

1st Symposium on Nanotechnology for Public Health, Environment, and Energy
Whitaker Hall Auditorium Room, Washington University in St. Louis (WUSTL)

Day One 9/24 (Thursday)

8:30 – 8:45 Welcome Remarks: Chancellor Mark S. Wrighton (WUSTL)
8:45 – 9:00 Larry Goldberg (National Science Foundation, WUSTL Engineering Alum)
9:00 – 9:45 George M. Whitesides (Harvard University)
 Nanotechnology in Adolescence

9:45 – 10:00 Break (Whitaker Atrium)

Session 1 Nanomaterials: Synthesis and Instrumentation

10:00 – 10:30 David Pui (University of Minnesota)
 Advances in Instrumentation for Nanoparticle Exposure and Toxicity Studies
10:30 – 10:50 Younan Xia (BME, WUSTL)
 Nanomaterials at Work in Various Applications
10:50 – 11:10 William Buhro (CHEM, WUSTL)
 Colloidal Semiconductor Quantum Wires
11:10 – 11:30 Daren Chen (EECE, WUSTL)
 Development of Miniature Nanoparticle Sizer for Personal Exposure Monitoring
11:30 – 11:50 Sophia Hayes (CHEM, WUSTL)
 Optically-pumped NMR: An Emerging Tool for the Study of Structure at the
 Nanoscale in Semiconductors

11:50 – 1:00 Lunch (Whitaker Atrium)

Session 2 Nanotoxicity and Public Health

1:00 – 1:30 Gunter Oberdorster (University of Rochester)
 Effects and Fate of Inhaled Nanoparticles
1:30 – 1:50 Pratim Biswas (EECE, WUSTL)
 Nanoparticle Aerosol Science and Technology Enabling Nanotoxicology Studies
1:50 – 2:10 Yinjie Tang (EECE, WUSTL)
 Antimicrobial Effect of Metal Oxide Nanoparticles
2:10 – 2:30 Yujie Xiong (NRF, WUSTL)
 Metallic Nanostructures for Toxicity Study

2:30 – 2:45 Break (Whitaker Atrium)

Session 3 Nanotechnology: Environment, Health and Safety (EHS)

2:45 – 3:15 Sandip Tiwari (Cornell University)
 National Nanotechnology Infrastructure Network (NNIN)
3:15 – 3:35 Larry Nagahara (National Cancer Institute, NIH)

Physical & Life Sciences at the Interface: A Nanotechnology and Oncology Perspective

- 3:35 – 3:55 Dong Qin (SEAS and NRF, WUSTL)
Nanotechnology at Intersection of Public Health and Environment
- 3:55 – 4:15 Laura Stolle (Air Force Research Laboratory, AFRL)
The Importance of Immunity in Nanotoxicity
- 4:15 – 4:35 Cindy Buhse (Food and Drug Administration, FDA)
Regulatory Considerations for Nanomaterial Containing Therapeutics
- 5:00 – 7:00 Nano Research Facility Tour and Poster Session (EPS building)

Day Two 9/25 (Friday)

Session 4 Nanomaterials for Biomedicine

- 8:30 – 9:00 Michael Welch (Radiology, WUSM)
Radiolabeled Nanoparticles for Diagnosis
- 9:00 – 9:20 Samuel Achilefu (Radiology, WUSM)
Biospecific Gold Nanoparticles for Near-Infrared Fluorescence Imaging of Caspase-3 Activation
- 9:20 – 9:40 Dipanjan Pan (Medicine, WUSM)
Nanomedicine Opportunities with Ligand-directed “Soft” Metal Nanocolloids
- 9:40 – 10:00 Maulik Shah (St. Louis University, SLU)
Targeted Zinc NanoDots as Cancer Therapeutics
- 10:00 – 10:30 Break (Whitaker Atrium)
- 10:30 – 10:50 Lihong Wang (BME, WUSTL)
Photoacoustic Tomography: High-Resolution Imaging of Optical Contrast *in vivo* at New Depths
- 10:50 – 11:10 Jingyi Chen (BME, WUSTL)
Gold Nanocages: Synthesis, Properties, and Biomedical Applications
- 11:10 – 11:30 Joshua Maurer (CHEM, WUSTL)
Patterned Materials for Biological Applications
- 11:30 – 1:00 Lunch (Whitaker Atrium)

