

SNO letter

NEWSLETTER OF SUSTAINABLE NANOTECHNOLOGY ORGANIZATION



**Sustainable
Nanotechnology
Organization**

Research | Education | Responsibility

**INSIDE THIS
ISSUE:**

Welcome message	1
Nanotechnology for sustainable society	2
Conference information	4

**Join SNO at
www.susnano.org**

**SNO Newsletter
Submissions**

*Please send news, conference announcements, job postings, letters to the editor, and other contributions to the newsletter to the newsletter editor, Vishal Shah at:
ShahV@dowling.edu*

The next newsletter will appear in September 2012.

W E L C O M E T O S N O

In spring of 2012, along with **Dr. Omowunmi Sadik** of State University of New York at Binghamton and other colleagues, we are pleased to have founded a new organization: The Sustainable Nanotechnology Organization (SNO). The reason for the founding of the new organization is to provide a home to the scientists working in the highly inter-disciplinary field of sustainable nanotechnology. At present, the community is not served in total by any other organizations and based on the type of research being performed by the scientists, they try to fit within other scientific organizations. It is never good for the growth of the community when it has to be a subset of other disciplines. SNO will aim at bringing non-overlapping scientific communities into the sustainability community. The organization is open to anyone with an interest in topics ranging from applications and implications of engineered nanomaterials to societal and economic

aspects of nanotechnology. SNO is also reaching out to industries interested in sustainable nanotechnology, bringing them alongside academicians. Being a new international organization, we look forward to active participation from the community across the globe to raise nanotechnology to aid in sustaining the future."



Barbara Karn

Dr. Barbara Karn currently serves as a Program Director for the Environmental Health and Safety of Nanotechnology program at National Science Foundation, USA.

G O V E R N A N C E O F S N O

First draft of the SNO bylaws will be available on the organization's website by the first week of August and will be voted upon at the First Sustainable Nanotechnology Conference on Sunday, November 4, 2012. Any questions, suggestions or comments should be sent to Dr. Sadik via email at osadik@binghamton.edu. The final draft of the bylaws, that would be voted

at the Conference, will be posted on the web in the first week of October.

Elections for all the positions within the organization will also be held at the Conference. Nominations for the positions will be open from the second week of October and continue till the elections are held in the Conference. Nominations can be made prior to the Conference via email to Dr. Sadik.

NANOTECHNOLOGY FOR A SUSTAINABLE SOCIETY

INTERVIEW WITH DR. MIHAIL C. ROCO

For this first edition of the newsletter, I interviewed Dr. Mihail C. Roco, Senior Advisor for Nanotechnology at National Science Foundation. Dr. Roco is the founding chair of the National Science and Technology Council's subcommittee on Nanoscale Science, Engineering and Technology (NSET), and played a major role in developing the National Nanotechnology Initiative (NNI). Forbes magazine recognized him in 2003 as the first among "Nanotechnology's Power Brokers" and Scientific American named him one of 2004's top 50 Technology Leaders. (image source: www.nsf.gov)

Shah. Where does the field of nanotechnology stand in the current society?

Roco. Over the last 10 to 12 years, nanotechnology has evolved from a curiosity in science to one of the most transformative technologies seen in modern times. Still in its infancy, nanotechnology has already shown its promise to society. In 2010 in the United States alone, we have more than \$110 billion in product manufacturing incorporating nanotechnology as a key functional component. In several areas, nanotechnology has become a large part of the market. For example, around 60% of semiconductors and over 40% of manufactured catalysts have some form of nanotechnology involved. In addition, nanotechnology has become a main factor in discovery, innovation, and application. The technology has also shown a footprint in emerging research, with approximately 70% of energy-related proposals submitted to National Science Foundation having a basis in nanotechnology. The numbers are significant considering the variety of proposals and ideas.

Shah. How do you foresee a balance in the application and implication aspects of nanotechnology?



Roco. When talking of implication, it is important to consider which generation of nanotechnology is under discussion. Nanoparticles from the first generations were largely passive with new properties and functions but not changing during their use. In contrast, nanoparticles from the second generation change their behavior during use, and this could have significant health and safety implications. Such nanoparticles have a wide range of applications, from drug delivery, catalysts, and self-cleaning windows. I believe that in the field of nanoparticle implications, it is important to develop a predictive approach to extrapolate the limited experiments available. New methods have to be developed in all aspects of the implications studies, as the existing methods are not fully applicable. We need to keep evaluating the human

INTERVIEW WITH DR. MIHAIL C. ROCO

benefits from the nanotechnology and achieve the best investment possible—one having the least negative effect as much as possible. We have implemented at NSF and recommended for all NNI that, for large projects such as nano centers, one incorporates environmental health and safety, as well as ethical and legal aspects, from the early stages of research and development.

