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Nanomachines: Design, Manufacturing, Manipulation and Applications

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Abstract: Nanomachines are mobile nanosystems whose individual components are typically in the 1-100 nm range. Variously known as nanomotors, nanobots, nanoengines, biomachines, they are mechanical or electromechanical devices capable of converting energy to motion or designed to perform specific tasks. Nanomachines are an emerging technology with significant benefits in human health, economic competitiveness and national security. They have potential applications in cancer treatment, drug delivery, medical imaging, sensing and actuation, information storage, energy systems, catalysis, and environmental remediation. For this technology to succeed, it is important to understand the design rules, large-scale manufacture and methods for manipulation. This session will address some of these research challenges.

Bio: Dr. Khershed P. Cooper is Program Director for the Advanced Manufacturing Program at NSF. He is NSF representative for National Science & Technology Council (NSTC)'s Nano Science Engineering & Technology (NSET) Sub-committee and is a member of the National Nanotechnology Initiative (NNI)'s Signature Initiative on Sustainable Nanomanufacturing. He contributes to the development of the Manufacturing USA Institutes. Prior to joining NSF, Dr. Cooper was a Program Officer at the Office of Naval Research (ONR) and a Senior Research Metallurgist at the Naval Research Laboratory (NRL), where he studied materials processing, additive and nanomanufacturing. He also has industrial research experience. He has nearly 150 publications, over 150 invited talks, and 70 contributed presentations. He has sponsored symposia and workshops in additive and nanomanufacturing. He is a Fellow of ASM International and a recipient of its prestigious Burgess Memorial Award. He received his PhD from University of Wisconsin - Madison.