Session 5 Nanomaterials for Energy and Environment

- 1:00 – 1:30 Chancellor Tom George (University of Missouri at St. Louis, UMSL)
Light Energy Relaxation and High-Harmonic Generation in C₆₀ (part 1)
- 1:30 – 1:45 Guoping Zhang (Indiana State University)
Light Energy Relaxation and High-Harmonic Generation in C₆₀ (part 2)
- 1:45 – 2:15 Gary Wiederrecht (Argonne National Laboratory)

Hybrid Plasmonics: New Routes to Nanoscale Imaging, Spectroscopy, and Efficient Energy Flow

- 2:15 – 2:30 Break (Whitaker Atrium)
- 2:30 – 2:50 Richard Axelbaum (EECE, WUSTL)
Aerosol Synthesis of Cathodic Material for Lithium Ion Rechargeable Batteries
- 2:50 – 3:10 Robert Blankenship (Biology, WUSTL)
Photosynthetic Membranes as Natural Nanoscale Bioenergy Conversion Devices
- 3:10 – 3:30 Young-Shin Jun (EECE, WUSTL)
Nanoscale Control of Geologic CO₂ Sequestration
- 3:30 – 3:50 Jingyue (Jimmy) Liu (UMSL)
Nanostructures for Energy Applications
- 3:50 – 4:00 Closing Remarks
- 4:00 – 5:00 Facility Tour

Poster Session

5:00-7:00 pm, Thursday, September 24, 2009

Earth and Planetary Sciences Building, Lower Level

1. Enhanced Toxicity of Cu-doped TiO₂ Nanoparticles to Pathogenic and Environmental Microorganisms
Rick Huang, Bing Wu, Manoranjan Sahu, Xueyang Feng, Patricia Wurm, Howard Wynder, Pratim Biswas, and Yinjie J. Tang (EECE, WUSTL)
2. Assessment of ZnO Nanoparticle's Toxicity to Microbial Species
Yin Wang, Bing Wu, Sureshkumar Radhakrishna, Da-Ren Chen, and Yinjie J. Tang (EECE, WUSTL)
3. Antimicrobial Effects of Metal Oxide Nanoparticles
Angela Horst, Yi-Shuan Lee, Zhipeng Wang, Bing Wu, and Yinjie J. Tang (NRF, WUSTL)
4. Hand-held Nanoparticle Sizer for Worker Protection: Integration of Mini-charger and Mini-classifier
Lin Li and Daren Chen (EECE, WUSTL)
5. Patterned Deposition of Nanoparticles with Different Shapes by Aerosol Route
Richard Frnka, Daren Chen, Fan Mei, Kristy Wendt, Brent Riggs, and Nathan Banka (NRF, WUSTL)
6. Characterization and Toxicity of Biomimetically Synthesized Manganese Oxide Nanoparticles
Alexandra Rutz, Hongbo Shao, and Young-Shin Jun (NRF, WUSTL)

