# Curriculum Vitae: David M. Klaus

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## Academic Appointments

*Aerospace Engineering Sciences Department, University of Colorado, Boulder*

2015-*present* Professor
2009-2015 Associate Professor (*tenured*)
2002-2009 Assistant Professor
1998-2002 Assistant Professor (*Attendant Rank*)

2018-2020 Associate Dept. Chair, Undergraduate Program
2015-2016 Associate Dept. Chair, Undergraduate Program

*BioServe Space Technologies Research Center, University of Colorado, Boulder*

2015-*present* Faculty Affiliate
1999-2015 Associate Director
1995-1999 Research Associate / Manager, Payload Mission Operations
1990-1994 Graduate Research Assistant

*External Leadership and Visiting Scholar Appointments*

2019-2024 Deputy Director, NASA SmartHab Space Technology Research Institute (HOME)
2018-2022 Executive Director, FAA Center of Excellence for Commercial Space Transportation
2018 *summer* Visiting Professor, FH Aachen, Germany
2009 *fall* Visiting Professor, Institute of Astronautics, Technische Universität München, Germany
2006-2011 Associated Graduate Faculty Member, Environmental Biology, University of Guelph, Canada
1994-1995 Fulbright Scholar, DLR Institute of Aerospace Medicine, Cologne, Germany

## Professional Experience

1989-1990 Mission Operations Engineer, EVA, Barrios Technology, Inc., NASA JSC
1986-1989 Test & Analysis Engineer, Advanced Space Suits, Rockwell International, NASA JSC
1985-1986 Systems Engineer, ECLSS, Shuttle Launch Control, Lockheed, NASA KSC & VAFB

## Education

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|---|---|---|---|
| 1994-1995 | -- | *postdoc* | University of Bonn, Germany |
| 1994 *summer* | -- | *German Language* | University of Kiel, Germany |
| 1991-1994 | PhD | Aerospace Engineering Sciences | University of Colorado - Boulder |
| 1990-1991 | MS | Aerospace Engineering Sciences | University of Colorado - Boulder |
| 1990 | -- | *non-degree coursework* | University of Houston - Clear Lake |
| 1981-1984 | BS | Mechanical Engineering | West Virginia University |
| 1980-1981 | -- | *pre-engineering* | Marshall University |

## Awards & Recognition

CU College of Engineering & Applied Science, Dean's Faculty Performance Award, 2021
CU Aerospace Department Distinguished Performance Award, 2021
AIAA Fellow, 2020
CU Aerospace Department Service Award, 2019
International Conference on Environmental Systems (49th ICES) Award for Technical Excellence, 2019
CU Aerospace Department Outstanding Graduate Teaching and Mentoring Award, 2014
CU College of Engineering & Applied Science, Charles Hutchinson Memorial Teaching Award, 2011

CU President's Teaching Scholar, 2011
AIAA Associate Fellow, 2011
CU Council on Research and Creative Work (CRCW), Faculty Fellowship (Sabbatical), 2009-2010
AIAA Distinguished Service Award, 2009
CU Provost Faculty Achievement Award, 2007
CU Boulder Faculty Assembly (BFA) Excellence in Teaching Award, 2007
AIAA Rocky Mountain Section Educator of the Year Award, 2004
ASGSB Thora W. Halstead Young Investigator's Award, 2003
NASA Certificate of Recognition from the ISS Expedition 2 (6A) Crew, 2001
Colorado Space Grant Consortium, Certificate of Appreciation, 2001
CU AIAA Student Branch, Lecture Award, 1999, 2001, 2004, 2006
NASA Astronaut Candidate Finalist, class of 1998 and 2000
NASA Certificate of Recognition for the STS-83/94 MSL-1 Mission, 1997
NASA Certificate of Recognition from the STS-77 Crew, 1996
NASA Certificate of Recognition for the STS-73 USML-2 Mission, 1995
J. William Fulbright Scholarship (Germany), 1994-1995
Woodrow Wilson High School, Flying Eagle Alumni Award, 1994
NASA Certificate of Recognition for the STS-50 USML-1 Mission, 1992
American Society for Gravitational and Space Biology (ASGSB), Student Research Award, 1991
Rockwell International, Engineer of the Month, June 1988
Lockheed Space Operations Company, Team Award Commendations (*August*), 1986
USAF Performance Commendations, Vandenberg AFB, California (*February, April and May*), 1986
WVU President's Honors List (4.0 GPA), Dec 1984

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## RESEARCH

**Bioastronautics Research Group**: https://www.colorado.edu/bioastronautics/

### Publications

*Journal Articles (refereed)*

1. Rollock, AE and Klaus, DM (2025) Characterizing the Impact of Emergent Technologies on Earth Communications Reliance for Crewed Deep Space Missions. *Acta Astronautica* [accepted]
2. Zaccarine, SA and Klaus, DM (2024) Monitoring, maintenance and fault management considerations for self-sufficient deep-space habitat operations. *Acta Astronautica*, **225:** 376-389
3. Pischulti, PK and Klaus, DM (2024) A Systems Approach for Characterizing Human Deep Space Mission Anomaly Response Capabilities and Functional Constraints. *Journal of Space Safety Engineering* 10.1016/j.jsse.2024.06.007
4. Zero, M, Klaus, D, Arquilla, K and Fanchiang, C (2024) Defining and Measuring Crewmember Operational State for Spaceflight Operations. *Aerospace Medicine and Human Performance.* **95**(12): 1-11
5. Pischulti, PK, Duke, TL, Smith, AL, Klaus, DM, Amick, RZ (2024) Surveying and assessing 'smart' technologies to identify potential applications for deep space human exploration missions. *Acta Astronautica*, **222:** 534-549
6. Brighton, E.M. and Klaus, D.M. (2023) Categorization of Select Cockpit Performance Evaluation Techniques. *Aerospace Medicine and Human Performance* **94(9):** 696-704
7. Allen, L.A., Kalani, A.H., Estante, F., Rosengren, A.J., Stodieck, L., Klaus, D. and Zea. L. (2022) Simulated Micro-, Lunar, and Martian gravities on Earth - Effects on *Escherichia coli* Growth, Phenotype, and Sensitivity to Antibiotics. *Life (Basel)* 2022 Sep, **12(9):** 1399
8. Rollock, A.E. and Klaus, D.M. (2022) Defining and characterizing self-awareness and self-sufficiency for deep space habitats. *Acta Astronautica* Sept 2022, **198:** 366-375

9. Banerjee, N.T., Baughman, A.J., Lin, S-Y., Witte, Z.A., Klaus, D.M. and Anderson, A.P. (2021) Side-by-Side Comparison of Human Perception and Performance using Augmented, Hybrid, and Virtual Reality. *IEEE Transactions on Visualization and Computer Graphics* 2021 Aug 18. 2022 Dec; **28(12):** 4787-4796
10. 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* **37(1) (2021):** 100-107 doi/abs/10.2514/1.B37782
11. Fanchiang, C., Marquez, J.J. and Klaus, D.M. (2020) A Framework for Relating Crew Member Performance Measures to Spacecraft Design and Operations. *New Space* **8(4):** 193-200 DOI: 10.1089/space.2020.0033
12. Banerjee, N.T., Baughman, A.J., Lin, S-Y., Witte, Z.A., Klaus, D.M. and Anderson, A.P. (2020) Development of Alternative Reality Environments for Spacecraft Habitat Design Evaluation. *Virtual Reality* **25:** 399–408 https://doi.org/10.1007/s10055-020-00462-6
13. Anderson, A, Boppana, A., Wall, R. Acemyan, C.Z., Adolf, J. and Klaus, D. (2020) Framework for Developing Alternative Reality Environments to Engineer Large, Complex Systems. *Virtual Reality* 10.1007/s10055-020-00448-4 [Online First]
14. Niederwieser, T. Kociolek, P., Hoehn, A., Klaus, D. (2019) Effect of altered nitrogen partial pressure on Chlorellaceae for spaceflight applications. *Algal Research* **41** 101543
15. Lotto, M.A., Klaus, D.M. and Hynek, B.M. (2018) Operational Conditions and In Situ Resources for Mars Surface Exploration. *New Space* **6**(4):320-334
16. Ocampo, R.P. and Klaus, D.M. (2018) Applying Regression Analysis to Model the Risk of Space Flight and Terrestrial Activities. *The Journal of Space Safety Engineering* **5(3-4)**: 135-139
17. Zea, L., Nisar, Z., Rubin, P., Cortesao, M., Luo, J., McBride, S., Moeller, R., Klaus, D., Mueller, D., Varanasi, K., Mücklich, F. and Stodieck, L. (2018) Design of a Spaceflight Biofilm Experiment. *Acta Astronautica* **148:** 294–300
18. Klaus, D.M. (2018) The Pursuit of Occupant Safety in Commercial Human Spaceflight. *New Space* **6(1)**: 48-52
19. Niederwieser, T., Kociolek, P. and Klaus, D. (2018) A Review of Algal Research in Space. *Acta Astronautica* Life Sciences in Space Research **16**: 8–17
20. Aunins, T.R., Erickson, K.E., Prasad, N., Levy, S.E., Jones, A, Shrestha, S., Mastracchio, R., Hopkins, M., Stodieck, L., Klaus, D., Zea, L. and Chatterjee, A. (2018) Spaceflight modifies Escherichia coli gene expression in response to antibiotic exposure and reveals role of oxidative stress response. *Frontiers in Microbiology* Volume 9: Article 310
21. Niederwieser, T. Kociolek, P. and Klaus, D. (2018) Spacecraft Cabin Environment Effects on the Growth and Behavior of *Chlorella vulgaris* for Life Support Applications. *Life Sciences in Space Research*, **16**: 8-17
22. Lotto, M.A., Johnson, K.M., Nie, C.W. and Klaus, D.M. (2017) The Impact of Reduced Gravity on Free Convective Heat Transfer from a Finite, Flat, Vertical Plate. *Microgravity Science and Technology,* **29(5)**: 371-379
23. Zea, L., Larsen, M., Estante, F., Qvortrup, K., Moeller, R., Dias de Oliveira, S., Stodieck, L. and Klaus, D. (2017) Phenotypic Changes Exhibited by *E. coli* Cultured in Space. *Frontiers in Microbiology* **8:**1598
24. Massina. CJ, Nabity, JA and Klaus, DM (2017) Thermal Evaluation of Simulated Spacecraft Radiators with Discretized Emissivity Properties *J. Spacecraft and Rockets,* **54(2)**: 368-375
25. Zea, L., Prasad, N., Levy, S., Stodieck, L., Jones, A., Shrestha, S. and Klaus, D. (2016) A Molecular Genetic Basis Explaining Altered Bacterial Behavior in Space *PLoS ONE* **11(11)**: e0164359
    Ocampo, RP and Klaus, DM (2016) Comparing the Relative Risk of Space Flight to Terrestrial Modes of Transportation and Adventure Sport Activities. *New Space,* **4(3)**: 190-197
26. Nabity, J.A., Holquist, J.B., Milanese, M.J., Lotto, M.A. and Klaus, D.M. (2016) Effect of Gravity on Ice-Layer Growth in a Freezable Heat Exchanger, *J. Thermophysics and Heat Transfer* **30(3)**:499-512

27. Massina, C.J. and Klaus, D.M. (2016) Prospects for Implementing Variable Emittance Thermal Control of Space Suits on the Martian Surface. *ASME J. Thermal Science and Engineering Applications,* **8(4)**: 041002-041002-8
28. Ocampo, R. and Klaus, D. (2016) A Quantitative Framework for Defining "How Safe is Safe Enough?" in Crewed Spacecraft. *New Space*, **4(2)**: 75-82
29. Massina, C.J. and Klaus, D.M. (2015) Defining a Discretized Space Suit Surface Radiator with Variable Emissivity Properties. *ASME J. Thermal Science and Engineering Applications,* **7(4)**: 041014-041014-9
30. Hager, P.B., Walter, U., Massina, C.J. and Klaus, D.M. (2015) Characterizing a transient heat flux envelope for lunar surface space suit thermal control applications. *J. Spacecraft and Rockets,* **52(4)**: 1193-1202
31. Neis, S.M. and Klaus, D.M. (2014) Considerations toward Defining Medical 'Levels of Care' for Commercial Spaceflight. *New Space,* December 2014, **2(4)**: 165-177
32. Mindock, J.A. and Klaus, D.M. (2014) Contributing Factor Map: A Taxonomy of Influences on Human Performance and Health in Space. *IEEE Transactions on Human-Machine* Systems, **44(5)**: 591-602
33. Hager, P.B., Klaus, D.M. and Walter, U. (2014) Characterizing transient thermal interactions between lunar regolith and surface spacecraft. *Planetary and Space Science* **92** (2014): 101–116
34. Ocampo, R.P. and Klaus, D.M. (2013) A Review of Spacecraft Safety: from Vostok to the International Space Station. *New Space* **1(2)**: 73-80
35. Higdon, K.P. and Klaus, D.M. (2013) Characterizing Human Spacecraft Safety and Operability Through a Minimum Functionality Design Methodology. *Journal of Spacecraft and Rockets*, **50(3):** 591-602
36. Chappell, S.P. and Klaus, D.M. (2013) Enhanced Simulation of Partial Gravity for Extravehicular Activity, *Journal of Human Performance in Extreme Environments*, **10(2):** article 1
37. Metts, J.G. and Klaus, D.M. (2012) First-order feasibility analysis of a space suit radiator concept based on estimation of water mass sublimation using Apollo mission data. *Advances in Space Research* **49(1)**: 204-212
38. Kobrick, R.L., Klaus, D.M., and Street, K.W. (2011) Developing Abrasion Test Standards for Evaluating Lunar Construction Materials, *SAE Int. J. Aerospace* **4(1)**:160-171
39. 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
40. Kobrick, R.L., Klaus, D.M. and Street, K.W., Jr. (2011) Validation of proposed metrics for two-body abrasion scratch test analysis standards. *WEAR* (issue 11-12) **270**: 815–822
41. Kobrick, R.L., Klaus, D.M. and Street, K.W., Jr. (2011) Standardization of a volumetric displacement measurement for two-body abrasion scratch test data analysis. *WEAR* (issue 9-10) **270**: 650-657
42. Kobrick, R.L., Klaus, D.M. and Street, K.W. Jr. (2011) Defining an abrasion index for lunar surface systems as a function of dust interaction modes and variable concentration zones. *Planetary and Space Science* **59**: 1749–1757
43. Khairul-Bariah, A.A.N., Then, S.M., Rageshwary, R., Fazlina, N., Wan-Zurinah, W.N. Roslan, H., Klaus, D.M., Stodieck, L.S. and Jamal, R. (2010) Changes in Gene Expression of HepG2 Cells Exposed to Microgravity *Gravitational and Space Biology Bulletin* **23(2)**: 91-92
44. Thomas, E.A., Weislogel, M.M., Klaus, D.M. (2010) Design Considerations for Sustainable Spacecraft Water Management Systems. *Advances in Space Research* **46**: 761-767
45. Horneck, G., Klaus, D. and Mancinelli, R. (2010) Space Microbiology. *Microbiology and Molecular Biology Reviews* **74(1):** 121-156
46. Seelig, H-D., Hoehn, A., Stodieck, L.S., Klaus, D.M., Adams, W.W. and Emery, W.J. (2009) Plant water parameters and the remote sensing R1300/R1450 leaf water index: controlled condition dynamics during the development of water deficit stress. *Irrigation Science* **27**:357–365
47. Benoit, M.R., Brown, R.B., and Todd, P., Nelson, E, and Klaus, D.M. (2008) Buoyant plumes from solute gradients generated by non-motile *Escherichia coli*. *Physical Biology* **5:** 046007, 10pp
48. Seelig ,H-D., Adams, W.W., Hoehn, A., Stodieck, L.S., Klaus, D.M. and Emery, W. J. (2008) Extraneous variables and their influence on reflectance-based measurements of leaf water content. *Irrigation Science* **26**: 407–414

