
Editorial

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Biographical notes: Mark J. Jackson is a Professor of Mechanical Engineering Technology at the College of Technology of Purdue University, USA. His research interests include micromachining and the design of nanomachine tools. He was educated at Liverpool and Cambridge universities and is a Faculty Associate at the Birck Nanotechnology Center and the Center for Advanced Manufacturing at Purdue University, UK.

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Waqar Ahmed is the Chair of Nanotechnology at the University of Ulster. His area of research is in chemical vapour deposition of thin film nanostructures especially nanocrystalline diamond. He was educated at the University of Salford and has held academic positions at the University of Northumbria and Manchester Metropolitan University, UK.

In the past ten years, significant advancements have been made in the development of nanomanufacturing. Therefore, the goal of this Special Issue of the *International Journal of Nanomanufacturing* is to publish the current state-of-the-art in the area of

environmentally sustainable nanomanufacturing and to provide a forum for developing next generation green nanomanufacturing processes. Recent increases in research and commercialisation efforts in the area of nanomanufacturing have resulted in additional challenges for those professionals involved with environmental, occupational health and safety issues. The complex and diverse techniques used in nanomanufacturing can produce environmental stressors which, when in significant concentrations, may produce harmful health consequences for workers and researchers as well as detriments to the environment. Fortunately, suitable engineering controls, administrative strategies and monitoring techniques have been developed and implemented to assist in the proper management and control of potential exposures to these stressors. While the main impetus of the vast majority of employee and environmental exposure control strategies has traditionally targeted airborne chemical contaminants, nanomanufacturing operations requires concentrated efforts in such areas as nanoparticle deposition/collection and laser safety management. This Special Issue of the *International Journal of Nanomanufacturing* provides some of the latest work performed in the characterisation and control of environmental and occupational health exposures to stressors created during nanomanufacturing efforts.

The accurate measurement of airborne particles in the nanometre range is a challenging task. Since several studies have linked exposures to airborne ultra-fine particles to elevated human health risks, the need to assess the concentrations of particles in the workplace that are below one hundred nanometres in diameter is imperative. Several different techniques for monitoring nanoparticles are now available and others are currently being tested for their merit. Laboratory Condensation Nuclei Counters (CNCs), field-portable condensation particle counters, nanometre differential mobility analysers, electron microscopy and other novel and experimental approaches to measuring nanoparticles have been recently employed in investigations. Several of the papers presented in this special edition provide additional insights into advancements in this area. The papers provide overviews of these techniques as well as the advantages and disadvantages to each. The various techniques are sized up against such attributes as accuracy, precision, economics, portability and practicality. Additional material covered in this special edition includes applications in surface coatings, surface manipulations, filtration technology and biomedicine and elucidate both commercially available methods as well as those currently in the experimental stages. The release of a special edition involving environmental, occupational health and safety issues pertinent to nanomanufacturing is timely. The field already has many researchers and entrepreneurs engaging in cutting-edge efforts, with the field expected to grow exponentially over the next few decades. It is imperative that those working in the field minimise exposures to themselves, their subordinates/colleagues and the environment to stressors resulting from their efforts. This attempt to pull together some of the more recent research in this area was meant as an aid for those interested in a responsible approach to safety and environmental stewardship while in pursuit of further advances in nanomanufacturing.

The papers presented in this issue are based on oral presentations made during the *Fifth International Surface Engineering Congress and Exposition* held 15–17 May 2006 at the Seattle Convention Center at Seattle, Washington. At the Congress, a large number of technical sessions (16), presentations (more than 65) and posters (25), were provided on a wide range of topics such as *Thin Film Nanomanufacturing*, *Thin Films and Coatings*, *Failure Analysis of Thin Films*, *Mechanical Properties of Thin Films*, *Micro and Nanoscale Tribology*, *Thermal Spraying of Thin Films*, *Biomedical Applications* and

Environmentally Benign Nanomanufacturing. Although the conference proceedings contain many of the presentations (In M.J. Jackson and W. Ahmed (Eds). *Proceedings of the Fifth International Surface Engineering Congress and Exposition*, ASM International, 2006), a selection of papers included in this Special Issue are specially extended versions of the conference presentations selected to represent advances in Environmentally Sustainable Nanomanufacturing and are expected to enlighten readers of the *International Journal of Nanomanufacturing*. We are grateful to authors who contributed to this Special Issue. The papers presented in this Special Issue have been refereed by peer reviewers who are experts in their field and have returned their reviews in a timely fashion. We wish to thank them for their reviews.

We also thank ASM International for providing us the opportunity to chair the International Surface Engineering Congress and Exposition and we thank Professor Mohammed Dorgham, Editor-in-Chief of the *International Journal of Nanomanufacturing*, for publishing this Special Issue.