

SCHEDULE OF PRESENTATIONS (*Updated March 6, 2013*)

THURSDAY AFTERNOON, MARCH 7, 2013

1:00 pm – 5:00 pm	Registration
3:00 pm – 5:00 pm	IBE Executive Council Meeting
5:00 pm – 6:00 pm	Welcome Reception
6:00 pm	Dinner (on your own)

FRIDAY MORNING, MARCH 8, 2013

7:00 am – 8:00 am	Breakfast/IBE Committee Meetings Organizers: Dr. Czarena Crofcheck and IBE Committee Chairs
8:00 am – 9:20 am	Opening Remarks/Keynote Address
8:00 am	Opening Remarks Dr. Czarena Crofcheck, President of IBE 2013
8:10 am	Keynote Address: <i>Spider Silk: Developing an Ancient Biomaterial for the Future</i> Dr. Randolph V. Lewis USTAR Professor of Biology Utah State University
9:20 am – 9:30 am	Break
9:30 am – 12:00 pm	Four Concurrent Sessions
I-A: SENSORS & BIOSENSORS 1 Chairs: Dr. Stefan Zauscher, Duke University; Dr. Amani Wan Salim, Purdue University	
9:30 am	Engineering Whispering Gallery Mode Optical Biosensors for Environmental Monitoring Sensors and Biosensors Heather K. Hunt, Matthew T. Bernards, Carol E. Soteropoulos, Emily O'Brien, University of Missouri
9:45 am	Enzyme-based Biosensors for Studying Methanogenic Biofilm Physiology Stephanie Burrs, Diana Vanegas, Masashige Taguchi, Prachee Chaturvedi, University of Florida
10:00 am	Micro and nanostructured lipid membranes for sensing and cell manipulation Invited Speaker: Erik Reimhult, University Professor, Dept. of Nanobiotechnology University of Natural Resources & Life Sciences, Vienna, Austria

- 10:30 am Break
- 10:45 am Graphene Bio-Nanosensing
Yue Cui, Utah State University
- 11:00 am Comparative studies on nanomaterial platforms for biosensors to monitor meat quality
Diana Vanegas, Stephanie Burrs, Prachee Chaturvedi, Masashige Taguchi, Katelyn Ward, Arthur Teixeira, Eric McLamore, University of Florida
- 11:15 am Complex supported lipid bilayers with high cholesterol content formed by helical eptide-induced vesicle fusion
Gregory Hardy, Rahul Nayak, Munir Alam, Joe Shapter, Stefan Zauscher, Duke University
- 11:30 am Non-destructive optical oxygen sensing using PtTFPP (Platinum Tetrakis Pentafluorophenyl Porphyrin) on long term shelf life study for food packaging
Kul Inn, Wan W. Amani Wan Salim, Purdue University; D. Marshall Porterfield, Purdue University, NASA Headquarters
- 11:45 am Directed functionalization strategies for high-resolution optical fiber based biosensors
Rajtarun Madangopal, Matthew C. Stensberg, Leyla Nesrin Kahyaoglu, Jenna L. Rickus, Purdue University; D. Marshall Porterfield, Purdue University, NASA Headquarters

I-B: BIOMATERIALS & STRUCTURES 1

Chair: Dr. Darlene Taylor, North Carolina Central University

- 9:30 am Peptide-Based materials for Drug Delivery
Invited Speaker: Dr. Suzie Pun
Robert J. Rushmer Associate Professor of Bioengineering
University of Washington
- 10:00 am Nano-engineered Polymer Coatings and Capsules for Controlled Drug Delivery and Cell Transplantation
Eugenia Kharlampieva, University of Alabama - Birmingham
- 10:15 am Exploiting Softlithographic Techniques to Make Particles for Applications in Life and Material Sciences
Charles J. Bowerman, Kevin Chu, Kevin Reuter, Jillian Perry, Marc Kai, Tammy Shen, Cathy Fromen, Dominica Wong, Yapei Wang, Chris Luft, Joseph M. DeSimone, University of North Carolina at Chapel Hill
- 10:30 am Break
- 10:45 am Electrospun Nanofibers as Functional Biomaterials
Christopher A. Bonino, Carl D. Saquing, Saad A. Khan, North Carolina State University
- 11:00 am MicroSCALE screening reveals genetic modifiers of therapeutic response in melanoma
Kris C. Wood, Duke University

- 11:15 am Substrate Topography Influences the Functional Neurons Produced by Direct Reprogramming of Fibroblasts
Karina Kulangara, Andrew F. Adler, Hong Wang, Malathi Chellappan, Ellen Hammett, Ryohei Yasuda, Kam W. Leong, Duke University
- 11:30 am Multifunctional thermo-responsive polymer brushes with dynamic nanotopology for attachment, killing and release of bacteria
Qian Yu, Janghwan Cho, Phanindhar Shivapooja, NSF Research Triangle Materials Research Science and Engineering Center, Department of Biomedical Engineering, Duke University; Gabriel P. Lopez, NSF Research Triangle Materials Research Science and Engineering Center, Department of Biomedical Engineering, Duke University, Department of Mechanical Engineering and Materials Science, Duke University
- 11:45 am A pH-sensitive starch composite
Yuzhi Deng, Pennsylvania State University

I-C: BIOENERGY: BIOCHEMICAL CONVERSIONS

Chairs: Dr. Yanna Liang, Southern Illinois University; Dr. Pratap Pullamanapalil, University of Florida

- 9:30 am Advances in the analysis of sweet sorghum composition for bioprocess development
Matthew B. Whitfield, Mari S. Chinn, Matthew W. Veal, North Carolina State University
- 9:45 am Correlation between Lignin Monomers Recovery and Fermentable Sugars Generation from Miscanthus Pretreated by Sodium Hydroxide
Woochul Jung, Dhanalekshmi Savithri, Ratna Sharma-Shivappa, Praveen Kolar, Sunkyu Park, North Carolina State University
- 10:00 am Corn fiber as a renewable resource for producing microbial lipids
Ivan Perez, Kyle Goetzelmann, Yi Cui, Yanna Liang, Southern Illinois University
- 10:15 am Biological Hydrogen Production from NMMO (N-Methylmorpholine-N-Oxide) Pretreated Sugarcane Bagasse
Shunchang Yang, University of Florida; Pratap Pullammanappalil, University of Florida; Robert Diltz, Air Force Research Laboratories; Subramanian Ramakrishnan, FAMU-FSU College of Engineering
- 10:30 am Break
- 10:45 am Beyond Sugar: Engineering a Carboxylic Acid Platform for Lignocellulosic Biomass
Boya Xiong, Pennsylvania State University; Tom Richard, Pennsylvania State University
- 11:00 am Isolation and characterization of anaerobic microorganisms from the Logan City Wastewater Lagoon System for the production of high value bioproducts
Joshua T. Ellis, Neal Hengge, Ronald C. Sims, and Charles D. Miller, Utah State University

11:15 am Anaerobic Co-Digestion of Swine Manure and Corn Stover with Additional Enzymes for Enhancing Biogas Production
Jorge Gontupil, Zhimin Liu, M. Darwin, Jay J. Cheng, North Carolina State University.

