

Hao Chen

CONTACT INFORMATION

Assistant Professor
School of Systems & Enterprises
Stevens Institute of Technology
216 North Building
Hoboken, NJ 07030, USA

Email: hao.chen@stevens.edu
Office: (201) 216-5173
Website: <https://faculty.stevens.edu/hchen5>

ACADEMIC APPOINTMENTS

Assistant Professor	Stevens Institute of Technology, Hoboken NJ	Aug. 2021 - Present
Postdoctoral Fellow	Georgia Institute of Technology, Atlanta, GA	Jul. 2021 - Aug. 2021

EDUCATION

Georgia Institute of Technology, Atlanta GA Ph.D. in Aerospace Engineering Thesis: Interdisciplinary Space Logistics Optimization Framework for Large-Scale Space Exploration Committee: Prof. Koki Ho (Chair), Prof. E. Glenn Lightsey, Prof. Brian Gunter, Prof. Christopher Carr, Prof. Harrison M. Kim Major/Minor: Aerospace Engineering (Major), Mathematics (Minor)	May 2021
University of Illinois Urbana-Champaign, Urbana IL M.S. in Aerospace Engineering	Aug. 2016
Sun Yat-sen University, Guangzhou China B.S. in Theoretical and Applied Mechanics	Jun. 2014

RESEARCH INTERESTS

- **Space Logistics**
- **Space Resource Utilization**
- **Multi-Mission Space Campaign Design**
- **On-orbit Servicing, Assembly, and Manufacturing**
- **Complex Systems**
- **Human Factors Engineering**
- **Engineering Design and Systems Engineering**

AWARDS/SCHOLARSHIPS

- **Luigi G. Napolitano Award**, International Astronautical Congress **2019**
 - Conferred every year to a young scientist who has significantly contributed to the advancement of the aerospace science.
- **Mavis Future Faculty Fellowship (MF3)**, University of Illinois at Urbana-Champaign **2018-2019**
- **Warren W. Yee Memorial Fellowship**, University of Illinois at Urbana-Champaign **2017**
- **The First Prize Scholarship**, Sun Yat-sen University **2012**

TEACHING EXPERIENCE

Stevens Institute of Technology, Hoboken NJ

Instructor

EM/ISE 424 Engineering Design VIII (Undergraduate Level)	Spring 2023
EM/ISE 423 Engineering Design VII (Undergraduate Level)	Fall 2022
SYS 640 System Supportability and Logistics (Graduate Level)	Fall 2021, Spring 2022, Fall 2022, Spring 2023

Georgia Institute of Technology, Atlanta GA

Graduate Teaching assistant

AE 6353 Orbital Mechanics (Graduate Level)	Fall 2020
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University of Illinois Urbana-Champaign, Urbana IL

Graduate Teaching assistant

AE 403 Spacecraft Attitude Control (Undergraduate/Graduate Level)	Spring 2017, Spring 2019
AE 352 Aerospace Dynamical Systems (Undergraduate Level)	Fall 2017

PUBLICATIONS and PRESENTATIONS

*Chen and Chen's students/advises are in **boldface**.

