

## **Allison Anderson, PhD**

Assistant Professor, Smead Department of Aerospace Engineering Sciences  
Assistant Professor Adjunct, Department of Integrative Physiology  
Affiliated Faculty, Biomedical Engineering Program  
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University of Colorado – Boulder

## **Research Interests**

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Human spaceflight, human exploration, human performance, extreme environment physiology, aerospace biomedical engineering, wearable sensor systems, spacesuit design, spaceflight associated neuro-ocular syndrome, behavioral health in isolated confined extreme environments, alternative reality technologies, audiology and cochlear function.

## **Education**

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Ph.D., Aerospace Biomedical Engineering, Massachusetts Institute of Technology, June 2014  
Thesis: *Understanding Human-Space Suit Interaction to Prevent Injury During Extravehicular Activity*  
Advisor: Prof. Dava Newman

M.S., Aerospace Engineering, Massachusetts Institute of Technology, February 2011  
M.S., Technology Policy Program, Massachusetts Institute of Technology, February 2011  
Thesis: *Addressing Design Challenges in Mechanical Counterpressure Spacesuit Design and Space-Inspired Informal Education Policy*  
Advisor: Prof. Dava Newman

B.S., Astronautics Engineering, University of Southern California, December 2007  
Minor: Astronomy

## **Professional Experience**

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2019 - Present, Affiliated Faculty, Biomedical Engineering Program, University of Colorado – Boulder

2018 - Present, Assistant Professor Adjunct, Department of Integrative Physiology, University of Colorado – Boulder

2017 - Present, Assistant Professor, Smead Department of Aerospace Engineering Sciences, University of Colorado – Boulder

2015 - 2016, Visiting Assistant Professor, Smead Department of Aerospace Engineering Sciences, University of Colorado - Boulder

2014 - 2016, NSBRI First Award Postdoctoral Research Fellow, Dartmouth College Geisel School of Medicine

2008 - 2014, Research Assistant, Man Vehicle Lab, Massachusetts Institute of Technology

2007 – 2008 Systems Engineer and Research Consultant; Information Sciences Institute, Marina Del Rey, CA

## **Honors and Awards**

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2020 Young Professional Engineer of the Year, AIAA Rocky Mountain Section

2020 Research and Innovation Office Faculty Fellow, campus-wide leadership program (cohort of 13 faculty)

2019 Outstanding Undergraduate Teaching and Mentorship Award, Aerospace Engineering Sciences

2016 Selected as a National Academy of Science New Leader in Space Science

2014 National Space Biomedical Research Institute First Award Fellow

2014 Selected for Graduate Women in Aerospace Conference

2014 Technical Communications Seminar, 1<sup>st</sup> Place (MIT)

2013 Graduate Women of Excellence Award (MIT)  
2012 1<sup>st</sup> Place Poster, International Conference on Environmental Systems (MIT)  
2008 Man Vehicle Lab 'Sherry' Award (MIT)  
2006 Order of Troy (USC)  
2006 Blue Key Honor Society (USC)  
2006 Tau Beta Pi Engineering Honor Society (USC)  
2005 MDA 365 Leadership (USC)  
2004-2007 Engineering Honors Program (USC)  
2004 Alpha Lambda Delta Honor Society (USC)

### **Peer Reviewed Journal Publications (H-Index: 11)**

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Dr. Anderson's students underlined

1. Arquilla K, Leary S, Webb A, **Anderson AP** Wearable 3-lead electrocardiogram (ECG) placement model for fleet sizing of medical devices. *Aerospace Medicine and Human Performance*. Aerospace Medicine and Human Performance. 91 (11), pp. 868-875(8). DOI: <https://doi.org/10.3357/AMHP.5633.2020>; November 2020
2. Lyons K, Slaughenaupt R, Mupparaju S, Lim J, **Anderson AP**, Stankovic A, Cowan D, Fellows A, Binsted K, Buckey J. Autonomous Psychological Support for Isolation and Confinement. *Aerospace Medicine and Human Performance*. 91 (11), pp. 876-885(10). DOI: <https://doi.org/10.3357/AMHP.5705.2020>; November 2020
3. Banerjee NT, Baughman A, Lin S, Witte Z, Klaus DM, **Anderson AP**. Development of Alternative Reality Environments for Spacecraft Habitat Design Evaluation. *Virtual Reality*. (), 1-10. DOI: 10.1007/s10055-020-00462-6; July 2020
4. **Anderson AP**, Covington K, Rieke C, Fellows A, Buckey J. Detecting changes in distortion product otoacoustic emission maps using statistical parametric mapping and random field theory. *The Journal of the Acoustical Society of America*.147(5):3444–3453. DOI: 10.1121/10.0001235. April 2020
5. **Anderson AP**, Boppana A, Wall R, Acemyan CZ, Adolf J, Klaus D. Framework for developing alternative reality environments to engineer large, complex systems. *Virtual Reality*. DOI: 10.1007/s10055-020-00448-4. May 2020
6. Arquilla K, Webb AK, **Anderson AP**. Textile electrocardiogram (ECG) electrodes for wearable health monitoring. *Sensors*. 20(4):1013. DOI:10.3390/s20041013. February 2020
7. Shen Y-Y, Ahmed NR, **Anderson AP**. Newton–Cotes Discretization for Improved Dead-Reckoning in Bayesian Estimators with Limited Sampling Rate. *Journal of Guidance, Control, and Dynamics*.43(4):831–837. January 2020
8. Boppana A, **Anderson AP**. DynaMo: Dynamic Body Shape and Motion Capture with Intel RealSense Cameras. *Journal of Open Source Software*.4(41):1466. DOI: 10.21105/joss.01466. September 2019
9. Stirling L, Arezes P, **Anderson AP**. Implications of Space Suit Injury Risk for Developing Computational Performance Models. *Aerospace Medicine and Human Performance*. 90(6):553–65. June 2019
10. Masterova KS, **Anderson AP**, Cowan DR, Fellows AM, Zegans ME, Buckey JC. Portable Autorefractors for Detecting Axial Length Changes in Space. *Aerospace Medicine and Human Performance*. 89(8):724–730. DOI: 10.3357/AMHP.5049.2018. August 2018
11. Buckey JC, Phillips SD, **Anderson AP**, Chepko AB, Archambault-Leger V, Gui J, Fellows AM. Microgravity-induced ocular changes are related to body weight. *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*. 315(3):R496–R499. DOI: 10.1152/ajpregu.00086.2018. May 2018
12. **Anderson AP**, Butterfield JS, Subramanian PS, Clark TK. Intraocular pressure and cardiovascular alterations investigated in artificial gravity as a countermeasure to spaceflight

