USDA/CSREES-AFMNet Joint Nanotechnology Grantees' Meeting

September 27-28, 2009
Hilton Santa Fe Historic Plaza, Ortiz Room
Santa Fe, NM

Meeting Coordinators:

USA:
Dr. Hongda Chen, USDA/CSREES
Dr. Robert Powell, University of California, Davis, rlpowell@ucdavis.edu
Dr. Norman Scott, Cornell University, nrs5@cornell.edu
Ms. Emily Morehouse, USDA/CSREES

Canada:
Dr. Rickey Yada, AFMNet, rickey.yada@afmnet.ca
Dr. Alan Paulson, AFMNet, apaulson@dal.ca

CINT:
Dr. Tom Picraux, Chief Scientist, picraux@lanl.gov
Ms. Antonya Sanders, antonya@lanl.gov

New Mexico State University
Dr. LeRoy Daugherty, ldaugher@ad.nmsu.edu
Mr. Tim Nesbitt, tnesbitt@ad.nmsu.edu

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/CSREES NRI nanotechnology programs 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;
4. To learn the capabilities, expertise and facilities at the Center for Integrated Nanotechnologies (CINT) and its user conference (September 29-30, 2009, Registration separately, http://cint.lanl.gov/)

Agenda

First Day: **Chamisa Courtyard and Ortiz Rooms, Hilton Santa Fe Historic Plaza**

7:30-8:30 AM Registration and Continental Breakfast

Section Prelude

8:30-8:40 AM Introduction, ***Hongda Chen and Rickey Yada***

8:40-8:50 AM Welcoming Remarks, ***Bob Hwang***, Director of the Center for Integrated Nanotechnologies, Sandia National Laboratories

8:50-9:10 AM Agriculture and Food in New Mexico, ***LeRoy Daugherty***, Associate Dean and Director, Agricultural Experiment Station, College of Agricultural, Consumer and Environmental Sciences, New Mexico State University (confirmed)

9:10-9:40 AM Nanoscale Science at the Center for Integrated Nanotechnologies, ***Tom Picraux***, Chief Scientist, CINT (confirmed)

9:40-9:55 AM Overview of USDA/CSREES nanotechnology program, ***Hongda Chen***, NPL, USDA/CSREES

9:55-10:10 AM Overview of AFMNet nanotechnology activities, ***Rickey Yada***, Scientific Director, AFMNet

10:10-10:40 AM Coffee Break

10:40 AM-12:00 PM

Session I: **Nanoscale Materials and Soft Matters**
Chairs: Norm Scott and Alan Paulson
(20 minutes each project, Q&As included)

NANOSCALE SELF ASSEMBLY OF STARCH: PHASE RELATIONS, FORMATIONS, AND STRUCTURE, ***Ziegler, G.R.***; *Runt, J.*, PENNSYLVANIA STATE UNIVERSITY

ZEIN NANOFABRICATED BIOMATERIALS FOR TISSUE SCAFFOLDING, ***Padua, G.W.***; *Crofts, A. R.; Liu, C.*, UNIVERSITY OF ILLINOIS

NANOMECHANICAL PROPERTIES OF INDIVIDUAL BACTERIAL CELLS, ***Dutcher, J.R.***, UNIVERSITY OF GUELPH

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

12:00-1:20 PM Plated Lunch

1:20-2:20 PM

Session I: **Nanoscale Materials and Soft Matters (con't)**
Chairs: Norm Scott and Alan Paulson
(20 minutes each project, Q&As included)

LUMINOUS EDIBLE NANOPARTICLES AS SENSORS OF FOOD QUALITY AND SAFETY, **Ludescher, R. D.;** (***Zhang, X.)***, RUTGERS UNIVERSITY

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

USE OF OXIDOREDUCTASES FOR THE BIOSYNTHESIS OF CARBOHYDRATE-BASED INDUSTRIAL POLYOLYS, **Vieille, C.**; ***Worden, R.M***.; *Hassler, B.*; *Beauchamp, J.*; *Liu, C.*, MICHIGAN STATE UNIVERSITY

2:20-2:40 PM Afternoon Break

2:40-5:40 PM

Session II: **Nanoscale Delivery in Foods**
Chairs: Rickey Yada and Robert Powell
(20 minutes each project, Q&As included)

