

IISE Transactions: Focused Issue on Design and Manufacturing (DM)

DM Focused Issue Statement

Design and manufacturing-focused issue welcomes submissions to address all design and manufacturing aspects in the life cycle of a product or process, including both processing conditions and systems considerations. Papers published by the DM-focused issue are expected to present novel methodologies motivated by real-world engineering design and manufacturing applications and address the fundamental intellectual issues in product lifecycle with the primary objectives of economic, environmental, and societal improvement. Manuscripts should be structured with a thorough discussion of the problem being solved, its practical significance, and the relationship of the modeling undertaken to the problem. Understanding and insights should be the focus of the manuscript, which should also clearly convey why the current understanding of a problem is insufficient and what understanding is being advanced. All manuscripts must include significant content that provides a concrete example illustrating how the modeling or analysis would be applied in practice. Those that describe an interesting problem but then assume away the interesting aspects of the problem to facilitate modeling will be rejected. The application domain includes but is not limited to automotive, medical, aerospace, energy, military/defense, semiconductor/electronics, and consumer products.

Department Statements

Advanced Material and Manufacturing Processes (AMMP)

The AMMP Department covers a broad spectrum of manufacturing processes for various materials such as metals, polymers, ceramics, and biomaterials. The manufacturing processes include both traditional methods, such as casting, forming, machining, welding, and joining, and non-traditional or newly emerging methods, such as laser-beam and electrical-discharge machining, additive/hybrid manufacturing, biomedical manufacturing, and nano-/micro-manufacturing, among others. Topics of interest for this department include but are not limited to the following: design, analysis, optimization, validation, verification, and qualification of AMMP parts; modeling, simulation, monitoring, and control of AMMP; and process planning, statistical process control, and capability analysis for AMMP. This department intends to publish cutting-edge AMMP-related research work with IISE-relevant competencies. Submissions to the newly emerging or impactful research areas are strongly encouraged. Note that while the submissions about a traditional manufacturing process are still considered, they will be subject to heightened scrutiny.

Design and Realization of Product and Facility (DRPF)

The DRPF department welcomes submissions in the areas of (1) Design Engineering and Product Realization, and (2) Facility Design and Operations, which share the fundamental methodologies such as deterministic and stochastic modeling, simulation, and optimization. The area of Design Engineering and Product Realization is for researchers and practitioners to publish high-quality papers in the broad areas of design and product realization within the context of ISE. The papers should advance excellence in innovative modeling and exploring ISE techniques, including but not limited to ISE-related design methods, design optimization, design automation, design for X (X being any relevant design and manufacturing areas), lifecycle design, design innovations, uncertainty quantification, and reliability-based design. The area of Facility Design and Operations is the premiere destination for research papers that support and enable the transformation of production and logistic systems. These papers should support the design and operation of facilities, both from a Greenfield as well as from a redesign perspective. Design problems, including facility and department sizing, equipment selection, operational process optimization, path design, etc., are of interest. But also of interest are operational issues such as staffing, cross-training, operations selection, etc. Target application facilities can range from manufacturing facilities, distribution centers, logistics supply chain nodes, and other service facilities in the private and public spheres.

In both areas, manuscripts addressing practical problems with sufficient technical depth are strongly encouraged. Manuscripts with less quantitative analysis are considered only when a brand-new area in innovative product systems is studied and practical usefulness is demonstrated through actual implementation.

Smart and Cyber Manufacturing (SCM)

SCM refers to the next generation of manufacturing enabled by ubiquitous data and unprecedented computational intelligence. They are systems of collaborating computational entities, which are in intensive connection with the surrounding physical world and its ongoing processes, providing and using, at the same time, data-accessing and data-processing services available on the Internet. The SCM department seeks submissions on all aspects of SCM processes and systems. The original contributions of the submissions may include but are not limited to: data-driven modeling and predictive analytics for manufacturing processes and systems, process and system design optimization, process and system automation, optimal process control and system-level operational decision making, generative artificial intelligence (AI), and novel research topics that could potentially revolutionize smart manufacturing operations. We especially welcome manuscripts that apply and adapt emerging machine learning and AI techniques to manufacturing design, control, and operation-related problems. Different from submissions to the Data Science, Quality and Reliability focused issue, manuscripts submitted to D&M issue in general, and SCM in particular, should center around the manufacturing relevance and impact, rather than merely a data science method motivated by a manufacturing problem. The applications of emerging technologies such as the Internet of Things (IoT) and cloud/edge computing to traditional and emerging manufacturing processes/systems are strongly encouraged.

Manufacturing Systems and Simulations (MSS)

The objective of the MSS department is to serve as the first outlet of choice for publishing the results of high-quality research focusing on the analysis of Industrial and Systems Engineering methods in manufacturing systems. Such work should advance the state of knowledge on methods, processes, and systems for enabling efficient manufacturing. The department encourages submissions that employ rigorous quantitative models and simulation analysis of manufacturing and production system dynamics, emerging technology applications, as well as works that develop innovative techniques for improving manufacturing system capabilities and efficiencies. Submissions that address the important role of manufacturing systems within the broader context of supply chain capabilities are also encouraged. Manuscripts addressing problems arising in practical manufacturing systems settings with high technical rigor are strongly encouraged. Manuscripts that apply existing methodologies that have been well established in the manufacturing systems literature and applications or that apply new methods marginally improving performance on previously defined problems will be subject to heightened scrutiny.