11:30 am Potential of methane production from anaerobic co-digestion of swine manure with rice straw and cocoa husk
M. Darwin, Zhimin Liu, Jorge Gontupil, Jay J. Cheng, North Carolina State University

I-D: METABOLIC PATHWAY ENGINEERING

Chair: Dr. Ryan Senger, Virginia Polytechnic Institute and State University (Virginia Tech)

9:30 am Sugar Utilization in Escherichia coli at the Single-cell Level
Taliman Afroz, Chemical and Biomolecular Engineering, North Carolina State University, Konstantinos Biliouris, Chemical Engineering and Materials Science, University of Minnesota, Yiannis Kaznessis, Department of Chemical Engineering

9:45 am Characterization of the Pradimicin A Biosynthetic Pathway
Kandy Napan, Department of Biological Engineering, Utah State University; Whitney Morgan, Department of Biological Engineering, Utah State University; Thomas Anderson, Department of Biology, Utah State University; Jon Takemoto, Department of Biology, Utah

10:00 am Host selection for synthetic pathways using a computational systems biology approach to explore biodiversity
Hadi Nazem-Bokaei, Virginia Tech; Ryan S. Senger, Virginia Tech

10:15 am Metabolic flux redistribution for enhanced production of 1, 2-propanediol and 1-propanol in Escherichia coli
Rachit Jain, University of Georgia; Yajun Yan, University of Georgia

10:30 am Break

10:45 am Deriving Metabolic Engineering Strategies with Flux Ratios Genome-Scale Modeling
Ryan S. Senger, Jiun Y. Yen, Hadi-Nazem Bokaei, Benjamin G. Freedman, and Ahmad I.M. Athamneh, Department of Biological Systems Engineering, Virginia Tech

11:00 am Pathway Pioneer: A Web-based Network Visualization and Flux Analysis Tool
Nicholas S. Flann, Utah State University; Jonathan Valiente, Utah State University; Misty Wallace, Utah State University; Richard Brown, Utah State University; Scott Hinton, Utah State University.

11:15 am Regulation of the production of antitumor chromomycins in Streptomyces roseiscleroticus
Jia Zeng, Department of Biological Engineering, Utah State University; Jixun Zhan, Department of Biological Engineering, Utah State University

11:30 am Raman spectroscopy for metabolic engineering applications
Ahmad. I. M. Athamneh and Ryan S. Senger, Department of Biological Systems Engineering, Virginia Tech

12:00 pm -1:00 pm **LUNCH (on your own)**

FRIDAY AFTERNOON, MARCH 8, 2013

1:10 pm – 2:40 pm **GENERAL SESSION: BioBusiness Nexus**
Chair: Dr. Guigen Zhang, Clemson University

Panel Theme: *Moving Technology for Translation*

Panel Members:

Terri Lomax, PhD

Vice Chancellor, Research, Innovation and Economic Development
NC State University

Jackie Quay, MSPH, JD

Interim Director of the Office of Technology Development
University of North Carolina, Chapel Hill

Bryan Baines, Rph.

Associate Director
Office of Licensing & Ventures
Duke University

Joseph Nixon, MBA

Business Development Director
North Carolina Biotechnology Center

Amanda Elam, PhD

President
Galaxy Diagnostics, Inc.

Ruth Shuman, PhD

NSF Program Director, SBIR/STTR program
Presentation: *Preparing a Winning NSF SBIR/STTR Proposal*

2:40 pm - 2:45 pm **Break**

2:45 pm – 4:05 pm **GENERAL SESSION: Funding Opportunities for Biological Engineering**
Chairs: Dr. Liju Yang, North Carolina Central University;
Dr. Eric McLamore, University of Florida

- 2:45 pm Funding opportunities at NSF SBIR/STTR programs
Dr. Ruth Shuman, NSF, Program Director, SBIR/STTR program
- 3:10 pm Introduction to NSF Chemical Measurement and Imaging Program
Dr. Lin He, NSF, Program Director, Chemical Measurement and Imaging program
- 3:35 pm Funding opportunities at NASA Space Life and Physical Sciences Division
Dr. D. Marshall Porterfield, NASA, Division Director, NASA Space Life and Physical Sciences, Human Exploration and Operations Mission Directorate.
- 4:00 pm Question & Answer Session

4:05 pm – 4:15 pm Break

4:15 pm – 6:30 pm Four Concurrent Sessions

II-A: SYNTHETIC BIOLOGY

Chair: Dr. Chase Beisel, North Carolina State University

- 4:15 pm Estimation of gene network parameters from single-cell fluorescence trajectories
Matthew W Lux, David A Ball, Jean Peccoud, Virginia Bioinformatics Institute
- 4:30 pm Development of a Biophysical Model of Translational Coupling
Tian Tian, Pennsylvania State University; Howard Salis, Pennsylvania State University
- 4:45 pm Engineering safeguard mechanism for microbial swarmbots
Shuqiang Huang, Duke University; Anna Jisu Lee, Duke University
- 5:00 pm Break
- 5:15 pm Synthetic Biology and Bioinformatics for Predictable Control of Therapeutic Genes
Caroline Hom, Arizona State University; Karmella Haynes, Arizona State University
- 5:30 pm Development of Flavin-based Fluorescent Proteins for Biological Imaging
Arnab Mukherjee, Kevin B. Weyant, Joshua Walker, Charles M. Schroeder, Department of Chemical and Biomolecular Engineering; John Ossyra, Kaustubh D. Bhalerao, Department of Agriculture and Biological Engineering, University of Illinois at Urbana-Champaign
- 5:45 pm Temporal control of self-organized pattern formation without morphogen gradients in engineered bacteria
Stephen Payne, Bochong Li, David Schaeffer, Lingchong You, Duke University
- 6:00 pm Constructing a Synthetic Gene Network to Model and Understand Signaling Interactions in *Drosophila melanogaster*
Ashley Jermusyk, North Carolina State University; Gregory T. Reeves, North Carolina State University

6:15 pm Economic production of Polyhydroxyalkanoates in Escherichia coli
Asif Rahman, Utah State University; Ronald C. Sims, Utah State University; Charles D. Miller, Utah State University

II-B: NANOMATERIALS AND NANOSYSTEMS

Chairs: Dr. Ming Su, University of Central Florida; Dr. Adarsh Radadia, Louisiana Tech University

4:15 pm Multiplexed detection of biomarkers using phase change nanoparticles
Chaoming Wang, Liyuan Ma, Yong Qiao, University of Central Florida

4:30 pm Top-down fabrication of particulate micro/nanodevices for drug delivery and cell tracking
Jingjiao Guan, Peipei Zhang, Junfei Xia, Zhibin Wang, Florida State University

4:45 pm Micellar nanodroplet-assisted ligand exchange of metal complex by dsDNA
Fei Yan, North Carolina Central University; Jennifer M. Romeika, North Carolina Central University

5:00 pm Break

5:15 pm Carbon Nanotubes Interfacing Bacillus anthracis Spores
Liju Yang, North Carolina Central University

5:30 pm The Effects of the Electrical Double Layer on Giant Ionic Currents through Single Walled Carbon Nanotubes
Samuel Bearden, Clemson University; Guigen Zhang, Clemson University

5:45 pm Ag-TiO₂-CNT Nanoparticles for Environmental Remediation: Synthesis, Characterization and Application
Youngmi Koo, Ginaya Littlejohn, Boyce Collins, Jagannathan Sankar, Yeoheung Yun, North Carolina A&T State University; Vesselin N. Shanov and Mark Schulz, University of Cincinnati.

