



**Journal of
Micro- and
Nano-
Manufacturing**

Guest Editorial

Recent Advancements in Micro- and Nano-Manufacturing From WCMNM2023—Part I

Product development activities worldwide are increasingly focusing on fabricating complex micro and nanoscale features and components, which find applications in optics, electronics, biomedical, and aerospace industries. This has led to renewed interest in the subtractive and additive techniques to produce nano and/or microscale features with greater precision, accuracy, and reliability. It is important to note that in addition to experimental studies, process modeling and simulation help in understanding the underlying physics of the processes and suggest directions to optimize them. This Special Issue in the *ASME Journal of Micro- and Nano-Manufacturing* endeavor to present a snapshot of the latest research carried out in this field worldwide. Part I of this Special Issue contains extended versions of select papers from the World Congress on Micro and Nano Manufacturing 2023 (WCMNM 2023) held in Evanston, IL. WCMNM aims to bring together the worldwide community of micro and nano-manufacturing experts. It is jointly organized by the International Institution for Micro-Manufacturing (I2M2), the Multi-Material Micro Manufacturing (4M) Association, and the International Forum on Micro-Manufacturing (IFMM). WCMNM topics of interest include processes, equipment, and systems for fabricating miniaturized parts with nano and microscale features together with research focused on developing and validating this technology for specific application areas.

The papers broadly cover research on microforming, microscale electro discharge machining/electrochemical machining/electrochemical, direct writing, and microfluidic spinning technologies. Part I of the Special Issue comprises three full research papers and three technical briefs. Funazuka et al. reports the effects of nanotextured dies on the micro-extrudability of AA6063. It was found that the extrusion force could be significantly reduced with the use of nanotextured dies. The paper by Aizawa et al. shows that the

acicular microtextured copper sheet device can be employed as an IR-emitter with the selected wavelengths. Deshpande and Pan present a novel technique for additive manufacturing via direct writing on a rotating mandrel. The three technical briefs report research on error budgeting of a wafer bonding alignment system by Wang et al., the development of high energy density pulsed power supply for micro-electro discharge machining by Cao et al., and the characterization of shunt-assisted silicon electrode for micro-electrochemical machining.

We believe that the papers included in this Special Issue will be of interest to researchers and practicing engineers. We are grateful to Stefan Dimov, Editor-in-Chief of the *ASME Journal of Micro- and Nano-Manufacturing*, for his valuable suggestions and guidance in preparing this Special Issue—Part I for publishing. We sincerely thank the authors for contributing with their research work to this issue. We are grateful to the reviewers for the timely reviews and constructive comments to the papers. Finally, we sincerely thank the ASME publishing team for their professional support during the preparation of this Special Issue.

Ramesh Singh
I2M2 Scientific Chair of WCMNM 2023,
Indian Institute of Technology Bombay,
Mumbai 400076, India

Pavel Penchev
4M Scientific Chair of WCMNM 2023,
University of Birmingham, Birmingham B15 2TT, UK

Tohru Sasaki
IFMM Scientific Chair of WCMNM 2023,
University of Toyama, Toyama 930-8555, Japan