49. Seelig, H-D., Hoehn, A., Stodieck, L.S., Klaus, D.M., Adams, W.W. and Emery, W.J. (2008) The assessment of leaf water content using leaf reflectance ratios in the visible, near-, and short-wave-infrared, *International Journal of Remote Sensing*, **29**:13, 3701-3713
50. Seelig, H.-D., Hoehn, A., Stodieck, L.S., Klaus, D.M., Adams, W.W. and Emery, W.J. (2008) Relations of remote sensing leaf water indices to leaf water thickness in cowpea, bean, and sugarbeet plants. *Remote Sensing of Environment* **112(2)**: 445-455
51. Lee, J.S., Klaus, D.M., Maness, P.C. and Spear, J.R. (2007) The Effect of Butyrate Concentration on Hydrogen Production via Photofermentation for use in a Martian Habitat Resource Recovery Process. *International Journal of Hydrogen Energy* **32 (15)**: 3301– 3307
52. Benoit, M. and Klaus, D.M. (2007) Microgravity, Bacteria, and the Influence of Motility. *Advances in Space Research* **39(7)**: 1225-1232
53. Russell, J.F. and Klaus, D.M. (2007) Maintenance, Reliability and Policies for Spacecraft Life Support Systems on Orbital Space Stations. *Reliability, Engineering and Systems Safety* **92(6)**: 808-820
54. Stroud, K.J. and Klaus, D.M. (2006) Spacecraft Design Considerations for Piloted Reentry and Landing. *J. British Interplanetary Society* **59(12)**: 426-442
55. Aponte, V. M., Finch, D. S., and Klaus, D. M. (2006) Considerations for non-invasive in-flight monitoring of astronaut immune status with potential use of MEMS and NEMS devices. *Life Sciences Journal* **79(14)**: 1317-1333
56. Hatfield, T., Klaus, D. and Simske, S. (2006) Ultrasonic 360º Cross Section Scanning Methodology for Monitoring Bone and Muscles Areas During Space Flight. *Microgravity Science and Technology* **XVIII(1)**: 15-21
57. Klaus, D.M. and Howard, H.N. (2006) Antibiotic Efficacy and Microbial Virulence during Space Flight. *Trends in Biotechnology* **24(3)**:131-6
58. Russell, J., Klaus, D. and Mosher, T. (2006) Applying Analysis of International Space Station Crew-Time Utilization to Mission Design. *J Spacecraft and Rockets* **43(1)**: 130-136
59. Benoit, M.R., Li, W., Stodieck, L.S., Lam, K.S., Winther, C.L., Roane, T.M. and Klaus, D.M. (2006) Microbial Antibiotic Production Aboard the International Space Station. *Applied Microbiology and Biotechnology*, **70(4)**: 403-411
60. Stroud, K.J., Harm, D.L. and Klaus, D.M. (2005) Preflight Virtual Reality Training as a Countermeasure for Space Motion Sickness and Disorientation. *Aviation, Space and Environmental Medicine* **76**:352-356
61. Benoit, M. and Klaus, D. (2005) Can genetically modified *Escherichia coli* with neutral buoyancy induced by gas-vesicles be used as an alternative method to clinorotation for microgravity studies? *Microbiology* **151**: 69-74
62. Chappell, S.P. and Klaus, D.M. (2004) Adaptation of Terrestrial Mountaineering Equipment and Training Methods for Planetary EVA Operations. *SAE 2004 Transactions Journal of Aerospace* ISBN: 0-7680-1550-2 **(1)**: 415-425
63. Hoehn, A., Klaus, D. and Stodieck, L. (2004) A Modular Suite of Hardware Enabling Space Flight Cell Culture Research. *J. Gravitational Physiology* **11(1)**: 39-50
64. Klaus, D., Benoit, M., Nelson, E. and Hammond, T. (2004) Extracellular Mass Transport Considerations for Space Flight Research Concerning Suspended and Adherent *in vitro* Cell Cultures. *J. Gravitational Physiology* **11(1)**: 17-28
65. Hatfield, T.R., Klaus, D.M. and Simske, S.J. (2004) An Ultrasonic Methodology for Muscle Cross Section Measurement to Support Spaceflight. *Microgravity Science and Technology* **15(3)**: 3-11
66. Czupalla, M., Aponte, V., Chappell, S. and Klaus, D. (2004) Analysis of a Spacecraft Life Support System for a Mars Mission. *Acta Astronautica* **55**: 537-547
67. Klaus, D.M. (2004) Gravitational Influence on Biomolecular Engineering Processes. *Gravitational and Space Biology Bulletin* **17 (2)**: 51-65
68. Brown, R., Klaus, D. and Todd, P. (2002) Effects of space flight, clinorotation and centrifugation on the substrate utilization efficiency of *E. coli*. *Microgravity Science and Technology* **XIII/4**: 24-29

69. Lam, K.S., Gustavson, D.R., Pirnik, D.L., Pack, E., Bulanhagui, C., Mamber, S.W., Forenza, S., Stodieck, L.S. and Klaus, D.M. (2002) The effect of space flight on the production of actinomycin D by *Streptomyces plicatus*. *J. Industrial Microbiology and Biotechnology* **29** (6): 299-302
70. Owen, R.B., Zozulya, A.A., Benoit, M.R. and Klaus, D.M. (2002) Microgravity materials and life sciences research applications of digital holography. *J. Applied Optics* **41**: 3927-3935
71. Klaus, D.M. (2001) Clinostats and Bioreactors. *Gravitational and Space Biology Bulletin* **14(2)**: 55-64
72. Kacena, M.A., Merrell, G.A., Manfredi, B., Smith, E.E., Klaus, D.M. and Todd, P. (1999) Bacterial growth in space flight: logistic curve parameters for *Escherichia coli* and *Bacillus subtilis*. *Applied Microbiology and Biotechnology* **51**: 229-234
73. MacCallum, T., Anderson, G., Poynter, J., Stodieck, L. and Klaus, D. (1998) Autonomous Biological Systems Experiments. *Biological Sciences in Space* (Special Issue: *Ecology in Space*) **12(4):** 363-365
74. Klaus, D.M. (1998) Microgravity and its Implication for Fermentation Technology. *Trends in Biotechnology* **16(9)**: 369-373
75. Lam, K.S., Mamber, S., Pack, E., Forenza, S., Fernandes, P. and Klaus, D. (1998) The Effects of Space Flight on the Production of Monorden by *Humicola fuscoatra* WC5157 in Solid State Fermentation. *Applied Microbiology and Biotechnology* **49(5)**: 579-583
76. Klaus, D.M., Todd, P. and Schatz, A. (1998) Functional Weightlessness During Clinorotation of Cell Suspensions. *Advances in Space Research* **21(8/9)**: 1315-1318
77. Todd, P., Klaus, D.M., Stodieck, L.S., Smith, J., Staehelin, A., Kacena, M., Manfredi, B., and Bukhari, A. (1998) Cellular Responses to Gravity: Extracellular, Intracellular and In-Between. *Advances in Space Research* **21(8/9)**: 1263-1268
78. Klaus, D., Simske, S., Todd, P. and Stodieck, L. (1997) Investigation of Space Flight Effects on *Escherichia coli* and a Proposed Model of Underlying Physical Mechanisms. *Microbiology* **143(2)**: 449-455
79. Todd, P. and Klaus, D.M. (1996) Theories and Models on the Biology of Cells in Space. *Advances in Space Research* **17(6/7)**: 3-10
80. Luttges, M.W., Stodieck, L. and Klaus, D.M. (1994) Four Educational Programs in Space Life Sciences. *Advances in Space Research* **14(8)**: 439-446

*Book Chapters (refereed) and Other Publications*

1. Klaus D. (2024) Chapter One: An Overview of Habitat Systems Supporting Human Spaceflight. In: Shelhamer, M & Antonsen, E.L. (eds.) *Systems Medicine for Human Spaceflight.* pp. 1-20, World Scientific Publishing Company https://doi.org/10.1142/9789811287695_0001
2. Klaus D.M. (2020) Undergraduate and Graduate Programs in Bioastronautics. In: Young L.R., Sutton J.P. (eds) *Handbook of Bioastronautics*. Springer, Cham. https://doi.org/10.1007/978-3-319-10152-1_82-2
3. Klaus D.M. (2018) Undergraduate and Graduate Programs in Bioastronautics, In: Young L.R., Sutton J.P., (eds.) *Encyclopedia of Bioastronautics*. Springer, Cham
4. Klaus, D.M. (2011) Microgravity in the *Encyclopedia of Astrobiology*, Part 13/M, Muriel Gargaud (ed.), Springer-Verlag Berlin Heidelberg, pp. 1054-1055 (*revised versions 2014 and 2019*)
5. Klaus, D. and Morrow, R. (2008) Life Sciences: Air and Space Year in Review. *Aerospace America* **12**: 88-89
6. Klaus, D. (2007) Life Sciences: Air and Space Year in Review. *Aerospace America* **12:** 87
7. Klaus, D.M. (2002) Space Microbiology: Microgravity and Microorganisms in *The Encyclopedia of Environmental Microbiology*, G. Britton (ed.), John Wiley & Sons, NY, pp. 2996-3004
8. Klaus, D.M. (1994) Effects of Space Flight on the Growth and Development of *Escherichia coli*. Doctoral Dissertation, Advisor: Dr. Marvin Luttges, University of Colorado

*Conference Papers (refereed)*

1. Pischulti, PK and Klaus, DM (2024) Towards Fault Management Autonomy – The Development and Evaluation of a Self-Sufficient Anomaly Response System Architecture for Deep Space Habitats *ICES-2024-420*

2. Sage O. Sherman, SO, Pischulti, PK, Hwang, M, Bergés, M, Mohanty, A, Gebraeel, N, Ivey, DB, Robinson, SK, Klaus, D and Anderson, AP (2024) A Development Framework for a Comprehensive Capstone which Demonstrates Human Interaction with Autonomous Habitat Technology. *ICES-2024-439*
3. Klaus, D. Zaccarine, S., Pischulti, P. and Rollock, A. (2022) Functionally Aligning Emergent Technologies for Deep Space Smart Habitats. *ICES-2022-120*
4. Arquilla, K., Zero, M., Hauber, K., Shelhamer, M., Klaus, D. and Fanchiang, C. (2022) Detection of task type through unobtrusive physiological monitoring. *ICES-2022-153*
5. Klaus, D. and Hauber, K. (2022) Mapping Life Support System Functions and Technologies to Commercial Spaceflight Applications. *IEEE Aerospace Proceedings* (978-1-6654-3760-8/22/$31.00 ©2022 IEEE) Paper no. 2531 (8.02 Human Exploration Systems Technology Development)
6. Fanchiang, C. Seyedmadani, K., Shelhamer, M., Zero, M. and Klaus, D. (2021) Characterizing a Biosignal Sensor Suite as an Approach for Astronaut Performance Model Validation. *ICES-2021-405*
7. Klaus, D., Pischulti, P., Rollock, A. and Zaccarine, S. (2020) Establishing assessment criteria for intelligent infusion of smart systems into a space habitat *ICES-2020-419* (published but not presented, ICES meeting cancelled due to COVID)
8. Junker, J.H. and Klaus, D.M. (2019) Parametric Analysis of Internal Heat Transfer for Full-body Radiative-cooled Space Suit Concepts. *ICES-2019-142*
9. Holquist, J.B., Klaus, D.M. and Nabity, J.M. (2018) Design of a Vacuum-Assisted Product Removal, Ionic Liquid-based, Carbon Dioxide Electrolyzer. *ICES-2018-32*
10. Lotto, M.A., Holquist, J.B., Klaus, D.M. and Nabity, J.A. (2018) Considerations for Capturing and Converting Martian CO2 with Room Temperature Ionic Liquid-Based ISRU Systems. *ICES-2018-31*
11. Niederwieser, T., Wall, R., Nabity, J. and Klaus, D. (2017) Development of a Testbed for Flow-Through Measurements of Algal Metabolism Under Altered Pressure for Bioregenerative Life Support Applications. *ICES-2017-23*
12. Escobar, C., Nabity, J. and Klaus, D. (2017) Defining ECLSS Robustness for Deep Space Exploration. *ICES-2017-280*
13. Nabity, J.A., Holquist, J. and Klaus, D.M. (2017) A Single Loop, Passive Autonomous Approach for Spacecraft Thermal Control. *ICES-2017-243*
14. Klaus, D.M. (2017) Functional Integration of Humans and Spacecraft through Physics, Physiology, Safety and Operability. *IEEE Aerospace Proceedings* (978-1-5090-1613-6/17) Paper no. 2346 (8.0505)
15. Holquist, JB, Klaus, DM, Nabity, JA and Abney, MB (2016) Electrochemical Carbon Dioxide Reduction with Room Temperature Ionic Liquids for Space Exploration Missions. *ICES-2016-314*
16. Nabity, J.A., Holquist, J.A., Milanese, M.J. and Klaus, D.M. (2015) Characterizing the Effect of Gravity on a Freezable Water Heat Exchanger with Respect to Flow Orientation. *ICES-2015-173*
17. Massina, C.J., Nabity, J.A. and Klaus, D.M. (2015) Modeling the Human Thermal Balance in a Space Suit using a Full Surface, Variable Emissivity Radiator. *ICES-2015-26*
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2. Zero, M., Klaus, D., Arquilla, K., Shelhamer, M., & Fanchiang, C. (2022). Development of a Task-Design Framework for Quantifying Crew Performance. *Proceedings of the Human Factors and Ergonomics Society (HFES) Annual Meeting*, 66(1), 45–49. https://doi.org/10.1177/1071181322661359
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*Conference Abstracts and Posters (non-refereed)*

1. Zaccarine, SA and Klaus, DM (2024) Attributes of Self-Sufficiency and Habitability for Deep-Space Operations. (poster) NASA Human Research Program (HRP) Investigators' Workshop, Galveston, TX, Feb. 2024
2. Pischulti, P.K. and Klaus, D.M. (2024) Simulation of an Autonomous Anomaly Response Architecture f0r Human Deep-Space Exploration Missions (3rd place student poster competition). NASA Human Research Program (HRP) Investigators' Workshop, Galveston, TX, Feb. 2024

3. Fanchiang, C, Zero, M, Shelhamer, M. Arquilla, K, and Klaus, D (2024) HCAAM: Using a Human Capabilities Framework to Quantify Crew Task Performance in Human-Robotic Systems - Year 5. (poster) NASA Human Research Program (HRP) Investigators' Workshop, Galveston, TX, Feb. 2024
4. Zaccarine, S. and Klaus, D. (2023) Characterizing the Trade Space for Incorporating Emerging Technologies into Deep-Space 'Smart' Habitats: Needs and Opportunities (*poster*). 52nd International Conference on Environmental Systems (ICES), Calgary, Canada, July 2023
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7. Pischulti, P.K. and Klaus, D.M. (2023) Utilizing MBSE to Model a Self-Sufficient Anomaly Response Process to Identify Capability Needs for Future Deep Space Habitats (*poster*). NASA Human Research Program (HRP) Investigators' Workshop, Galveston, TX, Feb. 2023
8. Zero, M., Klaus, D.M. Arquilla, K., Gagnon, A., Shelhamer, M., and Fanchiang, C. (2023) Monitoring Cognitive and Physical Workload Changes alongside Task Performance using a Suite of Non-invasive Wearable Sensors (*poster*). NASA Human Research Program (HRP) Investigators' Workshop, Galveston, TX, Feb. 2023
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10. Allen, L.A., Forward, T., Kalani, A.H., Klaus, D. and Zea, L. (2022) *Salmonella typhimurium, Shewanella oneidensis* MR-1, and ISS-isolated *Staphylococcus epidermidis*: The Effect of Simulated Micro-, Lunar, and Martian Gravities on Growth and Size, and Practical Implications, 73rd International Astronautical Congress (IAC), Paris, France, 18-22 September 2022. IAC-22,A1,IP,x69576
11. Zero, M., Klaus, D., Arquilla, K., Shelhamer, M. and Fanchiang, C. (2022) Assessing Crewmember Operational State and Task Performance Effectiveness to Guide Space Habitat Design and Mission Operations (*poster*). 51st International Conference on Environmental Systems (ICES), St. Paul, MN, July 2022
12. Zaccarine, S. and Klaus, D. (2022) Autonomous System Capabilities and Attributes for Nominal Operation Task Allocation of a 'Smart' Deep Space Habitat (*poster*). 51st International Conference on Environmental Systems (ICES), St. Paul, MN, July 2022
13. Pischulti, P. and Klaus, D. (2022) Incorporating Smart-Technology Enabled Systems For Anomaly Response In Deep Space Habitats (*poster*). 51st International Conference on Environmental Systems (ICES), St. Paul, MN, July 2022
14. Rollock, A. and Klaus, D. (2022) Function Prioritization Strategy for Self-Reliant Deep Space Habitat Tradespace (*poster*). 51st International Conference on Environmental Systems (ICES), St. Paul, MN, July 2022
15. Hauber, K., Fanchiang, C., Klaus, D.M., Zero, M., Arquilla, K., Reynolds, R. and Shelhamer, M. (2022) Characterizing Non-invasive Biometric Sensors For Use In Task Performance Prediction And Operational Design. Poster. NASA Human Research Program (HRP) Investigators' Workshop. Virtual Meeting. Feb. 2022. (*1st place student poster competition*)
16. Zero, M., Klaus, D.M, Hauber, K., Arquilla, K., Reynolds R.J., Shelhamer, M. and Fanchiang, C. (2022) Investigating Correlations Between Biomeasures and Task Performance Metrics for Predictive Capabilities. Poster. NASA Human Research Program (HRP) Investigators' Workshop. Virtual Meeting, February 2022.
17. Hauber, K. and Klaus, D. (2021) Mapping Life Support System Functions and Technologies to Commercial Spaceflight Applications. (*poster*) 50th International Conference on Environmental Systems (ICES), Virtual Event, July 2021

