

# USDA/NIFA-AFMNet Joint Nanotechnology Grantees' Conference

December 10-11, 2010

USDA/NIFA Waterfront Center, Room 1410A-D  
800 9<sup>th</sup> Street, SW  
Washington, DC

(Direction: <http://nifa.usda.gov/about/visit.html>)

## Meeting Coordinators:

USA:

Dr. Hongda Chen, USDA/NIFA, [hchen@nifa.usda.gov](mailto:hchen@nifa.usda.gov)

Dr. Norman Scott, Cornell University, [nrs5@cornell.edu](mailto:nrs5@cornell.edu)

Dr. Jozef Kokini, University of Illinois at Urbana-Champaign, [kokini@uiuc.edu](mailto:kokini@uiuc.edu)

Dr. Jodi Williams, USDA/NIFA, [JWILLIAMS@nifa.usda.gov](mailto:JWILLIAMS@nifa.usda.gov)

Canada:

Dr. Rickey Yada, AFMNet, [rickey.yada@afmnet.ca](mailto:rickey.yada@afmnet.ca)

Dr. Allan Paulson, AFMNet, [apaulson@dal.ca](mailto:apaulson@dal.ca)

Dr. David Lineback, AFMNet, [lineback@umd.edu](mailto:lineback@umd.edu)

Dr. Charity Parr-Vasquez, AFMNet, [charity.parr@afmnet.ca](mailto:charity.parr@afmnet.ca)

## Objectives:

1. To review and evaluate the progress of nanoscale science, engineering and nanotechnology research in agriculture, food and soft matter projects supported by USDA/NIFA AFRI nanotechnology program and AFMNet;
2. To exchange ideas about the vision, challenges and opportunities among the USA and Canada scientists on the advancement in nanoscale science and nanotechnology that may bring about for the future food, soft matters, and agriculture systems;
3. To stimulate and foster collaborations among the USA and Canada scientists interested in advancing nanoscale science and nanotechnology for foods, soft matters and agriculture

# Agenda

## *First Day:*

- 7:30-8:30 AM**      **Registration and Continental Breakfast; Poster Session set-up**
- 8:30AM**      Welcoming Remarks, *Deborah Sheely*, Assistant Director, NIFA Institute of Food Production and Sustainability
- 8:45 AM**      Introduction – People, Purpose, and Program, *Hongda Chen and Rickey Yada*
- 8:30 AM – 12:00 PM**      **Plenary Session**  
   **Chairs: *Hongda Chen and Rickey Yada***
- 9:00 AM**      **Keynote:** Nanotechnology Long-term Impacts and Research Directions: 2000-2020, *Mihail Roco*, NSF
- 9:30 AM**      Opportunities for cross-border collaborations related to nanotechnology research and development, *Nils Petersen*, National Institute for Nanotechnology, Canada
- 10:00 AM**      Research Outcome, Impacts and Directions of Nanoscience and Nanotechnology for Medical Applications by NIH and The Current Hot Topics, *Albert Lee*, NIH/NIBIB
- 10:30 AM**      **Coffee break and Poster Viewing**
- 10:50 AM**      Overview of EPA nanotechnology programs – Applications, Implications and Regulations, *Nora Savage*, EPA/ORD/NCER.
- 11:10 AM**      Nanotechnology Enabled Biomaterials and Bioproducts: Green, Clean and More, *Lorraine Sheremeta*, National Institute for Nanotechnology, Canada
- 11:30 AM**      Nanotechnology in the Forest Products Industry and Packaging, *Theodore H. Wegner*, USDA Forest Service
- 11:50 AM**      Nanotechnology-enabled Sensing – the State of Science and Vision, *Roger D. van Zee*, NIST.
- 12:10 AM**      Metrology for Nanomaterials and Collaboration Opportunities at NIST, *Michael T. Postek*, NIST.
- 12:30-1:30 PM**      **Lunch and Posters viewing**

**1:30 PM**                      **Session I: Nanoscale Materials, Environment, Safety, Regulation, and Public Perception/Acceptance**  
**Chairs: *Norman Scott and Allan Paulson***  
**(15 minutes each project, Q&As included)**

NANOTECHNOLOGY-BASED STRATEGIES FOR FOOD SAFETY & SECURITY, *Dutcher, J.R.*, UNIVERSITY OF GUELPH

FOOD MICRONUTRIENT AND FLAVOR RELEASE IN NANOSTRUCTURED MATRICES, *Dungan, S. R.; Ebeler, S. E.; Phillips, R. J.*, UNIVERSITY OF CALIFORNIA, DAVIS

A SOLUBLE NANOSCALE SELF-ASSEMBLING COMPLEX FROM STARCH, PROTEIN, AND LIPID FOR HEALTHY NUTRIENT DELIVERY, *Hamaker, B. R.; Campanella, O. H.*, PURDUE UNIVERSITY