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

FABRICATION OF NUTRACEUTICAL NANO-COMPOSITES UTILIZING MICRO-DISPENSING TECHNOLOGY AND ENGINEERED EDIBLE FILMS WITH CONTROLLABLE SURFACE MORPHOLOGY, ***Takhistov, P***.; *Kokini, J.*; *Huang, Q.*, RUTGERS UNIVERSITY

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

DESIGN OF NANO-LAMINATED COATINGS TO CONTROL BIOAVAILABILITY OF LIPOPHILIC FOOD COMPONENTS, ***M^{c}Clements, D***.; *Decker, E.; Park, Y.*, UNIVERSITY OF MASSACHUSETTS, AMHERST

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

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

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

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

NUTRIGENOMIC AND FORMULATION STUDIES WITH FOLATES AND REDUCED FOLATES, ***Kitts, D.***, UNIVERSITY OF BRITISH COLUMBIA

5:40 PM Day 1 Adjourn

Dinner on your Own

Second Day: **Chamisa Courtyard and Ortiz Rooms, Hilton Santa Fe Historic Plaza**

7:30 - 8:00 AM Continental breakfast

8:00 – 8:10 AM Day 2 Opening Briefing - ***Hongda Chen and Rickey Yada***

8:10 – 10:10 AM

Session III: **Environment, Safety, Regulation, Public Reception/Acceptance, and Education of Nanotechnology**
Chairs: Hongda and Alan Paulson
(20 minutes each project, Q&As included)

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

CONSUMABLE NANOTECHNOLOGY: A REGULATORY PERSPECTIVE, **Sheremeta, L.M.**, ADVANCED FOODS AND MATERIALS NETWORK

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

PUBLIC PERCEPTION OF AGRIFOOD TECHNOLOGIES:USING EXTENSION TO ASSESS AND LINK STAKEHOLDER KNOWLEDGE WITH PUBLIC POLICIES, ***Stone, J.***; *Busch, L.; Thompson, P.; Grabill, J.*, MICHIGAN STATE UNIVERSITY

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

EDUCATIONAL NANOTECHNOLOGY PROGRAM, ***Dweik, M.***, LINCOLN UNIVERSITY OF MISSOURI

10:10-10:40 AM Coffee Break

10:40AM -12:00 PM

Session IV: **Nanoscale Sensors and Detection**
Chairs: Norm Scott and Robert Powell
(20 minutes each project, Q&As included)

INTRA-SPECIES APPROACH TO DEVELOPING A NANOMECHANICAL MODEL OF DROUGHT AND DESICCATION TOLERANCE IN PLANTS, ***Layton, B.E.***; *Boyd, M.B.*; *Peethambarana, B.*; *Balsamo, R.A.*, DREXEL UNIVERSITY

THE DETECTION OF FOOD-BORNE TOXINS WITH MULTIFUNCTIONAL NANOPARTICLES, ***Kennedy, I. M.***, *Hammock, B.D., Gee, S.J.*, UNIVERSITY OF CALIFORNIA, DAVIS-

IMPACT: HIGH THROUGHPUT SCREENING FOR FOOD CONTAMINANTS WITH MULTIFUNCTIONAL NANOSCALE MATERIALS, ***Kennedy, I.***; *Hammock, B.; Gee, S.; Nichkova, M.,* UNIVERSITY OF CALIFORNIA, DAVIS

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

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

12:00-1:20 PM Buffet Lunch

1:20-3:00 PM

Sensor IV (con't): **Nanoscale Sensors and Detection (20 minutes each project, Q&As included)**

SELF-AMPLIFYING NANOBIOSENSOR FOR DIRECT DETECTION OF PRIONS IN BLOOD, **Montagna, R. A.**; Craighead, H. G., ***Madhukar, V.*** , INNOVATIVE BIOTECHNOLOGIES INTERNATIONAL, INC. and CORNELL UNIVERSITY

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

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

NANOPOROUS SILICON BASED SENSOR ARRAY FOR BACTERIA DETECTION, ***Lu, C.;*** *Bhunia, A.*, PURDUE UNIVERSITY

3:00-3:30 PM Afternoon Break

3:30-4:20 PM

Sensor IV (con't): Nanoscale Sensors and Detection (20 minutes each project, Q&As included)

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.***, RUTGERS UNIVERSITY

4:20 – 4:50 PM Closing summary and discussion

FOOD APPLICATIONS OF STRUCTURED NANOMATERIALS***, Lineback, D.,*** UNIVERSITY OF MARYLAND

5:00 PM Adjourn

See you next year!