18. Fanchiang, C., Klaus, D., Zero, M. and Shelhamer, M. (2021) Using a Human Capabilities Framework to Quantify Crew Task Performance in Human-Robotic Systems (*poster*) NASA Human Research Program Investigators' Workshop (HRP IWS), Virtual Event, January 2021
19. Anderson, A., Banerjee, N., Boppana, A., Baughman, A., Lin, S.Y., Wall, R., Witte, Z. and Klaus, D. (2020) Spacecraft Habitat Design Evaluation using Alternative Realty Technologies (*abstract and presentation by Anderson*) NASA Human Research Program (HRP) Investigators' Workshop, #20162, Galveston, TX, January 2020
20. Seyedmadani, K., Klaus, D., Shelhamer, M. and Fanchiang, C. (2020) Using a Human Capabilities Framework to Quantify Crew Task Performance in Human-Robotic Systems (*poster*) NASA Human Research Program (HRP) Investigators' Workshop, Galveston, TX, January 2020
21. Allen, L.A., Forward, T., Stodieck, L., Klaus, D. and Zea, L, (2019) The Effects of Simulated Lunar and Martian Gravities on the Growth and Morphology of *Escherichia coli*, *Shewanella oneidensis*, Methicillin-Resistant *Staphylococcus aureus*, and *Pseudomonas aeruginosa* (*poster*), American Society for Gravitational and Space Research, ASGSR 35th Annual Meeting, Denver, CO, Nov. 2019
22. Schauer. R., Flores, P., Cortesão. M., McBride, S.A., Frank, G., Countryman, S., Hoehn, C., Vellone, M. Doraisingam, S., Floyd, S., Rupert, M., Klaus, D., Varanasi, K.K., Moeller, R., Sato, K., Gorti, S., Stodieck, L. and Zea, L. (2019) Verification of the Design of a Fungal Biofilm Experiment in Preparation for Spaceflight (*abstract*) American Society for Gravitational and Space Research, ASGSR 35th Annual Meeting, Denver, CO, Nov. 2019
23. Flores, P., Schauer, R., McBride, S., Luo, J., Pennington, P,. Countryman, S., Hoehn, C., Vellone, M., Doraisingam, S., Floyd, S., Rupert, M., Klaus, D., Varanasi, K.K., Muecklich, F., Gorti, S., Sato, K., Moeller, R,. Stodieck, L., Zea, L. (2019) Verification of the Design of a Bacterial Biofilm Experiment in Preparation for Spaceflight (*abstract*) American Society for Gravitational and Space Research, ASGSR 35th Annual Meeting, Denver, CO, Nov. 2019
24. 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) Smart Technology Infusion for Deep Space Exploration Habitats (*abstract and presentation*) 8th AIAA-Rocky Mountain Annual Technical Symposium, CU Boulder, November, 2019
25. Lotto, M. and Klaus, D. (2019) CO2 Capture with Two Ionic Liquids and Implications for Mars ISRU. (*poster*). 49th International Conference on Environmental Systems (ICES), Boston, MA July 2019 (*3rd place in student poster competition*)
26. Banerjee, N., Baughman, A., Lin, S., Witte, Z., Klaus, D. and Anderson, A. (2019) Development of Alternative Reality Environments for Spacecraft Habitat Design Evaluation (*poster*) NASA Human Research Program Investigators' Workshop (HRP IWS) Galveston, TX, January 2019
27. Klaus, D. (2017) Task 184/320/353 Summary: Human Spaceflight Safety (*poster*) FAA COE CST 7th Annual Technical Meeting, Las Cruces, NM, Oct 2017
28. Lotto, M., Klaus, D. and Muscatello, A. (2017) Advantages and Performance Gaps of Electrochemically Converting Carbon Dioxide and Water into Methane and Oxygen in a Single Process Vessel (*poster*). 47th International Conference on Environmental Systems (ICES), Charleston, SC July 2017
29. Wall, R., Niederwieser, T., Klaus, D. and Nabity, J. (2017) Evaluation of Agar-Grown Algae for Environmental Control and Life Support Systems in Spacecraft Applications (*poster*). 47th International Conference on Environmental Systems (ICES), Charleston, SC July 2017
30. Klaus, D. and Ocampo, R. (2016) Task 320: Commercial Spaceflight Risk Assessment and Communication (*poster*) FAA COE CST 6th Annual Technical Meeting, Las Cruces, NM, Oct 2016
31. Holquist, J.B., Klaus, D.M., Nabity, J.A. and Abney, M.B. (2016) Ionic Liquids Selection and Initial Test Results for Electrochemical Carbon Dioxide Reduction (*poster*) 46th International Conference on Environmental Systems (ICES), Vienna, Austria, July 2016 (*1st place student poster competition)*
32. Ocampo, R. and Klaus, D. (2015) Human Spaceflight Safety (*poster*) FAA COE CST 5th Annual Technical Meeting, Washington DC, Oct 2015
33. Holquist, J.B., Klaus, D.M., Nabity, J.A. and Abney, M.B. (2015) Opportunities and Challenges for Direct Oxygen Generation using Electrochemical Carbon Dioxide Reduction Catalyzed by Room Temperature

Ionic Liquids (*poster*) 45th International Conference on Environmental Systems (ICES), Bellevue, WA, July 2015 (*2nd place student poster competition*)

34. Fanchiang, C., Klaus, D.M. and Marquez, J. J. (2015) A Framework for Quantifying Human Performance to Support Conceptual Spacecraft Design Evaluation (*abstract and poster #0177*) NASA Human Research Program (HRP) Investigator's Workshop, Session B: Space Human Factors Engineering, Galveston, TX, January 2015
35. Zea, L., Stodieck, L. and Klaus, D., Characterizing Phenotypic and Gene Expression Changes in *E. coli* Challenged with Antibiotics during Spaceflight, 4th International Space Station Research and Development Conference, Boston, MA, July 7-9, 2015
36. Chamberlain, C., Huang, R. and Klaus, D.M. (2014) Spacecraft Human-Rating (poster) FAA COE CST 4th Annual Technical Meeting, Washington DC, Oct 2014
37. Zea, L, Klaus, D.M. and Stodieck, L.S. (2014) The First Fifty Years of Bacterial Growth and Antibiotic Effectiveness Research in Space (*poster*) 30th American Society for Gravitational and Space Research (ASGSR), Pasadena, CA, Oct, 2014
38. Zea, L, Klaus, D.M. and Stodieck, L.S. (2014) Preliminary Results of the Antibiotic Effectiveness in Space-1 (AES-1) Experiment Conducted Onboard ISS (*poster*) American Society for Gravitational and Space Research (ASGSR, 30th annual meeting), Pasadena, CA, Oct, 2014
39. Zea, L and Klaus, D.M. (2013) Bacterial Growth and Susceptibility to Antibiotics under Simulated Martian, Lunar and Orbital Gravity Levels (*poster*) joint meeting of the American Society for Gravitational and Space Research (ASGSR, 29th annual) and the International Symposium for Physical Sciences in Space (ISPS, 5th annual), p. 138, Orlando, FL, Nov, 2013
40. Fanchiang, C. and Klaus, D.M. (2013) Spacecraft Human-Rating (*poster*) FAA COE CST 3rd Annual Technical Meeting, Washington DC, Oct 2013 (*2nd place student poster competition*)
41. Fanchiang, C. and Klaus, D.M. (2013) Defining a Crew Utilization Figure of Merit to Characterize Human Performance Influence on Spacecraft Design (*poster*) AIAA 43rd International Conference on Environmental Systems (ICES), Vail, CO, July 2013
42. Gamsky, J. and Klaus, D.M. (2013) ECLSS Technology Database to Support Trade Studies and Research Gap Analyses (*poster*) AIAA 43rd International Conference on Environmental Systems (ICES), Vail, CO, July 2013
43. Holquist, J., Klaus, D.M. and Graf, J.C. (2013) Characterization of Potassium Superoxide for Air Revitalization in Spacecraft (*poster*) AIAA 43rd International Conference on Environmental Systems (ICES), Vail, CO, July 2013 (*tied for 3rd place in student competition*)
44. Massina, C.J. and Klaus, D.M. (2013) Considerations for Incorporating Variable Emissivity Radiators into a Space Suit Heat Rejection System (*poster*) AIAA 43rd International Conference on Environmental Systems (ICES), Vail, CO, July 2013
45. Rieger, S., Klaus, D.M., Hoehn, A., Koenig, P. and Stodieck, L. (2013) Design and Experimental Verification of a Small Scale Spacecraft Humidity Control System (*poster*) AIAA 43rd International Conference on Environmental Systems (ICES), Vail, CO, July 2013 (*tied for 3rd place in student competition*)
46. Tozer, S., Klaus, D.M., Hoehn, A., Koenig, P. and Stodieck, S. (2013) Designing for Minimum Risk in Spacecraft High Pressure Oxygen Systems (*poster*) AIAA 43rd International Conference on Environmental Systems (ICES), Vail, CO, July 2013
47. Fanchiang, C. and Klaus, D.M. (2012) FAA Human-rating Terminology and Definition (*poster*) FAA COE for CST, Second Annual Technical Meeting, Socorro, NM, Oct/Nov 2012
48. Fanchiang, C. and Klaus, D.M. (2012) Defining an Operability Index for Human Spacecraft Design (*poster*) AIAA 42nd International Conference on Environmental Systems (ICES), San Diego, CA, July 2012 (*3rd place student poster competition)*
49. Ocampo, R.P. and Klaus, D.M. (2012) Defining a Safety Index for Human Spacecraft Design (*poster*) AIAA 42nd International Conference on Environmental Systems (ICES), San Diego, CA, July 2012
50. Klaus, D.M. and Ahmed, F. (2010) Interdependencies between Culture Temperature, Cell Size and Sedimentation Rate on Escherichia coli Growth under Normal Gravity, on a Clinostat and in Space

(*abstract*) *American Society for Gravitational and Space Biology*, ASGSB 26th Annual Meeting, p.26, National Harbor, MD

51. Metts, J.G. and Klaus, D.M. (2010) Electrochromic Radiator Impact on Apollo Sublimator Water Consumption. (*poster*) 40th International Conference on Environmental Systems (ICES), Barcelona, Spain, July 2010 (*1st place student poster competition*)
52. Kobrick, R.L., Klaus, D.M. and Street, Jr., K.W. (2010) Defining lunar surface system material abrasion potential by dust interaction modes and variable concentration zones (*abstract*) Lunar Dust, Plasma and Atmosphere Conference, Boulder, CO, January 2010
53. Then, S.M., Fazlina, N., Hafizah, M., Khairul-Bariah, A.A.N., Noor-Hamidah, H., Maha, A., Klaus, D.M., Stodieck, L.S. and Jamal, R. (2009) Impact of Microgravity on the Expression of Multi-Drug Resistant Proteins in Jurkat Cells (*abstract*) *Gravitational and Space Biology Bulletin* **23(1)**: p.24, ASGSB 25th Annual Meeting, Raleigh, NC
54. Khairul-Bariah, A.A.N., Then, S.M., Rageshwary, R., Fazlina, N., Wan-Zurinah, W.N. Roslan, H., Klaus, D.M., Stodieck, L.S. and Jamal, R. (2009) Changes in Gene Expression of HepG2 Cells Exposed to Microgravity (*abstract*) *Gravitational and Space Biology Bulletin* **23(1)**: p.23, ASGSB 25th Annual Meeting, Raleigh, NC
55. Metts, J.G and Klaus, D.M. (2009) Electrochromic Radiators for Space Suits: Preliminary Testing Results (*poster*) 39th International Conference on Environmental Systems (ICES), Savannah, GA, July 2009 (*2nd place student poster competition*)
56. Kobrick, R.L. and Klaus, D.M. (2009) Test and Operational Strategies for Reducing Abrasion and Mitigating Dust Contamination of Lunar Surface Systems (*poster*) 39th International Conference on Environmental Systems (ICES), Savannah, GA, July 2009
57. Kobrick, R.L., Klaus, D.M., and Street, K.W. (2009) Applying Lunar Dust Abrasion Data Analysis to Impact Considerations for Spacecraft Design, (*abstract*) IAC Conference
58. Metts, J.G. and Klaus, D.M. (2008) Application of Electrochromic Materials for Active Space Suit Thermal Control (*poster*) 38th International Conference on Environmental Systems (ICES), San Francisco, CA, July 2008 (*4th place award student poster competition*)
59. Davis, B., Metts, J. and Klaus, D. (2007) Translating Life Support System Functions into Hardware Requirements and Operational Considerations for a Lunar Outpost Analogue (*poster*), First Annual Pacific International Space Center for Exploration Systems (PISCES) Conference, (*invited finalist team*), Hilo Hawaii, Nov 2007
60. Klaus, D.M. (2006) Microbial Systems and the Space Flight Environment (*abstract*) *Gravitational and Space Biology Bulletin* **20(1)**: p.30 and (*poster*) ASGSB 22nd Annual Meeting, Arlington, VA
61. Ahmed, F.N., Howard H.N. and Klaus, D.M. (2006) Coupled Effects of Temperature and Simulated Microgravity (Clinostat) on *E. coli* Population (*abstract*) *Gravitational and Space Biology Bulletin* **20(1)**: p.4 and (*poster*) ASGSB 22nd Annual Meeting, Arlington, VA
62. Stanczyk, A.R. and Klaus, D.M. (2006) The influence of antibiotics on bacterial motility and its implication for drug efficacy in microgravity (*abstract*) *Gravitational and Space Biology Bulletin* **20(1)**: p.5 and (*poster*) ASGSB 22nd Annual Meeting, Arlington, VA
63. Russell, J. and Klaus, D. (2006) Influence of Mission Constraints on Technology Selection and Data Collection (*abstract*) *Habitation* **10(5)**
64. Russell, J. Bamsey, M. and Klaus, D. (2006) Characterization of Ground-based Analogs for Lunar and Martian Exploration (*abstract*) *Habitation* **10(3/4)**: p. 180 and (*poster*) Habitation Conference, Orlando, FL
65. Howard, H.N. and Klaus, D.M. (2005) Containment Geometry Considerations for Space Flight and Simulated Microgravity Microbiology Experiments (*abstract*) *Gravitational and Space Biology Bulletin* **19(1)**: p. 11 and (*poster*) ASGSB 21st Annual Meeting, Reno, NV
66. Benoit, M.R., Nelson, E.S. and Klaus, D.M. (2005) Mathematical Analysis and Numerical Modeling of Buoyant Flow from Solute Gradients around Growing *Escherichia coli* Cells (*abstract*) *Gravitational and Space Biology Bulletin* **19(1)**: p. 21 and (*poster*) ASGSB 21st Annual Meeting, Reno, NV

67. Klaus, D.M. (2004) Bioastronautics in Aerospace Engineering Sciences (*abstract*) *Gravitational and Space Biology Bulletin* **18(1)**: p.32
68. Howard, H.N. and Klaus, D.M. (2004) Antibiotic Effectiveness in Simulated Microgravity (*abstract*) *Gravitational and Space Biology Bulletin* **18(1)**: p. 10 and (*poster*) ASGSB 20th Annual Meeting, New York, NY
69. Manley, J.M., Benoit, M.R. and Klaus, D.M. (2004) Non-invasive Measurement of the Population Density of *E. coli* Grown in Simulated Microgravity (*abstract*) *Gravitational and Space Biology Bulletin* **18(1)**: p. 6 and (*poster*) ASGSB 20th Annual Meeting, New York, NY
70. Benoit, M.R. and Klaus. D.M. (2004) Mitigating the Effects of Clinorotation on *Escherichia coli* through Induced Cellular Neutral Buoyancy (*abstract*) *Gravitational and Space Biology Bulletin* **18(1)**: p. 21 and (*poster*) ASGSB 20th Annual Meeting, New York, NY
71. Klaus, D.M. (2003) Gravitational Influence on Biomolecular Engineering Processes (*abstract*) *Gravitational and Space Biology Bulletin* **17(1)**: p. 22
72. Benoit, M.R., D.M. Klaus and E.S. Nelson (2003) Computational Modeling of Extracellular Mass Transport (*abstract*) *Gravitational and Space Biology Bulletin* **17(1)**: p. 11 and (*poster*) ASGSB 19th Annual Meeting, Huntsville, AL
73. Benoit, M.R., D.M. Klaus and W. Li (2002) Results of a Long Duration (72-day) Space Flight Experiment on Microbial Antibiotic Production (*abstract*) *Gravitational and Space Biology Bulletin* **16(1)**: p. 13 and (*poster*) ASGSB 18th Annual Meeting, Cape Canaveral, FL
74. Elms, R.D., T.A. Good, D.M. Klaus and M.V. Pishko (2002) Chemical and Gravity Dependent Factors affecting Escherchia coli Lag Phase Termination (*abstract*) *Gravitational and Space Biology* Bulletin **16(1)**: p. 21 and (*poster*) ASGSB 18th Annual Meeting, Cape Canaveral, FL
75. Klaus, D. (2002) Bioastronautics: Bioengineering in the Aerospace Curriculum (*poster*) Butcher Symposium on Genomics and Biotechnology, Broomfield, CO
76. Benoit, M.R., Klaus, D.M. and Owen, R.B. (2001) Quantifying Extracellular Mass Transport using Digital Holography (*abstract*) *Gravitational and Space Biology Bulletin* **15 (1)**: p. 23 and (*poster*) ASGSB 17th Annual Meeting, Alexandria, VA
77. Benoit, M., Bonomo, J. and Klaus, D. (2000) Effects of Space Flight on Microbial Antibiotic Production (*poster*) Colorado Alliance for Bioengineering (CAB), Aurora, CO
78. Supra, L., Finger, B., Klaus, D., MacKnight, A., Silverstein, J., Urban, J. and Strayer, D. (2000) Biological Wastewater Processor Experiment Definition (*poster*) 4th International Conference on Life Support and Biosphere Science (LSBS), Baltimore, MD
79. Klaus, D.M. and Stodieck, L.S. (1997) Microbial Response to Space Flight (*poster*) Recent Advances in Fermentation Technology (RAFT II) Symposium, San Diego, CA
80. Stodieck, L.S., Hoehn, A., Goulart, C., Sterrett, K. and Klaus, D.M. (1997) High-Frequency Access to Low-Gravity Biotechnology Research via Generic Space Flight Hardware (*poster*) Colorado Biotechnology Symposium, Boulder, CO
81. Klaus, D.M., Todd, P. and Schatz, A. (1996) Functional Weightlessness During Clinorotation of Cell Suspensions (*poster*) 31st Scientific Assembly of COSPAR, Birmingham, UK
82. Klaus, D.M. (1996) BioServe's Microorganism Space Flight Research Program (*poster*) Symposium on Colorado Space Biology Commercialization, Boulder, CO
83. Kacena, M.A., Leonard, P.E., Klaus, D.M., Simske, S.J., Luttges, M.W. (1994) The effect of microgravity on *E. coli* growth rates under suspension and solid agar conditions (*abstract*) *ASGSB Bulletin*, **8(1)**: p.18 and (*poster*) ASGSB 10th Annual Meeting, San Francisco, CA
84. Klaus, D. and Luttges, M. (1993) Antibiotic Effectiveness on *E. coli* During Space Flight (*abstract*) *ASGSB Bulletin* **7(1)**: p. 56 and (*poster*) ASGSB 9th Annual Meeting, Arlington, VA
85. Klaus, D., and Luttges, M. (1992) Metabolic Adaptation of *E. coli* in Microgravity (*abstract*) *ASGSB Bulletin*, **6(1)**: p. 36 and (*poster*) ASGSB 8th Annual Meeting, Tucson, AZ
86. Klaus, D., and Luttges, M. (1991) Metabolic Adaptation of *E. coli* in Microgravity (*abstract*) *ASGSB Bulletin*, **5(1)**: p. 58

