
Editorial

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Biographical notes: Suresh Chalasani received the PhD Degree in Computer Engineering from the University of Southern California, Los Angeles. He is an Associate Professor at the University of Wisconsin-Parkside, Kenosha, WI, where he is currently the Chair of the Business department. He specialises in supply chain management systems, e-commerce, healthcare management, and bioinformatics. He published numerous articles in journals such as the IEEE Transactions and served on the program committees of several conferences and symposia. He is currently on the editorial boards of the *IEEE Systems Journal* and the *IJBET*. He received multiple research and instructional grants from the National Science Foundation and the University of Wisconsin System.

Panduranga Rao Koritala (founder), Chairman and Chief Executive Officer of Spark Biotech, is an internationally known leader in several areas of novel drug delivery and biotechnology research. He has worked in this area for over 40 years and is widely published in over 160 scientific publications, including books. He has worked at Indian National Labs and universities in the UK, Germany and USA. He is a proven entrepreneur and has successfully brought ridge augmentation and guided tissue regeneration biotech products to market in India. During his tenure as head of Biomaterials Division and a Director Grade Scientist at the Central Leather Research Institute (CSIR national laboratory) in India, he led an active research group in the Biomaterials area.

Nilmini Wickramasinghe, PhD MBA researches and teaches in several areas within Information Systems. In addition, she specialises in the impacts of technologies on the healthcare industry and various aspects of medical informatics. She is well published in all these areas having written several

books, over 70 refereed scholarly papers. She holds an Associate Professor position at Stuart School of Business and is the Editor-in-Chief of two international journals.

In a world where bigger is usually synonymous with better, nanotechnology, a term derived from the Greek word ‘nano’ meaning dwarf, stands tall amongst the many great paradoxes of life as it appears to hold the key to advances in critical techniques for modern medicine and the delivery of superior healthcare. In fact, many leading surgeons today¹ believe that the future for surgery is at the cellular or gene level and without key advances in nanotechnology this vision cannot be realised.

Given that nanotechnology is increasingly playing a major role in human healthcare technologies – examples include the use of nano-particles in cancer therapy and targeted drug delivery systems not to mention that nanotechnology is also widely issued in tissue engineering applications – we decided it was important to devote a special focus on this domain and understand why this ‘dwarf’ technology is actually such a giant.

Currently, some of the emerging key areas with respect to nanotechnology in healthcare include:

- Nanotechnology based drug delivery systems
- Bio materials based on nanotechnology
- Tissue engineering applications of nanotechnology
- Quantum dots (nanocrystals) for diagnostic purposes
- Nanoreactors for biotechnological manufacturing processes
- Gene therapy
- Nanotechnology for cancer therapy and diagnosis
- Surgical applications of nanotechnology
- Business considerations of nanotechnology
- Manufacturing and scaling aspects of nanoparticles, nanospheres, nanorods, nanosponges and nanocrystals
- Social awareness and toxicological aspects of nanotechnology.

In developing this special issue, our goal was to provide an overview of research and implementation issues with respect to nanotechnologies in the medical field. This was indeed an ambitious goal especially when one considers the current breadth and depth of research in this dynamic and growing area. While it is not possible to fully capture in one volume the true vastness of research presently being carried out in this domain, the papers in this special issue do discuss the current status and future prospects of key initiatives.

Specifically, the paper by Barber ‘Nanotechnology and diagnostics in the age of omics’ serves to highlight various technologies at the micron and nano-scales which have the potential to change medical diagnostics. ‘Biomaterial surface patterning of

self-assembled monolayers for controlling neuronal cell behaviour' by Murugan et al., discuss key elements pertaining to design strategies and methodologies for nano- and micro-scale surface patterning and the subsequent control of cellular responses in-vitro. Wang et al. 'Security risks for remote intelligent Pharmacy-on-a-Chip delivery systems' focuses on the primary security concerns for remote intelligent pharmacy-on-a-chip delivery systems and the final paper in this compilation by Shelly et al. 'Nanostructured Lipid Carriers and their application in drug delivery' discusses critical issues with Solid Lipid Nanoparticles (SLN), and Nanostructured Lipid Carriers (NLC).

It is our hope that this special issue will be as useful to researchers who might use it to formulate new research topics related to nanotechnology as well as practitioners and business personnel who would be able to gain foresight on the implementation of nanotechnology and a deeper understanding into the critical issues pertaining to the barriers and facilitators in advancing this key discipline.

Note

¹Sir Alfred Cuschieri key note address 2007 HCTM conference, Pisa, Italy.