
Joshua M. Hamel, Ph.D., P.E.
Seattle University, Mechanical Engineering Department
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Curriculum Vitae (as of 11/2024)
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Education

Ph.D. - Mechanical Engineering **07/2007 – 08/2010**

University of Maryland, College Park, MD

- Advisor: Dr. Shapour Azarm
- Thesis: *Sensitivity Analysis Based Approaches for Mitigating the Effects of Reducible Interval Input Uncertainty on Single- and Multi-Disciplinary Systems using Multi-Objective Optimization*

M.S.E. - Mechanical Engineering **08/2000 – 12/2001**

University of Michigan, Ann Arbor, MI

- Advisors: Dr. Steve Ceccio and Dr. David Dowling
- Thesis: *Hydrofoil Static Pressure Acquisition at High Reynolds Number*

B.S. - Mechanical Engineering **06/1996 – 05/2000**

United States Naval Academy, Annapolis, MD

Research Interests

- Design and optimization of complex and multidisciplinary engineering systems
- Approximation and reduced order computational modeling of systems
- Design for additive manufacturing

Academic Appointments

Associate Professor **09/2020 – Present**

Seattle University - Mechanical Engineering Department

Affiliate Faculty **01/2017 – Present**

University of Washington – Mechanical Engineering Department

Assistant Professor **09/2014 – 08/2020**

Seattle University - Mechanical Engineering Department

Assistant Professor **08/2010 – 08/2014**

California State University, Long Beach - Mechanical and Aerospace Engineering Dept.

Military Experience

Reserve Officer, Naval Aviator, U.S. Navy **08/2010 – 06/2020**

Active Duty Officer, Naval Aviator, U.S. Navy **05/2000 – 07/2010**

Journal Publications

- Weiss, B., Hamel, J., Storti, D., Ganter, M., 2021, "Data-Driven Additive Manufacturing Constraints for Topology Optimization," *ASME Journal of Manufacturing Science and Engineering*, 143(2): 021001.
- Schwartz, J., Hamel, J., Ekstrom, T., Ndagang, L., and Boydston, A.J., 2020, "Not all PLA filaments are created equal: An experimental investigation," *Rapid Prototyping Journal*, Vol. 26(7), pp. 1263-1276. <https://doi.org/10.1108/RPJ-06-2019-0179>.
- Hamel, J., Salsbury, C., Bouck, A., 2018, "Characterizing the Effects of Additive Manufacturing Process Settings on Part Performance Using Approximation Assisted Multi-Objective Optimization," *Progress in Additive Manufacturing*, Vol. 3(3), pp. 123-143.
- Reinke, J., Hamel J., Machak, S., 2018, "Design and Fabrication of a Prototype Coupler Component to Facilitate the Concurrent Collection of Mixing Chamber and Breath-By-Breath Metabolic Measurements," *Seattle University Undergraduate Research Journal* Vol. 2.
- Hamel, J., Allphin, D., Elroy, J., 2018, "Multi-Objective Optimization Model Development to Support Sizing Decisions for a Novel Reciprocating Steam Engine Technology," *Journal of Energy Resources Technology*, Vol. 140(7).
- Hamel, J., Azarm, S., 2011, "Reducible Uncertain Interval Design (RUID) by Kriging Meta-Model Assisted Multi-Objective Optimization," *Journal of Mechanical Design*, Vol. 133(1), DOI: 10.1115/1.4002974.
- Hamel, J., Li, M., and Azarm, S., 2010, "Design Improvement by Sensitivity Analysis (DISA) under Interval Uncertainty," *Journal of Mechanical Design*, Vol. 132(8), DOI: 10.1115/1.4002139.
- Li, M., Hamel, J., and Azarm, S., 2010, "Optimal Uncertainty Reduction for Multi-Disciplinary Multi-Output Systems Using Sensitivity Analysis," *Structural and Multidisciplinary Optimization*, Vol. 40, pp. 77-96, DOI: 10.1007/s00158-009-0372-6.
- Bourgoyne, D.A., Hamel, J.M., Ceccio, S.L., and Dowling, D.R., 2003, "Time averaged flow over a hydrofoil at high Reynolds number," *Journal of Fluid Mechanics*, Vol. 496, pp. 365-404, DOI: 10.1017/S0022112003006190.

Conference Publications and Presentations

- Hamel, J., Gutierrez, M., Proctor, T., and Rujoni, E., "An Experimental Study Focused on the Impact of Manufacturing Process in the Mechanical Performance of Lattice Structures," Proceedings of the 2024 International Mechanical Engineering Congress & Exposition (IMECE), Portland, OR, IMECE2024-145840.
- Hamel, J., Shuman, T., Han, Y.L., Kuder, K., Cook, K., "One Program's Response to a Pilot Accreditation Criteria Concerning Diversity, Equity, and Inclusion," Proceedings of the 2024 International Mechanical Engineering Congress & Exposition (IMECE), Portland, OR, IMECE2024-145820.
- Hamel, J., and Kamla, L., 2022, "An Experimental Investigation of the Mechanical Behavior of 3d Printed Structures as a Function of Manufacturing Process Decisions," Proceedings of the

ASME 2022 International Mechanical Engineering Congress & Exposition (IMECE), Columbus, OH, Oct. 30 – Nov. 3, 2022, IMECE2022-95317.