associated neuro-ocular syndrome. *Journal of Applied Physiology*. 125(2):567–76. August 2018

13. **Anderson AP**, Mayer MD, Fellows AM, Cowan DR, Hegel MT, Buckey JC. Relaxation with Immersive Natural Scenes Presented Using Virtual Reality. *Aerospace Medicine Human Performance*. 88(6):520–6. DOI: 10.3357/AMHP.4747.2017. June 2017
14. Rieke CC, Clavier OH, Allen LV, **Anderson AP**, Brooks CA, Fellows AM, Brungart DS, Buckey JC. Fixed-Level Frequency Threshold Testing for Ototoxicity Monitoring. *Ear and Hearing*. DOI: 10.1097/AUD.000000000000433. March 2017. (Nominated for *Best Paper*)
15. **Anderson AP**, Babu G, Swan JG, Phillips SD, Knaus DA, Toutain-Kidd CM, Zegans ME, Fellows AM, Gui J, Buckey JC. Ocular changes over 60 min in supine and prone postures. *Journal of Applied Physiology*. 123(2):415–23. DOI: 10.1152/jappphysiol.00687.2016. August 2017
16. **Anderson AP**, Fellows AM, Binsted KA, Hegel MT, Buckey JC. Autonomous, Computer-Based Behavioral Health Countermeasure Evaluation at HI-SEAS Mars Analog. *Aerospace Medicine and Human Performance*. 87(11):912–20. 2016
17. **Anderson AP**, Swan JG, Phillips SD, Knaus DA, Kattamis NT, Toutain-Kidd CM, Zegans ME, Fellows AM, Buckey JC. Acute effects of changes to the gravitational vector on the eye. *Journal of applied physiology*. jap 00730 2015. December 2015
18. **Anderson AP**, Menguc Y, Wood RJ, Newman D. Development of the Polipo Pressure Sensing System for Dynamic Space-Suited Motion. *IEEE Sensors Journal*. 15(11):6229–37. November 2015
19. **Anderson AP**, Newman DJ. Pressure sensing for in-suit measurement of space suited biomechanics. *Acta Astronautica*. 115:218–25. October 2015
20. **Anderson AP**, Newman DJ, Welsch RE. Statistical Evaluation of Causal Factors Associated with Astronaut Shoulder Injury in Space Suits. *Aerospace Medicine and Human Performance*. 86(7):606–613. May 2015

*Under revision, review, and preparation*

1. Arquilla K, Webb A, **Anderson A**. Coping with the isolated, confined, and extreme environment caused by the COVID-19 pandemic and the influence of prior experience. *Under revision*
2. Lan M, Phillips S, Archambault-Leger V, Chepko A, Lu R, **Anderson A**, Masterova K, Fellows A, Halter R, Buckey J. Proposed mechanism for reduced jugular vein flow in microgravity. *Under revision*
3. Boppana A, **Anderson A**. Dynamic foot morphology explained through 4D scanning and shape modeling. *Journal of Biomechanics*. *Under review*
4. Voros J, Sherman S, Rise R, Kryuchkov A, Stine P, **Anderson A**, Clark T. Galvanic Vestibular Stimulation Produces Cross Modal Improvements in Visual Thresholds. *Under review*
5. Banerjee N, Baughman A, Lin S, Witte Z, Klaus D, **Anderson A**. Side-by-Side Comparison of Human Perception and Performance in Augmented, Hybrid, and Virtual Reality. *IEEE Transactions on Visualization and Computer Graphics*. *Under review*
6. Carroll D, **Anderson A**, Phillips S, Knaus D, Kattamis N, Fellows A, Buckey J. Numerical model of the eye and its application to microgravity-induced vision changes. *In preparation*
7. Sherman S, Arquilla K, Cowan D, Fellows A, Buckey J, **Anderson A**. Modified reality judgement and presence questionnaire: A survey-based metric to evaluate virtual environments. *In preparation*
8. Van Akin M, Lantz O, Fellows A, Buckey J, **Anderson A**. Acute effects of postural changes and lower body positive and negative pressure on the eye. *In preparation*
9. Shen Y, Ahmed N, **Anderson A**. Magnetometer-Free Inertial Sensing of Human Motion in Ambulatory Environments over Operationally Relevant Durations. *In preparation*

## Peer Reviewed Conference Publications

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Dr. Anderson's students underlined.