Journal Articles

- [J11] Y. Takubo, **H. Chen**, and K. Ho, "[Hierarchical Reinforcement Learning Framework for Stochastic Spaceflight Campaign Design](#)," *Journal of Spacecraft and Rockets*, Vol. 59, No. 2, pp. 421-433, 2022.
- [J10] **H. Chen**, M. Ornik, and K. Ho, "[Space Exploration Architecture and Design Framework for Commercialization](#)," *Journal of Spacecraft and Rockets*, Vol. 59, No. 2, pp. 538-551, 2022.
- [J9] T. Sarton du Jonchay, **H. Chen**, M. Isaji, Y. Shimane, and K. Ho, "[On-Orbit Servicing Optimization Framework with High- and Low-Thrust Propulsion Tradeoff](#)," *Journal of Spacecraft and Rockets*, Vol. 59, No.1, pp. 33-48, 2022.
- [J8] **H. Chen**, B. Gardner, P. Grogan, and K. Ho, "[Flexibility Management for Space Logistics via Decision Rules](#)," *Journal of Spacecraft and Rockets*, Vol. 58, No. 5, pp. 1314-1324, 2021.
- [J7] T. Sarton du Jonchay, **H. Chen**, O. Gunasekara, and K. Ho, "[Framework for Modeling and Optimization of On-Orbit Servicing Operations Under Demand Uncertainties](#)," *Journal of Spacecraft and Rockets*, Vol. 58, No. 4, pp. 1157-1173, 2021.
- [J6] **H. Chen**, T. Sarton du Jonchay, L. Hou, and K. Ho, "[Multifidelity Space Mission Planning and Infrastructure Design Framework for Space Resource Logistics](#)," *Journal of Spacecraft and Rockets*, Vol. 58, No. 2, pp. 538-551, 2021.
- [J5] T. Sarton du Jonchay, **H. Chen**, Anna Wieger, Zoe Szajnfarber, and K. Ho, "[Space Architecture Design for Commercial Suitability: A Case Study in In-Situ Resource Utilization Systems](#)," *Acta Astronautica*, Vol. 175, pp. 45-50, 2020.
- [J4] **H. Chen**, T. Sarton du Jonchay, L. Hou, and K. Ho, "[Integrated In-Situ Resource Utilization System Design and Logistics for Mars Exploration](#)," *Acta Astronautica*, Vol. 170, pp. 80-92, 2020.
- [J3] **H. Chen**, H. Lee, and K. Ho, "[Space Transportation System and Mission Planning for Regular Interplanetary Missions](#)," *Journal of Spacecraft and Rockets*, Vol. 56, No. 1, pp. 12-20, 2019.
- [J2] Z. Chen, **H. Chen**, and K. Ho, "[Analytical Optimization Methods for Space Logistics](#)," *Journal of Spacecraft and Rockets*, Vol. 55, No. 6, pp. 1582-1586, 2018.
- [J1] **H. Chen** and K. Ho, "[Integrated Space Logistics Mission Planning and Spacecraft Design with Mixed-Integer Nonlinear Programming](#)," *Journal of Spacecraft and Rockets*, Vol. 55, No. 2, pp. 365-381, 2018.

Conference Proceedings (Selected)