6:00 pm Seeded Nanodiamond Surfaces for Bacterial Biosensing
Adarsh Radadia, Louisiana Tech University

II-C: BIOENERGY: BIOCHEMICAL CONVERSIONS

Chairs: Dr. Yanna Liang, Southern Illinois University; Dr. Pratap Pullamanapalil, University of Florida

4:15 pm New insight into enzyme decrystallization of plant cellulose
Ms Xiaohui Ju, Dr. Elive Brown, Dr. Xiao Zhang, Washington State University; Dr. Mark Bowden, Environmental Molecular Science Laboratory, Pacific Northwest National Laboratory

4:30 pm The effect of water-soluble polysaccharides on enzymatic hydrolysis of bacterial cellulose
Lin Fang, Jeffrey Catchmark, Pennsylvania State University, Department of Agricultural and Biological Engineering

- 4:45 pm Catalytic Oxidation of lignin to value added chemicals
Lalitendu Das, Dr. Praveen Kolar, North Carolina State University
- 5:00 pm BREAK
- 5:15 pm Development of a thermochemical process for the hydrolysis of polylactic acid for reuse
Diane Chauliac, K.T. Shanmugam, L. O. Ingram, P.C. Pullammanappallil, University of Florida
- 5:30 pm Influence of carbon source preadaptation on substrate utilization by *Clostridium autoethanogenum*
Rachel M. Slivka, Mari S. Chinn, Amy M. Grunden, North Carolina State University

II-D: ENVIRONMENTAL ENGINEERING: COMPLEXITY & SYSTEM ISSUES

Chair: Dr. Wen Zhang, University of Arkansas

- 4:15 pm Analysis of indirect effects within ecosystem models using pathway-based methodology
Qianqian Ma, Caner Kazanci, University of Georgia
- 4:30 pm Nutrient uptake and biofilm formation by *Chlorella vulgaris* fed with wastewater
Yogendra Kanitkar, Wen Zhang, University of Arkansas
- 4:45 pm Microbial biofilm proton and oxygen flux during biogenic corrosion of cement
Liqu Cheng, Mitch House, W. Jason Weiss, Purdue University, M. Katherine Banks, Texas A&M University
- 5:00 pm Break
- 5:15 pm Antibiotic behavior in the environment and the corresponding potential to promote antibiotic resistance
Jeffrey Ullman, University of Florida; Murugan Subbiah, Texas A&M University; Douglas Call, Washington State University
- 5:30 pm The impact of continued nutrient enrichments on disinfection byproduct formation
Clint Mash, Thien Duc Do, Wen Zhang, Julian Fairey, University of Arkansas
- 5:45 pm Decentralized graywater recovery using bioreactors: effects of household-derived silver nanoparticles
Eric McLamore, M. Shupler, K. Ward, Y. Zhang, University of Florida; D. Jaroch, Purdue University
- 6:00 pm Assessing differences in mechanism of toxicity of ionic silver and silver nanoparticles in *D. magna* embryos
Matthew Stensberg, Rajtarun Madangopal, Qingshan Wei, Gowri Yale, Hugo Ochoa-Acuna, Alex Wei, Purdue University; Eric McLamore, University of Florida
- 6:15 pm Synthesis of formate through reduction of CO₂ catalyzed by acidophilic formate dehydrogenase
Yong Hwan Kim, Department of Chemical Engineering, Kwangwoon University
- 6:30 pm **DINNER (on your own)**

SATURDAY MORNING, MARCH 9, 2013

7:00 am – 8:00 am **Breakfast on Own / Professional Development Forum**
Organizers: Dr. Ronald Sims, Utah State University;
Elisabeth (Libbie) Linton, WestTech Engineering, Inc, Salt Lake City, Utah

8:00 am – 9:00 am **GENERAL SESSION: Bioethics**
Chair: Dr. Praveen Kolar, North Carolina State University

8:00 am Welcome

8:05 am The Bioethics of Stem Cell Research
Kristina Dziki, University of Maryland

8:15 am Healthy Racism
Ashton Holton, Mississippi State University

8:25 am Bio-Printing: Extending Life at What Expense?
Ariel Isser, University of Maryland

8:35 am Ethics of Human Enhancement in Bioengineering
Renee Mitchell, University of Maryland

8:45 am Am I patentable? The contrasting effects of gene patents
Ryan Putman, Utah State University

8:55 am Discussion

9:00 am – 9:10 am **Break**

9:10 am – 12:00 pm **Four Concurrent Sessions**

III-A: SENSORS & BIOSENSORS 2

Chairs: Dr. Stefan Zauscher, Duke University; Dr. Amani Wan Salim, Purdue University

9:10 am Cell-based Sensing: From 2D to 3D Cell Culture
Liju Yang, North Carolina State University

9:25 am Oxygen uptake in *brassicca napus* (CANOLA) at or near swathing under non-lethal stress
Jeff Richards, Janelle Coutts, Levine H, Lanfang, Eric S. McLamore, University of Florida

- 9:40 am Lab-on-a-Chip Technology utilizing All-solid-state ion-selective electrode (ASISE)
Approaches for Microfabricated Biological Sensors
W. W. Amani Wan Salim, Joon H. Park, R. Wu, M. Zeitchek, A. Brovont, A. ul Haque, S. Pekarek, M. K. Banks, Purdue University; D. Marshall Porterfield, Purdue University, NASA Headquarters
- 9:55 am Self-referencing Ca^{2+} sensors and differential imaging to study gravity response and physiology in *Ceratopteris richardii*
Masashige Taguchi, Eric McLamore, University of Florida
- 10:10 am Chinese Hamster Ovary Cell Culture on All-Solid-State Ion-Selective Electrodes
Joon H. Park, Dharshini Perumal, W.W. Amani Wan Salim, Zulaika Miswan, Purdue University; D. Marshall Porterfield, Purdue University, NASA Headquarters
- 10:25 am Break
- 10:40 am Paper Microfluidics Detection of Salmonella Using a Smart Phone
Tu San Park, Wenye Li, Jeong-Yeol Yoon, University of Arizona
- 10:55 am Nano-Dielectrophoresis Chip Integrated with Raman Spectroscopic Self-referencing Detection of Foodborne Pathogens
Chao Wang, Chenxu Yu, Foram R. Madiyar, Jun Li, Kansas State University
- 11:10 am Extremely Fast Nucleic Acid Amplification by Droplet Manipulation for Point-of-Care Diagnosis of Blood Infection
Dustin K. Harshman, Roberto Reyes, Tu San Park, Jeong-Yeol Yoon, University of Arizona
- 11:25 am DEP Manipulation of Polystyrene Beads
Johnie Hodge, Guigen Zhang