1. Arquilla, K., Webb, A. K., **Anderson, A.** "Woven electrocardiogram (ECG) electrodes for health monitoring in operational environments", IEEE Engineering in Medicine and Biology Conference. Held virtually, 07/2020.
2. Boppana, A., **Anderson, A.** "A Biomechanical Design Framework to Improve Spacesuit Boot Fit." *50th International Conference on Environmental Systems*. Virtually held, 07/2020.
3. Devendorf, L., Arquilla, K., Wirtanen, S., **Anderson, A.**, Frost, S. "Craftspeople as Technical Collaborators: Lessons Learned through an Experimental Weaving Residency." *Computer Human Interaction*, 2020. Honolulu, HI. 04/2020 (*Honorable Mention for Best Paper*). Note: Acceptance rate to conference equivalent to a journal publication.
4. Shen, Y., Miller, J., **Anderson, A.** "Comfort, Mobility, and Durability Assessment of a Wearable IMU System for EVA Suits". IEEE Aerospace Conference. Big Sky, MT. 03/2020.
5. Voros, J., Sherman, S., Rise, R., Callas, M., Kyruchkov, A., Stine, P., Rizkallah, J., **Anderson, A.**, Clark, T. "Multi-Modal Stochastic Resonance to Enhance Astronaut Perceptual Performance: Experimental Design". IEEE Aerospace. Big Sky, MT. 03/2020.
6. Shen, Y., Wood, S., **Anderson, A.** "Evaluation of Wearable Inertial Sensors for Spacesuit Design Applications Using Hardware-in-the-Loop Simulation". AIAA Scitech 2020 Forum. Orlando, FL. 01/2020
7. Shen, Y., **Anderson, A.** "Extended Kalman Filter for Magnetometer-Free Estimation of Spacesuit Wearer Joint Kinematics Using Inertial Measurements". International Conference on Information Fusion, Ottawa, Canada. 07/2019.
8. Pinedo, C., Dixon, J., Chang, C., Auguste, D., Brewer, M., Jensen, C., Hill, C., Desilva, D., Jones, A., **Anderson A.**, Voss, J. "Development of an Augmented Reality System for Human Space Operations" International Conference on Environmental Systems, Boston, MA, 07/2019.
9. Huerta, R., Kerr, E., **Anderson, A.** "Mechanical Counterpressure and Gas-Pressurized Fusion Spacesuit Concept to Enable Martian Planetary Exploration". International Conference on Environmental Systems, Albuquerque, NM, 07/2018.
10. Shen, Y., Boppana, A., Arquilla, K., **Anderson, A.** "Wearable Sensor Suit System for Quantifying Human-Spacesuit Interactions." IEEE Aerospace Conference, Big Sky MT, 03/2018.
11. Buckley, J., Phillips, S., **Anderson, A.**, Chepko, A., Archambault-Legere, V., Masterova, K., Fellows, A., Cowan, D. "The Importance of Tissue Weight and Tissue Compressive Forces in Human Spaceflight" 68<sup>th</sup> International Astronautical Congress, International Astronautical Federation. Adelaide, Australia. 09/2017.
12. **Anderson, A.**, Newman, D., "Pressure Characterization Between the Upper Body and Space Suit During Mission-Realistic Movements" IEEE Aerospace Conference, Big Sky MT, 03/2015.
13. **Anderson A.**, Hilbert A., Bertrand P., Newman D., In-Suit Sensor System for Characterizing Human-Space Suit Interaction, International Conference on Environmental Systems, Tucson, AZ, 07/ 2014.
14. Bertrand P., **Anderson A.**, Hilbert A., Newman D., Feasibility of Spacesuit Kinematics Characterization and Human-Suit Interactions, International Conference on Environmental Systems, Tucson, AZ, 07/2014.
15. **Anderson A.**, A. Diaz, M. Kracik, G. Trotti, J. Hoffman, and D. Newman, "Developing a Spacesuit Injury Countermeasure System for Extravehicular Activity: Modeling and Analysis" International Conference on Environmental Systems, San Diego, CA. 07/2012.

16. **Anderson, A.**, J. Waldie, D. Newman, "Modeling and Design of a BioSuit Donning System" International Conference on Environmental Systems, Barcelona, Spain. 07/2010.
17. **Anderson, A.**, J. Turner, L. Gundersen, G. Trotti, D. Newman "Framework for Space-Inspired Informal Education Exhibits" International Conference on Environmental Systems, Barcelona, Spain. 07/2010.
18. D. Barnhart, J. Kunc, **A. Anderson**, J. Cheng, O. Faghfoor, "Hands-On Space Flight Risk Reduction Training Through Ground Based Dynamic Flight Testing" International Astronautical Congress, Hyderabad, India. 2007.

### **Other Publications**

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1. **Zero M**, Easter B, **Anderson A**, Lehnhardt K. "Multidisciplinary Expertise for Exploration Medical System Design". IEEE Potentials. 07/2020.
2. **Anderson, A.** "Understanding Human-Space Suit Interaction to Prevent Injury During Extravehicular Activity" Doctoral Degree in Aerospace Biomedical Engineering, Massachusetts Institute of Technology. Advisor Prof. Dava Newman. 06/2014
3. **Anderson, A.** "Addressing design challenges in mechanical counterpressure spacesuit design and space-inspired informal education policy" Dual Masters Degree in Aerospace Engineering and Technology Policy, Massachusetts Institute of Technology. Advisor Prof. Dava Newman. 02/2011