- [C23] **C. Chullen, I. Pena, and H. Chen**, “Evolutionary Technology Infusion into Spacesuit Systems,” *52nd International Conference on Environmental Systems (ICES 2023)*, Calgary, Alberta, Canada, no. ICES-2023-167, Jul. 2023.
- [C22] **C. Chullen, I. Pena, and H. Chen**, “Technology Infusion in Spacesuits – A Comparative System Analysis,” *20th International Conference on Systems Engineering Research (CSER 2023)*, Hoboken, NJ, Mar. 2023.
- [C21] **C. Chullen, I. Pena, K. Ganesan, and H. Chen**, “Advanced Technology Infusion into Spacesuit Systems,” *ASCEND 2022*, Las Vegas, NV & Virtual, no. AIAA 2022-4351, Oct. 2022.
- [C20] H. Lee, **H. Chen**, and K. Ho, “Maximizing Observation Throughput via Multi-Stage Satellite Constellation Reconfiguration,” *2022 AAS/AIAA Astrodynamics Specialist Conference*, Charlotte, NC, AAS 22-825, Aug. 2022.
- [C19] **H. Chen**, and H. Lee, “Distributed Space Resource Logistics System Optimization under Economies of Scale,” *ASCEND 2021*, Las Vegas, NV & Virtual, no. AIAA 2021-4079, Nov. 2021.
- [C18] T. Sarton du Jonchay, Y. Shimane, M. Isaji, **H. Chen**, and K. Ho, “On-Orbit Servicing Logistics Framework Generalized to the Multi-Orbit Case,” *AAS/AIAA Astrodynamics Specialist Conference*, Online, Aug. 2021.
- [C17] **H. Chen**, B. Gardner, P. Grogan, and K. Ho, “Flexibility Management for Space Logistics Through Decision Rules,” *ASCEND 2020*, AIAA-2020-4187, Online, Nov. 2020.
- [C16] Y. Takubo, **H. Chen**, and K. Ho, “Performance Analysis of Hierarchical Reinforcement Learning Framework for Stochastic Space Logistics,” *ASCEND 2020*, AIAA-2020-4230, Online, Nov. 2020.
- [C15] T. Sarton du Jonchay, **H. Chen**, O. Gunasekara, and K. Ho, “Rolling Horizon Optimization Framework for the Scheduling of On-Orbit Servicing Operations under Servicing Demand Uncertainties,” *ASCEND 2020*, AIAA-2020-4131, Online, Nov. 2020.
- [C14] K. Ikeya, H. Sakamoto, **H. Chen**, and K. Ho, “Integrated Orbit Design and Network-Based Optimization of Interplanetary Mission Architectures,” *AIAA SciTech Forum 2020*, AIAA 2020-0072, Orlando, FL, Jan. 2020.
- [C13] **H. Chen**, M. Ornik, and K. Ho, “Incentive Design for Commercial Participation in Space Logistics Infrastructure Development and Deployment,” *70TH International Astronautical Congress*, Washington D.C., United States, IAC-19,D3,1,6,x51353, Oct. 2019.
- [C12] **H. Chen**, T. Sarton du Jonchay, L. Hou, and K. Ho, “Space Resource Logistics for Human Exploration to Mars,” *70TH International Astronautical Congress*, Washington D.C., United States, IAC-19,A5,2,4,x49279, Oct. 2019.
- [C11] T. Sarton du Jonchay, **H. Chen**, A. Wieger, Z. Szajnfarber, and K. Ho, “Space System Architecting for Commercial Suitability: A Case Study in Cislunar Space Transportation,” *70TH International Astronautical Congress*, Washington D.C., United States, IAC-19,D3,4,4,x49785, Oct. 2019.
- [C10] A. Wieger, **H. Chen**, T. Sarton du Jonchay, K. Ho, and Z. Szajnfarber, “An Approach to Endogenously Incentivizing Commercial Participation through System Architecture Choices,” *70TH International Astronautical Congress*, Washington D.C., United States, IAC-19,D3,1,4,x52667, Oct. 2019.
- [C9] **H. Chen**, T. Sarton du Jonchay, L. Hou, and K. Ho, “Multi-Fidelity Space Mission Planning and Space Infrastructure Design Framework for Space Resource Logistics,” *AIAA Propulsion & Energy Forum 2019*, Indianapolis, IN, no. AIAA 2019-4134, Sep. 2019.
- [C8] **H. Chen** and K. Ho, “Hierarchical Reinforcement Learning Framework for Space Exploration Campaign Design,” *AIAA Propulsion & Energy Forum 2019*, Indianapolis, IN, no. AIAA 2019-4135, Sep. 2019.
- [C7] **H. Chen**, A. Lapin, T. Ukai, C. Lei, and K. Ho, “Optimization for Large-Scale Multi-Mission Space Campaign Design by Approximate Dynamic Programming,” *AIAA SPACE 2018 Conference and Exposition*, Orlando, FL, no. AIAA 2018-5287, Sep. 2018.
- [C6] **H. Chen**, and K. Ho, “Multi-Actor Analysis Framework for Space Architecture Commercialization,” *AIAA SPACE 2018 Conference and Exposition*, Orlando, FL, no. AIAA 2018-5410, Sep. 2018.

- [C5] **H. Chen**, K. Ho, B. Gardner, and P. Grogan, “Built-in Flexibility for Space Logistics Mission Planning and Spacecraft Design,” *AIAA SPACE 2017 Conference and Exposition*, Orlando, FL, no. AIAA 2017-5348, Sep. 2017.
- [C4] **H. Chen**, H. Lee, and K. Ho, “Space Transportation System and Infrastructure Design for Regular Interplanetary Cargo Missions,” *AIAA SPACE 2017 Conference and Exposition*, Orlando, FL, no. AIAA 2017-5197, Sep. 2017.
- [C3] Z. Chen, **H. Chen**, and K. Ho, “Analytical model of Space Infrastructure Staged Deployment Strategy in Space Logistics,” *AIAA SPACE 2017 Conference and Exposition*, Orlando, FL, no. AIAA 2017-5349, Sep. 2017.
- [C2] K. Ho, **H. Chen**, and H. M. Kim, “Value of Bootstrapping Staged Deployment of Infrastructure: Case Study in Space Infrastructure Deployment,” *ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, Cleveland, OH, no. DETC2017-67610, Aug. 2017.
- [C1] **H. Chen**, and K. Ho, “Integrated Space Mission Planning and In-Orbit Infrastructure Design with Mixed-Integer Programming,” *AIAA SPACE 2016 Conference and Exposition*, Long Beach, CA, no. AIAA 2016-5309, Sep. 2016.