7. Structure and Stability of Nanocrystalline Biogenic Uranium(IV) Oxide
Kai-Uwe Ulrich, Lisa Blue, and Daniel Giammar (EECE, WUSTL)
Authors at Collaborating Institutions: Eleanor Schofield and John Bargar at Stanford Synchrotron Radiation Light Source; Harish Veeramai, Jonathan Sharp, and Rizlan Bernier-Latmani at Ecole Polytechnique Federale de Lausanne
8. The Role of Surface Charge, Size, and Shape of Gold Nanostructures in Their Surface Attachment and Internalization by Cells
Eun Chul Cho, Jingwei Xie, Qiang Zhang, Leslie Au, Patricia A. Wurm, and Younan Xia (BME, WUSTL)
9. Nanofiber Scaffolds with Gradations in Mineral Content for Mimicking the Tendon-to-Bone Insertion Site
Xiaoran Li, Jingwei Xie, Justin Lipner, Xiaoyan Yuan, Stavros Thomopoulos, and Younan Xia (BME, WUSTL and Orthopedic Surgery, WUSM)
10. Gold Nanocages: Synthesis and Biomedical Applications
Claire M. Cogley, Leslie Au, Kwang Hyun Song, Yiyun Cheng, Sara Skrabalak, Jingyi Chen, Lihong Wang, and Younan Xia (BME, WUSTL)
11. Pd-Pt Bimetallic Nanodendrites with High Activity for Oxygen Reduction
Byungkwon Lim, Majiong Jiang, Pedro H. C. Camargo, Eun Chul Cho, Jing Tao, Xianmao Lu, Yimei Zhu, and Younan Xia (BME, WUSTL and Brookhaven National Laboratory)
12. Nanostructured Scaffolds for Tissue Engineering Applications
Nathaniel Hogrebe, Jingwei Xie, and Younan Xia (NRF, WUSTL)
13. Noninvasive Photoacoustic Sentinel Lymph Node Mapping using Au Nanocages as a Lymph Node Tracer in a Rat Model
Kwang Hyun Song, Chulhong Kim, Claire M. Cogley, Younan Xia, and Lihong V. Wang (BME, WUSTL)
14. Use of Nanomaterials in Thermoacoustic and Photoacoustic Imaging
Manojit Pramanik, Balaji Sitharaman, Dipanjan Pan, Greg Lanza, and Lihong V. Wang (BME, WUSTL and Medicine, WUSM)
15. Low Power Imaging Sensors with Polymer and Nanowire Polarization Filters
Viktor Gruev, Raphael Njuguna, Jan Van der Spiegel, and Nader Engheta (CSE, WUSTL)
16. Single Nanoparticle Detection by Mode Splitting in Ultra-High-Q Microtoroid
Jiangang Zhu, Sahin Kaya Ozdemir, Yun-Feng Xiao, Lin Li, Lina He, Da-Ren Chen and Lan Yang (ESE/EECE, WUSTL)
17. Whispering Gallery Mode Biosensors
Michael Zakrewsky, SahinOzdemir, and LanYang (NRF, WUSTL)

