

ASME Journal of Mechanical Design

Special Issue: Machine Learning for Engineering Design

Modern Machine Learning (ML) techniques are transforming many disciplines ranging from transportation to healthcare by uncovering patterns in data, developing autonomous systems that mimic human abilities, and supporting human decision-making. While engineering design researchers have increasingly used ML techniques to address targeted problems ranging from materials design to uncertainty quantification in high-dimensional problems, many open questions still exist, including: (1) how to effectively use ML (either by itself or in concert with other Engineering Design approaches) for new design applications that are not well-supported by existing ML practice or tools; (2) how to leverage the unique aspects of Engineering Design in creating new ML approaches; and (3) how to share benchmark problems or datasets that can measure ML progress in design. This special issue brings together fundamental scientific and mathematical contributions across those three areas. Representative topics include (but are not limited to):

- Fundamental advances in unifying prior engineering and design knowledge with ML techniques
- Principled ML-based approaches for computational design support
 - Leveraging and managing uncertainty
 - Learning from multiple representations of design
 - Transfer learning for cross-domain or cross-physics design problems
 - Techniques for design using limited data
 - ML for analyzing consumer data, preference elicitation, and design for user experience
 - ML for design-for-X (manufacturing, lifecycle, safety, etc.)
- Techniques for understanding and supporting human designers
 - Computational creativity for engineering design
 - Supporting conceptual design
 - Blending human or organizational information into ML models
- Tackling challenges that occur when using ML models for engineering design
 - Calibration and validation of ML-based models
 - Addressing security, privacy, and cyber resilience/reliability
- Implications of ML for engineering design education
- Creation and distribution of testbeds and datasets that can support future research in the area

We particularly encourage papers that leverage the specific intersection between engineering design and ML, with contributions that generalize across multiple design problems.

Submission Instructions

Please submit your paper at <http://journaltool.asme.org> and note on the cover page that your paper is intended for the special issue on “Machine Learning for Engineering Design”. Please also email the Editor, Professor Wei Chen, at editor@asmejmd.org, to alert her that your paper is intended for the special issue. Information about the *Journal of Mechanical Design* can be found at <http://www.asmejmd.org>. Early submission is encouraged.

Publication Target Dates

Submission Deadline:	Initial review completed by:	Publication:
February 1, 2019	April 15, 2019	November 2019

Papers submitted by February 1, 2019, will be reviewed in time for inclusion in the special issue. Papers received after that date may still be considered for the special issue, if time and space permits.

Guest Editors

Jitesh H. Panchal, Purdue University, panchal@purdue.edu
Mark Fuge, University of Maryland, fuge@umd.edu
Ying Liu, Cardiff University, LiuY81@cardiff.ac.uk
Samy Missoum, University of Arizona, smissoum@email.arizona.edu
Conrad Tucker, Penn State, ctucker4@psu.edu