87. Klaus, D.M. (1989) Cooperative Operations Between Crewmembers and Robots Onboard Space Station Freedom (abstract) AIAA Houston Section, 14th Annual Technical Symposium Proceedings, p. 9-9

*Technical Presentations, Seminars, Workshops & Panels*

1. NASA Space Technology Research Institute (STRI) HOME 5th Annual Technical Meeting, co-organizer and presenter, Research Thrust 1 – Vehicle Functional Design, UC Davis, CA, June 2024
2. NASA Space Technology Research Institute (STRI) HOME 4th Annual Technical Meeting, co-organizer and presenter, Research Thrust 1 – Vehicle Functional Design, CU Boulder, June 2023
3. Launching Space Biology Workshop: Microgravity Microbiology (*invited, opening session*), CU Boulder, May 2023
4. Texas A&M Aerospace Engineering Seminar: Bioastronautics: From Bacteria to Deep Space Smart Habitats (*invited*), College Station, TX, April 2023
5. 51st International Conference on Environmental Systems (ICES Functionally Aligning Emergent Technologies for Deep Space Smart Habitats, St. Paul, MN, July 2022
6. NASA Space Technology Research Institute (STRI) HOME 3rd Annual Technical Meeting, co-organizer and presenter, Research Thrust 1 – Vehicle Functional Design, UC Davis, CA, July 2022
7. Florida Institute of Technology, Department of Aerospace, Physics, and Space Sciences (*invited*), Graduate Seminar, Designing for Human Spaceflight, Melbourne, FL, April 2022
8. FAA COE CST 11th (and final) Annual Technical Meeting, organized and co-hosted meeting, moderated Research Area 1 (Human Space Flight) Panel, FIT, Melbourne, FL, April 2022
9. IEEE Aerospace Conference, Mapping Life Support System Functions and Technologies to Commercial Spaceflight Applications, Big Sky, MT, March 2022
10. NASA Space Technology Research Institute (STRI) HOME Seminar Series: Aligning ConOps to Functions with discussion of Key Terms and Definitions, virtual event, October 2021
11. 50th International Conference on Environmental Systems (ICES) Panel: Lunar Nomads vs. Settlers – What's next, and what does it take? (*invited*), Panelist, virtual event, July 2021
12. NASA Space Technology Research Institute (STRI) HOME 2nd Annual Technical Meeting, co-organizer and presenter, Research Thrust 1 – Vehicle Functional Design, virtual event, July 2021
13. CSF/MITRE Virtual Workshop on Creating a Human Research Program for Spaceflight Participants in the Commercialization of Space (*invited*), virtual event, May 2021
14. NASA Space Technology Research Institute (STRI) HOME-RETHi Seminar: Research Thrust 1: Vehicle Functional Design, virtual event, April 2021
15. Inaugural Bioastronautics@Hopkins: A Virtual Symposium on Human Spaceflight (*invited*), Speaker, Bioastronautics at the University of Colorado, virtual event, February 2021
16. NASA Space Technology Research Institute (STRI) HOME Seminar Series: Designing Toward Self-Reliant Deep Space Habitats, virtual event, January 2021
17. FAA AST Senior Management and Staff Briefing, COE CST Research Area 3: Human Spaceflight Tasks, virtual event, December 2020
18. FAA Center of Excellence for Commercial Space Transportation (COE CST), 10th Annual Technical Meeting, co-host and panelist for Research Area 3 – Human Spaceflight, virtual event, October 2020
19. NASA Space Technology Research Institute (STRI) HOME Seminar Series: Context and Criteria for Incorporating Smart Systems into a Deep Space Habitat, virtual event, August 2020
20. NASA Space Technology Research Institute (STRI) HOME 1st Annual Technical Meeting, co-organizer and presenter, Research Thrust 1 – Vehicle Functional Design, virtual event, July 2020
21. NASA Space Technology Research Institute (STRI) HOME Seminar Series: Aligning and Evaluating Applications of Smart Systems for a Deep Space Habitat, virtual event, May 2020
22. Engineers Without Borders, Engineering Exploration Lecture Series, Bioastronautics – the study and support of life in space, CU Engineering Center, Feb 2020
23. AIAA Rocky Mountain Section Annual Technical Symposium (*invited panelist*), Feature Panel: NASA's Return to Spaceflight Moon and Mars and Artemis, CU Boulder, Nov 2019

24. 49th International Conference on Environmental Systems (ICES), Parametric Analysis of Internal Heat Transfer for Full-body Radiative-cooled Space Suit Concepts, Boston, MA, July 2019
25. Conference on World Affairs (*invited*), Panel Moderator, *Space... Why Bother?*, CU Boulder, April 2019
26. FAA COE CST Human Spaceflight Research Workshop, (*organized and hosted*), University of Colorado, Boulder, May, 2018
27. FAA COE CST, Seventh Annual Technical Meeting, Panelist and Moderator, Human Spaceflight Research Panel, Las Cruces, NM, October 2017
28. Bioastronautics Education Workshop (*organized and hosted*), University of Colorado, Boulder, June, 2017
29. Conference on World Affairs (*invited*), Panelist, The 2nd Space Renaissance, Macky Auditorium, CU Boulder, April 2017
30. IEEE Aerospace Conference, Functional Integration of Humans and Spacecraft through Physics, Physiology, Safety and Operability, Big Sky, MT, March 2017
31. American Society for Gravitational and Space Research (ASGSR) 32nd Annual Meeting, A Systems Engineering Perspective on Gravitational Microbiology, Cleveland, OH, October 2016
32. FAA COE CST, Sixth Annual Technical Meeting, Task 320: Commercial Spaceflight Risk Assessment and Communication, Las Cruces, NM, October 2016
33. Rocky Mountain Chapter of the American Vacuum Society (RMCAVS) Annual Symposium - Space: The Final Vacuum Frontier (*invited*), Protecting Human Life in the Vacuum of Space: Challenges and Solutions, Westminster, CO, Sept. 2016
34. NSBRI Workshop on Piloting Spacecraft: Guidance and Control of Human Vehicles, (*invited, presented via WebEx*) 'Functional Integration of humans in piloted spacecraft', Houston, TX, Sept 2016
35. EVA Collaborative Workshop, NASA JSC, Sept 2016
36. FAA COE CST, Fifth Annual Technical Meeting, Task 320: Commercial Spaceflight Risk Assessment and Communication, Washington DC, October 2015
37. Café Scientifique, (*invited*) Gravity's influence on the spectrum of life – from humans to bacteria, UCCS, Colorado Springs, September 2015
38. Society for General Microbiology (SGM) Annual Conference 2015, (*invited*) Role of gravity in microbiological processes, 'Microbes in Space' session, Birmingham, UK, April 2015
39. 18th Annual FAA Commercial Space Transportation Conference, (*invited*) Panelist, Washington, DC, February, 2015
40. FAA COE CST, Fourth Annual Technical Meeting, Task 184: Human Rating of Commercial Spacecraft, Washington DC, October 2014
41. President's Teaching Scholars Program, Fall 2014 Retreat, (*invited*) Bacterial Responses to Spaceflight, Boulder, Sept. 2014
42. 44th International Conference on Environmental Systems (ICES), Incorporating Bioastronautics into an Engineering Curriculum, Tucson, AZ, July 2014
43. AIAA CU Student Section (*invited*), An Odyssey from 'Old Space' to 'New Space', CU, March, 2014
44. IEEE Aerospace Conference, Spacecraft Human-Rating: Historical Overview and Implementation Considerations, Big Sky, MT, March 2014
45. FAA COE CST, Third Annual Technical Meeting, Task 184: Human Rating of Commercial Spacecraft, Washington DC, October 2013
46. FAA COE CST, Second Annual Admin Meeting, Strategic Planning Summary, Somers Point, NJ, June 2013
47. Colorado School of Mines, AIAA/SEDS CSM Space Society (*invited*) Bioastronautics: the Study and Support of Life in Space, Golden, CO, November 2012
48. FAA COE CST, Second Annual Technical Meeting, Task 184: Human Rating of Commercial Spacecraft, Socorro, NM, November 2012
49. MIT Department of Aeronautics & Astronautics, New Trends in Aerospace Seminar Series (*invited*) Bacterial responses to spaceflight - biophysics, crew health, applications, and planetary protection, Boston, MA, October 2012

50. 42nd International Conference on Environmental Systems (ICES), Perspectives on Spacecraft Human-Rating, San Diego, CA, July 2012
51. Next Generation Suborbital Researchers Conference (*invited*), 'Windows of Opportunity' for Conducting Gravitational Biology Research onboard Suborbital Spacecraft, Palo Alto, CA, February 2012
52. FAA Center of Excellence for Commercial Space Transportation (COE CST) First Annual Technical Meeting, Task 184: Human Rating of Commercial Spacecraft, Boulder, CO, November 2011
53. 2011 Airport Planning Design and Construction Symposium, Plenary Speaker (*invited*), Airport Consultants Council (ACC) and American Association of Airport Executives (AAAE), Commercial Space Transportation, Denver CO, Feb 24, 2011
54. ASGSB 26th Annual Meeting, Panelist (*invited*) NASA Space Biology on the ISS: Next steps after the Shuttle, National Harbor, MD, November 2010
55. ASGSB 26th Annual Meeting, Interdependencies between Culture Temperature, Cell Size and Sedimentation Rate on Escherichia coli Growth under Normal Gravity, on a Clinostat and in Space, National Harbor, MD, November 2010
56. Seminar (*invited*), Functional Decomposition of the Dream Chaser Design Reference Mission, Sierra Nevada Corp., Louisville, CO, June 2010
57. Technical Interchange Meeting (TIM) (*chair*), Human Rating of Commercial Spacecraft, Sierra Nevada Corp, Louisville, CO, June 2010
58. Technical University of Munich, Institute of Astronautics Seminar (*invited*), Spacesuits: Past, Present and Future Munich, Germany, December, 2009
59. 39th International Conference on Environmental Systems (ICES), Academic Principles of Human Space Habitat Design, Savannah, GA, July, 2009
60. CU Alumni Relations, (*invited*), Luncheon Speaker at Northrop Grumman, Redondo Beach, CA, May 2009
61. CU Students for the Exploration of Space (SEDS) (*invited*), Expert Panel Discussion on Space Policy, CU, October 2008
62. AIAA CU Student Section (*invited*), Bioastronautics – Integrating the Human Subsystem into a Spacecraft, CU, September 2008
63. Workshop on Microgravity Sciences (*invited speaker and panelist)* Agensi Angkasa Negara (National Space Agency of Malaysia), Putrajaya, Malaysia, Sept. 2008
64. CU Students for the Exploration of Space (SEDS) (*invited*), NASA Launch and Mission Operations and the Astronaut Selection Process, CU, April 2008
65. Society of Women Engineers (SWE) Regional Conference (*invited*), Designing a Lunar Surface Habitat, CU, March 2008
66. Aerospace Engineering Sciences Graduate Seminar (*invited*), Developing an Undergraduate Aerospace Vehicle Design & Performance Rocket Lab, co-presented with Jonathan Metts, PhD student, CU, February 2008
67. Cyanobacteria in a Lunar Environment Workshop (*invited*), NASA Ames Research Center, CA, January 2008
68. Technical University of Munich, Institute of Astronautics Seminar (*invited*) Integrating Bioastronautics into an Engineering Curriculum. Munich, Germany, November, 2007
69. Texas Tech University, Space Science and Engineering Research Group Seminar (*invited*), Integrating Bioastronautics into an Engineering Curriculum. Lubbock, TX, October, 2007
70. 37th International Conference on Environmental Systems (ICES), Space Suit Concepts and Vehicle Interfaces for the Constellation Program. Chicago, IL, July 2007
71. Undergraduate Space Research Symposium, Key Note Speaker (*invited*), Human Space Mission Design, CU Space Grant Consortium, Boulder, CO, April 2007
72. AIAA CU Student Section, Guest Lecture (*invited*), Astronaut Selection Process, November 2006
73. 36th International Conference on Environmental Systems (ICES), Defining space suit functional design requirements for lunar and Mars exploration missions, Norfolk, VA, July 2006
74. Exploration Extravehicular Activity (EVA), NASA JSC, Houston, TX, November 2005

75. 35th International Conference on Environmental Systems (ICES), Spacecraft Life Support System Design Guidelines for Human Exploration of the Moon and Mars, Rome, Italy, July 2005
76. 15th Annual National Effective Teaching Institute (NETI) Workshop, (*nominated*), American Society for Engineering Education (ASEE), Portland, OR, June 2005
77. 20th American Society for Gravitational and Space Biology (ASGSB) Annual Conference, Bioastronautics in Aerospace Engineering Sciences, New York, NY, Nov. 2004
78. AIAA CU Student Section, Guest Lecture (*invited*), Astronaut Selection Process, September 2004
79. Presentation to John Schumacher (NASA Chief of Staff) on CU's Bioastronautics Program, (*invited*), August 2004
80. 34th International Conference on Environmental Systems (ICES), Systems Engineering Evaluation of a Mars Habitat Design, Colorado Springs, CO, July 2004
81. Colorado Space Grant Consortium, C-SMARTS Lecture Series, How to Become an Astronaut, (*invited*), recorded on May 26, 2004
82. Presentation to Sean O'Keefe (NASA Administrator) on CU's Bioastronautics Program, (*invited*), April, 2004
83. Conference-Workshop on Strategic Research to Enable NASA's Exploration Missions, Cleveland, OH, June 2004
84. NASA 7th Annual Microgravity Environment Interpretation Tutorial (MEIT) Workshop (*invited*), Glenn Research Center, Cleveland, OH, March, 2004 (3 talks)
    i) Overview of Space Biology from Cells to Humans,
    ii) Physical Effects of Space Flight Acting on Biological Systems,
    iii) Simulating Partial-g on Earth and 1g in Space,
85. NSF ADVANCE Program, Leadership Education for Advancement and Promotion (LEAP) Workshop (*nominated*), CU Boulder, January 2004
86. 19th American Society for Gravitational and Space Biology (ASGSB) Annual Conference (*invited*), Gravitational Influence on Biomolecular Engineering Processes, Huntsville, AL, Nov. 2003
87. NASA Fundamental Space Biology Program Workshop 'What do you need to know about doing cell biology experiments in space?' (*invited*), Huntsville, AL, November 2003 (2 talks)
    i) A Modular Suite of Hardware Enabling Space Flight Cell Culture Research,
    ii) Mass Transport Considerations for Space Flight Research Concerning Suspended and Adherent Cell Cultures,
88. 33rd International Conference on Environmental Systems (ICES), Applications of Vestibular System Response to Mission Risk Mitigation Factors and Spacecraft Design Requirements, Vancouver, BC, Canada, July, 2003
89. BIO 2003 Conference, Effects of Space Flight on Microbial Antibiotic Production, (*invited*), Washington, DC, June 2003
90. Southwest Research Institute (SWRI) Seminar, Bioastronautics and Microgravity Sciences, (*invited*), Boulder, CO, April 2003
91. NASA Office of Biological and Physical Research (OBPR) Free Flyer (FF) Research Roadmap Workshop (*invited*), Moffett Field, CA, December 2003
92. Center for Aerospace Structures (CAS) Seminar, Bioastronautics and Microgravity Sciences: Simulating Weightlessness by Clinorotation, (*invited*), CU-Boulder, April, 2003
93. NSF Faculty Career Development Workshop (*nominated*), Tempe, AZ, March 2003
94. CU Aerospace Graduate Seminar, Bioastronautics, (*invited*), CU-Boulder, November, 2002
95. AIAA CU Student Section, Guest Lecture, Astronaut Selection Process, (*invited*), September 2002
96. American Society for Microbiology (ASM) 102nd General Meeting (*invited*), Effects of Space Flight on Antibiotic Production, Salt Lake City, UT, May 2002
97. University of Colorado at Denver, Department of Biology Seminar, Featured Speaker, Space Biotechnology, (*invited*), May 2002
98. Rocky Mountain Regional Society for Industrial Microbiology (SIM), Featured Speaker, Space Biotechnology, (*invited*), Boulder, CO, Feb. 2002

