Editorial

We are pleased to release the first issue of the fourteenth volume of the **Transactions on Machine Design** with the papers described below.

In the opening paper, "**The Convergence of Data Science in Machine Design: Transforming Design, Operations, and Innovation in the Digital Era**," the authors studied the transformative convergence of data science and mechanical engineering, emphasizing its growing relevance for both industry and small to medium enterprises. They presented a standard data science workflow, data collection, preparation, exploration, modelling, and communication and illustrated how each phase supports engineering decision making. Finally, they conclude that the integration enhances a data-driven mindset, turning raw operational data into strategic assets that drive efficiency, innovation, and sustainability.

In the following paper, "**Design Architectures for Operating Theatres Machines**," the authors outlined a multidisciplinary framework for modeling and managing operating theatre (OT) systems through a multi-agent system (MAS) integrated into an Interactive Decision Support System (IDSS). The authors further presented the challenge of frequent schedule disruptions, particularly from emergency cases, by proposing a real-time, adaptive rescheduling architecture. The authors also presented key principles for OT equipment design, including ergonomics, sterility, modularity, safety, and interoperability and emphasised human-centred design and regulatory compliance.

In the final paper, "**Design and Development of 3D Printing Machines for Fabrication**," the authors advocated a mechanical engineering-focused analysis of 3D printing machine design, emphasising structural integrity, motion control, extrusion mechanics, and thermal regulation. This work differed considerably from early, low-cost FDM printer designs, owing to modern advancements such as multi-material compatibility, integrated 3D scanning, and parameter optimisation to improve print quality. This work is a valuable addition to the research on additive manufacturing.

We hope that the research in this issue makes a significant contribution to machine design research.

Editors