III-B: BIOMATERIALS & STRUCTURES 2

Chair: Dr. Zhaohui Tong, University of Florida

- 9:10 am The impact of casein functionalized cellulose nanowhiskers on polylactic acid composites
Jin Gu, Jeffrey M. Catchmark, Pennsylvania State University
- 9:25 am A novel strategy for directing tissue-material interactions in surgical sealant applications
Eva Juarez Perez, Jahid Ferdous, Tarek Shazly, University of South Carolina
- 9:40 am Nanocrystalline cellulose for artificial vascular graft applications
Xiao Zhang, Elvie Brown, Nehal Abu Lail, Washing State University; Dehong Hu, PNNL
- 9:55 am Synthesis and Characterization of Nanocomposite with tunable properties of PLA-b-PDMAEMA copolymer and Carboxymethyl Cellulose (CMC)
Nusheng Chen, Zhaohui Tong, University of Florida

- 10:10 am Electrical and Pneumatic Actuation of Elastomer Surfaces for Active Control of Biofouling
Phanindhar Shivapooja, Qiming Wang, Beatriz Orihuela, Daniel Rittschoff, Xuanhe Zhao, Gabriel P. Lopez, Duke University
- 10:25 am Break
- 10:40 am Computational study of lignin-protein interactions
Jyotsna L. Pandey, Heath D. Watts, James D. Kubicki, Tom L. Richard, Pennsylvania State University
- 10:55 am Impact of periodic injection of brilliant yellow into growing *Gluconacetobacter xylinus* cellulose on cellulose structure
Yuanyuan Weng, Department of Agricultural and Biological Engineering, Pennsylvania State University; Jeffrey M. Catchmark, Department of Agricultural and Biological Engineering, Pennsylvania State University
- 11:10 am Impact of hypoxia and physical confinement on glioblastoma cancer stem cells
Ruth Herrera-Perez, David Jaroch, Rajtarun Madangopal, Soo Ha, Kari Clase, Jenna Rickus, Purdue University
- 11:25 am Development of a Chemo-Mechanical Material Platform to study Neural Stem Cell Differentiation
Emily R. Geishecker, Lehigh University; Sabrina S. Jedlicka, Lehigh University
- 11:40 am Recognition of Poly(dimethylsiloxane) using Phage displayed Peptides
Swathi Swaminathan, Utah State University; Yue Cui, Utah State University

III-C: iGEM SYNTHETIC BIOLOGY

Chair: Dr. Tom Richard, Pennsylvania State University

- 9:25 am Detection of water-borne pathogens via split beta-galactosidase complementation
Khateeb Hussain, Ryan Muller, Nisarg Patel, Madeline Sands, Abhinav Markus, Ethan Ward, Rohit Rajan, Arizona State University
- 9:40 am Arachnicoli: Production and Purification of Spider Silk Proteins in *Escherichia coli*
Ryan Putman, Asif Rahman, Charles Barentine, Andrea Halling, Brian Smith, Federico Rodriguez, Elizabeth Martinez, Thomas Harris, Cameron Copeland, Cody Tramp, Joshua T. Ellis, Charles D. Miller, Utah State University; Kathleen Miller, Logan High School; Swetha Chandrasekar, Cooper Union; Jamal Abdinor, University of Utah

- 9:55 am Applying innovations in Human-Computer Interaction for Supporting Discovery and Learning in Synthetic Biology
Sirui Liu, Kara Lu, Linda Ding, Nicole Francisco, Veronica Lin, Casey Grote, Taili Feng, Kelsey Tempel, Michelle Ferreirae, Consuelo Valdes, Orit Shaer, Wellesley College; Nahum Seifeselassie, MIT; Heidi Wang, Stanford University
- 10:10 am Multiplex Automated Genome Engineering (MAGE) in Naturally Competent Bacteria
Spencer Katz, Hwa-Pyung Lim, Andriana Lebid, Jae Seong No, Aaron Lewis, Farren Isaacs, Yale University
- 10:25 am Break
- 10:40 am Real-time quantitative measurement of RNA and protein levels using fluorogen-activating biosensors
Eric Pederson , Yang Choo, Peter Wei, Jesse Salazar, Cheemeng Tan, Aaron Mitchell, Ge Yang, Catalina Achim, Diana Marculescu, Carnegie Mellon University; Natasa Miskov-Zivanov, Carnegie Mellon University, University of Pittsburgh
- 10:55 am Do Multiple Start Codons Affect Codon Slippage?
Hannah Jepsen-Burger, Tom Richard, Howard Salis, Pennsylvania State University

III-D: TISSUE & CELLULAR ENGINEERING

Chairs: Dr. Angela Pannier, University of Nebraska; Dr. Tarek Shazly, University of South Carolina

- 9:10 am Hydroxylated Flavones Reduce Alzheimer's Disease Amyloid-beta Oligomerization and Physiological Activity
Melissa A. Moss, Department of Chemical Engineering and Biomedical Engineering Program, University of South Carolina, J. Will Reed, Department of Chemical Engineering, University of South Carolina, Kayla Pate, Department of Chemical Engineering, University of South Carolina, John Clegg, Biomedical Engineering Program, University of South Carolina, Mac Rogers, Department of Chemical Engineering, University of South Carolina
- 9:25 am An Agent-based Model of Ductal Carcinoma in situ (DCIS) and its Validation in a Tissue-engineered Model of DCIS
Qanita BaniBaker, Soonjo Kwon, Ahmadreza Ghaffarizadeh, Gregory J.Podgorski, Nicholas S. Flann, Utah State University
- 9:40 am Zein: New polymer for nonviral gene delivery
Jessica D. Taylor, Mary C. Regier, Qiuran Jiang, Angela K. Pannier, University of Nebraska- Lincoln
- 9:55 am Effect of Media Formulation on Human Mesenchymal Stem Cells (hMSCs) Maintenance In Vitro
Meghan E. Casey, Bree Ann Young, Courtney E. LeBlon, Sabrina S. Jedlicka, Lehigh University

