, D. Klaus*)
   Research Topic: Assessing Feasibility of Electrochromic Space Suit Radiators for Reducing Extravehicular Activity Water Consumption
8. Bret Van Poppel, PhD Mechanical, 2010 (*advisor, J. Daily*)
   Research Topic: Numerical Methods for Simulating Multiphase Electrohydrodynamic Flows with Application to Liquid Fuel Injection

MS Thesis Advisor – completed (2)

1. **Faculty Advisor** for 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
2. **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 – current (1)

1. **Committee member** for Michael Valosin, Aerospace MS (*Advisor, A. Anderson*)
   MS Thesis Title: Gas Exchange Replication and Respiration Device

MS Thesis Committee – completed (4)

1. **Committee member** for Kyle Marquis, Aerospace MS, Aug 2021 (*Advisor, F. Jimenez*)
   MS Thesis Title: A Deployable Radiator Architecture Enabling High-Power Spacecraft using Thin Tubes and Layered and Tapered Panels
2. **Committee member** for 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
3. **Committee member** for 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
4. **Committee member** for 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. WSGC First Nations Launch High-powered Rocket Competition, CU Rocket Buffaloes, Bruno Armas, Aaron Ashley, Joel Funtanilla, Alyvia Hildebrand, Mason Moran, AY2017/18

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. Madisen Purifoy-frie, Habitats Optimized for Missions of Exploration, **DLA** 8/24/2020-date
2. Charles MacCraiger, uG-LilyPond - Floating Plant Pond for Microgravit**y, SPUR** 6/3/2019-8/9/2019
3. Jacob Killelea, Space Habitat CO2 Sequestration, **DLA** 8/26/18-12/21/2018
4. Eric Bergman, Space Habitat Thermal Control System Test Facility - TVAC Cooling Shroud, **DLA** 8/28/2017-5/4/2018
5. Ryan Wall, Closed-Loop Algal Oxygen Production for Life Support Systems, **UROP** 2016 summer grant
6. 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

American Institute for Aeronautics and Astronautics (AIAA)

ASCEND Conference Topic Administrator, Feb 2020 – date
Chair, Life Sciences and Systems Technical Committee, May 2019 - date
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

MDPI
Guest Editor, ChemEngineering Special Issue Low-Pressure Capture Using Ionic Liquids

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

Reviewer (ad hoc)

Manuscripts

Acta Astronautica
Entropy
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 Spacecraft and Rockets
Journal of Thermophysics and Heat Transfer
Journal of Residuals Science & Technology

MISCELLANEOUS

Hazardous Waste Management (CU EH&S), renewed 2021
Collaborative Institutional Training Initiative (CITI) Program courses, Human Research, Biomedical Research Investigators and Key Personnel, Part 1 - Basic Course, Certification Number: 32491926, 7/19/2019; Social Behavioral Research Investigators and Key Personnel, Part 1 – Basic Course, Certification Number: 32495036, 7/19/2019
The National Institutes of Health (NIH) Office of Extramural Research training course "Protecting Human Research Participants," Certification Number: 1783502, 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