PHYTOGLYCOGEN DENDRIMER AS NANO-CARRIER FOR ANTIBACTERIAL PEPTIDE LOADING AND RELEASE, *Yao, Y.; Bhunia, A.; Narsimhan, G.*, PURDUE UNIVERSITY

NANOSTRUCTURAL ENGINEERING OF LIPID NETWORKS, *Mazzanti, G.* DALHOUSIE UNIVERSITY

IMPACT, DETECTION AND TRACKING OF NANOPARTICLES IN AGRICULTURE: A FOCUS ON CROPS AND ASSOCIATED SOIL MICROBES, *Britt, D.; Anderson, A.; McLean, J.; Johnson, W.; Gale, B.*, UTAH STATE UNIVERSITY

NANO PUBLIC PERCEPTION, *Batt, C.*, CORNELL UNIVERSITY

FOOD NANOTECHNOLOGY: UNDERSTANDING THE PARAMETERS OF CONSUMER ACCEPTANCE, *Hallman, W.K.; Ludescher, R.; Tepper, B.; Cuite, C.; Nucci, M.*, RUTGERS UNIVERSITY

**3:30-4:00 PM**                      *Afternoon Break and Poster Viewing*

**Session II:**                      **Nanoscale Delivery in Foods**  
**Chairs: *David Lineback and Rickey Yada***  
**(15 minutes each project, Q&As included)**

DESIGN OF NANO-LAMINATED COATINGS TO CONTROL BIOAVAILABILITY OF LIPOPHILIC FOOD COMPONENTS, *M<sup>c</sup>Clements, D.; Decker, E.; Park, Y.*, UNIVERSITY OF MASSACHUSETTS, AMHERST

NANOSTRUCTURE AND NANOSCALE INTERACTIONS OF PROTEIN/POLYSACCHARIDE COACERAVATES, *Huang, Q.*, RUTGERS UNIVERSITY

NANO-SCALE COLLOIDAL ASSEMBLIES IN FOODS, *Rousseau, D.*, RYERSON UNIVERSITY

CHITOSAN/PLGA NANOPARTICLES FOR INCREASED BIOACCESSIBILITY AND BIOAVAILABILITY OF MODEL LIPOPHILIC VITAMIN, *Sabliov, C.; Moldovan, D.*, LOUISIANA STATE UNIVERSITY AGRICULTURAL CENTER

PREPARATION, CHARACTERIZATION AND APPLICATION OF NANO-CONTROLLED RELEASE/DELIVERY SYSTEMS, *Wan, W.*, UNIVERSITY OF WESTERN ONTARIO

ENHANCED DELIVERY OF PHYTOCHEMICALS BY NANODISPERSION IN POLYSACCHARIDE MATRICES, *Edgar, K. J.*; VIRGINIA POLYTECHNIC & STATE UNIVERSITY, *Taylor, L. S.; Mauer, L. J.*; PURDUE UNIVERSITY

STRATEGIES USED TO IMPROVE THE STABILITY OF L-5-METHYLTETRAHYDROFOLATE, *Liu, A.*, UNIVERSITY OF BRITISH COLUMBIA

**5:45 PM**                      **Day 1 Adjourn**

*Dinner on your Own around the town*

**Second Day:**

**7:30 - 8:30 AM**              **Continental Breakfast and Networking**

**Session III:**                      **Nanoscale Phenomena and Modeling**  
**Chairs: *Jodi Williams and Charity Parr-Vasquez***  
**(15 minutes each project, Q&As included)**

ENGINEERING NANOSCALE ENERGY-SAVING BIOPOLYMER FILMS, *Lee, T. C.; Huang, Q.*, RUTGERS UNIVERSITY

NANOSCALE TRIBOLOGY OF TASTE: RELATING TEXTURE TO ORAL SENSORY PERCEPTION FOR DESIGN OF FUNCTIONAL FOODS, *Martini, A.*, PURDUE UNIVERSITY

**Session IV:**                      **Nanoscale Sensors and Detection**  
**Chairs: *Allan Paulson and Hongda Chen***  
**(15 minutes each project, Q&As included)**

BIONANOFABRICATED SERS-BASED ARRAYS, *Batt, C. A.*, CORNELL UNIVERSITY

STAND-OFF SERS DETECTION USING NANOPARTICLES, *Batt, C.; Erickson, D.*, CORNELL UNIVERSITY

MOLECULAR TAGGING OF FOOD FOR TRACEABILITY AND AUTHENTICITY,  
*Naaum, A.*, UNIVERSITY OF GUELPH

MULTI-LAYERED SURROUND SERS NANOSENSOR ARRAY SYSTEM FOR THE  
RAPID, SPECIFIC AND MULTIPLEXED DETECTION OF FOODBORNE BACTERIA AND  
TOXINS, *Cullum, B., Chen, Y.R.; Chao, K.*, UNIVERSITY OF MARYLAND BALTIMORE  
COUNTY, & USDA/ARS/BELTSVILLE