99. AIAA Conference on ISS Utilization, Antibiotic Production in Space using an Automated Fed-Bioreactor System, Cape Canaveral, FL, Oct. 2001
100. UEF Conference, Analysis of Gravity-Dependent and Independent Extracellular Mass Transport Phenomena, Banff, Canada, Oct. 2001
101. AIAA CU Student Section, Guest Lecture, Astronaut Selection Process, (*invited*), September 2001
102. Technical Interchange Meeting - Microgravity Sciences (NASA Glenn Research Center) and Gravitational Biology (Ames Research Center) (*invited*), Cleveland OH, May 2001
103. Annual Space Day Celebration, Featured Speaker, Living and Working in Space, Yalesville Elementary School and Young Astronaut Club, Wallingford, CT, (*invited*), May 2001
104. Tulane Environmental Astrobiology Center Workshop on Microbiological and Mucosal Interactions in Space (*invited*), New Orleans, LA, April 2001
105. Colorado Space Grant Consortium, Student Guided Space Odyssey Undergraduate Space Research Symposium, Featured Speaker, Human Exploration and Development of Space, (*invited*), April 2001
106. College Committee on Bioengineering (CCOB) Seminar Series, Bioastronautics, CU, Nov. 2000
107. 16th American Society for Gravitational and Space Biology (ASGSB) Annual Conference, European Low Gravity Research Association (ELGRA) and the Canadian Space Agency (CSA) Joint Symposium, Featured Speaker (*invited*), Clinostats and Bioreactors, Canada, October 2000
108. 2nd Annual Cell Culture Hardware Developer's Workshop, Montréal, Quebéc, Canada, October 2000
109. LASP Seminar, (*invited*) Bioastronautics, September 2000
110. CU Graduate School Symposium, Featured Speaker, The Extremes of Life, (*invited*), August 2000
111. STS-95 One-Year Post-Flight Research Forum, NASA HQ, Washington, DC, January 2000
112. Society for Industrial Microbiology (SIM) Symposium (*invited*), Microgravity and Microorganisms, Session, Washington, DC, August 1999
113. Spacelab Accomplishments Forum, Panelist for commercial research performed onboard the Spacelab missions, National Academy of Sciences, Washington, DC, (*invited*), March 1999
114. Cell and Genomics Space Research Seminar (*invited*), NASA Ames Research Center, March 1999
115. International Space Station "Make it Your Business" Panelist, Internationally Televised Interactive Broadcast produced by NASA and WHRO TV, (*invited*) Norfolk, VA, February 1999
116. 3rd NASA (Mir) Phase 1 Research Program Symposium, Huntsville, AL, November 1998
117. Departmental Seminar, Bristol-Myers Squibb Pharmaceutical Research Institute (*invited*), Space Biotechnology, Wallingford, CT, December 1998
118. AIAA CU Student Section, Guest Lecture, Astronaut Selection Process, (*invited*), October 1998
119. College of Business Administration Seminar (*invited*) Space Biotechnology, Management Department and Center for Entrepreneurship Oklahoma State University, Stillwater, OK, September 1998
120. Gordon Research Conference (*invited*), Effects of Microgravity on the Development of Microorganisms, Colby-Sawyer College, NH, July 1998
121. Biological Waste Water Processing in Microgravity Workshop (*invited*) NASA Johnson Space Center, Houston, TX, June 1998
122. Gravitational Biology and Ecology Seminar, (*invited*) NASA Ames Research Center, Feb. 1998
123. NASA (Mir) Phase 1 Research Program Symposium, NASA Johnson Space Center, Houston, TX, August 1997
124. Second U.S. Microgravity Laboratory (USML-2) One-Year Post-Flight Research Forum, National Academy of Sciences, Washington, DC, February 1997
125. Microbiology Departmental Seminar (*invited*), Effects of Weightlessness on Microorganisms, Montana State Univ., Bozeman, MT, Sept. 1996
126. Physics Colloquium (*invited*), Space Life Sciences, Montana State University, Bozeman, MT, Sept. 1996
127. 31st Scientific Assembly of COSPAR, Cellular Responses to Gravity, Birmingham, UK, July 1996
128. Departmental Seminar (*invited*), Space Microbiology, Bristol-Myers Squibb Pharmaceutical Research Institute, Wallingford, CT, March 1996

129. Institute Seminar, *E. coli* Growth Kinetics: A Comparison of Clinostat to Space Flight Results and a Definition of Functional Weightlessness, German Aerospace Research Establishment (DLR), Institute of Aerospace Medicine, Cologne, Germany, (*invited*), May 1995
130. The 5th European Symposium on Space and Environmental Control Systems and 24th International Conference on Environmental Systems (ICES), Effects of Space Flight in *E. coli* Growth, Friedrichshafen, Germany, June 1994
131. The World Space Congress, Four Educational Programs in Space Life Sciences, Washington, DC, September 1992
132. Committee on Science, Space, and Technology, Hearing on Biomedical Research in Space, Washington, DC, October 1991
133. American Society for Gravitational and Space Biology (ASGSB) 7th Annual Meeting, Metabolic Adaptation of *E. coli* in Microgravity, Crystal City, VA, October 1991
134. 19th Intersociety Conference on Environmental Systems (ICES), Performance Evaluation of Advanced Space Suit Concepts for Space Station, San Diego, CA, July 1989
135. AIAA Houston Section, Cooperative Operations Between Crewmembers and Robots Onboard Space Station Freedom, 14th Annual Technical Symposium, Clear Lake, TX, May 1989

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**Cumulative Research Funding** (2002-2024) of **~$21M** total with **~$8M** as PI from 56 grants and 2 gift funds

*Current Research*

1. **CU Lead PI and Deputy Director/Co-I** with Director/Co-PI S. Robinson (UC Davis, lead institution), CU Co-Is J. Nabity, A. Anderson, and T. Clark, collaborators from Carnegie Mellon, Georgia Tech, Howard Univ., USC, Texas A&M and 3 unfunded industry partners, **Habitats Optimized for Missions of Exploration (HOME)**, NASA Space Technology Research Institute (STRI), Topic 2 – Deep Space Habitats (SmartHabs), 80NSSC19K1052. 9/1/2019-8/31/2024, NCE thru 8/31/25

*Gift Fund Support*

1. **Fiscal Principal, Marlar Human Spaceflight Fund**, Board of Trustees for the William F. Marlar Memorial Foundation (annual since 2006)
2. **Fiscal Principal, Bioastronautics Fund,** private donor, (2018-2024)

*Completed Projects (since tenure track in 2002)*

1. **PI, Executive Director and Administration II** (Task 330 renewal), FAA Center of Excellence for Commercial Space Transportation (COE CST) with subcontract to Orion America Technologies, 2/5/2020-8/19/2022, extended to 12/31/23, NCE to 3/31/24 for administrative closeout process
2. **Co-I, Using A Human Capabilities Framework to Quantify Crew Task Performance for Human-Robotic Systems,** with The Space Research Company LLC, (C. Fanchiang, PI) NASA HRP HCAAM VNSCOR, *definition phase*: 4/15/2019-12/31/19 (NCE 2/15/20); *implementation phase*: 1/1/20-4/14/2023 (NCE 8/14/23)
3. **Co-I, Graduate Assistantships in Areas of National Need (GAANN): Critical Aerospace Technologies**, US Department of Education, with PI Penny Axelrad (11 Co-Is), 10/1/2018-9/30/2021 (NCE through summer 2022), (student support only)
4. **PI, Mapping Life Support Functions and Technologies to Commercial Spaceflight Applications FAA COE ECLSS** (Task 396) FAA Center of Excellence for Commercial Space Transportation (COE CST) 2/5/20-12/31/21

5. **Co-I, Characterization of Biofilm Formation, Growth and Gene Expression on Different Materials and Environmental Conditions in Microgravity**, PI Luis Zea, NASA/CASIS (NNH15TT002N), 1/1/2017-12/31/2020
6. **PI, Assessing the Feasibility of using Co-Electrolysis to Concurrently Convert Carbon Dioxide and Water into Methane and Oxygen for Propellant and Life Support on Mars** (NNX16AM49H), training grant for Mike Lotto, PhD student, NASA Space Technology Research Fellowship (NSTRF); 8/1/2016-7/31/2020 (NCE 12/31/2020)
7. **PI, Executive Director and Administration** (Task 330), FAA Center of Excellence for Commercial Space Transportation (COE CST) with subcontract to Orion America Technologies, 6/1/18-5/31/19 (NCE 12/31/19)
8. **Co-I**, **Interactive Space Vehicle Design Tool with Virtual Reality**, NASA (80NSSC18K0198) NRA Appendix A, Omnibus Human Research Program**,** with PI Dr. Allison Anderson, 8/28/18 – 11/9/19
9. **PI, Design and Operational Considerations for Human Space Flight Occupant Safety** (Task 353) FAA Center of Excellence for Commercial Space Transportation (COE CST); 6/1/17-5/31/18 (NCE 12/31/18)
10. **PI, Direct Generation of Oxygen via Electrocatalytic Reduction of Carbon Dioxide in an Ionic Liquid** (NNX14AL72H), training grant for Jordan Holquist, PhD student; NASA Space Technology Research Fellowship (NSTRF); 8/1/14-7/31/18 (NCE 8/31/18)
11. **PI, COE CST Theme 3 Workshop** (Task 373) FAA Center of Excellence for Commercial Space Transportation (COE CST); 6/1/17-12/31/17 (NCE 8/31/18)
12. **CU PI**, with The Space Research Company LLC, (C. Fanchiang) **NASA STTR**, Elemental Resource Breakdown Approach for Crew-Vehicle Design, 7/1/17-6/8/18
13. **PI, Commercial spaceflight risk assessment and communication** (Task 320) FAA Center of Excellence for Commercial Space Transportation (COE CST); 6/1/15-5/31/17
14. **PI, Human-Systems Integration in Complex Aerospace Systems** (NNX13AR76H); training grant for Christine Fanchiang, PhD candidate, NASA Harriett G. Jenkins Graduate Fellowship Program ; NASA ARC, 9/30/2013-12/31/2016
15. **PI**, with Orbital ATK on **Next Space Technologies for Exploration Partnerships** (NextSTEP) Phase I Broad Agency Announcement, (BAA NNH15ZCQ001K) Appendix B: Habitation Systems, with Co-I's Jim Nabity and Jim Voss, ECLSS Definition, 8/31/15-7/25/16
16. **PI**, with Orbital ATK on **Next Space Technologies for Exploration Partnerships** (NextSTEP) Phase I Broad Agency Announcement, (BAA NNH15ZCQ001K) Appendix B: Habitation Systems, with Co-I's Jim Nabity and Jim Voss, Graduate Projects, 8/31/15-5/31/16
17. **PI, Characterization of Dynamic Thermal Control Schemes and Heat Transfer Pathways for Incorporating Variable Emissivity Electrochromic Materials into a Space Suit**; (NNX12AN17H S02); training grant for Chris Massina, PhD candidate; NASA Space Technology Research Fellowship (NSTRF), 8/1/12-7/31/16
18. **PI, Using the International Space Station to Evaluate Antibiotic Efficacy and Resistance**; with Co-I Louis Stodieck; NASA / Center for the Advancement of Science in Space (CASIS), International Space Station US National Laboratory (Contract No.: GA-2014-146/TO1); 7/11/14-5/11/15 (NCE to 8/31/15)
19. **PI, A Self-Regulating Freezable Heat Exchanger for Spacecraft** in collaboration with TDA Research, Inc., STTR Phase II (NNX13CJ46C); NASA JSC; 9/1/13-7/10/15 (NCE to 8/25/15)
20. **PI, NASA Crew Robotics, Avionics, and Vehicle Equipment** (CRAVE) with Alliant Techsystems Inc. and its subsidiaries ATK Space Systems Inc. and ATK Launch Systems Inc., pre-approved vendor

contract, submitted Oct 2009, awarded 7/7/10-6/30/15, funding TBD per project as announced, no bids to date (*contract focus impacted due to NASA programmatic changes post award*)

21. **PI, Human-Rating of Commercial Spacecraft** (Task 184), FAA Center of Excellence for Commercial Space Transportation (COE CST); 6/1/11-12/31/14
22. **PI, Safety and Mission Assurance Support for the NASA Commercial Crew Program;** Sierra Nevada Corp / NASA CCiCap, 9/1/12-12/31/14
23. **Co-PI, Animal Enclosure Module – Environmental Control and Life Support System (AEM-E),** with Louis Stodieck (PI) NASA Ames, 7/16/12-6/30/14
24. **Characterization of a KO2-based approach for spacecraft atmosphere revitalization**, NASA JSC, 2/1/13-8/31/13
25. **PI, A Self-Regulating Freezable Heat Exchanger for Spacecraft Thermal Control**, NASA Phase 1 STTR with TDA Research, Inc., 3/12/12-1/13/13
26. **PI. COE Technical Oversight** (Task 281), FAA, 1/12/11-8/31/12
27. **PI, Human Rating Plan and Verification Matrix for the Dream Chaser Spacecraft System**, Sierra Nevada Corp / NASA CCDev2, 5/16/11-7/31/12
28. **PI, ECLSS CO2 Testbed Feasibility Study**, with S. Tozer (Aero MS), Lockheed Martin, 6/1/12-12/31/12
29. **PI, Defining a Failure Mode-Based, Multivariate Risk Index to Assess Human Spacecraft Safety and Reliability,** GSRP Training Grant with J. Mindock (Aero PhD), NASA JSC**,** 8/09 – 8/12
30. **Co-I (Associate Director) Specialized hardware and advanced payload integration and operations approach to enable research on the ISS National Lab with Jatropha curcas** with Louis Stodieck (PI), NASA BAA (NNH10CAO0001K), 6/1/2010 - 5/31/2011
31. **PI, Human Rating Plan for the Dream Chaser Spacecraft System,** Sierra Nevada Corp / NASA CCDev Program, 3/19/2010-12/31/2010
32. ***PI, Support of Human Space Flight Advanced Programs Group, Lockheed Martin****, 10/1/08-12/31/10, grant awarded then deobligated due to NASA Constellation Program cancellation*
33. **PI, Application of Electrochromic Materials for Active/Passive Space Suit Thermal Control,** GSRP Training Grant with J. Metts (Aero PhD), NASA JSC (Wyoming Space Grant, supplement), 8/07-8/10
34. **PI, Lunar dust characterization and mitigation technologies for surface exploration spacecraft and spacesuits**, GSRP Training Grant with Ryan Kobrick (Aero PhD), NASA GRC, 8/07 – 8/10
35. **Fiscal Principal, Gift Support of a Student Project in Manned Spaceflight**, *eSpace/WIRED*, 1/1/09-5/31/09
36. **Co-I, (Associate Director), ISS National Lab Pathfinder** (NCC8-242) with Louis Stodieck (PI), NASA, 11/1/07-10/31/08
37. **Co-I (Associate Director), Mission Support for the Microbial Drug Resistance and Virulence (MDRV) Payload** with Louis Stodieck (PI), NASA, 1/14/08-7/11/08
38. **Co-I (Associate Director) Sponsor Membership Agreement between Astronautic Technology (M) SDN. BHD. , Malaysia and BioServe Space Technologies at the University of Colorado, for Support for Scientific Program of Angkasawan Mission** with Louis Stodieck (PI) and Alex Hoehn, ANGKASA (Malaysian Space Agency), 5/07-12/07
39. **Co-I (Associate Director), Commercial Partnerships in Support of the NASA Human Research Program**, with Louis Stodieck (PI) and Alex Hoehn**,** NASA**,** 1/07-12/07