Magazine Articles

- [M2] **H. Chen**, and K. Ho, “Development of On-Orbit Servicing, Assembly and Manufacturing Creates New Capabilities in Spacefaring Operations,” *AIAA Aerospace America*, 2022.
- [M1] **H. Chen**, and K. Ho, “Gateway Leads the Era of Deep Space Infrastructure Development,” *AIAA Aerospace America*, 2021.

Invited Technical Talks

- **H. Chen**, and K. Ho, “Time-expanded Network for Long-Term Human Space Mission Planning,” INFORMS Annual Meeting, National Harbor, MD, Nov. 2020.

Conference Presentations

- [P11] “Flexibility Management for Space Logistics Through Decision Rules,” at *ASCEND 2020*, Online, Nov. 2020.
- [P10] “Incentive Design for Commercial Participation in Space Logistics Infrastructure Development and Deployment,” at *70TH International Astronautical Congress*, Washington D.C., United States, Oct. 2019.
- [P9] “Space Resource Logistics for Human Exploration to Mars,” at *70TH International Astronautical Congress*, Washington D.C., United States, Oct. 2019.
- [P8] “Multi-Fidelity Space Mission Planning and Space Infrastructure Design Framework for Space Resource Logistics,” at *AIAA Propulsion & Energy Forum 2019*, Indianapolis, IN, Sep. 2019.
- [P7] “Hierarchical Reinforcement Learning Framework for Space Exploration Campaign Design,” at *AIAA Propulsion & Energy Forum 2019*, Indianapolis, IN, Sep. 2019.
- [P6] “Optimization for Large-Scale Multi-Mission Space Campaign Design by Approximate Dynamic Programming,” at *AIAA SPACE 2018 Conference and Exposition*, Orlando, FL, Sep. 2018.
- [P5] “Multi-Actor Analysis Framework for Space Architecture Commercialization,” at *AIAA SPACE 2018 Conference and Exposition*, Orlando, FL, Sep. 2018.
- [P4] “Integrated Space Mission Planning and In-Orbit Infrastructure Design with Mixed-Integer Programming,” at *AIAA SPACE 2016 Conference and Exposition*, Long Beach, CA, Sep. 2016.

Other Presentations

- [P3] **H. Chen**, T. Sarton du Jonchay, L. Hou, and K. Ho, “Integrated Analysis Framework for Space Propellant Logistics: Production, Storage, and Transportation,” Lunar ISRU Workshop, Columbia, MD, Jul. 2019.
- [P2] K. Ho and **H. Chen**, “Space Transportation Network Analysis for CisLunar Space Economy with Lunar Resources,” Annual Meeting of the Lunar Exploration Analysis Group, Columbia, MD, Oct. 2017.

[P1] T. Ukai, **H. Chen**, and K. Ho, “Optimization for Campaign-level Human Space Mission Design,” INFORMS Annual Meeting, Houston, TX, Oct. 2017.

SERVICES

- AIAA Space Logistics Technical Committee
 - Conferences Sub-Committee Chair, 2021-present.
 - Member, 2018-2021.
- AIAA ASCEND Technical Program Team - Space Logistics Topic Admin, 2021-present.
- AIAA SciTech 2023 Forum and Exposition, National Harbor, MD & Online, Jan. 2023
 - Reviewer
 - Session Chair, EXPL-18: Robotic Precursor and Human Exploration Missions
 - Session Chair, EXPL-21: Planetary Surface Interaction with Landing and Ground Robotics Systems
- ASCEND 2021 (AIAA) Conference, Las Vegas, NV & Online, Nov. 2021
 - Review Coordinator, Session Organizer.
 - Session Chair, SLS-01: Space Logistics Campaign Planning
 - Session Chair, SLS-02: Space Logistics Design for Commonality and Affordability
 - Session Chair, SLS-03: Resilient Architectures and Space Logistics
- NSF 2022 Review Panel Fellow Cohort – CMMI's Game Changer Academies (CGCA)
- Reviewer, *Aerospace - MDPI*, 2021, 2022
- Reviewer, *Mathematics - MDPI*, 2022
- Reviewer, *Mathematical and Computational Applications - MDPI*, 2022
- Reviewer, *IEEE Transactions on Aerospace and Electronic Systems*, 2021, 2022.
- Reviewer, *Transactions of the JSASS / Aerospace Technology Japan*, 2019, 2020, 2022.
- Reviewer, *Journal of Spacecraft and Rockets*, 2018, 2021, 2022.
- Reviewer, *Acta Astronautica*, 2022.