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TOPIC:

Thinking Small to Solve Big Problems: Exercising a New Paradigm to Solve Global Quality of Life Challenges

ABSTRACT:

Presented is the concept of convergent technology, the intersection of the precision assembly of matter, nanotechnology, coupled with the functional building blocks of nature, biotechnology, and fused by the network flow of spatiotemporal information, informatics. We will present the details of the technological demands and the results of efforts associated with the production of a new class of functional material and devices. Elements of the discussion will include the genetic engineering of active biological molecules into engineering building blocks and the incorporation of "metabolism" into engineered devices and materials through precision assembly of these molecules into stable "active" materials. Finally, we will provide exemplars using these building blocks to engineer systems that address issues surrounding energy, environment and human health: the societal grand challenges of our age.

PROFILE:

Dr. Carlo Montemagno is currently the Director of the Ingenuity Lab, an institution dedicated developing and deploying technologies to solve many of societies grand challenges. He is also the Canada Research Professor in Intelligent Nanosystems, Professor of Chemical and Material Engineering at the University of Alberta and the Director of the Biomaterials program at the National Institute for Nanotechnology. He was the founding Dean of the College of Engineering and Applied Science at the University of Cincinnati. Prior to his current appointment he was the founding Chair of the Department of Bioengineering and Associate Director of the California NanoSystems Institute as well as the Roy & Carol Doumani Professor of Biomedical Engineering at UCLA. Previous to Dr. Montemagno's tenure with UCLA, he served as Associate Professor in the Department of Biological and Environmental Engineering at Cornell University.

Dr. Montemagno earned his B.S. in Agricultural and Biological Engineering from Cornell (1980) and M.S. in Petroleum and Natural Gas Engineering from Penn State University (1990). After completing his

undergraduate studies in 1980, he joined the United States Navy and served for ten years in several senior management positions as a Civil Engineering Corps Officer. He then joined Argonne National Laboratory where he led laboratory and field investigations developing bioremediation technology for the treatment of hazardous waste. In 1995 Dr. Montemagno earned his Ph.D. in Civil Engineering and Geological Sciences from Notre Dame University. Upon obtaining his Ph.D. in Civil Engineering, he began his academic career as an Assistant Professor at Cornell University in the Department of Agricultural and Biological Engineering where he was one of the pioneers in the field of Nanobiotechnology.

Dr. Montemagno's current research and near term investigations focus on the development of experimental techniques to integrate metabolic functionality into materials through the engineering of biomolecular systems. Recent efforts addressed the creation of advanced systems for water purification and treatment, and the development of materials for the synthesis of high-value chemicals through the harvesting of solar energy.

Dr. Montemagno has amassed a distinguished scholarly record resulting in a number of patents as well as appointments to numerous editorial boards and governmental committees. Dr. Montemagno is a Fellow of the American Academy of Nanomedicine, a Fellow of the American Institute for Medical and Biological Engineering, and a Fellow of the NASA Institute of Advance Concepts. A recipient of the Feynman Prize for Experimental Work in Nanotechnology, he is a frequent keynote/plenary speaker.