**10:00 -10:30 AM**      **Coffee break and Poster Viewing**

**Session IV (con't):**    **Nanoscale Sensors and Detection**  
**Chairs: *Jozef Kokini and Allan Paulson***  
**(15 minutes each project, Q&As included)**

HIGH THROUGHPUT SCREENING FOR FOOD CONTAMINANTS WITH  
MULTIFUNCTIONAL NANOSCALE MATERIALS, *Kennedy, I.; Hammock, B.; Gee, S.;*  
*Nichkova, M., (Sudheendra Lakshmana, HeeJoo Kim)* UNIVERSITY OF CALIFORNIA,  
DAVIS

NANOWIRE SWITCH AND NANO-ELECTRODE/NANOCHANNEL BASED IMPEDANCE  
BIOSENSOR FOR RAPID SCREENING OF AVIAN INFLUENZA VIRUS, Li, Y.  
UNIVERSITY OF ARKANSAS; Ruan, C. M.; Huang, T. J.; **Lu, H.** Pennsylvania State  
University,

NANOPOROUS SILICON BASED SENSOR ARRAY FOR BACTERIA DETECTION, **Lu,**  
**C.**, Virginia Tech, *Bhunja, A.*, PURDUE UNIVERSITY

NANOLITER/PICOLITER SCALE FLUIDIC ARRAYS FOR RAPID IDENTIFICATION OF  
PATHOGENIC BACTERIA, **Hong, J.W.;** *Oyarzabal, O.* AUBURN UNIVERSITY

RAPID DETECTION OF FOODBORNE PATHOGENIC BACTERIA BY SURFACE  
ENHANCED RAMAN SPECTROSCOPY USING AG NANORODS ARRAY SUBSTRATES,  
**Huang, Y.;** *Park, B.; Zhao, Y.*, UNIVERSITY OF GEORGIA & USDA/ARS/BELTSVILLE

NANOSCALE ANALYSIS OF CHEMICAL RESIDUES IN FOODS USING WHISPERING-  
GALLERY MODE MINIATURE SENSORS, Guo, Z., (**Lei Huang**) RUTGERS UNIVERSITY

**12:00 PM**                      **Closing Remarks, *Rickey Yada and Hongda Chen***

**12:10 PM**                      **Adjourn**

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## **Poster Sessions: *Jodi Williams and Hongda Chen***

### **Section 1: Food Safety Intervention**

Developing "Green Nanotechnology" for Eliminating Foodborne Pathogens, Nina Shapley, Karl Matthews, Rutgers, the State University of New Jersey, *Anubhav Tripathi*, Brown University

Development of Antimicrobial Food Processing Surfaces by Nanoscale Surface Modification, *Julie Goddard*, University of Massachusetts Amherst

Nano-engineered surfaces for controlling the attachment of pathogenic and biofilm forming bacteria to food contact surfaces, *Carmen Moraru*, Cornell University and *Diana-Andra Borca Tasciuc*, Rensselaer Polytechnic Institute

Nanodispersing Lipophilic Antimicrobials to Improve Food Safety, *Qixin Zhong*, the University of Tennessee

Antimicrobial Nanoparticle Delivery Systems, *David McClements*, University of Massachusetts Amherst

Functionalized lipid nanoparticles for pathogen inactivation in cut leafy-greens and other minimally processed vegetables, *Maria San Martin Gonzalez*, Purdue University

Multifunctional food grade nanofibers with biological control agents for improving food safety of fresh produce and cut fruits, *Nitin Nitin, You-Lo Hsieh*, University of California, Davis

Super-Repellent Antimicrobial Coatings to Ensure Food Safety, Weihua Ming, University of New Hampshire

### **Section II: Safety Assessment of Engineered Nanomaterials**

Influence of Nanoparticle Characteristics on Fate, Bioavailability, and Toxicity of Food-Grade Nanoemulsions, *Hang Xiao*, University of Massachusetts Amherst

Characterization of Engineered Nanoparticles Introduced into Food Matrices and Their Behavior in Gastrointestinal Tract, *Mengshi Lin*, University of Missouri, Columbia

Oral delivery of bioactives with polymeric nanoparticles: bioavailability and tissue distribution of delivered active ingredient, nanoparticle translocation, and overall nanoparticle bioreactivity, *C. M. Sabliov*, Louisiana State University

Impact of the Physicochemical Properties of Engineered Nanomaterials on their Cellular Uptake and Potential Toxicity in the Gastrointestinal Tract Environment, *Prabir K. Dutta, Jim Rathman, Jim Waldman*, The Ohio State University, Columbus, *Chihae Yang*

*Happy Holidays!*  
*See you next year!*