40. **PI Systematic Characterization of Antibiotic Effectiveness under Altered Gravitational Environments,** (NNJ07JA48H, transferred award), GSRP Training Grant with Kevin Higdon (Aero PhD), NASA, 1/07-12/07
41. **Co-I (Associate Director), BioServe Cooperative Agreement (NCC8-242)**, with Louis Stodieck (PI) and Alex Hoehn, NASA, 11/05-10/06
42. **PI, Development of a Novel BioMEMS Sensor for Cytokine Measurement in Body Fluids and Minimally Invasive Astronaut Immune System Monitoring** (NNG04GO76H), GSRP Training Grant with Vanessa Aponte (Aero PhD), NASA, 9/04-8/06
43. **PI, Systematic Characterization of Antibiotic Effectiveness under Altered Gravitational Environments** (NNJ05JG75H, *previously NNJ04JF86H*), GSRP Training Grant with Heather Howard (Aero MS), NASA, 9/04-8/06
44. **PI (CU), Lunar Space Suit Portable Life Support System (PLSS) Analysis** (CRAVE DO1), with R. Askew and M. Schuller (Texas A&M), R. Kobrick (CU), NASA**,** 4/05- 2/16/06
45. **PI (CU), Spacesuit Architecture Study** (CRAVE DO6), with R. Askew and M. Schuller (Texas A&M), M. Bamsey (CU), NASA, 9/05-11/05
46. **Co-I (Associate Director), BioServe Cooperative Agreement (NCC8-242),** with Louis Stodieck (PI) and Alex Hoehn**,** NASA**,** 11/04-10/05
47. **PI, Modeling Extracellular Mass Transport** (NGT3-52386), GSRP Training Grant with Mike Benoit (Aero PhD), NASA, 9/02-8/05
48. **PI, Space Motion Sickness Mitigation** (NAG9-1438), GSRP Training Grant with Ken Stroud (Aero PhD), NASA, 9/02-12/04
49. **Co-I, (Associate Director), BioServe Cooperative Agreement** (NCC8-242), with Louis Stodieck (PI) and Alex Hoehn**,** NASA**,** 11/03-10/04
50. **PI, Interaction and Synergism of Microbial Fuel Cell Bacteria within Methanogenesis** (NAG9-1555), GSRP Training Grant with Jackson Lee (Aero MS), NASA**,** 9/03-8/04
51. **PI, Quantitative Ultrasonic Bone and Muscle Density Measurement Techniques (NAG9-1468)**, GSRP Training Grant with Tom Hatfield (Aero PhD)**,** NASA**,** 9/02-5/04
52. **PI (CU), Mass and Momentum Transport in Cell Suspension Cultures** (NAG3-2783) with Emily Nelson (NASA Glenn), M. Benoit (CU)**,** NASA**,** 5/02-5/04
53. **Co-I, Miscible Fluids in Microgravity – Thermal (MFMG-T) Experiment Support** (augment to NCC8-242) with Louis Stodieck (PI), NASA, 7/03-12/03
54. **Co-I (Associate Director), BioServe Cooperative Agreement** (NCC8-242), with Louis Stodieck (PI) and, Alex Hoehn, NASA, 11/02-10/03
55. **PI, Bioastronautics Curriculum Development**, CU Engineering Excellence Fund (EEF), 5/02-8/02

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# TEACHING

Established a novel curriculum in human space flight that has become a graduate focus area within the Aerospace Engineering Sciences Department termed *Bioastronautics*

**Courses Taught** (*since 1993*)

*Undergraduate*
ASEN 2004 Aerospace Vehicle Design and Performance: Orbits, Rockets & Satellites *(revised, 2007)*
ASEN 2519 *Special Topics:* Introduction to Human Spaceflight *(new course, summer 2004)*
ASEN 3519 *Special Topics*: Fundamentals of Human Spacecraft *(new course, 2005)*
ASEN 4018 Senior Projects I: Design Synthesis
ASEN 4028 Senior Projects II: Design Practicum
ASEN 4158 Space Habitat Design (*previously cross listed with 5158*)
ASEN 4849 Independent Study

*Graduate*
ASEN 5016* Space Life Sciences *(new course, 1993)* – 681 students cumulative 1993-2020
ASEN 5018/6028 Graduate Projects I/II: Human Spacecraft Design section *(new course, 2008)*
ASEN 5116 Spacecraft Life Support Systems *(revised, 2002)*
ASEN 5158* Space Habitat Design *(revised, 2003)* – 799 students cumulative 2002-2024
ASEN 5506/6506 Bioastronautics Seminar *(new course, 1995 and revised, 2003)*
ASEN 5519: Special Topics: Lunar Module Design (*new course, grad projects pilot, Spring 2007)*
ASEN 5849/6849 Independent Study

**ASEN 5016 and 5158 concurrently offered for distance MS program (formerly CATECS, CAETE, BBA…)*

**Thesis Students**

*PhD Thesis Committee Member – **current***

1. Bharath Tata, Aerospace PhD student (*advisor, J. Nabity*), passed comps Oct 2024
2. Danielle Carroll, Aerospace PhD candidate (*advisor, J. Nabity*), passed comps April 2024
3. Gabriella Schauss, Aerospace PhD Candidate (*advisor A. Anderson*), passed comps May 2023
   **Research Topic**: The Development of Analytical and Fabrication Methodologies for Mechanical Counter Pressure to Address Current Challenges of Planetary Exploration Garments
4. Christine Escobar, Aerospace PhD candidate, passed comps Oct 2022 (*co-advisor with J. Nabity*)
   **Research Topic**: Robust ECLSS Design Methodology for Deep Space Exploration

*PhD Thesis Advisor – **completed***

1. Patrick Pischulti, Aerospace PhD Dec 2024 (*PhD beginning Jan 2020, prelim 2020, comps May 2023)*
   **Dissertation Title:** *Strategies for Enabling Self-Sufficient Anomaly Response in Deep Space Habitats*
   **Funding:** TA Fall 2019, NASA HOME STRI Jan 2020-present
2. Michael Zero, Aerospace PhD Dec 2024 (*PhD beginning January 2020, prelim 2020, Comps May 2023)*
   **Dissertation Title:** *Defining, Measuring, and Applying Spaceflight Crewmember Operational State*
   **Funding:** TA Fall 2019 and Spring 2020, NASA VNSCOR HCAAM grant summer 2020-2023, HOME STRI Fall 2023-present
3. Eric Brighton, Aerospace PhD Aug 2024 (*prelim 2017, PhD beginning January 2018, military leave 2020, comps Jan 2022, defense May 2024, ABD)*

**Dissertation Title:** *A Systems Engineering Approach to Holistically Evaluating Cockpit Design and Performance*
**Funding:** US Navy, GI Bill (while continuing to work full time)

4. Sophie Zaccarine, Aerospace PhD Aug 2024 (*PhD beginning Jan 2020, prelim 2020, comps Dec 2022, defense May 2024, ABD)*
**Dissertation Title:** *Characterizing Self-Sufficiency and Habitability for Autonomous Deep-Space Habitat Operations*
**Funding:** TA Fall 2019, NASA HOME STRI Jan 2020-April 2024
**Employment**: Blue Origin, 2024

5. Annika Rollock, Aerospace PhD August 2023 (*prelim 2019, PhD beginning Jan 2020, comps Jan 2022, final defense May 2023, ABD)*
**Dissertation Title:** *Guiding Principles for Prioritizing Use of Emergent Technology Towards Self-Reliant Deep Space Habitats*
**Funding:** NASA HOME STRI 2020-2023
**Employment**: Aurelia Institute, 2023

6. Michael Lotto, Aerospace PhD Dec 2020 (*BS/MS May 2015, PhD beginning August 2015, prelim Sep 2015, comps Nov 2017, final defense Nov 2020).*
**Dissertation Title**: *Assessing the Feasibility of using Co-electrolysis with Task-Specific Ionic Liquids to Produce Methane and Oxygen for Martian In-Situ Resource Utilization*
**Funding:** NASA STTR Freezable Heat Exchanger, 2015; BioServe, 2015-16; NASA Space Technology Research Fellowship (NSTRF), 2016-2020
**Employment**: Paragon Space Development Corp. 2020-22, Blue Origin 2022

7. Tobias Niederwieser, Aerospace PhD Dec 2018
**Dissertation Title**: *Analysis of Factors Affecting the Implementation of an Algal Photobioreactor into a Spacecraft Life Support System*
**Funding:** BioServe RA, PhD Fellowship from the German Academic Scholarship Foundation, 2016
**Employment**: BioServe, and Assistant Research Professor CU, 2022

8. Jordon Holquist, Aerospace PhD Dec 2018
**Dissertation Title**: *Direct Generation of Oxygen via Electrocatalytic Reduction of Carbon Dioxide in an Ionic Liquid*
**Funding:** NASA CEP, 2013; Phase 2 NASA STTR TDA 2013-2014; NASA Space Technology Research Fellowship (NSTRF) 2014-2018
**Employment**: Fulbright Scholar at TUM, Paragon Space Development Corp.

9. Christine Fanchiang, Aerospace PhD May, 2017
**Dissertation Title**: *A Quantitative Human Spacecraft Design Evaluation Model for Assessing Crew Accommodation and Utilization*
**Funding:** BioServe; FAA COE CST Task 184 2011-13; Achievement Reward for College Scientists (ARCS) Scholarship; P.E.O. Scholar Award; NASA Harriett G. Jenkins Fellowship 2013-2016
**Employment**: Founder, The Space Research Company

10. Robert Ocampo, Aerospace PhD, May 2016
**Dissertation Title**: *Defining, Characterizing, and Establishing 'Safe Enough' Risk Thresholds for Human Space Flight*
**Funding:** NASA/SNC CCDev2, CCiCap 2011-2014, TA Spr 2014; FAA COE CST Task 320 2015-16
**Employment**: Sierra Nevada Corp., Blue Origin, 2019-

11. Chris Massina, Aerospace PhD, May 2016
**Dissertation Title**: *Characterization of Dynamic Thermal Control Schemes and Heat Transfer Pathways for Incorporating Variable Emissivity Electrochromic Materials into a Space Suit*

**Funding:** BioServe; NASA Space Technology Research Fellowship (NSTRF) 2012-2016
**Employment**: NASA JSC

12. Luis Zea, Aerospace PhD Aerospace, May 2015
**Dissertation Title**: *Phenotypic and Gene Expression Responses E. Coli to Antibiotics during Spaceflight*
**Funding:** BioServe; DAAD Fellowship; CASIS AES-1
**Employment:** BioServe, CU Assistant Research Professor, 2018-22, Sierra Space 2022

13. Jennifer Mindock, PhD Aerospace, August 2012
**Dissertation Title:** *Development and Application of Spaceflight Performance Shaping Factors for Human Reliability Analysis*
**Funding:** NASA GSRP Fellowship; ARCS, Scholarship; Zonta Amelia Earhart Fellowship
**Employment:** Wyle, NASA JSC

14. Kevin Higdon, PhD Aerospace, May 2012
**Dissertation Title:** *A Systematic Process for Assessing Human Spacecraft Conceptual Designs in Terms of Relative Safety and Operational Characteristics*
**Funding:** NASA GSRP Fellowship; Marlar Foundation
**Employment**: Sierra Nevada Corporation, Jacobs ESSSA Group, Zero Point Frontiers Corp.

15. Jonathan Metts, PhD Aerospace, December 2010
**Dissertation Title:** *Application of Electrochromic Materials for Active Space Suit Thermal Control*
**Funding**: NASA GSRP Fellowship; ARCS Scholarship
**Employment**: Sierra Nevada Corp., Bigelow Aerospace, Zero Point Frontiers Corp., SpaceX, Blue Origin

16. Ryan Kobrick, PhD Aerospace, August 2010
**Dissertation Title:** *Lunar Dust Characterization and Mitigation Technologies for Surface Exploration Missions*
**Funding**: NASA GSRP Fellowship; AIAA Fellowship; ARCS Scholarship
**Employment**: Postdoc MIT 2010-12; Space Florida, 2012-16, Assistant Prof. Embry-Riddle, 2016-2020, Paragon Space Development Corp. 2020

17. Evan Thomas, PhD, Aerospace, August 2009
**Dissertation Title:** *Sustainable Fouling Management for Spacecraft Fluid Handling Systems*
**Funding**: NASA JSC Fellowship
**Employment**: NASA JSC; Assistant Prof., Portland State University, 2010, Assoc. Prof. CU, 2018

18. Steve Chappell, PhD, Aerospace, August 2006
**Dissertation Title**: *Analysis of Planetary Exploration Spacesuit Systems and Evaluation of a Modified Partial Gravity Simulation Technique*
**Funding/Recognition:** AIAA Foundation Graduate Award, 2005
**Employment:** Wyle, NASA JSC - EVA Physiology, Systems, & Performance Project (EPSP), Human Adaptation & Countermeasures

19. Vanessa Aponte, PhD, Aerospace, August 2006
**Dissertation Title**: *Development and Analysis of a Novel Cytokine Biosensor Concept for Astronaut Immune System Monitoring*
**Funding/Recognition:** NASA GSRP, 2004-2006; NASA JSC Internship, 2003; Chancellor's Teaching Assistantship Award, 2001; GEM Scholarship, 2001; 9News Interview; Hispania News; Outstanding Graduate Student of the Year Award from the Society for Hispanic Professional Engineers (SHPE) and GEM,2005; CU President's Diversity Award Recipient, Student Category, 2005; HENAAC Award, 2005
**Employment:** Lockheed Martin

20. Jim Russell, PhD, Aerospace, December 2005
**Dissertation Title**: *Expanded Life-Cycle Analysis to Optimize Spacecraft Life Support System Design*
**Funding/Recognition:** Sigma Xi Scientific Research Society 'Grant-in-Aid of Research' Award, 2003;

AIAA Foundation Graduate Award, 2002 and 2005
**Employment**: Postdoc at Purdue Univ. 2005-06; Lockheed Martin 2006

21. Mike Benoit, PhD, Aerospace, August 2005
**Dissertation Title**: *Responses, Applications, and Analysis of Microgravity Effects on Bacteria*
**Funding/Recognition:** John A. Vise Award, 2003; AIAA Foundation Graduate Award, 2003; NASA GSRP (NGT3-52386), 2002-2005; President ASGSB Student Chapter, 2003 (and VP, 2002)
**Employment**: Postdoc at Stanford Univ. 2006-2010; Codexis 2010

22. Ken Stroud, PhD Aerospace, December 2004
**Dissertation Title**: *Mitigating Vestibular Disturbances During Spaceflight Using Virtual Reality Training and Reentry Vehicle Design Guidelines*
**Funding/Recognition: NASA GSRP (NAG9-1438), 2002-2005; AIAA Willy Z. Sadeh Award, 2002**
**Employment**: NASA Johnson Space Center; Sierra Nevada Corporation

23. Tom Hatfield, PhD Aerospace, December 2004
**Dissertation Title**: *Development of Novel Ultrasonic Physiological Measurement Methodologies Appropriate for Space Flight*
**Funding/Recognition:** AIAA Foundation Graduate Award, 2003; NASA GSRP (NAG9-1468), 2002-04
**Employment**: Wyle Life Sciences, NASA Johnson Space Center

24. Rob Brown, PhD Aerospace, May 1999 (*co-advised with P. Todd*)
**Dissertation Title**: *Effects of Spaceflight, Clinorotation and Centrifugation on the Growth and Metabolism of Escherichia coli*
**Employment**: Lt. Col, USAF; Professor, Division Chief, Dept. of Astronautics, USAFA, CO Springs

*PhD Thesis Committee Member – **completed***

1. Aaron Allred, Aerospace PhD, 2024 (*advisor T. Clark*), comps April 2023, defense June 2024
**Dissertation Title:** *Galvanic Vestibular Stimulation as a Countermeasure to Motion Sickness in Astronauts*

2. Mitch Woolever, Aerospace PhD, 2024 (*advisor, J. Nabity*), comps April 2022, defense May 2024
**Dissertation Title**: *Ionic Liquid Property Prediction via Quantitative Structure Property Relationships with Application to Electrochemical Bosch Carbon Formation Catalyst Renewal*

*3.* George Lordos, MIT Department of Aeronautics and Astronautics, PhD, 2024 (*advisor O. de Weck*)
**Dissertation Title:** *Engineering Robust and Autocatalytic Architectures for Human Missions to Mars*

4. Sam Eshima, Aerospace PhD 2023 (*advisor, J. Nabity*)
**Dissertation Title:** *Sensor Suite Optimization Process for Environmental Control and Life Support Systems that Utilize Machine Learning for Anomaly Detection and Diagnostics*

5. Sage Sherman, Aerospace PhD 2023 (*advisor, A. Anderson*)
**Dissertation Title:** *Investigating Stochastic Resonance as a Countermeasure for Human Performance in Spaceflight*

6. Kipp Larson, Aerospace PhD, 2023 (*advisor J. Nabity*)
**Dissertation Title:** *Space Suit Thermal Control with a Gas-Gap Heat Switch*
**Employment**: Ball Aerospace

7. Abhishektha Boppana, CU Aerospace PhD May 2022, comps Nov 2020 (*advisor, A. Anderson*)
**Dissertation Title:** *Implementing Dynamic Foot Shape Models to Improve Spacesuit Boot Fit*

8. Young-Young Shen, CU Aerospace PhD, May 2022, comps Dec 2018, defense Jan 2022, ABD (*advisor A. Anderson*)
**Dissertation Title:** Develop*ment and Evaluation of a Magnetometer-Free Wearable Inertial Sensor System for Spacesuit Wearer Joint Kinematics Estimation*