Cerda, M., and Hamel, J., 2021, “A Multiobjective Optimization Based Approach for Producing Manufacturable Structures from Topology Optimized Designs,” Proceedings of the ASME 2021 International Mechanical Engineering Congress & Exposition (IMECE), Virtual Online, November 2021, IMECE2021-72224.

Hamel, J., Strebinger, C., Gilbertson, E., Han, Y., Cook, K. E., Shuman, T. R., and Mason, G., 2021, “WIP: Building Design Experience and a Greater Sense of Community through an Integrated Design Project,” 2021 IEEE Frontiers in Education Conference (FIE), 2021, pp. 1-5, DOI: 10.1109/FIE49875.2021.9637480.

Han, Y., Hamel, J. M., Strebinger, C., Mason, G., Cook, K. E., and Shuman, T. R., 2021, “Lessons Learned: Making the “New Reality” More Real: Adjusting a Hands-on Curriculum for Remote Learning,” 2021 ASEE Virtual Annual Conference Content Access, Virtual Conference, <https://peer.asee.org/37450>.

Weiss, B., Hamel, J., Ganter, M., and Storti, D., 2018, “Data-Driven Additive Manufacturing Constraints for Topology Optimization,” Proceedings of the ASME IDETC/CIE Conference, Quebec City, Quebec, August 2018, DETC2018-85391.

Hamel, J., 2017, “Experiment Driven Local Optimization (EDLO) with an Application to Additive Manufacturing,” Proceedings of the ASME IDETC/CIE Conference, Cleveland, OH, August 2017, DETC2017- 67921.

Hamel, J., 2015, “Sequential Cooperative Robust Optimization (SCRO) for Multi-Objective Design Under Uncertainty,” Proceedings of the ASME IDETC/CIE Conference, Boston, MA, August 2015, DETC2015-47885.

Allphin, D., Hamel, J., 2014, “A Parallel Offline CFD and Closed-Form Approximation Strategy for Computationally Efficient Analysis of Complex Fluid Flows,” Proceedings of the ASME 2014 International Mechanical Engineering Congress & Exposition, Montreal, Canada, November 2014, IMECE2014-38691.

Hamel, J., Allphin, D., Elroy, J., 2014, “Model Development for the Design Optimization of a Novel Reciprocating Engine Technology,” Proceedings of the ASME 2014 International Mechanical Engineering Congress & Exposition, Montreal, Canada, November 2014, IMECE2014-38696.

Hamel, J., 2014, “Cooperative Design Optimization (CDO) for Multidisciplinary Systems,” Proceedings of the ASME IDETC/CIE Conference, Buffalo, NY, August 2014, DETC2014-35299.

Hefazi, H., Hamel, J., and Schmitz, A., 2011, “Development of Decomposition Based Design Optimization Tools for Ship Design,” Computer Applications and Information Technology in the Maritime Industries (COMPIT) Conference, Berlin, Germany, May 2011.

Hamel, J., Azarm, S., 2010, “Uncertain Interval Design (UID) by Kriging Meta-Model Assisted Multi-Objective Optimization,” Proceedings of the ASME IDETC/CIE Conference, Montreal, Canada, September 2010, DETC2010-28456.

Hamel, J., Li, M., and Azarm, S., 2009, "Design Improvement by Sensitivity Analysis (DISA) under Interval Uncertainty," Proceedings of ASME IDETC/CIE Conference, San Diego, CA, September 2009, DETC2009-87127.

Li, M., Hamel, J., Azarm, S., Tseng, C., and Lee, Y.T., 2009, "A Matlab Based Software Tool for Multi-Objective Robust Optimization and Sensitivity Analysis: A Case Study for Undersea Propulsion System Design," 8th World Congress on Structural and Multidisciplinary Optimization, Lisbon, Portugal, June 2009.

Li, M., Hamel, J., and Azarm, S., "Multi-Disciplinary Multi-Objective Sensitivity Analysis (MIMOSA) with Interval Parameter Uncertainty," 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Victoria, British Columbia, Canada, September 2008.

Bourgoyne, D.A., Hamel, J.M., Judge, C., Ceccio, S.L., Dowling D.R., and Cutbirth, J.M., "Hydrofoil turbulent near wake structure and dynamics at high Reynolds numbers," 24th Symposium on Naval Hydrodynamics, Fukuoka, Japan, July 2002.

Bourgoyne, D.A., Hamel, J.M., Judge, C., Ceccio, S.L., and Dowling D.R., "Lifting Surface Flow, Pressure and Vibration at High Reynolds Number," ASME International Conference and Exposition, New York, NY, November 2001.

Invited Talks

Hamel, J., "Approaching Engineering Challenges with a Design Optimization Perspective," UW ME Department Graduate Seminar Series, December 2017.