In addition, as a society, we need to develop capacity — a structural framework consisting of institutions, agencies, and organizations ready for the unexpected implications of nanotechnology. Through such a framework, we will be better prepared to combat any possible negative implications on human or environmental health, should it arise.

Shah. How can nanotechnology make society more sustainable?

Roco. Our desire to have a sustainable society is a main reason behind the growth of nanotechnology. Nanotechnology requires fewer amounts of material, water, and energy, and with the high degree of precision in nanomanufacturing, we are generating less pollution for the same functionality. I see the future trend in the production of nanoparticles will be to also become more sustainable.

In the past, the topic of sustainable nanotechnology did not receive satisfactory attention because the benefits of nanotechnology were primarily in the advanced materials and electronics areas, where sustainability issues are generally not considered immediately. However, after 2005 there has been an increase in the applications of nanotechnology in energy and water sector, and more recently in climate change and biodiversity. We have also seen a spike in the development of nanotechnology in special minerals and materials. These areas are highly linked with sustainability.

I believe that nanotechnology has the potential to influence the wider economy and society and to provide the path for attaining a high degree of social sustainability.

Shah. Looking back into the past, is there anything in the field of nanotechnology you wished would have happened differently?

Roco. Over last 10 years, I have seen a wonderful evolution in the field where core ideas have evolved into transformative technologies around the world. Nanotechnology can be used as an example of the penetration of science and engineering in society. However, I wish to point out few things that have not yet materialized in the field. The tools for measurement, simulation and predictive concepts of nanomaterials and nanosystems are still under development. This has been one of the major hurdles in advancing the goal of building “materials and systems by design”. Another limitation has been in addressing the effects of nanotechnology on sustainability in a coordinated way. A challenge is understanding how nanotechnology will influence the human society in longer term.

Nanotechnology will improve human health through molecular medicine, improve human capacity in learning, and catalyze the development of a sustainable society without wars. My personal wish is for a future where all the development is done in convergence with other technologies in serving human dimension.

Shah. What is your message to the members of sustainable nanotechnology organization?

Roco. I am happy that we now have an organization in the field of sustainable nanotechnology. There is a need for an organization that develops a capacity in the society for the future in wider nanotechnology related disciplines including education, legislative guidance, and infrastructure and instrumentation development amongst many. I wish sustainable nanotechnology organization and its members all the success.

(Telephone interview with Dr. Roco was conducted in June 2012 by Vishal Shah)

FIRST SUSTAINABLE NANOTECHNOLOGY ORGANIZATION CONFERENCE

First Sustainable Nanotechnology
Organization Conference
Sunday, Nov. 4 – Tuesday, Nov. 6, 2012
[Become a Corporate Member](#)

The objective of this conference is to bring together scientific experts from academia, industries, and government agencies from around the world to present and discuss current research findings on the subject of nanotechnology and sustainability.

The conference program will address the critical aspects of sustainable nanotechnology such as life cycle assessment, green synthesis, green energy, industrial partnership, environmental and biological fate, and the overall sustainability of engineered nanomaterials. In principle, this involves the fundamental/applied research on the chemistry of producing new green nanomaterials; eco-manufacturing processing of nanomaterials and products. The conference will also foster new collaboration between academic and industrial participants.

**FOR FURTHER DETAILS, CONFERENCE REGISTRATION AND PROGRAM
INFORMATION VISIT THE WEB AT WWW.SUSNANO.ORG**

DEADLINES

Abstract/Poster	: Monday, July 30
Undergraduate and graduate student award	: Monday, July 30
Early Registration	: Monday, September 10
Hotel Registration	: Thursday, October 4

CONFERENCE FEES

Before Sept. 10, 2012	Sept. 11 to Nov. 4, 2012
Regular: \$325	Regular: \$425
Government: \$300	Government: \$400
Student: \$275	Student: \$375

The first year's membership (ending December 2013) is included in the conference fee.