

**Applications of Nanotechnology
for Safe and Sustainable
Environmental Remediations**

Nano-4-Rem

ANSSER_s



**Applications of Nanotechnology
for Safe and Sustainable
Environmental Remediations
(*Nano-4-Rem ANSSER_s*):
An Overview of the Initiative**

Ephraim Massawe, ScD

emassawe@selu.edu

Associate Professor

Southeastern Louisiana University

November 2, 2015

Nano-4-Rem ANssERs Webinar Panelists



Dr. Ephraim Massawe is chair and coordinator of the Nano-4-Rem initiative and Associate Professor at Southeastern Louisiana University



Greg Gervais is chief of EPA's Technology Assessment Branch within the Superfund Program.



Jan Slunský is director of the NANO IRON company. His MSc in mechanical engineering is from Brno University of Technology



Dr. Chunming Su is an EPA Soil Scientist in the Ground Water and Ecosystems Restoration Division in Ada, Oklahoma.



Dr. Mark D. Hoover is a senior research scientist in the National Institute for Occupational Safety and Health in Morgantown, WV.



Dr. Lorraine [Marceau] Day serves as the Safety Program Administrator at Louisiana State University's Center for Advanced Microstructures and Devices (CAMD).

Nano-4-Rem Objectives

To provide an opportunity for representatives from the environmental and occupational health and remediation community, industry, academia, and government to:

- **Share perspectives and develop ideas** for good work practices and guidelines and selection criteria for Nano-4-Rem-ANssERs;
- **Familiarize with other U.S. nanotechnology stakeholders**, (e.g. vendors, transporters, and contractors and communities; and
- **Share case studies** of nano-enhanced technologies, including
 - selection criteria for alternatives to traditional remediation strategies and methods,
 - job planning, job tasks, and
 - nanomaterial handling practices.

Nano-4-Rem Objectives (continued)

To advance the goals of the Nanoinformatics 2020 Roadmap and the National Nanotechnology Initiative (NNI), Nano-4-Rem also addresses:

- **Occupational and environmental regulatory issues** as they relate to remediation, synthesis and characterization, and the application of nanoinformatics for Nano-4-Rem ANssERs: information needs
- **The fate and transport of nanomaterials** during and after remediation;
- **Risks**, including contributions from both toxicological properties of nanomaterials (hazard) and their potentials for occupational and environmental exposure, where hazard x exposure = risk;
- **Results** of the recent nanoinformatics survey of state agencies and programs described on the workshop website; and
- **Opportunities** for developing and sustaining continuing advances and collaborations.

Components of the Nano-4-Rem ANssERs Initiative

- An **organizing committee** comprising representatives from:
 - Government agencies including EPA, NIOSH, OSHA, ...
 - Academia
 - Professional Organizations
 - Commercial Organizations
- Our **workshop** series
- The Nano-4-Rem **web site**
- Our **webinar series**
- *An informatics framework and process for developing and sharing relevant and reliable information*

Nano-4-Rem Organizing Committee

Ephraim Massawe, Southeastern Louisiana University, **Committee Chair**

Janet Carter, U.S. Occupational Safety and Health Administration

Lorraine Marceau-Day, Louisiana State University

Gregory Gervais, U.S. Environmental Protection Agency, OSWER

Michael Gill, U.S. Environmental Protection Agency, Region 9/ORD

Mark D. Hoover, National Institute for Occupational Safety and Health

Daniel McCarthy, Southeastern Louisiana University

Martha Otto, U.S. Environmental Protection Agency, OSA

Chunming Su, U.S. Environmental Protection Agency, ORD

Sebastian van Delden, formerly of Southeastern Louisiana University

Host organization: Southeastern Louisiana University

Nano-4-Rem Supporting Organizations

- Louisiana Board of Regents for Higher Education
- NANOIRON Future Technology

- Norco Manufacturing Complex (Motiva)
- Louisiana Chemical Association

- REPSS Incorporated
- Environmental Measurements Corporation

- Palacký University, Olomouc, Regional Centre of Advanced Technologies and Materials

2013 Nano-4-Rem ANssERs Workshop Highlights

Poster and Exhibition Sessions

Podium Session 1 – Organizational Perspectives

- Perspectives from the National Nanotechnology Coordination Office ([NNCO](#))
- OSHA perspectives on sustainability ([OSHA, National](#))
- LA-OSHA Baton Area Office perspectives on state and local issues for nano-based environmental remediation ([OSHA, Area Office](#))
- An EPA overview of sustainable and safe application of nanotechnology in site remediation ([EPA](#))

2013 Nano-4-Rem Workshop Highlights (continued)

Podium Session 2 - Nanoinformatics

- Nanoinformatics tools and the issues for safe handling of nanotechnology ([NIOSH](#))
- Empowerment of the local and state governments for nanotechnology oversight ([Southeastern Louisiana University](#))
- Online community for nano-research and education ([Purdue University](#))

2013 Nano-4-Rem Workshop Highlights (continued)

Podium Session 3 – OSHE Issues

- OSH risks to nanoparticles ([University of Iowa](#))
- Assessing nanotechnology safety for remediation with some considerations ([Louisiana State University](#))

2013 Nano-4-Rem Workshop Highlights (continued)

Podium session 4 - Science of nano-remediation and non-remedial applications

- The use of functional procedures for management of nanomaterials ([Shell Motiva](#))
- Challenges, risks and future direction of nanotechnology research ([LSU](#))
- Utilization of nZVI for insitu ground water remediation with some recent results ([EPA](#))
- The current issues and concerns in sustainable-based remediation ([EPA](#))

2013 Nano-4-Rem Workshop Highlights (continued)

Podium session 5 - Safety issues and risks minimized in field tests of emulsified nZVI use in treating chlorinated solvents - U.S.EPA

Podium session 6 - Case studies discussions and reporting

Path Forward

- Build on the Nano-4-Rem inaugural workshop success
- Confirm stakeholder needs
- Refine our Nano-4-Rem informatics framework and process
- Develop and share information

Thank You All for Your Attention

please partner with us to advance Nano-4-Rem ANssERs

Dr. Ephraim Massawe

emassawe@selu.edu

Associate Professor, Environmental Health/Industrial Hygiene
Southeastern Louisiana University
Hammond, Louisiana

Special thanks and gratitude to the U.S. EPA, particularly Gregory Gervais, Mike Gill, and Jean Balent, for making this possible.