9. Heather Hava, PhD, CU Aerospace, ABD Fall 2020, graduated May 2022 (*advisor N. Correll*)
   **Dissertation Title**: *Development and Application of a Living Systems Centered Design Framework to kipImprove Habitability, Diet, Well-being, Crew Performance and Automation Strategies*

10. Daniel Case, CU PhD Aerospace, December 2021 (*advisor J. Nabity*)
    **Dissertation Title**: *Astronaut Radiation Protection for Long-Duration Missions: Integrating Passive Radiation Shielding into Space Habitat Design*

11. Carlos Pinedo, PhD, CU Aerospace, May 2021 (*advisor T. Clark*)
    **Dissertation Title**: *Design and Evaluation of Advanced Display and Control Concepts for Piloted Planetary Landing*

12. Kathryn Bretl, PhD CU Aerospace, May 2021 (*advisor T. Clark*)
    **Dissertation Title**: *The Development of a Conceptual Design for Short-Radius, Intermittent Centrifugation for Spaceflight Artificial Gravity*

13. Steve McGuire, PhD, CU Aerospace, August 2019 (*advisor N. Ahmed*)
    **Dissertation Title**: *Autonomous On-Line Learning of Assistant Selection Policies for Fault Recovery*

14. Emily Matula, PhD, CU Aerospace, August 2019 (*advisor J. Nabity*)
    **Dissertation Title**: *Characterization of Photobioregenerative Technology for Simultaneous Thermal Control and Air Revitalization of Spacecraft and Surface Habitats*
    Employment: JSC

15. Claas Olthoff, PhD, August 2017, Technische Universität München (TUM) (*advisor, U. Walter*)
    **Dissertation Title:** *Dynamic Simulations of Extravehicular Activities*
    **Employment**: TUM, NASA JSC postdoc, Professor, Univ Stuttgart, Germany

16. Philipp Hager, PhD, August 2013, Technische Universität München (TUM) (*advisor, U. Walter*)
    **Dissertation Title**: *Dynamic thermal modeling for moving objects on the Moon*
    **Employment**: European Space Agency (ESA) ESTEC in Nordwijk

17. Scott Washburn, PhD, CU Aerospace, August 2013 (*advisor, G. Born*)
    **Dissertation Title**: *A Model for the Rapid Evaluation of Active Magnetic Shielding Designs*
    **Funding**: NSF

18. Lt. Col. Randy 'Laz' Gordon, PhD, Air University, Maxwell AFB, Alabama, Military Strategy, May 2013 (*advisor, E. Dolman*)
    **Dissertation Title:** *The Realms Beyond the Pillars of Hercules: an Exploration Model for the Future of Human Spaceflight in US Grand Strategy*
    **Funding:** USAF

19. Chris Arellano, PhD, CU Integrated Physiology, 2012 (*advisor, R. Kram*)
    **Dissertation Title:** *Energetic Cost and Balance Control Mechanisms in Human Locomotion*
    **Funding:** NASA Fellowship

20. Matt Bamsey, PhD, Environmental Biology, University of Guelph, Ontario, Canada, 2012 (*advisor, M. Dixon*)
    **Dissertation Title:** *Ion-Selective Optical Sensors for the Management of Plant Nutrient Solutions*
    **Funding**: Canadian Fellowship
    **Employment**: Canadian Space Agency

21. Markus Czupalla, PhD, August 2011, Technische Universität München (TUM) (*advisor, U. Walter*)
    **Dissertation Title:** *The Virtual Habitat - Integral Modeling and Dynamic Simulation of Life Support Systems*
    **Employment**: Kaiser-Threde; Professor, FH Aachen University of Applied Sciences 2016

22. Brian Poller, PhD, CU Aerospace, 2009 (*advisor, R. Culp*)
    **Dissertation Title:** *The photometric detection of known sun occluding orbital debris*

23. Jim Clawson, PhD, CU Aerospace, 2007 (*advisor, A. Hoehn*)
    **Dissertation Title:** *Durability and design approaches in the use of flexible transparent polymer films for a Mars greenhouse application*
    **Funding:** NASA GSRP 2000-2003
    **Employment**: Stellar Solutions, Inc.

24. Ming Yi, PhD, CU Mech Engineering, 2007 (*advisor, R. Mahajan*)
    **Dissertation Title:** *Investigation of Thermal Field in Energy-Based Biomedical Applications*
    **Employment**: Postdoc at VA Tech

25. Hans Seelig, PhD, CU Aerospace, August 2005 (*advisor, A. Hoehn*)
    **Dissertation Title**: *The Assessment of Water Deficit Stress in Plants using Optical Measurement Methods*
    **Employment**: Postdoc at NIST, Professor, Dresden, Germany

26. Tom Yoder, PhD, CU Aerospace, August 1999 (*advisor, P. Todd*)
    **Dissertation Title**: Characterizing *the Physics of Plant Root Gravitropism: A systems Modeling Approach*
    **Employment**: Col., USAF; Head, Department of Astronautics, USAFA, Colorado Springs

*MS Thesis Advisor, MS Committee, MA committee and BS Honors Committee – completed*

1. **Committee Member** for Grace Wheeler, ENVD BS Honors Thesis (*advisor, Azhar Ahmed*), May 2022
   **BS Honors Thesis Title:** *Making Mars Home: Considerations from Earth when Designing Spacefaring Communities*

2. **Committee Member** for Savannah Buchner, Aerospace MS student (*advisor, A. Anderson*), May 2022
   **MS Thesis Title**: *Multimodal Feature Selection to Unobtrusively Model Trust, Workload, and Situation Awareness*

3. **Committee Member** for Saige Drecksler, Aerospace MS student (*advisor, T. Clark*), May 2022
   **MS Thesis Title**: *Quantifying Motion Sickness Induced by Simulated Wave-Like Motion*

4. **Committee Member** for Gabriella Schauss, Aerospace MS student (*advisor, T. Clark*), May 2022
   **MS Thesis Title:** *Wearable Textile Electrocardiogram Sport Bra for Real Time Health Monitoring*

5. **Committee Member** for Aaron Alred (*advisor T. Clark*), MS Aerospace, Dec 2021
   **MS Thesis Title:** *Vestibular Perceptual Thresholds for Angular Rotation about the Yaw, Roll and Pitch Axes*

6. **Committee Member** for Ryan Griffith (*advisor T. Clark*), MS Aerospace, August 2021
   **MS Thesis Title:** *Vestibular Perceptual Thresholds for Low-Frequency, Linear Translation in the Interaural and Sagittal Axes*

7. **Committee Member** for Jacob Kintz (*advisor T. Clark*), MS Aerospace, May 2021
   **MS Thesis Title**: *Estimating Operator Trust, Mental Workload, and Situation Awareness Through Embedded Measures for Human-Autonomy Teaming*

8. **Committee Member** for Esther Putman (*advisor T. Clark*), MS Aerospace, May 2021
   **MS Thesis Title**: *Operational Performance in Functional Mobility and Manual Control Tasks using Galvanic Vestibular Stimulation*

9. **Committee Member** for Johnny Zhang (*advisor A. Anderson*), MS Aerospace, May 2021
   **MS Thesis Title**: Methods for Assessing and Managing Operator Workload and Situation Awareness in Human Spaceflight Operations

10. **Committee Member** for Amin Ali Mody (*advisor A. Anderson*), MS Aerospace, May 2020
    **MS Thesis Title**: *Proof-of-Concept MCP Glove Prototype for the Hybrid Spacesuit Concept*

11. **Committee Member** for Roger Huerta i Lluch (*advisor A. Anderson*), MS Aerospace, May 2019
**MS Thesis Title**: *Feasibility and Analysis of a Hybrid Spacesuit Architecture for Planetary Surface Exploration*

12. **Advisor** for Tobias Niederwieser, Aerospace MS, May 2015
**MS Thesis Title:** *Evaluation of a Flow-Through Test Bed for Algal Atmosphere Revitalization in Spaceflight Applications*
**Grad School:** CU PhD

13. **Committee Member** for Mustafa G. Aydogan, BS Honors Thesis, May 2015, *summa cum laude*, Molecular, Cellular, and Developmental Biology (*advisor A. Hoenger*)
**BS Honors Thesis Title**: Primary cilia act as gravity transducers in bone cells
**Grad School:** Oxford

14. **Committee Member** for Michael Skeen, Aerospace MS, May 2013 (*advisor, R. Starkey*)
**MS Thesis Title:** *Conceptual Modeling and Analysis of Drag-Augmented Supersonic Retropropulsion for Application in Mars Entry, Descent and Landing Vehicles*

15. **Advisor** for Joshua Hecht, Aerospace MS, Dec 2012
**MS Thesis Title:** *First Order Feasibility Evaluation of a Water-based Freezable Heat Exchanger for use in Human Spacecraft Thermal Control*
**Funding:** NASA STTR with TDA Research, Inc.
**Employment:** Paragon Space Development Corp./

16. **Committee Member** for Cassie Kloberdanz, Journalism and Mass Communication MA, 2008, (*advisor, T. Robert*)
**MA Professional Project Title**: *Crisis Management and the Commercial Human Spaceflight Industry*
**Employment**: Sierra Nevada Corp.

17. **Advisor** for Evan Thomas, Aerospace BS/MS, May 2006
**MS Thesis Title**: *Investigating the Feasibility of a Modulated Diode Laser for Crewed Spacecraft Fire Detection*
**Funding/Recognition:** Engineering Excellence Fund (EEF) Grant, 2006
**Employment:** NASA JSC

18. **Advisor** for Jackson Lee, MS Aerospace, August 2004
**Funding:** *NASA GSRP (NAG9-1555), 2003-2004; Beverly Sears Student Research Award, 2004; NSF EAPSI Fellowship to Japan, Summer 2004*
**MS Thesis Title**: *Characterization of the Effect of Butyrate on Hydrogen Production in Biophotolysis for use in Martian Resource Recovery*
**Employment**: Peace Corps; PhD student at CSM

19. **Committee Member** for Alison Keith, MS CEAE, 2002, (*advisor, J. Silverstein*)
**MS Thesis Title**: *Development of a Biological Wastewater Processor for Space Applications: Bench-Scale Testing and Process Control*

20. **Committee Member** for Sybil Sharvelle, MS CVEN, 2002, (*advisor, J. Silverstein*)
**MS Thesis Title**: *Nitrogen Removal from a Urea-Soap Wastewater Using a Bioprocessing System: Process Monitoring and Control*

21. **Committee Member** for David Simmons, MS Aerospace, 2002, (*advisor, A. Hoehn*)
**MS Thesis Title**: *Fluid Handling Hardware for Space Life Science Applications*
**Employment**: Lockheed-Martin

22. **Committee Member** for Rene' Elms, MS Chem Eng, Texas A&M, 2002, (*advisor, T. Good*)
**MS Thesis Title**: *Chemical and Gravity Dependent Factors Affecting Escherichia coli Lag Phase Termination*

23. **Committee Member** for John Jost, BS Engineering Physics, *summa cum laude,* 2001, (*advisor, J. Ye*)
    **BS Honors Thesis Title**: *Optical Frequency Synthesis Based on a Femtosecond Laser Comb*
24. **Committee Member** for Britt Manfredi, MS Aerospace, 1996, (*advisor, P. Todd*)
    **MS Thesis Title**: *Effects of Spaceflight on the Growth and Development of Escherichia coli and Bacillus subtilis in Liquid suspension and of Pseudomonas aeruginosa Biofilm*
25. **Committee Member** for Mette Redman, MS Aerospace, 1996, (*advisor, P. Todd*)
    **MS Thesis Title**: *Long Term Maintenance of Tobacco BY-2 Cells in Culture*
    **Employment:** Medical Doctor

**Visiting Scholars Hosted**

1. **Practicum Supervisor** for Jan Junker, International Exchange Student, Technische Universität München, 2018, MS Student (*advisor, M. Killian, TUM*)
   **Research Topic:** Characterization of Candidate Internal Heat Paths for Spacesuits with a Distributed Variable Emissivity Radiator
   **Funding**: German Fellowship
2. **Practicum Supervisor** for Sina Kaufman (*with Tobias Niederwieser*), International Exchange Student, Technische Universität München, AY 2015/16, MS Student (*advisor, U. Walter, TUM*)
   **Research Topic:** Spacecraft Closed Life Support System Test
   **Funding**: German Fellowship
3. **Visiting Professor**, Hiroyuki Miyajima, Fall 2013, Professor, Faculty of Liberal Arts for Global Studies and Leadership, Tokyo Jogakkan College
4. **Practicum Supervisor** for Philipp Hager, International Exchange Student, Technische Universität München, Fall 2012, PhD Student (*advisor, U. Walter, TUM*)
   **Research Topic:** Dynamic thermal modeling for lunar surface systems
   **Funding:** German Fellowship (DAAD)
5. **Practicum Supervisor** for Jonas Schnaitmann, International Exchange Student, Technische Universität München, Diploma / MS, 2012 (*advisor, U. Walter, TUM*)
   **Research Topic**: Human modeling for spacecraft design
   **Funding**: German Fellowship
6. **Practicum Supervisor** for Ralf Purschke, International Exchange Student, Technische Universität München, Diploma / MS, 2009, (*advisor, U. Walter, TUM*)
   **Research Topic**: Human anthropometric modeling for spacecraft design
   **Funding**: German Fellowship
7. **Practicum Supervisor** for Matthias Pfeiffer, International Exchange Student, Technische Universität München, Diploma / MS, 2008, (*advisor, U. Walter, TUM*)
   **MS Thesis Title**: *Design of a human metabolic model for integrated ECLSS robustness analysis*
   **Funding**: German Fellowship
8. **Practicum Supervisor** for Jan Harder, International Exchange Student, Technische Universität München, Diploma / MS, 2008, (*advisor, U. Walter, TUM*)
   **MS Thesis Title**: *Development of a dynamic, environmentally- sensitive computer model of the human respiratory system to support the design of a space habitat*
   **Funding**: German Fellowship

**Student Design Competition Teams Advised**

1. NASA/NIA RASC-AL Student Design Competition Finalist - DELPHI (AES grad students Jonathan Anthony, Zeke Bretchel, Kaitlin McIntosh, Lauren McManus, Matthew Milanese, Sean Napier, Tobias Niederwieser and William Tandy), '*Best in Theme'* award for lunar architecture, 2015
2. Mars Society Inspiration Mars Student Design Contest - MAVERIC (AES grad students Eric Threet, Roger Huang, Christine Fanchiang), *2nd place*, 2014
3. NASA/NIA RASC-AL Student Design Competition Finalist - LITEHABS (AES grad students Asa Darnell, Tobias Niederwieser, Elliot Russell, Chris Christensen, Christine Fanchiang, Jonathan Anthony, Chris Nie, and Matthew Milanese) tied for *1st place, graduate division*, 2014
4. NASA/NIA RASC-AL Student Design Competition Finalist – ECLIPSE (AES grad students Jake Adams, Adam Brown, Adam Carahalios, Zachary Cuseo, Elyssa Kaszynski, Josh Smith, Ryder Whitmire, Eric Provo, Elise Kowalski and Chris Walsh), 2014
5. NASA/NIA RASC-AL Student Competition Finalist – ExO: Design and Implementation of a Long-Term Sustainable Lunar Habitat (AES grad students Stuart Tozer, Christine Fanchiang, Nicholas Zinner, Zachary Grunder, Joshua Imobersteg, Felix Bidner and Lee Jasper) Co-Advisor with Joe Tanner, *1st place graduate division*, 2012
6. NASA/NIA RASC-AL Student Competition Finalist – HI-LIFE (AES grad students Lydia McDowell, Adam Leppek, Lance Markovchick, Thomas Snow), 2012
7. PISCES Lunar Outpost National Student Design Competition (AES PhD students Jonathan Metts and Bruce Davis), Runner up, 2007
8. NASA MarsPort Student Design Competition (AES Srs Bob Gjestvang, Aaron Frey, Ryan Ries, Colleen Higgans, Kate Atkinson, Sara Lewandowski, Shawn Bockstahler and Jim Clawson (PhD), *1st place*, 2002

**Undergraduate Funded Research Supervised**

*BURST - Bioscience Undergraduate Research Skills and Training*
*DLA - Discovery Learning Apprenticeship*
*MEP - Minority Engineering Program, University of Colorado*
*SMART - Summer Multicultural Access to Research Training*
*SURE - Summer Undergraduate Research Experience*
*URAP - Undergraduate Research Assistantship Program, Hughes Initiative*
*UROP - Undergraduate Research Opportunity Program*

