Yen-Lin Han

Professor and Chair, Department of Mechanical Engineering
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Education

- **University of Southern California**, Los Angeles, CA
  Ph.D., Mechanical Engineering (2006)
  Dissertation: "Investigation of Knudsen Compressors at Low Pressures"
  Advisor: Prof. E. P. Muntz
- **University of Southern California**, Los Angeles, CA
  Master of Science, Electrical Engineering (2008)
  Major Field: Optics and Photonics
- **California State University Dominguez Hills**, Carson, CA
  Master of Business Administration, General Management (1999)
- **National Tsing-Hua University**, Hsin-Chu, Taiwan
  Bachelor of Science, Materials Science and Engineering, Minor in Economics (1993)

Current Academic Appointments

Seattle University, Seattle, WA

- Professor, Department of Mechanical Engineering (September 2024–Present)
- Chair, Department of Mechanical Engineering (July 2024–Present)
- PACCAR Chair and Professor, Mechanical Engineering (July 2022–June 2024)
- Thomas J. Bannan Chair, College of Science and Engineering (July 2021–June 2023)
- Associate Professor (September 2019–August 2024)
- Assistant Professor (September 2015–August 2019)
- Lecturer (September 2012–August 2015)

Previous Academic Positions

- **University of Connecticut**, Storrs, CT
  Assistant Professor-in-Residence, Mechanical Engineering (January 2010–August 2012)
- **University of Southern California**, Los Angeles, CA
  Lecturer (June 2006–December 2009)

Previous Industry Positions

- **ATT Group**, Taipei, Taiwan
  Fashion Brand Supervisor (MANGO, Spain) (October 1996–June 1998)
- **Giordano, East Jean Co. Ltd.**, Taipei, Taiwan
  Retail Manager Trainee, Independent Store Manager, Human Resource Trainer (December 1993–November 1995)

Teaching Excellence and Innovation

Course Portfolio

Core Mechanical Engineering Undergraduate Courses:

- *Thermodynamics* – Energy, heat, and work relationship fundamentals

- *Heat Transfer* – Integrated hands-on projects with industry applications
- *Fluid Mechanics* – Comprehensive coverage of fluid dynamics principles
- *Dynamic Systems* – Dynamic system behavior analysis
- *Control Systems* – Control theories with practical system analysis
- *Numerical Methods* – Computer-based mathematical problem solving techniques
- *Data Acquisition I & II* – Circuits and sensor integration to data acquisition systems
- *Engineering Design* – Industry sponsored capstone senior design project coordination

Specialized and Graduate Courses:

- *Advanced Energy Systems* – Energy conversion and storage technologies
- *Advanced Computational Methods (CFD)* – Computational Fluid Dynamics simulation
- *Introduction to MEMS* – Microelectromechanical systems design principles
- *Design, Simulation, and Rapid Prototyping of Microfluidic Devices*
- *Independent Study/Research* – Undergraduate research mentorship

Pedagogical Innovation

- **Authentic Problem-Based Learning:** Integrated real-world industry challenges into coursework, connecting theory with professional practice
- **Cross-Disciplinary Integration:** Developed electrical-mechanical integration in Data Acquisition courses, published in IEEE Transactions on Education with demonstrated learning improvements
- **Hands-On Design:** Coordinated 100+ industry sponsored capstone projects in engineering applications
- **Industry Immersion:** Co-developed NSF-funded programs connecting students with engineering professionals

Curriculum Leadership

- Co-Principal Investigator on NSF "Revolutionizing Engineering Education through Industry Immersion" ($1,861,527, 2017-2023)
- Co-Principal Investigator on NSF "Facilitating Problem-Based Learning with an Inverted Classroom" ($171,306, 2013-2016)
- Led curriculum transformation emphasizing authentic problems, engineering identity formation, and industry partnerships
- Implemented systematic assessment methods and inverted classroom approaches
- Created frameworks for engineering identity development with significant impact on student retention, especially for traditionally underrepresented minorities in Engineering

Research Excellence and Student Mentorship

Research and Mentorship

- PI on NSF Mid-CAREER Award "Self-Contained Soft Robotic Rehabilitation Device" ($311,439, 2023-2026)
- Mentored 40+ undergraduate researchers with numerous peer-reviewed publications, patents and patent applications, and Best Presentation Awards
- Research spans thermal-fluid sciences, medical devices, and computational methods including phase-changing material thermodynamics, heat transfer, CFD, Soft Robotics, and rehabilitation technologies

