



Guest Editorial

Special Section on Recent Advancements in Micro- and Nano-manufacturing From the WCMNM2018—Part 1

This Special Section contains a selection of papers presented at the World Congress of Micro- and Nano-Manufacturing that took place in September 2018 in the charming Slovenian city of Portorož. This annual congress is organized by three societies: the International Institution on Micro-Manufacturing (I2M2), the International Forum on Micro-Manufacturing (IFMM), and the 4M Association, and it is attended by over a hundred experts on micro- and nano-manufacturing from all over the globe. Having conducted separate conferences for their respective members for over a decade, from 2015 the three societies started to organize a joint conference that takes place in alternating succession in Americas, Europe, and Asia. WCMNM 2017 took place in Taiwan, WCMNM 2018 was held in Slovenia, and upcoming WCMNM 2019 will be organized in Raleigh, NC.

After the congress, the authors of the papers with the highest review scores were invited to submit their revised papers to this Special Section in the form of Technical Briefs. The guest editors are the I2M2 scientific committee chairs and the president of the I2M2 for the year of the congress.

The collected papers accurately represent the state of the art in micro- and nano-manufacturing today. The majority of the research topics in micromanufacturing is still focusing on subtractive technologies such as microgrinding, microdrilling and micro-milling, microultrasonic machining, electron-beam melting, laser surface texturing, elliptical vibration texturing, and a combination of several techniques such as micro-abrasive water jet and micro-wire electrical discharge machining. However, every year we observe increase in research on additive manufacturing technologies such as three-dimensional printing, lithographically patterned materials, and postprocessing of parts produced via additive manufacturing methods. Selection of research papers on additive manufacturing research include patterning of nitride layer with subsequent etching to produce micronozzles, fabrication, and testing of carbon-MEMs electrodes for electrokinetic propulsion, postprocessing of parts produced with additive techniques such as extrusion of metal green state or powder-based ceramics via micro-milling or micro-ultrasonic vibration-assisted burnishing. Additionally, some subtractive techniques are used for production or postproduction of micromolds, including those used for injection molding of polymer optical elements. Overall, more than a quarter of studies presented in this volume discuss processing or postprocessing methods related to additive manufacturing. In

terms of novel applications of micro- and nano-manufacturing we see rise in bio-applications, including fabrication and processing of bioceramics, a laser texturing for enhanced cell adhesion, and microdrilling of dental implants, laser surface texturing. Invariably, some works present micromanufacturing of semiconductor materials such as single-crystal silicon. Increasingly, numerical simulation and analysis is utilized to optimize fabrication and production.

The Guest Editors would like to thank the authors for their prompt efforts in preparing their papers, as well as all the reviewers for their assistance. We also thank the ASME Journal of Micro- and Nano-Manufacturing Editor, the Editorial Office, and the ASME Production Team.

Finally, we hope that the Readers will find the Technical Briefs collected in this Special Section issue to be insightful and inspirational to further advance the state of the art in micromanufacturing.

Guest Editors

Irene Fassi
Institute of Intelligent Industrial Systems and Technologies
for Advanced Manufacturing,
Consiglio Nazionale delle Ricerche,
Via A. Corti 12,
Milano 20133, Italy
e-mail: irene.fassi@cnr.it

Lawrence Kulinsky
Mechanical and Aerospace Engineering Department,
University of California,
Irvine, CA 92697
e-mail: lkulinsk@uci.edu

Martin Byung-Guk Jun
School of Mechanical Engineering,
Purdue University,
585 Purdue Mall,
West Lafayette, IN 47907-2088
e-mail: mbgjun@purdue.edu