Shu-Yu (Mich) Lin, M.S.
Ph.D. Student, Department of Aeronautics and Astronautics
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Massachusetts Institute of Technology

Research Interests

Human spaceflight, human-environment relationship, isolated/confined/extreme environments, behavioral health, space psychology, behavioral design in architecture, post-occupancy evaluation, user-centered design

Education

Ph.D., Space Architecture, Massachusetts Institute of Technology, exp. June 2026
Thesis: *Architectural Design Framework for Providing Passive Behavioral Health Countermeasures*
Committee: Prof. Katya Arquilla; Prof. Olivier de Weck (chair); Dr. Lauren Landon
GPA: 5.00/5.00

M.S., Aeronautics and Astronautics, Massachusetts Institute of Technology, June 2023
Thesis: *Wearable Sensor System for Quantifying Proprioceptive Competence in Microgravity [10]*
Advisors: Prof. Jeffrey Hoffman; Prof. Katya Arquilla
GPA: 5.00/5.00

B.S., Aerospace Engineering Sciences, University of Colorado Boulder, June 2021
Summa cum laude, with honors, GPA: 3.94/4.00

B.S., Applied Mathematics, University of Colorado Boulder, June 2021
Summa cum laude, with honors, GPA: 4.00/4.00

Selected Publications

Shu-Yu Lin, Lauren Landon, Katya Arquilla. "Mood Changes in an Isolation Analog: Validation and Analysis of the Subjective Habitability & Acceptability Questionnaire (SHAQ)". *In preparation.*

Shu-Yu Lin. "Wearable Sensor System for Quantifying Proprioceptive Competence in Microgravity" Master's Thesis. Massachusetts Institute of Technology. 06/2023.

Research and Professional Experience

3XN/GXN, Copenhagen, Denmark, Behavioral Designer & Researcher — Su. 2024
Conducted post-occupancy evaluations to assess affordances
Created behavioral design brief for masterplan project
Contributed to and edited chapter on blending research and practice [8]

NASA Johnson Space Center - Behavioral Health & Performance Lab, Houston, TX, Researcher; Mentor: Dr. Lauren Landon — Su. 2023
Analyzed participant data from NASA's analog isolation habitat studies to quantify the correlation between habitability and mood [3][11]

SpaceX – Operations, Hawthorne, CA, Space Medicine & Research Engineer — Su. 2022
Led flight hardware hazard assessment for over 25 research projects

Astrolab – Field Test, Dumont Dunes, CA, Human Factors Consultant — Su. 2021
Provided human factors & ergonomics assessment for lunar rover

Blue Origin – Advanced Concepts, Kent, WA, Space Architecture Intern — Su. 2020
Modeled and rendered a human habitation design in microgravity with Rhino and VRay

SpaceX – Vehicle Engineering, Hawthorne, CA, Mechanisms Intern
Designed and fabricated flight parts for Demo-II and Crew-1 Su. 2019
Designed portable actuation box for docking mechanism
CU Bioastronautics Lab, Boulder, CO, Researcher
Led software development in Unreal and Blendr to produce an augmented reality environment through the Microsoft Hololens [1][2] 2019-2021
Colorado Legislature, Denver, CO, Science & Engineering Policy Fellow
User research on renewable energy in rural communities Su. 2018
Colorado Space Grant, Boulder, CO, Systems Engineering Lead
Managed schedules and requirements for inflatable habitat model 2017-2018

Grants and Fellowships

Richard Dupont Memeorial Fellowship (MIT)
MISTI International Travel Support (MIT) 2024
NASA Space Technology Graduate Research Fellowship 2024
Award: Architectural Design Framework for Providing Passive Behavioral Health Countermeasures 2022
Graduate Student Council Conference Travel Grant (MIT)
National Science Foundation Graduate Research Fellowship 2021
Jack and Vickie Kerrebrock Fellowship 2021
John B. Cox '48 Endowed Scholarship (CU Boulder) 2021
Rudolph and Helen Gagg Scholarship (CU Boulder) 2020
Dorothy Martin Endowment Fund (CU Boulder) 2019
J. Tour Scholarship in Arts and Sciences (CU Boulder) 2018
Quarton Scholar (CU Boulder) 2020
Ball Aerospace Broadening Opportunities through Leadership and Diversity Scholarship (CU Boulder) 2021
2018-2021
Esteemed Scholars Award (CU Boulder)
Engineering Scholarship (CU Boulder) 2017-2021
Greenhouse Scholarship 2017-2021
2017-2021

Peer Reviewed Journal Publications

1. Banerjee, N., Baughman, A., **Lin, S.**, Witte, Z., Klaus, D., Anderson, A. "Development of Alternative Reality Environments for Spacecraft Habitat Design Evaluation." Virtual Reality, 1-10. 07/2020.
2. 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. 07/2020.

Under revision, review, or preparation

3. **Shu-Yu Lin**, Landon, L., Arquilla, K. "Mood Changes in an Isolation Analog: Validation and Analysis of the Subjective Habitability & Acceptability Questionnaire (SHAQ)". *In preparation.*
4. **Shu-Yu Lin**, Lian, C., Yang, A., and Arquilla, K. "Fluidity as a Measure of Movement Quality in Microgravity". *Under revision.*

Peer Reviewed Conference Publications

5. **Shu-Yu Lin**, Chen, L., Landon, L., Arquilla, K. "Acyclic framework for identifying causal

relationships in habitat design." International Astronautical Congress, Milan, Italy, 10/2024.
6. **Shu-Yu Lin**, Yang, A., Arquilla, K. "Prototyping Wearable Sensor Garment for Understanding Proprioceptive Changes in Microgravity." International Astronautical Congress, Paris, France, 09/2022.
7. **Shu-Yu Lin**, Yang, A., Arquilla, K. "Quantifying Proprioceptive Experience in Microgravity." SpaceCHI Workshop at ACM Computer Human Interaction. New Orleans, LA, 05/2022.