Publications and Scholarly Work

Peer-Reviewed Journal Publications (13 total)

Engineering Education:

1. Mejia, K., Hoang, S., Han, Y.-L. (2025). Career paths and building a supportive network for female faculty of color. *International Journal of Engineering, Social Justice, and Peace*. DOI: 10.24908/ijesjp.v12i1.19022.
2. Han, Y.-L., Turns, J., Cook, K., Mason, G., and Shuman, T.R. (2022). Students' Experience of an Integrated Electrical Engineering and Data Acquisition Course in an Undergraduate Mechanical Engineering Curriculum. *IEEE Transactions on Education*, **65(3)**, 331-343.
3. Han, Y.-L., Cook, K., Mason, G., & Shuman, T.R. (2018). Enhance Engineering Design Education in the Middle Years with Authentic Engineering Problems. *ASME Journal of Mechanical Design*, **140**, 122001-1–122001-9.
4. Cook, K., Han, Y.-L., Shuman, T.R., & Mason, G. (2017). Effects of Integrating Authentic Engineering Problem Centered Learning on Student Problem. *International Journal of Engineering Education*, **33(1A)**, 272–282.
5. Shuman, T.R., Mason, G., Han, Y.-L., & Cook, K. (2016). A Novel Approach to Educating Engineers: Learning in an Inverted Classroom through Problems Designed by Engineering Professionals. *Journal of Applied Engineering Science*, **14(3)**, 329–334.

Technical Research (undergraduate student's name underlined):

6. Lau, L., Han, Y.-L. (2016). Exploring a Novel Heating Probe Design for Tumor Ablation. *Journal of Medical Devices*, **10(3)**, 030930.
7. Zhao, S., Jiang, B., Maeder, T., Muralt, P., Kim, N., Matam, S. K., Jeong, E., Han, Y.-L., and Koebel, M. M. (2015). Dimensional and Structural Control of Silica Aerogel Membranes for Miniaturized Motionless Gas Pumps. *ACS Applied Materials and Interfaces*, **7(33)**, 18803–18814.
8. Muntz, E.P., Han, Y.-L. (2011). Performance Analysis of the Continuous Trace Gas Preconcentrator. *Physics of Fluids*, **23**, 030605.
9. Han, Y.-L. (2010). Working Gas Temperature and Pressure Changes for Microscale Thermal Creep Driven Flow Caused by Discontinuous Wall Temperatures. *Fluid Dynamics Research*, **42**, 045505.
10. Han, Y.-L., Young, M. (2009). Continuous Preconcentrator for Trace-Gas Analysis. *Recent Patents on Mechanical Engineering*, **2(3)**, 214-227.
11. Han, Y.-L. (2008). Thermal-Creep-Driven Flows in Knudsen Compressors and Related Nano/Microscale Gas Transport Channels. *Journal of Microelectromechanical Systems*, **13(4)**, 984-997.
12. Han, Y.-L., Muntz, E.P. (2007). An Experimental Investigation Micro/Meso-Scale Knudsen Compressors at Low Pressures. *Journal of Vacuum Science & Technology B*, **25(3)**, 703-714.
13. Han, Y.-L. Alexeenko, A. A., Young, M., Muntz, E. P. (2007). Experimental and Computational Studies of Temperature Gradient Driven Molecular Transport in Gas Flows Through Nano/Micro-Scale Channels. *Nanoscale and Microscale Thermophysical Engineering*, **11(1&2)**, 151-175.