### **Presentations and Posters**

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1. Zea L, Forward T, Kaksonen A, Anderson A. "Crew-Tended Biomining Research on the Lunar Surface." Lunar Science Surface Workshop. Held virtually. May 2020
2. Anderson, A., Rise, R., Sherman, S., Voros, J., Callas, M., Kryuchkov, A., Stine, P., Clark, T. "Performance Enhancement Through Multi-Modal Stochastic Resonance". NASA Human Research Program Investigators Workshop. Galveston, TX. January 2020 (Presentation)
3. Arquilla, K., Webb, A., Anderson, A. "Woven Textile Electrodes for Wearable Psychological Sensors in Extreme Environments". NASA Human Research Program Investigators Workshop. Galveston, TX. January 2020 (Presentation)
4. Anderson, A, Banerjee, N., Boppana, A., Baughman, A., S. Lin, R. Wall, Z. Witte, D. Klaus "Spacecraft Habitat Design Evaluation Using Alternative Reality Technologies". NASA Human Research Program Investigators Workshop. Galveston, TX. January 2020 (Presentation)
5. Sherman, S., Kryuchkov, A., Stine, P., Clark, T., Anderson, A. "Auditory Stochastic Resonance to Improve Perceptual Thresholds". NASA Human Research Program Investigators Workshop. Galveston, TX. January 2020 (Poster)
6. Voros, J., Callas, M., Anderson, A., Clark, T. "Galvanic Vestibular Stochastic Resonance to Improve Perceptual Thresholds". NASA Human Research Program Investigators Workshop. Galveston, TX. January 2020 (Poster)
7. Rise, R., Voros, J., Anderson, A., Clark, T. "Using Simulation to Improve Sensory Threshold Estimation on Two-Interval Stochastic Resonance Tasks". NASA Human Research Program Investigators Workshop. Galveston, TX. January 2020 (Poster)
8. Boppana, A., Priddy, S., Fineman, R., Stirling, L., Anderson, A. "Quantifying the Heel Lift in Spacesuit Gait". NASA Human Research Program Investigators Workshop. Galveston, TX. January 2020 (Poster)
9. Baughman, A., Witte, Z., Anderson, A. "Evaluation of Virtual and Hybrid Reality Systems for Astronaut Training". NASA Human Research Program Investigators Workshop. Galveston, TX. January 2020 (Poster)
10. Boppana, A., Anderson, A. "Development of a Dynamic 3D Scanning System with Multiple Intel RealSense Depth Cameras." International Society of Biomechanics, Kananaskis, Canada. 07/2019 (Presentation)

11. Boppana, A., Hoogkamer, W., Kram R., Anderson, A. "Using Dynamic Foot Morphology Data to Design Spacesuit Footwear". Footwear Science, Kananaskis, Canada. 07/2019 (Presentation). *Martyn Shorten Award for Innovation*.
12. Arquilla, K., Anderson, A., Webb, A. "Wearable Sensor System Architecture for Monitoring Long-Term Psychological Health." IEEE Engineering in Medicine and Biology Conference, Berlin, Germany. 07/2019. (Poster)
13. Bergman, E., Anderson, A., "Tatanka-II: A Terrestrial EVA Spacesuit Simulator" International Conference on Environmental Systems. Boston, MA. 07/2019 (Poster)
14. Van Akin, M., Anderson, A., "Design and Operation of a Multi-Functional Pressure Chamber for Human Spaceflight Research" International Conference on Environmental Systems. Boston, MA. 07/2019 (Poster)
15. Anderson A., Covington, K., Rieke, C., Fellows, A., Buckey, J. "Classification of Distortion Product Otoacoustic Emission Phase Maps" Aerospace Medicine Association Annual Meeting. Las Vegas, NV. 05/2019. (Presentation)
16. Anderson, A., Covington, K., Rieke, C., Fellows, A., Buckey, J. "Changes in Distortion Product Otoacoustic Emission Maps with Posture and Fluid Shift Using Statistical Parametric Mapping." Association for Research in Otolaryngology. Baltimore, MD. 02/2019 (Poster)
17. Anderson A., Banerjee N., Boppana A., Baughman A., Lin S., Witte Z., Wall R., Klaus D. "Spacecraft Habitat Design Evaluation Using Alternative Reality Technologies" NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2019 (Presentation)
18. Buckey J., Phillips S., Anderson A., Chepko A., Archambault-Leger V., Fellows A. "Pre-flight Body Weight Predicts Ocular Changes in Space" NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2019 (Poster)
19. Wood S., Shen Y., Anderson A. "Magnetometer-Free Characterization of Spacesuit Wearer Joint Kinematics Using Inertial and Strain Sensors" NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2019 (Poster)
20. Banerjee N., Baughman A., Lin S., Witte Z., Klaus D., Anderson A. "Development of Alternative Reality Environments for Spacecraft Habitat Design Evaluation" NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2019 (Poster)
21. Anderson, A., Covington K.B., Rieke C., Fellows A., Buckey J. "Analysis of Distortion Product Otoacoustic Emissions with Changes in Posture and Fluid Shift." NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2019 (Poster)
22. Buckey, J., Phillips S., Anderson A., Chepko A., Archambault-Leger V., Fellows A. "Pre-flight Body Weight Predicts Ocular Changes in Space" International Astronautical Congress, Bremen, Germany. October 2018. (Presentation)
23. Boppana, A., Arquilla, K., Anderson, A. "Measurement of Human-Spacesuit Contact Pressures Through a Wearable Sensing Garment." International Conference on Environmental Systems, Albuquerque, NM, July 2018. (Poster)
24. Shen, Y., Wood, S., Anderson, A. "Spacesuit Wearer Joint Kinematics Estimation Enabled by Inertial Measurement Unit Arrays" International Conference on Environmental Systems, Albuquerque, NM, July 2018. (Poster)
25. Anderson, A., Cowan, D., Mupparaju, S., Fellows, A., Buckey, J. "Computer-Based Mental Health Resources in Isolated Confined Environments." Aerospace Medicine Association, Dallas, TX. May 2018 (Presentation)
26. Anderson, A., Cowan, D., Fellows, A., Buckey, J. "Behavioral Health Research in Analog Environments: Opportunities and Challenges." Aerospace Medicine Association, Dallas, TX. May 2018 (Presentation)
27. Shen, Y., Anderson, A. "Characterization of Spacesuit Wearer Joint Kinematics Using Inertial Measurement Unit Arrays" NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2018 (Poster)