- 10:10 am Influence of alginate hydrogel biomechanical properties on the in vitro development of pre-implantation porcine embryos
Catherine N. Sargus, Angela K. Pannier, University of Nebraska-Lincoln; Elane C. Wright, Jeremy R. Miles, USDA-ARS U.S. Meat Animal Research Center
- 10:25 am Break
- 10:40 am Engineered B-Cell Biosensor for Specific, Sensitive and Rapid Detection of E. coli O157:H7
Ling Wang, Yanbin Li, University of Arkansas, Zhejiang University; Ronghui Wang, Byung-Whi Kong, Kaiming Ye, University of Arkansas
- 10:55 am Human Mesenchymal Stem Cell Elastic Modulus directs Differentiation Capacity
Courtney LeBlon, Caitlin Fodor, Tony Zhang, Xiaohui Zhang, Sabrina Jedlicka, Lehigh University
- 11:10 am Gold Nanoparticles Conjugated to Purified Collagen
Claire Spradling, Luis Jimenez, Dave Grant, Rebecca Rone, Sheila Grant, University of Missouri
- 11:25 am Methods for in vitro scaffold free cartilage tissue engineering
Mark L. Mosher, Steven H. Elder, Mississippi State University
- 11:40 am Slanted Columnar Thin Film (SCTF) Substrates for Biomolecule Delivery and Cell Culture
Tadas Kasputis, Alex Pieper, Daniel Schmidt, Derek Sekora, Keith Brian Rodenhausen, Eva Franke-Schubert, Mathias Schubert, and Angela K. Pannier, University of Nebraska-Lincoln

12:00 pm- 1:00 pm LUNCH (on your own) / POSTER VIEWING

SATURDAY AFTERNOON, MARCH 9, 2013

- 1:00 pm – 3:00 pm GENERAL SESSION: KSBB President address/FRONTIERS IN BIOLOGICAL ENGINEERING**
Chairs: **Dr. D. Marshall Porterfield**
Purdue University/ NASA Life and Physical Sciences Division; IBE President-Elect
Dr. Liju Yang
North Carolina Central University
- 1:00 pm **KSBB President Address**
Dr. Seung Wook Kim, Korea University College of Engineering
Presentation: Challenges in biofuel cell: Enzymatic fuel cell
- 1:30 pm **(Invited Talk) Fluorescent Carbon Dots for Bioimaging and Beyond**
Dr. Ya-Ping Sun
Frank Henry Leslie Professor of Chemistry,
Clemson University

2:00 pm **(Invited Talk)** Acoustic Microfluidics and New Biofunctional Colloids for Bioanalytical Applications
Dr. Gabriel Lopez
Professor of Biomedical Engineering and Mechanical Engineering and Materials Science
Duke University

2:30 pm **(Invited Talk)** Engineered Biological Systems for Long Duration Human Space Exploration
Dr. D. Marshall Porterfield
Professor of Biological Engineering and Biomedical Engineering
Purdue University
Division Director, NASA Life and Physical Sciences Division

3:00 pm - 3:10 pm **Break**

3:10 pm – 4:40 pm **Two Concurrent Sessions and Poster View**

IV-A: ENVIRONMENTAL ENGINEERING: ECOLOGICAL ENVIRONMENT MODELING BIOLOGICAL ENGINEERING DESIGN

Chair: Dr. Prem Parajuli, Mississippi State University

3:10 pm Ishmael and Environmental Ethics for Biological Engineering Design
Arthur T. Johnson, University of Maryland

3:25 pm Evaluation of soil organic carbon and soil moisture content from agricultural fields
Prem B. Parajuli, S. Duffy, J. Hatten, and Joel O. Paz. Mississippi State University

3:40 pm A Mobile Sensor for Water Quality Monitoring in Water Distribution System
Ruoxi Wu, W. W. Amani Wan Salim, A. Brovont, J. H. Park, S. Pekarek, R. S. Govindaraju, Purdue University; M. K. Banks, Texas A&M University; D. Marshall Porterfield, Purdue University, NASA Headquarters

3:55 pm An Ecophysiology Model to Link Genes to Phenotypes of the Common Bean
Melanie J. Correll, Li Zhang, Raveendra H. Patil, Kenneth J. Boote, James W. Jones, C. Eduardo Vallejos, University of Florida

4:10 pm Microbial crowd sourcing: Measuring bioavailable nutrient content in soils
Aurelein Desauay, P. Chaturvedi, M. Taguchi, J. Ullman, Agricultural & Biological Engineering, University of Florida, J.L. Garland, Microbiological & Biological Engineering, University of Florida

4:25 pm Significance of seed culture methods on mycelial morphology and production of a novel anti-cancer anthraquinone by marine fungus Halorosellinia sp.
Chao Yu, East China University of Science and Technology

IV-B: BIOENERGY: ALGAE-BASED SYSTEMS

Chairs: Dr. Umakanta Jena, University of Georgia; Dr. Eric McLamore, University of Florida

- 3:10 pm Enhanced Carbon Flux for algal cultivation systems via Thin-Film Mass Transfer
Ben J. Stuart, Chalerm Sak Dasa-ard, David Bayless, Ohio University
- 3:25 pm Physiological Methods for Maximal Fatty Acid Production in Genetically Engineered Cyanobacteria
Travis Saari, Michigan State University; Victoria Work and Dr. Matt Posewitz, Colorado School of Mines
- 3:40 pm Nutrients recycling strategies for microalgae-based CO₂ bio-mitigation system
Xinyi E, Czarena Crofcheck, University of Kentucky; Jennifer Aurandt, Kettering University
- 3:55 pm Extracellular organic matter (EOM) and salt effect on marine microalgae flocculation
Andrea J Garzon, Francesca Moss, and Zivko L Nikolov, Texas A&M University; Silvia Ramirez, Universidad Industrial de Santander
- 4:10 pm Design of a Swine Wastewater Treatment Facility to Produce Periphytic Algae as a Biomass Energy Feedstock
Nathan Holeman, M. D. Matlock, D. C. Carrier, C. V. Maxwell, W. Zhang, T. A. Costello, University of Arkansas
- 4:25 pm Development of an integrated algal biorefinery for polysaccharide and biofuel production
Cesar M Moreira, Yatin Behl, Murali Raghavendran, Spyros Svoronos, Edward Philips, Pratap Pullammanappallil, University of Florida

4:40 pm – 6:00 pm Poster Competition/ General Poster Session
Chair: Dr. Melissa Moss, University of South Carolina

NOTE: Poster presenters are permitted to set up beginning at 9:30 am on Friday, March 8, 2013. The room will be open to attendees at 12:00pm on Friday, March 8, 2013 to view the posters prior the competition at 4:40 pm on Saturday, March 9, 2013.