Peer-Reviewed Conference Proceedings (45 total)

Engineering Education (5 selected publications):

1. Han, Y.-L., Bae, W., Crowe, J. C., Rellihan, M. (2025), "Lessons Learned- Facilitating Conversations around Generative AI and its Impact on Society," 2025 ASEE Annual Conference, Montreal, Canada.
2. Han, Y.-L., Turns, J., Cook, K., Mason, G., Shuman, T.R. (2024). "An Inspiration Kit for Building a Culture that Fosters Engineering Identity," 2024 ASEE Annual Conference, Portland, OR.
3. Han, Y.-L., Cook, K., Mason, G., Shuman, T.R., Turns, J. (2020). Engineering with Engineers: Fostering Engineering Identity through Industry Immersion. 2020 ASEE Annual Conference and Exposition, Montreal, Québec, Canada.
4. Cook, K., Han, Y.-L., Mason, G., Shuman, T.R., Turns, J. (2019). Implicit Engineering Identity in the Mechanical Engineering Major. Proceedings of 2019 ASEE Annual Conference and Exposition, Tampa, FL.
5. Han, Y.-L., Cook, K. E., Shuman, T. R., Mason, G. S. (2016). Development of Authentic Engineering Problems for Problem-Centered Learning. Proceedings of 2016 ASEE Annual Conference and Exposition, New Orleans, Louisiana.

Technical Research with Undergraduate Students (14 publications - undergraduate students' names underlined):

1. Young, J. C., Olson, E., Do, T., Shuman, M., Ohta, D., Han, Y.-L. (2024), "Spider Legs Inspired Soft Robotic Extensor for Hand Rehabilitation," 2024 IEEE International Conference on Advanced Robotics and Its Social Impacts, Hong Kong.
2. Heintz-Walters, B., Young, J. C., Munoz, A., Han, Y.-L. (2024), "Exploring a Novel 3D Printed Soft Pneumatic Extensor Inspired by Spider Legs," 2024 Design of Medical Devices Conference, Minneapolis, MN.
3. Baysa, M., Lund, S., Han, Y.-L., (2024). "Exploring a Novel Rehabilitation Soft Robot Design for Stroke Patients with Clenched Fists," 10th International Conference on Mechatronics and Robotics Engineering, Milan, Italy.
4. Cabrera, M., Turoski, N., Baysa, M., Van Liew, J., Han, Y.-L., "Developing an Untethered Soft Robot for Finger Rehabilitation", 2023 8th International Conference on Automation, Control and Robotics Engineering, Hong Kong.
5. Baysa, M., Cabrera, M., Turoski, N., Han, Y.-L., (2023). "Extensor Soft Robot for Clenched Fist Rehabilitation After Stroke", 2023 Design of Medical Devices Conference, Minneapolis, MN.
6. Cabrera, M., Van Liew, J., Turoski, N., Baysa, M., Han, Y.-L., "Utilizing Computer Modeling to Develop a Wearable Soft Robot for Finger Rehabilitation", 12th International Conference on Advanced Mechatronic Systems, Toyama, Japan.
7. Glasgo, N., Soohoo, M, Han, Y.-L. (2022) Investigating the Design of a Soft Robot for Finger Rehabilitation, 2022 ASME IMECE, Columbus, OH.
8. Taylor, M., Westra, K., & Han, Y.-L. (2020). Developing a Thermally Actuated Soft Robot for Finger Rehabilitation. 2020 ASME IMECE, Virtual.
9. Roberts, K., & Han, Y.-L. (2019). Investigating Density Functional Theory's Effectiveness in Studying Metal-Organic Frameworks Structures. 2019 ASME IMECE, Salt Lake City, UT.
10. Nakao, J., & Han, Y.-L. (2018). Preliminary Heat Transfer Simulation Model of a Novel Dynamic Thermal Ablation Probe. 2018 ASME IMECE, Pittsburgh, PA.
11. Den Adel, C., Husler, Z.-M., & Han, Y.-L. (2017). Design of a Novel Radio Frequency Ablation Probe for Tumor Ablation Treatment. 2017 Design of Medical Devices Conference, Minneapolis, MN.
12. Alcantara, A., Dong, C., Cheung, J, & Han, Y.-L. (2017). Investigation of the Op-

timal Design of a Linear Aerospike Nozzle for Microsatellite Thrust Vector Control. 2017 AIAA Aviation Forum, Denver, Colorado.

13. Bever, A. M., Brown, P. J., Lane, K. V., Levy-Wendt, B. L., Yasuda, N., Han, Y.-L., & Shih, F. J. (2015). Characterization of a Fast Responding Composite Thermal Bimorph Actuator Based on Carbon Nanotube Sheets. 2015 ASME IMECE, Houston, Texas.
14. Bever, A. M., Levy-Wendt, B. L., del Rosario, V., Pentz, J. A., Han, Y.-L. and Shih, F. J. (2014). In-Plane Thermal Conductivities of CFRP Composites Interleaved with Dissimilar Conductive Media. ASME IMECE, Montreal, Canada.