28. Anderson, A., Klaus, D. "Interactive Space Vehicle Design Tool with Virtual Reality" NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2018 (Poster)
29. Boppana, A. Anderson, A. "Pressure Sensor Network to Quantify Spacesuit Contact Pressure" NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2018 (Poster)
30. Arquilla, K., Anderson, A. "Development and Analysis of Wired Textile Prototypes for use in Wearable Sensor Systems" NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2018 (Poster)
31. Phillips, S., Anderson, A., Chepko, A., Archambault-Leger, V., Masterova, K., Fellows, A., Cowan, D., Buckey, J. "Unique Numerical Model Incorporating Tissue Weight and Tissue Compressive Forces for Modeling Microgravity Effects" NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2018 (Poster)
32. Mupparaju, S., Anderson, A., Cowan, D., Lam, Q., Gifford, S., Love, R., Florom-Smith, A., Fellows, A., Buckey, J. "Computer-Based Mental Health Resources in ICES: Comparison Between Canada Forces Station Alert and HI-SEAS IV" NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2018 (Poster)
33. Cowan D., A. Anderson, J. Buckey, "Evaluation of Virtual Nature for Relaxation in Isolated, Confined Environments." Aerospace Medical Association, Denver, CO. May 2017 (Presentation).
34. Anderson A, C. Rieke, Fellows A, Buckey J. "Feasibility of DPOAE Mapping as an In-Flight Measure of Intracranial Pressure in Space." NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2017 (Presentation)
35. Anderson A, Fellows A, Phillips S, Chepko A, Archambault-Leger V, Kattamis N, Knaus, D, Zegans M, Buckey J. "Role of Cranial Venous Circulation in Microgravity-Associated Visual Changes." NASA Human Research Program Investigators Workshop, Galveston, TX. 01/2017 (Presentation)
36. Anderson A, Cowan, D., Fellows AM, Binsted K, Hegel, MT, Buckey JC. "Autonomous Behavioral Health Countermeasures - Virtual Space Station". NASA Human Research Program. Investigators Workshop, Galveston, TX, Galveston, TX. 01/2017 (Poster)
37. Phillips S, Chepko A, Archambault-Leger V, Kattamis N, Knaus, D, Anderson, A. Zegans M, Buckey J. "Numerical modeling of the eye structure and the cerebrovascular/cerebrospinal circulation." NASA Human Research Program. Investigators Workshop, Galveston, TX, Galveston, TX. 01/2017 (Presentation)
38. Anderson A, Fellows AM, Hegel MT, Buckey JC. "Virtual reality with natural scenes to reduce stress in isolated confined environments". Joint Life Science Meeting (CNES, ESA, ISGP), Toulouse, France, 06/2016 (Presentation)
39. Anderson A, Fellows AM, Binsted K, Hegel, MT, Buckey JC. "Evaluation of an autonomous, computer-based, behavioral health countermeasure in an isolated, confined environment". Aerospace Medical Association. 87th Annual Scientific Meeting, 04/2016. (Presentation)
40. Anderson A, Fellows AM, Buckey JC. "DPOAE Mapping as a Measure of Cochlear Sensitivity to Postural Changes". Association for Research in Otolaryngology, 2/2016. (Poster)
41. Anderson A, Fellows A, Phillips S, Chepko A, Archambault-Leger V, Kattamis N, Knaus, D, Zegans M, Buckey J. "Role of Cranial Venous Circulation in Microgravity-Associated Visual Changes." NASA Human Research Program Investigators Workshop, Galveston, TX. 02/2016 (Presentation)
42. Anderson A, Fellows AM, Binsted K, Hegel, MT, Buckey JC. "Autonomous Behavioral Health Countermeasures - Virtual Space Station". NASA Human Research Program. Investigators Workshop, Galveston, TX, 02/2016. (Poster)
43. Anderson A, Fellows A, Buckey J. "Feasibility of DPOAE Mapping as an In-Flight Measure of Intracranial Pressure in Space." NASA Human Research Program Investigators

