

OVERVIEW NANOTECHNOLOGY FOUNDATIONS FOR SUSTAINABLE SOCIETY

Mihail C. Roco, PhD

National Science Foundation and National Nanotechnology Initiative



Abstract: An international scientific and technological endeavor was set in motion by fundamental discoveries and unifying vision of nanotechnology formulated about 2000, which has inspired the National Nanotechnology Initiative (NNI). A key challenge in the vision has been advancing a sustainable society. NNI involves over thirty U.S. research, development, and regulatory federal agencies with a cumulative public R&D investment of about \$38 billion by 2022. NSF is focused on upstream research in all areas of nanoscale science, engineering, education, and innovation.

The presentation outlines how nanotechnology contributes with new solutions to sustainable society directly through nanotechnology applications and pollution mitigation or indirectly by enabling other emerging technologies. Nanotechnology provides a foundation for quantum information systems, wireless communication, semiconductors, and advanced manufacturing. Convergence of nanotechnology with modern biology, information, cognition, and artificial intelligence systems generates expanded opportunities to address sustainable society.

Bio: Mike Roco is the Senior Advisor for Science and Engineering at the National Science Foundation and founding chair of the U.S. National Science and Technology Council's subcommittee on Nanoscale Science, Engineering and Technology (NSET). Prior to joining National Science Foundation, he was professor of mechanical and chemical engineering. Dr. Roco is credited with thirteen inventions, contributed over two hundred and fifty articles and twenty-one books. He was elected as the Engineer of the Year by the U.S. National Society of Professional Engineers and NSF in 1999 and again in 2004. Dr. Roco is member of the European Academy of Sciences and Arts, member of the Swiss Academy of Engineering Sciences, honorary member of the Romanian Academy, and Fellow of ASME, of Institute of Physics and of AIChE. He was awarded the U.S. National Materials Advancement Award in 2007 "as the individual most responsible for support and investment in nanotechnology by government, industry, and academia worldwide", and received the IUMRS "Global Leadership and Service Award" at the EU Parliament in 2015 for "vision and dedicated leadership ...that has made major impact to all citizens around the world."