Book Chapters (2 total)

1. Han, Y.-L. (2022). Unveiling my engineering identity. In Margaret Bailey & Laura Shackelford (Eds.), *Women in Mechanical Engineering: Energy and the Environment*. Springer Publishing.
2. Han, Y.-L. (2012). Aerogel Materials for Aerospace. In S. Zhang & D. Zhao (Eds.), *Aerospace Materials Handbook* (pp. 699-743). Boca Raton, FL: CRC-Press.

Patents

Granted Patents (5 total):

1. "Selection of Environment Sensors for Autonomous Vehicle Maneuvering," PACCAR, AU2018425456B2, Apr. 2025.
2. "Autonomous Detection of and Backing to Trailer Kingpin," PACCAR, US12103342B2, Oct. 2024.
3. "Systems and Methods for Automatically Updating a Model of Vehicle Turning Dynamics," PACCAR, US-11878721-B2, Jan. 2024.
4. "Modular Wireless Communication Device Testing System," T-Mobile, US-11828802-B2, Nov. 2023.
5. "Pre-Concentrator for Trace Gas Analysis," US2008/0178658 A1, Jul. 2008.

Patents Pending: 30+ patents pending worldwide in mechanized trailer connectors, autonomous vehicle systems, and sensor technologies.

Professional Service and Leadership

Recent External Professional Service

- Scientific Program Committee, Design of Medical Devices Conference (2024, 2025)
- Technical Committee, IEEE ICMRE International Conference (2025)
- NSF review panelist for GRFP, S-STEM, IUSE programs
- DoD NDSEG Fellowships review panelist

Recent University Leadership and Service

University Level:

- Chair, Department of Mechanical Engineering (2024–Present)
- College of Science and Engineering (CSE) Dean's Search Committee (2025)
- Provost Fellow for Reimagine and Revise Curriculum (2022-2024)
- Member, Working Group on Preamble to Faculty Handbook (2025)
- Member, Office of Sponsored Projects Advisory Board (2023–Present)

College Level:

- Dean's Fellow for UG Curriculum (2024)

- Member, CSE Innovation Task Force (2024–Present)
- Member, CSE Faculty Performance Expectations Committee (2024)

Department Level:

- ME Department RRC coordinator
- Transfer Course Evaluation coordinator
- ABET visit preparation leadership
- Student advising and mentorship
- Industry partnership development

Awards and Recognition

- 2024 Seattle University College of Science and Engineering Dean's Fellow
- 2024 Best Presentation Award, 10th IEEE ICMRE, Milan
- 2023 Best Oral Presentation Award, 8th IEEE CACRE, Hong Kong
- 2022-2024 Seattle University Provost Fellow
- 2021 Society of Women Engineers Academic Leadership for Women Engineers program

Funding Record

Current External Funding

- NSF PFI: Self-Contained Soft Robotic Rehabilitation Device (PI)- $311,439, 2023-2026
- NSF REU Supplement (PI)- $16,000, 2025-2026

Major Previous Funding

- NSF IUSE/PFE-RED: Revolutionizing Engineering Education through Industry Immersion (Co-PI)- $1,861,527, 2017-2023
- NREL Collegiate Wind Competition (PI)- $9,999, 2019
- NSF IUSE: Facilitating Problem-Based Learning with an Inverted Classroom (Co-PI)- $171,306, 2013-2016

Internal Funding

- CSE Multidisciplinary Research Award (PI)- $50,379, 2023
- PACCAR Endowed Professorship- $50,000, 2022
- Thomas J Bannan Chair- $10,000, 2020
- Additional internal grants totaling over $80,000

International and Cross-Cultural Competencies

- Native fluency in Mandarin Chinese and English
- Educational background spanning Taiwan and United States with deep appreciation for cross-cultural learning developed through multicultural academic environments
- Worked closely with Spanish partners to develop the fashion brand Mango in Taiwan while in Fashion Industry
- Extensive experience working with diverse student populations and international research collaborations