- Workshop, Galveston, TX. 02/2016 (Poster)
44. Phillips S, Chepko A, Archambault-Leger V, Kattamis N, Knaus, D, Anderson, A. Zegans M, Buckey J. "Numerical modeling of the eye structure and the cerebrovascular/cerebrospinal circulation." NASA Human Research Program. Investigators Workshop, Galveston, TX, Galveston, TX. 02/2016 (Presentation)
  45. Anderson A, Abigail Fellows, Gautam Babu, Jacob Swan, Scott Phillips, Nicholas, Kattamis, Darin Knaus, Michael Zegans, Jay Buckey. "Ocular And Cerebrovascular Changes In Microgravity". Aerospace Medical Association Annual Meeting, Orlando, FL., 05/2015. (Presentation)
  46. Anderson, A. Fellows, J. Buckey. "Feasibility of DPOAE Mapping as an In-Flight Measure of Intracranial Pressure in Space". NASA Human Research Program Investigators Workshop, 01/2015. (Poster)
  47. Newman, D.J., Anderson, A., Diaz, A., Kracik, A., Hilbert, A., Bertrand, P., Hoffman, J., Trotti, G., "Spacesuit Trauma Countermeasures Research: Injury Prevention and Comfort Protection Design", NASA Human Research Program Investigators Workshop, Galveston, TX, 02/2014. (Presentation)
  48. Anderson A., Hilbert A., Bertrand P., Newman D., "Space Suit Trauma Countermeasure System: Pressure Sensing Capability for In-Suit Characterization", NASA Human Research Program Investigators Workshop, Galveston, TX, 02/2014. (Poster)
  49. Hilbert A., Diaz A., Anderson A., Newman D. J., "Human-Space Suit Interaction: Musculoskeletal Modeling & Statistical Analysis of Injuries", NASA Human Research Program Investigators Workshop, Galveston, TX, 02/2014. (Poster)
  50. Anderson, A., Menguc, Y., Wood, R., Newman, D.J., "Hyperelastic Pressure Sensor Development For Use in Extravehicular Mobility Unit" IAA Humans in Space Conference, Cologne Germany 07/2013. (Poster)
  51. Diaz, A., Anderson, A., Hoffman, J., Newman D. J., "Modeling Musculoskeletal Human-Spacesuit Interaction", International Astronautical Association (IAA) Humans in Space Conference, Cologne Germany 07/2013. (Presentation)
  52. Anderson A., A. Diaz, M. Kracik, G. Trotti, J. Hoffman, D. J. Newman "Understanding Human-Space Suit Interaction to Prevent Injury During Extravehicular Activity" NASA Human Research Program Investigator's Workshop 2013, Houston. (Poster)
  53. A. Diaz, A. Anderson, M. Kracik, G. Trotti, J. Hoffman, D. J. Newman "Development of a Musculoskeletal Human-Space Suit Interaction Model" NASA Human Research Program Investigator's Workshop 2013, Houston. (Poster)
  54. Anderson, A., D. Newman, "Developing a Spacesuit Injury Countermeasure System for Extravehicular Activity" International Conference on Environmental Systems 2012, San Diego. (Poster)
  55. Anderson, A., D. Newman, "Modeling Astronaut-Spacesuit Interaction to Develop a Spacesuit Trauma Countermeasure System for Extravehicular Activity" NASA Human Research Program Investigator's Workshop 2012, Houston. (Poster)
  56. Anderson A., A. Diaz, M. Kracik, R. Kobrick, G. Trotti, J. Hoffman, and D. Newman, "Methodology Toward Developing a Spacesuit Trauma Countermeasure System for Extravehicular Activity" NASA Human Research Program Investigator's Workshop 2012, Houston. (Poster)
  57. Anderson, A., M. Kracik, G. Trotti, D. Newman, "Preliminary Astronaut Injury Countermeasure and Protection Suit Design." IAA Humans Space Conference 2011, Houston. (Poster)
  58. Anderson, A., S. Wilcox, E. Gundersen, G. Trotti, D. Newman, "Using Space-Inspired Education Tools to Enhance STEM Learning in Rural Communities" American Society of Engineering Education Annual Conference 2011. Vancouver, Canada (Presentation)



## **Teaching Experience**

### University of Colorado – Boulder

Sp 2020, Su. 2019 ASEN 4519/5519: Medicine in Space and Surface Environments. *Developed as a new course. Co-Instruction with Emergency Medicine at CU-Anschutz Medical Campus.*

- *Course featured in Wired Magazine, Travel and Leisure, CU Anschutz Today, CU Boulder Today, Channel 9 News, Aerospace Medicine Association Newsletter, and Pres. Benson's farewell address to CU*

Sp. 2020, F. 2018 Instructor ASEN 5519: Experimental Design and Statistical Analysis. University of Colorado Boulder. *Developed as a new course.*

F. 2019, 2018, 2017 Instructor ASEN 2012: Experimental and Numerical Methods in Aerospace Engineering Sciences. University of Colorado Boulder. *Restructured curriculum.*

Sp. 2019, 2018 Instructor ASEN 6519: Extravehicular Activity. University of Colorado Boulder. *Developed as a new course.*

Sp. 2017 Instructor ASEN 5016: Space Life Sciences. University of Colorado Boulder

## **Student Research Advising**

### Primary Thesis Advisor

Young-Young Shen, PhD Candidate, exp. May 2021

Katya Arquilla, PhD Candidate, Draper Fellow, exp. May 2021

Abhishektha Boppana, PhD Candidate, NSF Graduate Research Fellow, exp. May 2022

Michael Van Akin, PhD Candidate, NSF Graduate Research Fellow, exp. May 2023

Sage Sherman, PhD Candidate, exp. May 2024

Neil Banerjee, PhD Candidate, exp. May 2024

Gabriella Schauss, PhD Candidate, exp. May 2025

Johnny Zhang, MS Candidate, exp. May 2021

Michael Valosin, MS Candidate, exp. May 2021

Alexander Baughman, MS, 2019

Amin Mody, MS, 2019

Roger Huerta Lluch, MS, 2019, Balsells Fellow

Arthur Barriault, MS, 2019

Joseph Butterfield, MS, 2018

Trevor Fritz, MS, 2018

### Thesis Committee Member

Jacob Kintz, PhD Candidate, 2024

Rachel Rise PhD Candidate, 2024, NSF Graduate Research Fellow

Jamie Voros, MS, PhD Candidate, 2023, Zonta International Amelia Earhart Fellowship

Christine Escobar, PhD Candidate, 2022

Kipp Larson, PhD Candidate, 2022

Carlos Pinedo, PhD Candidate, 2021

Jordan Dixon, PhD Candidate, 2021, Draper Fellow

Katie Bretl, PhD Candidate, 2021, NASA Space Technology Research Fellow

Gregory Bales, PhD Candidate, 2021 (UC Davis)

Ryan Alcantra, PhD Candidate, 2020, (CU Boulder, Integrative Physiology)

Jordan Holquist, PhD, 2018, NASA Space Technology Research Fellow

Conor Cullinane, PhD, 2018 (MIT)

Kadambari Suri, MS, 2019

William Holsclaw, BS, 2018 (CU Boulder, History Dept.)