1. Mustafa Aydogan and Joel Wetzsteon (MCDB) **Howard Hughes Medical Institute Biosciences** Undergraduate Research Grant 2013-2014 and **UROP** 2013 Summer Team Grant (co-advised with A. Hoenger, MCDB)
2. Mike Lotto, Kirstyn Johnson, Chris Nie, Andrew Broucek and Kyle Shannon (AES undergrads) and Jared Yenzer (ECE), *Micro-g Convection*, **NASA Reduced Gravity Program**, Summer 2012
3. Karla Rosario (Aero Soph), **SMART**, Summer 2011
4. *HALO Sr. Projects Team* (Nathan Luallen, Aaron Young, Patrick Quealy, James Nelson, Chris Lapanse, Joshua Hecht, Jessi Watson, Eric Donahue, Derek Houtz) **UROP**, Spring 2011, team grant
5. John Oakes, Jared Leidich, Madeline Tyson, *Sustainable Water Management Technologies for a Lunar Outpost*, **UROP**, Spring 2009, team award
6. Brock Kowalchuk (Aero Soph), *Prototyping the Next Generation Lunar Lander Vehicle Habitat,* **DLA**, 8/08-5/09
7. Cassia Rye (MCDB Sr), *Characterization of E. coli response to antibiotics under simulated microgravity,* **UROP**, 9/08-12/08
8. Arnoldo Trevizo (Aero Sr.), served as Boulder campus advisor for undergraduate research at CU-Denver involving biophysical modeling of growth and turgor pressure in *Phycomyces blakesleeanus,* **Ronald E. McNair Post-Baccalaureate Program Grant**, 4/08-7/08, (*funded through CU-Denver*)
9. Kristina Wang (Aero Soph), *Spacecraft Rapid Prototype Development* **UROP**, 5/07-8/07

10. Anna Stancyzk (U. Michigan, Visiting Summer Undergrad Intern), *The influence of antibiotics on bacterial motility and its implication for drug efficacy in microgravity*, **Honors Thesis Program**, 6/06-7/06 (*funded through U. Mich*)
11. Farres Ahmed (MCDB Jr.), *Identifying the Effect of Temperature on E. coli Cell Size*, **UROP**, 5/06-9/06
12. Farres Ahmed (MCDB Soph), Assessing the Role of Gravity on Bacterial Cell Sedimentation and Motility, **BURST** (*formerly URAP*), 10/05-5/06
13. Galina Dvorkina (Aero/EPOB, BS/double major), *Characterizing the Influence of Gravity on Bacterial Cell Sedimentation and Motility*, **UROP**, 10/04-5/05
14. James Manley (EPOB Sr.), *Non-invasive Measurement of Lag Phase of E. coli in Simulated Microgravity*, **UROP**, 10/04-4/05
15. Farres Ahmed (MCDB Fr.), **SURE**, Summer 2004
16. Doug Maxey (ECE Sr.) and Aaron Shileikis (Aero Sr.), Faculty Team Grant Advisor, *1-D Electrical Impedance Spectroscopy for Monitoring Vitality of Mammalian Cell Cultures*, **UROP**, 1/04-5/04
17. James Manley (EPOB Jr.) with Mike Benoit (Aero PhD) *Assessing the Effect of simulated weightlessness on a neutrally buoyant strain of E. coli*, **URAP**, 10/03-7/04
18. Travis Liggett (Aero MS), *VibraCo-PIographic Assessment of Unorthodox Exercise Techniques as Countermeasures to Osteopenia,* **Ronald E. McNair Post-Baccalaureate Program Grant**, 1/02-8/02
19. James Palmer (Aero Fr.) *Design and fabrication of a constant volume feed/waste reservoir for a space flight bioreactor prototype*, **SURE**, Summer 2000
20. Lucia Martinez (Aero Jr.), *Antibiotic Effectiveness against E. coli Exposed to Simulated Microgravity and Possible Terrestrial Applications Paralleling the Behavior of Multi-drug Resistant Pathogens*, **UROP**, 1/00-5/00
21. Carmen Gaines (Cornell Univ., Sr.), *Visualizing the Invisible: Modeling the Influence of Gravity on Bacterial Cells*, **SMART**, Summer 99
22. Ryan Snow (Aero Sr.), *0-G Waste Water Bioprocessor Parametric Evaluation and Sensor Selection*, **UROP**, Summer 99
23. Lucia Martinez (Aero Soph.), *Analyzing Decreased Antibiotic Effectiveness in Space to Better Understand the Rising Numbers of Multi-drug Resistant Pathogens on Earth*, **URAP**, 10/98-5/99
24. Craig Lanning (Aero Jr.), *A Model Correlating Growth Characteristics of E. coli Under Varying Inertial Conditions*, **UROP**, Summer 98
25. Anna Snodgrass (Aero Sr.), *Correlation of Terrestrial Drug Resistance with Decreased Antibiotic Effectiveness Occurring During Space Flight*, **UROP**, Summer 98
26. Lucia Martinez (Aero Soph.), *Space Automated Bioproduct Lab (SABL) Design Process and Volumetric Mock-up Fabrication*, **MEP**, 1/98-6/98
27. Craig Lanning (Aero Soph.), *A Model Correlating Growth Characteristics of E. coli Under Varying Inertial Conditions*, **UROP**, Summer 97
28. Stacy Walts (Aero Sr.*), The Influence of Sedimentation Due to Gravity on the Effectiveness of Antibiotics Against E. coli*, **UROP**, Summer 97
29. Carlson Vincenti (Aero Sr.), *Design, Fabrication and Evaluation of a Clinostat*, **SMART**, Summer 97
30. Bob Gjestvang (Aero Soph.), *Inertial Effects on Microbial By-product Production and Nutrient Consumption*, **URAP**, 10/96-5/97
31. Brian Cole (Physics/Aero Sr.), *Characterizing the Influence of Containment Geometry on Microbial Growth*, **UROP**, 3/96-7/96
32. Omar Wheatley (Aero Jr.), *Characterizing the Influence of Containment Geometry on Microbial Growth*, **UROP**, 3/96-7/96

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# SERVICE

**National / Professional**

FAA Center of Excellence for Commercial Space Transportation (COE CST), Aug 2010 – Aug 2022
- Executive Director, 2018-2022
- Member, Executive Committee / Lead COE PI for CU, 2012-2018
- Member, External Relations Committee, 2015-2016
- Chair, Strategic Planning Committee, 2012-2015
- Moderator, FAA COMSTAC Human Space Flight Occupant Safety Telecon, Nov 2012
- Chair, First FAA COE for CST Annual Technical Meeting, Boulder, CO, Nov 2011
- Founding Member, Coordinating Committee, 2010-2012

NASA Human Research Program (HRP) Standing Review Panel (SRP)
- Decompression Sickness / Extravehicular Activity, (DCS/EVA) SRP, 2014-2016
- Extravehicular Activity Element, EVA SRP, 2009-2011

The National Academies
- Cited External Reviewer in Institute of Medicine (IOM) *Review of NASA's Evidence Reports on Human Health Risks: 2014 Letter Report*, The National Academies Press, Washington, DC, 2015
- Cited External Reviewer in Institute of Medicine (IOM) *Review of NASA's Evidence Reports on Human Health Risks: 2013 Letter Report*, The National Academies Press, Washington, DC, 2014
- Cited External Reviewer in *Recapturing Space: Life and Physical Sciences Research for a New Era of Exploration,* Committee for the Decadal Survey on Biological and Physical Sciences in Space, Aeronautics and Space Engineering Board, Division on Engineering and Physical Sciences, National Research Council, The National Academies Press, Washington, DC, 2012
- Cited External Reviewer in *A Risk Reduction Strategy for Human Exploration of Space: A review of NASA's Bioastronautics Roadmap*, Institute of Medicine (IOM) and National Research Council (NRC), The National Academies Press, Washington DC, 2006
- Panel Member, NRC Division on Engineering and Physical Sciences, Aeronautics and Space Engineering Board, Review of *NASA's Capability Roadmaps for Human Health and Support Systems*, 2005
- Cited External Reviewer in *Preliminary Considerations Regarding NASA's Bioastronautics Critical Path Roadmap: Interim Report,* Institute of Medicine (IOM), The National Academies Press, Washington DC, 2005
- Presentation on *Space Biology* to Institute of Medicine (IOM) Committee reviewing NASA's Bioastronautics Critical Path Roadmap, Washington DC, June 2004

International Conference on Environmental Systems (ICES)
- Chair, Session on *Spacecraft Human Rating*, 2012
- Co-Chair, Session on *Extravehicular Activity (EVA) Systems*, 2006-11

American Institute of Aeronautics and Astronautics (AIAA)
- Member, 1988 (Lifetime Member as of 2010; Associate Fellow, 2011; Fellow, 2020)

*AIAA Life Sciences & Systems Technical Committee* (LS&S TC), 2005-2015
- TC Membership Subcommittee, 2012-15
- Chair, TC Membership Subcommittee, 2009-12
- Lead, TC Executive Subcommittee, 2009-11
- TC Chair, 2008-09
- TC Vice Chair, 2007-08
- TC Secretary, 2006-07

- Session Chair, AIAA Rocky Mountain Section, Annual Technical Symposium (ATS), *NASA's Artemis Program Moon to Mars Session*, University of Colorado Boulder, September 2021

Commercial Spaceflight Federation (CSF)
Research & Education Member (REM) Affiliates Program, 2015-2020

American Society for Gravitational and Space Research (ASGSR) – *formerly ASGS'B' ... Space 'Biology'*
Member, (intermittent) since 1991

Session Chair, 26th Annual Meeting, *Spaceflight Plants and Microbes: life support, opportunities, flight and ground results*, Washington DC, Nov 2010
Vice Chair, *Communications Committee*, 2007-09
Member (non-voting), *Executive Council*, 2007-09
Chair, *Strategic Planning Committee*, 2006-09
Governing Board (*elected, 3 year term*), 2004-07
Session Chair, 19th Annual Meeting Symposium, *Gravitational Influence on Biomolecular Engineering Processes*, Huntsville, AL, Nov 2003

New Space
Editorial Board, 2012-2024 https://home.liebertpub.com/publications/new-space/610/overview

Life Journal
Guest Editor, for special issue *Response of Terrestrial Life to Space Conditions*, 2013-2014
http://www.mdpi.com/journal/life/special_issues/space-conditions

Recent Advances in Fermentation Technology (RAFT) II Conference
Symposium Session Chair, *Microgravity Fermentation*, San Diego, CA, Nov. 1997

**CU System**

President's Teaching Scholars Program (PTSP), since 2011 (*lifetime appointment*)
PTSP Bylaws Committee, 2021-2023
Timmerhaus Teaching Ambassador Award, Selection Committee, (*inaugural year*) 2014-16, 2017-18, 2020

**Boulder Campus**

Fulbright Campus Screening Committee, 2002, 2013, 2017, 2018
CU Leeds School of Business Joseph L. Frascona Teaching Excellence Award, Selection Committee, 2014
Conflict of Interest and Commitments Committee, 2008-2011
Boulder Faculty Assembly (BFA) Teaching Award Selection Committee, 2008
Students for the Exploration and Development of Space (SEDS), CU Chapter, Faculty Advisor, 2005-2015
UROP Faculty Advisory Board, 2005-2008
Beverly Sears Grant Proposal Review Committee, 2004-2009

**College of Engineering and Applied Science**

Undergraduate Education Council (UEC), 2015-2016, 2018-2020
Search Committee, Associate Dean for Undergrad Education, 2019
College Health and Wellness Task Force, 2019
College Task Force, Biomedical Engineering Minor Implementation, 2014-2015
College Bioengineering Task Force, 2014-2015
College Task Force, Bioengineering Minor Development, Chair, 2014
College Teaching Award, Selection Committee, 2012-2014
CAETE Technology and Policy Committee, 2008-2009
College Committee on Bioengineering (CCOB), Member 2000-2001, Chair 2001-2009

**Aerospace Engineering Sciences Department**

AES Bylaw Revision Lead, 2024
PUEC (Holzinger Promotion) 2024
PUEC contributor (Anderson P&T) 2023

Bioastronautics Faculty Search Committee (Arquilla), Chair, 2022-2023
PUEC (teaching section, multiple), 2022-2023
AES Policies and Guidelines ad hoc Committee, 2020-2022
Faculty Mentoring Committee (Clark), 2016-2022
Personnel/Performance Evaluation (Teaching) Committee, 2019-2022
PUEC Reappointment (Zea), 2021
PUEC Promotion and Tenure (Matsuo), 2021
PUEC Reappointment (Anderson), 2020
PUEC Reappointment (Stodieck), 2020
Chair's Cabinet, 2018-2020
AES Undergraduate Committee for Operations, Chair 2018-2020
AES Undergraduate Committee for Curriculum Advancement, *ex officio* 2018-2020
AES Graduate Committee, *ex officio* 2018-2020
Faculty Mentoring Committee (Nabity), 2013-2020
AES Strategic Vision Committee, 2018/2019
AES Bylaw Revision Lead, 2017-2019
AES Executive Committee, 2012-2018
AES Undergraduate Committee, 2017/2018
AES Undergraduate Committee, 2013-2016, Chair 2015-2016
Post Tenure Review (Kantha), 2015/2016
Post Tenure Review (Li), 2015/2016
Bioastronautics Faculty Search Committee (Clark and Anderson), 2014/2015
PUEC Promotion and Tenure (Starkey), 2014
AES By-law Revision Committee, Chair, 2014
AES Bioastronautics Focus Area Lead, 2012-2014
Bioastronautics Faculty Search Committee (Nabity), Chair, 2011-2013
PUEC Reappointment (Stodieck), 2011/12
PUEC Reappointment (Tanner), Chair, 2011
AES Graduate Committee, 2010-2014
AES Student Award Committee, Chair, 2010-2012
New Faculty Mentoring Committee (Voss), 2009-2010
Senior Instructor Search Committee (Tanner), Chair, 2007/2008
Faculty Search Committee, 2007
Graduate Committee, 2006-09
By-Laws Review Committee, Chair, 2006-2008
Building Feasibility Study Committee, 2006
Graduate Program Planning Task Group, 2005/2006
Faculty Search Committee, 2004-2006
Self-Study Committee, 2003
Website Redesign *ad hoc* Committee, Chair 2002
Graduate Curriculum Committee, 2001-2006
Graduate Committee, 1999-2001

**Peer Reviewer (*ad hoc*)**

*Manuscript Reviews*

Acta Astronautica
Advances in Engineering Software
Advances in Space Research
Aerospace
Aerospace Science and Technology
AIAA Journal

Applied Microbiology and Biotechnology
Astrobiology
Aviation, Space and Environmental Medicine
BioMed Research International
Biotechnology and Bioengineering
BMC Microbiology
Canadian Journal of Microbiology
FEMS Microbiology Letters
Gravitational and Space Biology Bulletin
International Conference on Environmental Systems (ICES)
International Journal of Hydrogen Energy
Journal of Astrobiology
Journal of Bacteriology
Journal of Gravitational Physiology
Journal of Industrial Microbiology and Biotechnology
Journal of Spacecraft and Rockets
Journal of Space Safety Engineering
Microgravity Science and Technology
New Space
National Academies Press
New Space
npj Microgravity
PLOS ONE
Prentice Hall

*Proposal Reviews*

Agensi Angkasa Negara (National Space Agency of Malaysia)
AIAA Regional Student Competition
Canada Council for the Arts, Research Fellowships
Canadian Space Agency Life Sciences Research
CASIS
Lytmos Group
NASA ECF
NASA EPSCoR
NASA EVA Physiology
NASA NSPIRES
NASA NSTGRO
NASA NSTRF
NASA Office of Biological and Physical Research, Physical Sciences Division, Int'l Life Sciences Research
NASA Postdoctoral Researcher Program
NASA Research Announcement (NRA) Life Sciences
NASA SBIR Phase I Program
NASA SBIR Phase II Program
Natural Sciences and Engineering Research Council (NSERC) of Canada
SRON National Institute for Space Research, The Netherlands

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## MISCELLANEOUS TRAINING & ACTIVITIES

Lab Safety and Hazardous Waste Generator Training (CU EH&S), renewed 2023
Conducting Inclusive Faculty Searches Training, renewed 2022
Human Research/Social Behavioral Research Investigators and Key Personnel (CITI Certificate), renewed 2022
Human Research / Biomedical Research Investigators and Key Personnel, (CITI Certificate), renewed 2021
Biosafety Training (CU EH&S), renewed 2017
Radiation Safety Training (x-ray), CU Health Physics Laboratory, renewed 2012
Human Subject Experimentation Training (CU HRC), 2004
Radiation Safety Training (sealed source), CU Health Physics Laboratory, 2002
Space Medicine and Biology, Moscow State University Faculty of Medicine and IBMP, Russia, 2002
Wilderness First Responder, Wilderness Emergency Resources, 1998
CPR for the Professional Rescuer, American Red Cross, 1998
Emergency First Responder, American Red Cross, 1998
Brown Belt, Wado-Kai Shudokan Karate, 1994
Private Pilot, FAA, 1990
Aircraft Owners and Pilots Association (AOPA), 1989-2005
Space Shuttle Systems Training (MOD Phase 1), NASA/Houston, 1989
Management Training Program, Rockwell International, 1987-88
Aerospace Physiological Training (Altitude Chamber), NASA/Houston, 1987
SCUBA Open Water Certification, PADI, 1986
NASA Stand Board Certified Launch Control Center (LCC) Console Operator, ECLSS, 1985
Engineer Intern (EIT), State Board of Registration for Professional Engineers of West Virginia, 1985
Advanced Life Saving, Water Safety & CPR, Red Cross, 1981

**Languages**: conversational in *German*; Introductory courses in *Spanish*, *Russian* and *Italian*

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