



SECOND INTERNATIONAL NANOTECHNOLOGY CONFERENCE ON COMMUNICATIONS AND COOPERATION

Abstract

Nanotechnology at the National Institute of Standards and Technology

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Advances in fundamental nanoscience, design of new nano-materials, and ultimately manufacturing of new nanoscale products will all depend to some degree on the capability to accurately and reproducibly measure properties and performance characteristics at the nanoscale. *“Nanotechnology is the understanding and control of matter at dimensions of roughly 1 to 100 nanometers where unique phenomena enable new and novel applications”*¹. Where these new and unique properties manifest themselves is not fully known and new measurement techniques are needed to measure these new phenomena. Nanotechnology involves imaging, measuring, modeling, and manipulating matter at this length scale. It is imperative that a strong measurement and standards infrastructure be developed to support this work and the developing nanotechnology industry. Decades of nanoscience research have led to remarkable progress in nanotechnology as well as an evolution of instrumentation and metrology suitable for some of the nanoscale measurements. Consequently, today’s suite of metrology tools has been designed to meet the needs of exploratory nanoscale research, and new techniques, tool, instruments and infrastructure will be needed to support a successful nanotechnology industry manufacturing commercial products. Currently available metrology tools are also beginning to reach the limits of resolution, accuracy and capability, and are not expected to meet future requirements for nanomanufacturing. Revolutionary approaches to the metrology may be required in the near future. This presentation will discuss some of the NIST work in nanotechnology and nanometrology, present some of the results of the *NNI Interagency Workshop on Instrumentation and Metrology for Nanotechnology* held in Gaithersburg, MD² and will discuss the new Nanomanufacturing User Facility to help bridge the gap for new and

¹ NNI Strategic Plan, December 2004 available from the National Nanotechnology Coordination Office or downloaded from: www.nano.gov.

² NNI Interagency Workshop on Instrumentation and Metrology for Nanotechnology 2005 available from the National Nanotechnology Coordination Office or downloaded from: www.nano.gov.

potentially revolutionary nanometrology to be developed to meet the needs of nanotechnology research and nanomanufacturing.