### Undergraduate Researchers

Evelyn Clarke

Andres Davila (DLA)

Cody Watson (DLA)  
Michael Schlittenhart (DLA)  
Maya Greenstein  
Daniel Mendoza  
Abigail Durell  
Anissa Becerra (UROP)  
Anna Jonsen  
Ashkan Bafti  
Sarah Leary  
Emma Markovich (UROP)  
Ponder Stine (SPUR)  
Maria Callas (UROP)  
James Rizkallah (UROP)  
Justin Miller (SPUR)  
Steven Priddy (UROP)  
Lucas Pereira (SPUR)  
Jiabin Lin  
Aleksander Kryuchkov (DLA)  
Zoë Witte (UROP Team Grant)  
Alexander Baughman (SPUR, UROP Team Grant)  
Shu-Yu (Michelle) Lin (DLA)  
Maureen McNamara (BSL)  
Shaylah Wood (UROP)  
Keith Blaine Covington (UROP)  
Sevi Mit Senavinin (UROP)  
Ryan Wall  
Andrew Kerr (UROP)

### **Research and Professional Internships**

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2013, 2009 (Summer) Technology Development Intern; Dainese Research and Design, Morostica, Italy  
2012 (Summer) Research Intern, Advanced Spacesuit Lab; Johnson Space Center, Houston TX  
2011 (Summer) Space Studies Program, International Space University, Graduate  
2010 (Summer) ExplorationWorks Museum of Science and Culture, Helena MT  
2006-2004 Research Assistant; Combustion Physics Laboratory, Department of Mechanical Engineering, USC; Mentor: Dr. Paul Ronney  
2006 (Summer) Northrop Grumman – Electronic Systems, Azusa, CA, Intern  
2005, 2006 (Summer) Central Intelligence Agency, Washington DC, Intelligence Analyst Intern

### **Outreach and Community Involvement**

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2020 – Present Faculty Mentor, New Shepard Competition student team  
2019 – Present Faculty Mentor, Aerospace Medicine Students and Residents Organization, CU Chapter (Includes Anschutz Medical Campus)  
2017- Present Faculty Mentor, CU Technology for Extreme Environments Club, which participates in NASA SUITS Challenge  
2020 CU Boulder NEXT, speaker  
2019-2020 Advisor, Colorado Space Grant AEGIS Suit Simulator Project  
2019 TEDxMileHigh Speaker, delivered speech to 5,000 people, talk featured on TED.com  
2019 Space Generation Advisory Council Health in Space Webinar  
2019 Panel Speaker, Society for Women in Space Exploration  
2019 Aerospace Graduate Student Organization Career in Academia Panel

2019 Humans in Space, Guest lecture in elementary school, Bogota, Colombia  
2019 Human Performance Summit, Panel Speaker  
2019 Aerospace & STEM Summit, panel member  
2019, 2018 Guest lecture, "Human Exploration: Part 2" Pathway to Space, CU-Boulder Space Minor  
2018 Aerospace Graduate Seminar Speaker  
2018 Guest speaker, Altona Middle School  
2018 Guest lecture, "Aerospace Engineering Sciences @ CU Boulder", South Denver Chamber of Commerce  
2018 Guest lecture, "Virtual Reality for Space and Earth" Tuskegee Airmen Mile High Flight Program  
2017-2018 Faculty Mentor, NASA Wearables Challenge: Automatic Boot Thermal Control  
2017-2018 Faculty Mentor, NASA Wearables Challenge: EMG for Extravehicular Activity  
2018 LEGO First Robotics, team science mentor  
2017 Invited lecture, "Humans in Space!" CU-Boulder Spacer Minor  
2012 – 2013: Video maker; MIT K-12 Initiative with over 1.8 million views (MIT)  
2011 – 2012: Lecturer; MOSTEC High School AeroAstro course (MIT)  
2008 – 2013: Instructor; SEED Academy High School AeroAstro course (MIT)  
2008 – 2013: Lecturer; Cambridge Science Festival, MIT Museum  
2010 Lecturer; Teacher Professional Development in Molecular Biology. "Radiation and Hazards to DNA in Space Travel"  
2010 Instructor; Science Camp, ExplorationWorks Museum of Science and Culture  
2010 Program Director; Girls Scouting Space and Sky, Girl Scouts of Massachusetts  
2009 Lecturer; Girls Angle Math Club for Girls  
2008 High School Teacher; Instituto Cardenal Rodriguez, Juticalpa, Honduras  
2004 – 2007 Spirits in Action, Special Olympics-like event hosted at USC, Director 2007, Donations lead 2006, and event organization team member 2004-2005  
2005-2006 Tutor; Physics and Aerospace Engineering (USC)  
2003-2005 Tutor; Joint Educational Program (USC)