18. Nanophysiology of Bone
Brent Alexander, Tyrone Daulton, Guy Genin, Justin Lipner, Brigitte Wopenka, and Steve Thomopoulos (CMI/MASE/BME/EPS, WUSTL and Orthopedic Surgery, WUSM)
19. New Monolayer Tail Groups for Protein Resistant Surfaces
Larissa R. Cohen, Amir Munir, Matthew Hynes, Dawn M. Yanker, and Joshua A. Maurer (CHEM, WUSTL)
20. Using Phosphonates to Create Self-assembled Monolayers to Control Cell Growth
Matthew J. Hynes, Dawn M. Yanker, and Joshua A. Maurer (CHEM, WUSTL)
21. Novel Linkers to Control Relative Protein Concentrations on the Nanoscale
Matthew K. Strulson, and Joshua A. Maurer (CHEM, WUSTL)
22. Manipulation Protein Adsorption and Cell Growth on Patterned Substrates
Dawn M. Yanker, Matthew K. Strulson, Jad P. Abi-Mansour, and Joshua A. Maurer. (CHEM, WUSTL)
23. The Fabrication of a Device for Direct Electrical Detection of Proteins at the Microscale
Michael R. Post, Matthew K. Strulson, and Joshua A. Maurer (CHEM, WUSTL)
24. New Monomer Head Groups for Self-assembled Monolayer Surface Chemistry
Natalie A. LaFranzo and Joshua A. Maurer (CHEM, WUSTL)
25. Organophosphonic Acid Self-assembled Monolayers on Metal Oxides for Biological Applications
Dhiman Bhattacharyya and Joshua A. Maurer (CHEM, WUSTL)
26. Optically-pumped NMR Probe of the GaAs Nanostructure at Optically Relevant Defect Sites
Dustin Wheeler, Katie Wentz, Erika Sesti, Michal Hyrc, and Sophia E. Hayes (CHEM, WUSTL)
27. Local Bonding and Order in Photocrosslinked Molecular Crystals
Sarah Gresham, Kimberly Hartstein, and Sophia E. Hayes (CHEM, WUSTL)
28. Evaluating Differential Utility of Nanoparticle and Small Molecule Probes for Molecular Imaging of $\alpha\beta3$ -integrin Receptor Expression in Cancer
Walter J. Akers, Mikhail Berezin, Zongren Zhang, Yunpeng Ye, Kevin Guo, Ralph W. Fuhrhop, Gregory M. Lanza, and Samuel Achilefu (Radiology, Medicine, WUSM)
29. Sensitive and Efficient Detection of Thrombus with Fibrin-specific “Soft” Bi- and Tri-Valent Manganese Nanocolloids
Dipanjan Pan, Shelton D. Caruthers, Angana Senpan, Grace Hu, Mike J. Scott, Patrick J. Gaffney, Samuel A. Wickline, and Gregory M. Lanza (CTRAN, WUSM and St Thomas Hospital, London)

30. Rapid T1w MR Molecular Imaging of Atherosclerotic Angiogenesis with Colloidal Iron Oxide Nanoparticles
Shelton D. Caruthers, Angana Senpan, Dipanjan Pan, Todd Williams, J. Stacy Allen, Michael Scott, P. J. Gaffney, Samuel Wickline, and Gregory Lanza (CTRRAIN, WUSM and St Thomas Hospital , London)
31. An Ontology for Cancer Nanotechnology
Thomas Dennis, Pappu Rohit, and Nathan Baker (BME, WUSTL and Biochemistry & Molecular Biophysics, WUSM)
32. Nanoporous Gold as a Support for Immunoassay Development
Keith J. Stine, Kenise Jefferson, Dan Zhou, Amy Hacker, Marta Wells, and Olga V. Shulga (CNS, UMSL)
33. Comparative Study of Nanostructures by X-ray and Electron Techniques
Nandita Nag and Jingyue (Jimmy) Liu (CNS/UMSL)
34. Synthesis of Cu and CuO_x Nanowires via Reduction of CuO Nanowires
William Lowes and Jingyue (Jimmy) Liu (CNS, UMSL)
35. ZnO Nano-pyramid Decorated Nanowires
Dinghao Tang and Jingyue (Jimmy) Liu (CNS, UMSL)
36. A Novel Route to Carbon Supported PtSn Nanocatalysts for Direct Ethanol Fuel Cell Applications
Jimmy Liu, J. Braddock-Wilking, K. J. Stine, E. Mazjoub, and L. F. Allard (CNS, UMSL and Oak Ridge National Laboratory)
37. Prolonged Survival after Intra-Tumoral Injection of Zinc NanoDot Biogel in Melanoma Xenografts
Maulik Shah, Chrisotopher Kriedt, Kathi Hoyer, Claudette Klein, and Joseph Baldassare (SLU)
38. NRF Technical Core – Synthesis of Metallic Nanomaterials
Yujie Xiong (NRF, WUSTL)
39. NRF Technical Core – Scanning Probe Microscopy and Microfabrication
Brent Riggs (NRF, WUSTL)
40. NRF Technical Core – Scanning and Transmission Electron Microscopy
Kristy Wendt (NRF, WUSTL)