Other Publications

8. Lunsjö, M., **Lin, S.Y.**, Allen, K. "Bridging Theory and Practise: Applying Environmental Psychology in Architecture" in Handbook of Neuroscience and the Built Environment, Routledge. *Under review.*
9. Bell, S.T., Dev, S.I., Landon, L.B., Miller, J.C.W., Anderson, S.R., Flynn-Evans, E., Spencer, C.A., **Lin, S.Y.**, Khader, A. Human Factors and Behavioral Performance Exploration Measures in HERA Campaign 6: Final Report. Internal report submitted to the Human Factors and Behavioral Performance Element, NASA Human Research Program. Houston, TX: NASA Johnson Space Center. 09/2024.
10. **Shu-Yu Lin**. "Wearable Sensor System for Quantifying Proprioceptive Competence in Microgravity" Master's Thesis. Massachusetts Institute of Technology. 06/2023.

Presentations and Posters

11. **Shu-Yu Lin**, L. Landon, K. Arquilla. "Factors Impacting Habitability: Analysis of SHAQ Data from HERA C5 & C6." NASA Human Research Program Investigators Workshop. Galveston, TX. 01/2024. (Presentation)
12. **Shu-Yu Lin**, R. Howard, K. Arquilla. "Exploration of Place-Making in Space Architecture for Behavioral and Psychological Health." NASA Human Research Program Investigators Workshop. Galveston, TX. 01/2022. (Poster)
13. 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)

Teaching Experience

Instructor 16.459: Bioastronautics Journal Seminar. MIT — Fa. 2023 – Fa. 2024
Co-Instructors: Prof. Charles Oman, Dr. Andrew Liu
Kaufman Teaching Certificate Program. MIT — Fa. 2022
Recitation Leader EHON 1151: Critical Encounters. CU Boulder — Fa. 2018, 2019

Student Research Advising

Yutian He
Crystal (Crys) Yang (Undergraduate Research Opportunity Program)
Yihong (Amy) Chen (UROP)
Claire Chen (UROP) *[5]*
Caitlin Lian (UROP) *[4]*
Anna Yang (UROP) *[4][7]*

Honors and Awards

Arts Scholar (MIT) — 2024
AIAA Neil Armstrong Award — 2022
Graduate Award in Research (CU Boulder) — 2021

Graduate Award in Justice, Equity, Diversity, and Inclusion (CU Boulder)	2021
Matthew Isakowitz Fellowship	2020
Aviation Week / AIAA Tomorrow's Technology Leaders: The 20 Twenties	2020
Brooke Owens Fellowship	2019
Women in Aerospace Foundation Scholarship in memory of Molly K. Macauley	2019
Dean's List (CU Boulder)	2017-2021

Outreach and Community Involvement

Mentor, K-12 Fashion Workshop, Morningside Academy of Design (MIT)	2024
Mentor, Glass & Flamework Makerspaces (MIT)	2023
Board member, Flipping Failure Initiative (MIT)	2022-2023
Lecturer, Living in Space. Educational Studies Program *Developed for grade school students* (MIT)	Sp. 2022
Alumni mentor, Brooke Owens Fellowship Program	2021, 2023
Outreach & Diversity Chair, Graduate AeroAstro Association (MIT)	2021-2022
Lecturer, How to be an Astronaut. Educational Studies Program. *Developed ftor grade school students* (MIT)	Fa. 2021
Summit conference organizer, Brooke Owens Fellowship Program	2020
Undergraduate Representative, Inclusive Culture Committee Working Group Aerospace Engineering Sciences (CU Boulder)	2020
Mentor, CEAS Access & Inclusion Mentorship Program (CU Boulder)	2020-2021
Panelist, Designing for Mars Camp, Taliesin West of the Frank Lloyd Wright Foundation	2020
Panelist, Terranaut Club Nova Scotia	2020
Keynote Speaker, Society of Women Engineers	2020
Founder and President, CU Women of Aeronautics & Astronautics	2019-2021
Mentor, Womxn of Color Program, Broadening Opportunities through Leadership and Diversity (CU Boulder)	2019-2020

Media Appearances

Podcast speaker, Ignited Thinkers	2022
Podcast speaker, "An Aspiring Explorer Navigates a Changing Space Industry" Supercluster	2020
Interviewed for local news on bioastronautics research at CU Boulder	2019

Skills and Softwares

Research

Data Analysis (R, Matlab, Python, Atlas.ti), literature review (Zotero, Mendeley), experimental & statistical design, non-parametric statistics, publication and grant writing

Design and fabrication

Computer-aided 3D/2D drawing (Rhino, NX, AutoCad), human factors and ergonomics analysis, microelectronics, soldering, machine and hand sewing, mill and lathe, film processing, geometric dimensioning and tolerancing, glass flamework and lampwork

Project management

Gantt milestone tracking, selection criteria development, communicative, self-starter, detail-oriented

Additional Certifications and Experience

1. SCUBA – PADI Open Water (2021), SSI Advanced Open Water (2021)
2. Freediving – AIDA II (2021)
3. Parabolic flight experience – Completed 25 total parabolas. 2022 Campaign, 1 day.
4. First Responder Training – Medical CPR (2021)
5. Institutional Review Board – Biomedical Research Investigators (exp. 02/2025)
6. Languages: English (native), Mandarin Chinese (native), Taiwanese (basic), Spanish (proficient), German (basic)