## **Service**

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2021 US Frontiers of Engineering organizing committee, National Academy of Engineering (selected 2020)  
2020 – Present Faculty Affairs Advisory Board, CU-Boulder  
2020 – Present Member AIAA  
2019 – Present Co-Organizer of Faculty Sanity, CU-Boulder  
2018 – Present Bioastronautics Focus Lead, Graduate Committee, Dept. of Aerospace Eng. Science, CU-Boulder  
2018 Biomedical Engineering Faculty Search committee member  
2017 – Present Review editor, Frontiers in Physiology: Environmental, Aviation, and Space Physiology  
2017 – Present Member, Aerospace Medicine Association  
2019 Taskforce on Mental Health and Wellness, College of Engineering  
2019 Biomedical Engineering Faculty Search Committee Member  
2018 – 2020 – Executive Committee, Smead Department of Aerospace Engineering Sciences  
2017, 2020 Graduate Women in Aerospace Conference Co-Organizer  
2015 – 2016 Board member, Headrest substance use disorder facility  
2012 – 2014 Graduate Resident Tutor, Baker House (MIT)  
2008; 2011 Representative; Graduate Aeronautics and Astronautics Association (MIT)  
2010 Student Organizer; MIT 150 Exploration Symposium (MIT)  
2009 Student Organizer; Apollo 40 Celebration (MIT)

2009 Student Organizer; Sally Ride Festival (MIT)  
2007 Coordinator; W.V.T Rusch Engineering Honors Colloquium (USC)  
2003 – 2007 V-Key Managing Editor, Communications Manager, Representative; Viterbi Student Ambassadors (USC)

### **Invited Seminars**

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2020 University of Michigan, Department of Industrial and Operations Engineering  
2020 Program for Injury Prevention, Education, and Research, Colorado School of Public Health, UC Denver  
2020 Blue Origin  
2019 University of California – Davis, Department of Aerospace and Mechanical Engineering  
2018 Integrative Physiology, University of Colorado Boulder  
2018 Institute of Cognitive Science Colloquium, University of Colorado Boulder  
2017 University of Southern California, Department of Aerospace and Mechanical Engineering

### **Grants and Fellowships**

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#### Awarded

2019-2024 NASA Space Technology Research Initiative. *The HOME Space Technology Research Institute for Deep Space Habitat Design*. PI Robinson (UC Davis), My role: Co-I, Research Thrust Lead. 19 other Co-Is  
2019-2021 Translational Research Institute for Space Health. *Performance Enhancement Through Multi-Modal Stochastic Resonance*. My role: PI. Co-PI: Torin Clark  
2019 Engineering Excellence Fund (CU Boulder). My role: PI  
2018-2019 UROP Team grant (CU Boulder). My role: PI  
2019 Artist in Residence Fellowship (CU Boulder). My role: Co-I. PIs: Laura Devendorf, Steven Frost  
2018-2022 Department of Education Graduate Assistance in Areas of National Need. My role: Co-I. PI: Penina Axelrad. 10 other Co-Is  
2018 IRT Multi-functional Materials. *Prototyping Support for Multi-functional Textiles Research*. My role: PI with Laura Devendorf (CU Boulder)  
2018 IRT Multi-functional Materials. *Multifunctional electronic skins for applications in prosthetics and spacesuits*. My role: Co-PI. Co-PIs: Jianliang Xiao, Wei Zhang, Jacob Segil (CU Boulder)  
2017-2018 NASA Human Research Program. *Interactive Space Vehicle Design Tool with Virtual Reality*. My role: PI. Co-I: Dave Klaus  
2016-2017 NASA Human Research Program. *Quantifying and Preventing EVA Injury in Exploration Environments*. My role: Institute PI. PI: Prof. Jeff Hoffman (MIT)  
2014-2016 National Space Biomedical Research Institute First Award Fellow. *Feasibility of DPOAE Mapping as an In-Flight Measure of Intracranial Pressure in Space*. My role: PI. Mentor: Jay Buckey (Dartmouth College)  
2013 Whitaker International Summer Program Fellowship (MIT)  
2011 International Space University Tuition Scholarship (MIT)  
2010 NSF Graduate Research Fellowship Program (MIT)  
2009 MISTI International Travel Support (MIT)  
2008 MIT Presidential Fellowship (MIT)  
2005-2007 Achievement Award for College Scientists Scholarship (USC)  
2005-2006 Merit Research Award (USC)  
2004 Boeing Academic Scholarship (USC)  
2003-2004 Engineering Scholarship (USC)  
2003-2004 Trojan Scholarship (USC)

## **Media Appearances**

2019 Medicine in Space and Surface Environments featured in many media outlets, including Wired Magazine, Travel and Leisure, local news, and President Benson's farewell address  
2019 Interviewed for local news on cancellation of first all-female spacewalk  
2019 Scholastic Math, Interviewed about Spacesuits  
2019 Interviewed for high school student podcast on space  
2019 Interviewed for local news on new NASA Spacesuit. Featured in ASEE Newsletter  
2017 Podcast speaker, "You Make Me Sick: Humans in Space", Environmental Defense Fund

## **Additional Certifications and Experience**

1. SCUBA Certification – Basic (2002), Advanced (2010), Rescue (2017)
2. Parabolic Flight Experience –Completed total of 190 parabolas. 2009 Campaign, 1 day; 2015 Campaign, 4 days
3. Flight Experience – Private pilot (2016)
4. Geology field camp – 4 weeks, Mojave Desert (2014)
5. First Responder training – Medical Professional CPR and AED (2014), Emergency First Response (2017)
6. Isolated, Confined Environment – Canadian Forces Station Alert, 2 weeks December 2015, 2 weeks March 2016
7. American Institute for Avalanche Research and Education – Level 1 certification
8. Tripoli Rocketry Association - Member, amateur High Power Level 1 certification