6:30 pm - 8:30 pm Awards Banquet

POSTER LISTS

General Poster Session

- ~~**1. Impact of hypoxia and physical confinement on glioblastoma cancer stem cells (CANCELLED)**~~
Ruth Herrera-Perez (Presenting author), David Jaroch, Rajtarun Madangopal, Soo Ha, Kari Clase, Jenna Rickus, (Corresponding author), Associate Professor of Agricultural and Biological Engineering, Purdue University
- 2. Agent-Based Models for Synthetic Biology**
Laurie J. Heyer, A. Malcolm Campbell, Andrew Lantz, Tucker Whitesides, Jonah Galeota-Sprung, Davidson College; Todd T. Eckdahl, Jeffrey L. Poet, Missouri Western State University
- 3. Coupling of single-walled carbon nanotubes with near-infrared radiation inactivates *Bacillus anthracis* spores and stimulates spore germinations**
Xiuli Dong, Biomanufacturing Research Institute and Technology Enterprise (BRITE) and Department of Pharmaceutical Sciences, North Carolina Central University; Yongan Tang, Marvin Wu, and Branislav Vlahovic, Department of Physics, North Carolina Central University
- 4. Development of a Cost-effective Impedance Immunosensor for Rapid and Specific Screening of Avian Influenza Virus H5N1 Asian Field Strain**
Ronghui Wang, University of Arkansas; Xiaofei Yan, China Agricultural University; Zhanming Li, Zhejiang University; Yuntao Li, Chinese Academy of Sciences; Peirong Jiao, South China Agricultural University; Dong An, China Agricultural University; Mauhua Wang, China Agricultural University; Ming Liao, South China Agricultural University; Yanbin Li, University of Arkansas
- ~~**5. X ray excited luminescence properties and applications of Gd₂O₃:Eu nanophosphors**~~
Chaoming Wang, Ming Su, University of Central Florida **(MOVED TO GRADUATE COMPETITION)**
- 6. Mesophilic Anaerobic Co-Digestion of Swine Manure with Swithgrass and Wheat Straw for Methane Production**
Zhimin Liu, Jorge Gontupil, Mr. Darwin, Angelica Pura, Jay J. Cheng, North Carolina State University

Undergraduate Student Poster Competition Session

- 1. Physiological Methods for Maximal Fatty Acid Production in Genetically Engineered Cyanobacteria**
Travis Saari, Michigan State University; Victoria Work, Colorado School of Mines; Dr. Matt Posewitz, Colorado School of Mines
- 2. Baseline evaluation of groundwater quality in central New York in the face of shale gas development**
Anne Elise Creamer, Lauren McPhillips, Cornell University Department of Biological and Environmental Engineering; M. Todd Walter, Cornell University Department of Biological and Environmental Engineering, Cornell University Soil and Water Lab

3. Using E. coli to Determine Optimal DNA Design for Metabolite Production

Ben Clarkson, Becca Evans, Betsy Gammon, Meredith Nakano, Caroline Vrana, Laurie J. Heyer, A. Malcolm Campbell, Davidson College

Caleb Carr, David Carr, Eddie Miles, Jerrad Morton, Sachith Polpitaya, Kamay Trueblood, Todd T. Eckdahl, Jeffrey L. Poet, Missouri Western State University

4. Sustainable Green Roof Irrigation using Wastewater

Samuel Frey, Environmental Engineering Department, University of Connecticut; J. Suen, R. Munoz-Carpena,

Agricultural and Biological Engineering Department, University of Florida; E.S. McLamore, Agricultural and Biological Engineering Department, University of Florida

5. Developing Assembly Methods for Genetic Circuits used to Optimize Metabolic Pathways

Ben Clarkson, Becca Evans, Betsy Gammon, Meredith Nakano, Caroline Vrana, Laurie J. Heyer, A. Malcolm Campbell, Davidson College

Caleb Carr, David Carr, Eddie Miles, Jerrad Morton, Sachith Polpitaya, Kamay Trueblood, Todd T. Eckdahl, Jeffrey L. Poet, Missouri Western State University

6. A Nano-Zeolite Sensor to Detect Surfactants, a Contribution to Microbial Remediation Feasibility Studies

Katelyn S. Ward, Dr. Eric S. McLamore, Prachee Chaturvedi, Stephanie Burrs, Shige Taguchi, Diana Vegas, University of Florida

7. A Nanomaterial-Mediated Biosensor for Measuring Sarcosine

Grace Justinvil, Stephanie L. Burrs, Diana Vanegas, Eric S. McLamore, University of Florida

8. Effectiveness of Phenolic Acids Derived from Coconut Oil on Amyloid-beta Inhibition

Steven Vance, University of Kentucky/University of South Carolina

9. Bioenergy Landscape Design to Minimize Cultivation Emissions and Production Expenses

Thai N. Dinh, University of Oklahoma; John L. Field, Colorado State University; Keith H. Paustian, Colorado State University

10. Arachnicoli: Production and Purification of Spider Silk Proteins in Escherichia coli

Ryan Putman, Asif Rahman, Charles Barentine, Andrea Halling, Brian Smith, Federico Rodriguez, Elizabeth Martinez, Thomas Harris, Cameron Copeland, Cody Tramp, Joshua T. Ellis, Charles D. Miller, Utah State University; Kathleen Miller, Logan High School; Swetha Chandrasekar, Cooper Union; Jamal Abdinor, University of Utah

Graduate Student Poster Competition Session

1. Simulation of micro particle movement and alignment in an electric field

Yu Zhao, Johnie Hodge, Guigen Zhang, Clemson University, Bioengineering department, Clemson University

2. The Effect of Agricultural-Based Nitrogen Sources on Production of Biohydrogen by Thermotoga Neapolitana

Louis Hill, Caye Drapcho, Clemson University

3. Development of Flavin-based Fluorescent Proteins for Biological Imaging

Arnab Mukherjee, Kevin B. Weyant, Joshua Walker, John Ossyra, Kaustubh D. Bhalerao, Charles M. Schroeder (corresponding), Department of Chemical and Biomolecular Engineering, University of Illinois at Urbana-Champaign

