Editorial

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Biographical notes: David Tolfree is the Founder and Executive Director of Technopreneur Ltd., a consultancy company specialising in the commercial exploitation of micro and nanotechnologies. Currently, he is the European Vice-President of the Micro and Nanotechnology Commercialisation Education Foundation (MANCEF). He is also the Fellow of one of the Founders of the UK Institute of Nanotechnology Group and for many years has championed this area of technology. He is a Chartered Physicist, a Fellow of the Institute of Physics with a Master's degree in Nuclear Instrumentation. He has published over 140 papers, news papers, chapters for books and conference papers and given interviews on television and radio.

Mark J. Jackson is an Associate Professor of Mechanical Engineering in the College of Technology at Purdue University. He is an Associate Faculty Member of the Birck Nanotechnology Centre and the Centre for Advanced Manufacturing at Purdue. He is the Director of the Advanced Manufacturing Laboratory at Purdue and is conducting research in the field of micro and nanomanufacturing. He was educated at Cambridge and Liverpool Universities and has taught at Liverpool, Cambridge, Tennessee and Purdue Universities.

Waqar Ahmed holds the Chair of Nanotechnology and Advanced Manufacturing at the University of Central Lancashire. He is the Director of the Institute of Advanced Manufacturing and Innovation at UCLAN. His research interests include nanotechnology, advanced manufacturing, advanced materials and technology transfer.

This Special Edition of the journal records some of the papers presented at COMS2006, held in St Petersburg, Florida during 27–31 August 2006 and from people who could not attend the conference but made a relevant contribution to the subject areas it covered. COMS conferences are dedicated to commercialisation and education issues associated with micronanotechnology. They bring together the three stakeholders: industry, government and academia, known as the Triple Helix, into a friendly climate created to engender collaboration and partnership. The conferences are, as expressed by the theme of the 2006 Conference, 'Uniting the International Micronano Market Place'. Conferences are held annually at different locations around the world, migrating alternately between the USA, Europe and Asia. Each conference has its own theme and is run by a local organisation after agreement with MANCEF who own the conference brand. Past conferences have taken place in Hawaii, Dortmund, Oxford, Santa Fe, Amsterdam, San Diego, Ypsilanti, Baden-Baden and Edmonton in Canada. COMS2007 will be in Melbourne, Australia. There is a growing consensus amongst professionals that success in the global market depends not only on having the right technology at the right time for producing products and systems that people want and can afford, but equally on ensuring that all the stakeholders are aware of the social and economic impact the technologies will have on society. This is particularly important at the present time when nanotechnology is emerging as a key driver of change; sometimes it will be disruptive with serious consequences for businesses that are unprepared for it. It is also vitally important to develop the right infrastructure that supports training and business development. MANCEF through its global membership, stakeholder involvement and COMS conferences seeks to encourage these at the regional, national and international level. The conferences have proved their value as more delegates attend each year, bringing new ideas, innovations and opportunities to those looking for partnerships and business. Nanomanufacturing is presenting the next 'big' challenge to industry. Many MANCEF member companies, even those, who in the past were focused on micromanufacturing are now facing this challenge as new techniques are emerging from the laboratory. Currently top-down nanotechnology is leading since most of the techniques used are well-established extensions of those developed for MEMS and MST. The breakthrough in new materials and processes will come from bottom–up nanotechnologies. Bottom-up manufacturing is based on atomic or molecular manipulation. It offers a way forward to construct shapes, devices and nanomachines with molecular precision. A number of approaches can be taken to achieve bottom–up manufacturing. These include chemical synthesis, self-assembly and positional assembly. Chemical synthesis can produce molecules and nanoparticles for direct use into products either in bulk or disordered form. The nanoparticles used in most products are made using this process. Metal oxides such as titanium dioxide, zinc oxide, silicon dioxide, aluminium oxide, zirconia and iron oxide are currently the most commercially important nanoparticles. Self-assembly processes arrange molecules into ordered nanoscale structures. It can be induced by external means such as thermal, optical, electrical or magnetic forces. Positional assembly is still far from being possible but designs for self-contained table top nanofactories fully automated with robotic control of microtooling systems are envisaged for the future. Many of the Fortune 500 companies are now investing in nanotechnology and some already have products on the market; these include improved protective sunscreens, cosmetics, stain resistant fabrics, composite materials for vehicles and sports equipment, medical devices and diagnostics, targeted drug delivery systems and fire and water resistant coatings. There is the promise

of many more products in the foreseeable future. Nanotechnology is spearheading the development of new materials that will have unique properties tailored for specific applications. For example, carbon nanotubes are already being mass-produced and used in the construction of sports equipment such as tennis rackets and base-ball bats. They offer stronger, lighter alternatives at potentially lower cost. If they give a real competitive advantage to sportsmen, then they will replace many of the existing materials – an example of disruptive technology then could revolutionise sporting equipment. I wish to thank those who contributed to this special edition and hope that this issue will stimulate readers to acquire other volumes of this exciting new journal where many more developments in nanotechnology and nanomanufacturing will be recorded.