Hamel, J., "Design Optimization and Strategies for Systems Involving Computational Fluid Dynamics," ASME IMECE Conference, Denver, CO, November 2011.

Teaching Experience

Seattle University

- MEGR 1810: Innovative Design (2 credits)
- MEGR 1890: Integrated Design 1 (3 credits)
- MEGR 2100: Statics (4 credits)
- MEGR 2300: Dynamics (4 credits)
- MEGR 2810: Engineering Methods (4 credits)
- MEGR 3060: Machine Shop (1 credit)
- MEGR 4910: Design Optimization (3 credits)
- MEGR 5110: Engineering Design Decision-Making (3 credits)

California State University, Long Beach (08/2010-05/2014)

- MAE 590: Optimal Engineering Design Decision-Making
- MAE 471: Design and Analysis of Mechanical Engineering Systems I
- MAE 472: Design and Analysis of Mechanical Engineering Systems II
- MAE 453/553: Stability and Control of Aerospace Vehicles
- MAE 205: Computer Methods in Mechanical and Aerospace Engineering
- MAE 333: Engineering Fluid Dynamics

United States Naval Academy (08/2007-05/2010)

- EM 472: Mechanical Engineering Design

- EM 375: Introduction to Engineering Experimentation
- EM 215: Introduction to Mechanical Engineering
- EM 300: Principles of Propulsion

Academic Honors

- Selected as 2012 ONR/ASEE Summer Faculty Fellow and performed research at the Navy's SPAWAR Systems Center (SSC) Pacific in San Diego, CA.

Service

Seattle University

- MSME Program Director (2018 – Present)
- Chair, College of Science and Engineering Curriculum Committee (2020 – Present)
- ME Department Assessment/ABET Coordinator (2022 – Present)
- Member, University Assessment Committee, (2024 – Present)
- ME Department Interim Co-Chair (AY22-23)
- Member, Seattle University Makerspace Advisory Committee (2019 – 2021)
- Member, College of Science and Engineering Curriculum Committee (2017 – Present)
- Member, College of Science and Engineering Technology Committee (2018 – 2019)
- Member, College of Science and Engineering Business Continuity Committee

California State University, Long Beach

- Graduate Program Advisor for M.S. in Mechanical Engineering (MSME) Program
- Undergraduate Advisor and Mechanical Engineering (ME) Program Coordinator for CSULB's Antelope Valley Extension Program
- Chair, MAE Departmental Curriculum Committee

Community

- Reviewer for multiple journals, including: *ASME Journal of Mechanical Design, Structural and Multidisciplinary Optimization, Engineering Optimization, Energy, Aerospace Science and Technology* and *Mechanics Based Design of Structures and Machines*.
- Reviewer for the ASME IDETC/CIE and IMECE Conferences, and co-review coordinator for the Design for Additive Manufacturing tracks in 2018, 2019, 2020 and 2021.

Funding

- Named the Seattle University PACCAR Chair, \$50k, 9/2024-8/2026.
- Awarded Seattle University College of Science and Engineering Generative AI Faculty and Student Research grant with Trung Pham, SJ from Fine Arts, \$15k, 7/2024-9/2025.
- Awarded Seattle University College of Science and Engineering Summer Undergraduate Research Support Award, ~\$10k, 6/2022-9/2022.
- Co-PI on a one-year proposal submitted to the NEH with Dr. John Trafton in Film Studies at SU: *Visualizing Your Future: Making the Sciences Cinematic,* ~\$35k, but not funded.
- Awarded Seattle University College of Science and Engineering Summer Undergraduate Research Support Award, ~\$5k, 6/2019-8/2019.

- Awarded Seattle University College of Science and Engineering Summer Undergraduate Research Support Award, ~\$5k, 6/2018-8/2018.
- Co-Investigator on three-year research proposal submitted to NSF with Dr. Duane Storti at UW: *Towards a Unified Representation of Solids for Use in the Engineering Design and Manufacturing Workflow*, ~\$300K, but not funded.
- Senior Personnel on five-year NSF RED grant awarded to the ME Department at Seattle University, ~\$1.8M, 2017-2021.
- Awarded Seattle University College of Science and Engineering Summer Undergraduate Research Support Award, ~\$5k, 6/2016-8/2016.
- Principle Investigator (PI) for awarded research and development contract from Lawrence Livermore National Laboratory: *Optimal Design of Bennett Engine Concept*, \$25K, 6/2013 – 12/2013.
- Contributed significantly in the writing of a successful three-year research proposal to the Office of Naval Research (ONR), with Dr. Shapour Azarm (PI): *Multidisciplinary Sensitivity Analysis and Optimization under Uncertainty*, \$360K, 10/2008 – 09/2011

Professional Affiliations

- Member of the American Society of Mechanical Engineers (ASME)

Miscellaneous Skills and Certifications

- Certified as State of Maryland Professional Engineer (PE), License #25325.
- Certified as an FAA commercial pilot and an FAA instrument rated pilot, in both fixed-wing and rotary-wing aircraft, in June 2003.