4. **Cellular Responses to Anti-cancer Drug in 3D and 2D Cell Cultures**
Goral Trivedi, William Tyson, Liju Yang, North Carolina Central University
5. **Effect of Gold/Copper Sulfide Core/Shell Nanoparticles on Bacillus Anthracis Spores**
Addae Ebenezer, Marquita Lilly, Eric McCoy, North Carolina Central University; Chang Yang, Wei Chen, Physics, University of Texas at Arlington
6. **Pinewood activated char for mitigation of p-cresol**
Lalitendu Das, Dr. Praveen Kolar, Dr. John. J. Classen, Dr. Jason A. Osborne, North Carolina State University
7. ~~**Optrode biosensors for in vivo sucrose monitoring in plants (CANCELLED)**~~
~~Leyla Nesrin Kahyaoglu, Rajatarun Madangopal, Cliff Weil, Jenna L. Rickus, Purdue University~~
8. ~~**Electroactive Polymer based Nanocomposites For Multi-analyte Amperometric Biosensors (CANCELLED)**~~
~~Rajatarun Madangopal, Matthew C. Stensberg, Nicholas Pulliam, D. Marshall Porterfield, Jenna L. Rickus, Purdue University~~
9. ~~**Nature-inspired porous silica biomaterials for precision size exclusion at the mammalian cell surface (CANCELLED)**~~
~~Jennifer L. Kahn, Jenna L. Rickus, Purdue University~~
10. **Oxygen consumption as a rapid bioindicator of changes in water quality using Daphnia magna embryos**
Matthew Stensberg (Presenting), Michael Zeitchek, Kul Inn, Maria Sepulveda, D. Marshall Porterfield (Corresponding), Purdue University; Eric McLamore, University of Florida at Gainesville
11. **Solvent Selection and Recovery for Liquid-Liquid Extraction of Acetic Acid and Water**
Mahdieh Aghazadeh, Abigail Engelberth, Purdue University
12. **Engineered B-Cell Biosensor for Specific, Sensitive and Rapid Detection of E. coli O157:H7**
Ling Wang, Yanbin Li, University of Arkansas, Zhejiang University; Byung-Whi Kong, Ronghui Wang, Kaiming Ye, Sha Jin, University of Arkansas
13. **Nanobead and aptamer based QCM biosensor for rapid detection of avian influenza virus**
Luke Brockman, Ronghui Wang, Jacob Lum, Lisa Kelso, and Yanbin Li, University of Arkansas
14. **Investigation of Media Ingredients and Water Sources for Algae CO₂ Capture at Different Scales to Demonstrate the Correlations Between Lab-scale and L**
Tabitha Graham, Czarena Crofcheck, Aubrey Shea, Michael Montross, University of Kentucky Biosystems and Agricultural Engineering; Mark Crocker, University of Kentucky Center for Applied Energy Research, Rodney Andrews, University of Kentucky Center for Applied Energy Research, Biosystems and Agricultural Engineering
15. **Evaluation of the Antimicrobial Properties and Biocompatibility of Polypropylene Mesh Conjugated with Gold Nanoparticles**
Ross Hartter, Dr. Sheila Grant, Dr. Shramik Sengupta, University of Missouri
16. **Economic production of Polyhydroxyalkanoates in Escherichia coli**
Asif Rahman, Ronald C. Sims, Charles D. Miller, Utah State University

- 17. Characterization of the herboxidiene biosynthetic gene cluster in *Streptomyces chromofuscus* ATCC 49982**
Jia Zeng, Lei Shao, Jiachen Zi, Jixun Zhan, Department of Biological Engineering, Utah State University
- 18. Characterization of the Pradimicin A Biosynthetic Pathway**
Kandy Napan, Whitney Morgan, Jixun Zhan, Department of Biological Engineering, Utah State University; Thomas Anderson, Jon Takemoto, Department of Biology, Utah State University
- 19. Isolation and characterization of anaerobic microorganisms from the Logan City Wastewater Lagoon System for the production of high value bioproducts.**
Joshua T. Ellis, Neal Hengge, Ronald C. Sims, and Charles D. Miller, Utah State University
- 20. Phycocyanin Production by Cyanobacterial Biofilms Cultured in Oilfield Wastewater (Produced Water)**
Jonathan Wood, Ronald Sims, Jon Takemoto, Dong Chen, Utah State University
- 21. Antisense RNA: A Metabolic Switch for Controlling the Gene Expression**
Hadi Nazem-Bokaee, Ryan S. Senger, Virginia Tech
- 22. Fine-tuning Bacterial Gene Expression using Antisense RNA**
Hadi Nazem-Bokaee, Ryan S. Senger, Virginia Tech
- 23. Thermoresponsive Pervaporation Membranes Enabled by Hyperbranched Polyglycerols and Elastin Like Protein Conjugates**
Juliet Kallon and Darlene Taylor, North Carolina Central University
- 24. X-ray excited luminescence properties and applications of Gd₂O₃: Eu nanophosphors**
Chaoming Wang, Ming Su, University of Central Florida

INVITED SPEAKERS

Keynote Speaker

Randolph V. Lewis, Ph.D.
Utah State University



Dr. Randolph V. Lewis received his bachelor's degree from CalTech in 1972 and his M.S. in 1974 and PhD in 1978 degrees from the University of California at San Diego. He was a postdoctoral fellow at the Roche Institute of Molecular Biology. He joined the faculty at U. of Wyoming in 1980 and was Professor of Molecular Biology until 2011. He served as Department chair for five years and as a special assistant to the Vice President for Research. Randy joined Utah State University in 2011 as USTAR Professor of Biology and in the Synthetic Biomanufacturing Center.

His group has published over 130 papers in a wide variety of journals and has written 16 book chapters. They have seven issued patents. He has had grants totaling over \$31 million. Dr. Lewis has had 18 PhD and 3 M.S. students and currently has six PhD students and 16 undergraduates.

His research focuses on spider silks and the proteins they are made from. In the past 20 years they identified, through DNA cloning, the proteins that make up all six of the different silks which spiders can make as well as the glue proteins. With that information they proposed the key parts of the proteins that are responsible for the high elasticity and the tensile strength of these fibers. Based on that data they constructed synthetic genes that make proteins in which the elastic or strength elements have been systematically varied. These proteins have been produced in bacteria, purified and are now being spun in to fibers to determine the effects of the different elements. They currently can produce fibers that have energies to break greater than Kevlar and steel. The goal of this work is to provide a method to produce fibers with custom designed strength and elasticity for applications such as ligament and tendon repair/replacement, high tech clothing, parachutes, etc. Their research has been featured on several TV shows including Discovery, Nova, BBC and CSI New York.



Erik Reimhult, Ph.D.
University of Natural Resources and Life Sciences, Vienna, Austria

Professor Erik Reimhult is head of the Laboratory for Biologically inspired Materials (BIMat) and the Department of Nanobiotechnology (DNBT) at the University of Natural Resources and Life Sciences Vienna (BOKU), Austria. He got his PhD in Physics and Engineering Physics in 2004 from Chalmers University of Technology, Sweden, on self-assembly of supported lipid assemblies and biosensor development. He has worked as postdoctoral researcher at the Institute of Materials Research and Engineering Singapore, and as senior scientist (Oberassistent) at the Department of Materials at the ETH Zurich on biointerfaces, biosensing, nanofabrication, polymer surface modifications, supramolecular assembly, and multi-functional nanoparticles. In 2010 he became full professor at the BOKU and in 2012 Prof. Reimhult was recently awarded an ERC Starting Grant Award for research on NP-lipid membrane interactions. The current focus of research of the BIMat is the synthesis and properties of core-shell NPs, membrane

interactions, colloid strings and self-assembled and magnetically actuated membranes, investigated with colloid and surface sensitive techniques.



