

Editorial

It is my pleasure to present the first issue of International Journal of Micro-Nano Scale Transport (IJMNT). The later part of 20th century belonged to semiconductor revolution. The core of the revolution lies in miniaturization and packing of millions of devices inside vanishing small dimensions. In 1959 celebrated physicist Richard Feynman presented the idea of micromachines at the annual meeting of the American Physical Society. Today it is worth looking back at those predictions to find that reality has taken over imagination. However this trend of miniaturization did not restrict itself to the field of electronics alone. Micro-Nano scale science and technology has made tremendous advancement in recent years in a wide spectrum of disciplines such as energy conversion, computing technology, electronic devices, biological assays, drug delivery systems, medical diagnostics, chemical micro reactors and micro sensors to name a few. Although these various fields of applications made them investigated by researchers from different disciplines, the aspects that they deal with can be broadly classified into few categories. The major area under which Micro-Nano sciences are investigated is material science in which newer materials and their characterizations are being investigated. This has given a boost to the area of micro-scale transport. In addition to this, extending micro/nano scale technologies to health sciences through Bio-MEMS and micro-nanofluidic devices, bringing the concept of lab-on-chip in biological sciences have emerged as the latest important initiatives in this field. This has given rise to inter-disciplinary research where engineering concepts are used to address the problems at smaller scales required for the problems related to fundamental sciences and their applications. However, applications of these novel structured materials require that the transport processes in them are understood well. Thus, micro-nano scale transport process has emerged as a major area of research across various scientific and technological disciplines.

The size effect in materials affects the transport of thermal energy, charge, fluid, species, phases and biological entities significantly. In devices like thin films or micro channels, the basic constitutive laws such as the Fourier law of heat conduction, Newton's law of viscosity breakdown at smaller scales. Even widespread assumptions such as continuum in fluid mechanics lose applicability. The scientists and technologists all over the world are busy in identifying the regions in which this breakdown occurs and formulating strategies for analysis for such non-classical regimes. This brings out phonon transport in heat conduction, plasmonic resonance in metal nano particles, slip and molecular dynamics in micro channels, diffusive vis-a- vis ballistic transport of heat and mass and transport and selective nature of membrane diffusion in biological systems into focus. Although transport phenomena follow some general trends in heat, mass, momentum and species transport, the above non-classical transport processes at smaller scales are investigated by researches of different disciplines in different ways due to traditional difference of approach in these disciplines. As a result, the literature in the area micro-nano transport is spread over wide range of journals which apparently deal with completely different approaches of investigations. The need for having a journal dedicated to micro-nano transport processes is thus felt so that the commonality of approaches can be discovered by the investigators. The International Journal of Micro-Nano Scale Transport aims to bring all these research works together to aid the development of this common approach.

The International Journal of Micro-Nano Scale Transport will focus on transport processes of all kinds applicable to smaller dimensions. The processes may include (but not limited to) the transport of momentum, mass, chemical species, thermal, biological and electro-kinetic/ electrochemical quantities at micro-nanoscale in natural as well as engineered systems. The observations of the characteristic features of these transport processes, analysis of these observations and theorization as well as modeling and simulation of these processes will be the broad scope of this journal. The journal will specifically emphasize both the fundamentals of microscale transport as well as the application of these to specific areas like electronic cooling, micromachines for miniaturized mechanical devices including MEMS (and NEMS), synthesis and characterization of nanoparticles and nanostructured surfaces (like

super hydrophobic surfaces) and their applications in industrial and health care systems, micro and nano scale measurements, microfluidic devices for surgery and medicine, bio-MEMS for novel biological assays and similar other applications. The journal will also publish articles on newer concepts in the above areas with proof of concepts as rapid communications. Reviewing the above and related areas through well structured review articles will be a special feature of the journal.

I take this opportunity to express my gratitude to Drs. Gang Chen, Bengt Sunden, Stephan Kabelac, Peter A Kew, Yimin Xuan, Stephen U. S. Choi, Suman Chakraborty, Roger Kamm, Suresh Garimella, Yogendra Joshi and Avijit Bhunia for agreeing to serve in the editorial board inspite of their busy professional commitments. Just a thank is not enough to express the contribution of the staff at Multi-Science Publication, particularly Ms. Anita P.Raman, of Sci-World Media LLC, who is supporting Multi-Science's content development efforts for her constant efforts and vigilance over the process of evolution of the journal. Finally, 'the proof pudding is in eating'; if the researchers and the academicians working in the area of micro-nano scale transport find this journal to be the right medium for disseminating their research efforts, I along with the entire editorial board and the Multi-Science team will find our efforts to be rewarded.

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Sarit K.Das
Editor-in-Chief