Suzie H. Pun, Ph.D.
University of Washington

Dr. Suzie H. Pun received her Chemical Engineering Ph.D. degree in 2000 from the California Institute of Technology. She then worked as a senior scientist at Insert Therapeutics for 3 years before joining the Department of Bioengineering at University of Washington (UW). She is currently the Robert J Rushmer Associate Professor of Bioengineering, an Adjunct Associate Professor of Chemical Engineering, and a member of the Molecular Engineering and Sciences Institute at UW. Her research focus area is in drug and gene delivery systems and she has published over 50 research articles in this area. For this work, she was recognized with a Presidential Early Career Award for Scientists and Engineers in 2006.

Ruth Shuman, Ph.D.
National Science Foundation

Dr. Ruth Shuman joined the National Science Foundation in August 2009. She is currently serving as Program Director for the Biology and Chemical Technologies (BC) Cluster in the SBIR/STTR Program, and was named Cluster Leader in 2011. Her area of technical focus at NSF is biological and biomedical technologies, and she has a keen interest in synthetic biology and metabolic engineering. Formerly, she was the founder, president, and CEO of a successful venture-backed life science company, Gentra Systems, Inc., that developed, manufactured, and sold products for genetic testing and research to clinical and research laboratories worldwide. Following Gentra's acquisition by Qiagen, she held various consulting/advisory positions with start-up companies, and was CEO-In-Residence for Life Science with the University of Minnesota's Venture Center evaluating the business potential of University-developed technology. Ruth began her career as a faculty member at North Carolina State University, and was a pioneer in the development of gene transfer and genetic engineering technology. She holds a Ph.D. from the University of Minnesota in the area of Genetics and Cell Biology.



Lin He, Ph.D.
National Science Foundation/ North Carolina State University

Prof. Lin He is currently holding an Associate Professorship at the Department of Chemistry at the North Carolina State University and an Adjunct Professorship at Department of Biomedical Engineering, a joint program between UNC/NC State University. She is also a rotating Program Director in the Chemistry Division at the National Science Foundation.

Prof. He received her B.S degree from Peking University in China and her PhD from Penn State University in Analytical Chemistry. After graduation, she worked for Surrumed, Inc, a biotech startup company in the bay area, before she joined NC State in 2003. Prof. He's research interests include development of new biosensing tools using radical polymerization and exploitation of Ordered Nanoarray-Assisted Laser Desorption/ Ionization Mass Spectrometry in metabolite profiling and chemical imaging. During the past year and half, Prof. He has been managing research portfolios within the Chemical Measurement and Imaging (CMI) program and the Macromolecular, Supramolecular, and Nanochemistry (MSN) program in the CHE division at NSF.



D. Marshall Porterfield, Ph.D.
NASA headquarters/Purdue University

Dr. D. Marshall Porterfield is Division Director for Space Life and Physical Sciences at NASA headquarters in Washington DC where he oversees the Human Research, Physical Sciences, and Space Biology Programs. The division includes the designee NASA liaison for the International Space Station National Lab, management of extramural grants and research, as well as the intramural research and engineering assets at six NASA centers. Currently the programmatic focus is on ISS utilization. At

Purdue University Dr. Porterfield is a Professor of Biological Engineering where he helped found the Physiological Sensing Facility at Discovery Park. His expertise is development of sensing technologies as tools for research in biology, agriculture, the environment, space, and medicine using scanning probe sensors, biosensors, bio-MEMS, bio-nanotechnology, biomimetics and lab-on-a-chip technologies. His work in gravitational and space biology includes cell signaling and biophysical phenomena. He has received numerous awards including the Halstead Young Investigator Award from the American Society for Gravitational and Space Biology and election to the College of Fellows for the American Institute for Medical and Biological Engineering for his work. His leadership includes service as President of the American Society for Gravitational and Space Biology, and recently was elected to serve as President for the IBE.



Seung Wook Kim, Ph.D.
Korea University, Korea

Dr. Seung Wook Kim is the president of Korean Society for Biotechnology and Bioengineering(KSBB) and the Professor in the Department of Chemical and Biological Engineering at Korea University. He earned his B. S. in Chemical Engineering from Korea University, Seoul, Korea, in 1980; and also his M. S. in Chemical Engineering from Korea University in 1984; and his Ph. D. in Chemical Engineering at the University of Birmingham, Birmingham, U. K. in 1989. Before joining the faculty at Korea University in 1996, he worked at the Department of Genetic Engineering, the University of Suwon. Dr. Kim's primary line of research is based on bioprocess engineering; bioreactor design and bioprocess optimization involving bioenergy production, biocatalysis, protein and DNA immobilization on nanomaterials, enzymatic biofuel cell, microchannel bioreactor, bioreactions with supercritical fluid, rheological study of various fungi, and strain development by genetic modification. Dr. Kim has over 110 publications in international refereed journals, and over 30 patents.



Ya-Ping Sun, Ph.D.
Clemson University

Prof. Ya-Ping Sun earned his Ph.D. at the Florida State University in 1989. After postdoctoral training at the University of Texas at Austin, he joined the Clemson faculty as an assistant professor in 1992 and was promoted to full professor in 1999. Since 2003, he has been the endowed Frank Henry Leslie Chair Professor of Natural and Physical Sciences. His research interest is in the development of nanomaterials and other novel materials for various technological applications. Dr. Sun has more than 280 publications in journals and books.



Gabriel P. López, Ph.D.
Duke University

Prof. Gabriel P. López is founding Director of the NSF's Research Triangle Materials Research Science and Engineering Center (MRSEC) and a Professor of Biomedical Engineering and Mechanical Engineering & Materials Science at Duke University. He is also Research Professor of Chemical Engineering and a member of the Center for Biomedical Engineering at the University of New Mexico. In 1991, he completed Ph.D. studies in chemical engineering at the University of Washington where he worked under the mentorship of Prof. Buddy D. Ratner as a Kaiser Aluminum Co. Graduate Fellow. From 1991-1993, he was an NIH and Ford Foundation Postdoctoral Fellow under the mentorship of Prof. George M. Whitesides in the Dept. of Chemistry at Harvard University. He was appointed Assistant Professor of Chemical Engineering and Chemistry at the University of New Mexico in 1993, promoted to Associate Professor in 1999, and promoted to the rank of Professor in 2004. He was the founding director (2005) of the UNM Center for Biomedical Engineering. His research is currently supported by several sources including the NSF, NIH, DOD, and DOE. His current research interests include biointerfacial phenomena,

bioinspired and biomimetic materials and bioanalytical microsystems to address problems in medicine, biotechnology and environmental quality.

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The Triangle Materials Research Science and Engineering Center (MRSEC), launched in September 2011, is a national resource for materials science and engineering research and education located in the Raleigh/Durham/Chapel Hill area of North Carolina. The MRSEC research team encompasses faculty and students at Duke University, North Carolina State University, North Carolina Central University and the University of North Carolina-Chapel Hill. The MRSEC will have a major national and international impact in soft matter materials science through generation of new fundamental insights and theoretical understanding, new design principles, and new applications and uses for colloidal and macromolecular materials and their higher order assemblies