

**THE UNIVERSITY OF SOUTH DAKOTA'S  
STUDENT CHAPTER OF  
THE SOCIETY FOR BIOMATERIALS**

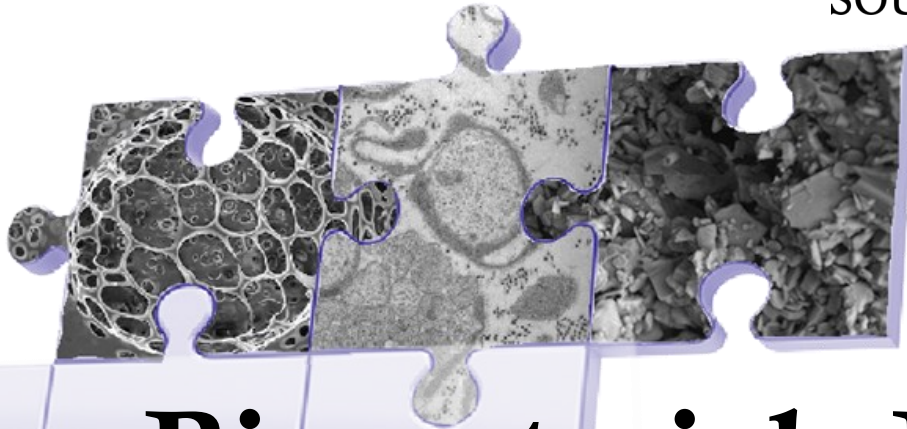
**PROUDLY PRESENTS:**



**Society For  
Biomaterials**



**UNIVERSITY OF  
SOUTH DAKOTA**



# **Biomaterials Day**

Putting the pieces together: Students, Researchers, Biomaterials and Commercialization

**WEDNESDAY, MAY 8, 2013**

**SIOUX FALLS, SD**

**[ORGS.USD.EDU/BIOMATERIALS](http://ORGS.USD.EDU/BIOMATERIALS)**

# NOTES



# FROM THE CO-CHAIRS OF THE UNIVERSITY OF SOUTH DAKOTA'S BIOMATERIALS DAY



Welcome Biomaterials Day Participants!

As representatives of the University of South Dakota's Student Chapter of the Society For Biomaterials, we would like to extend a warm welcome to all attendees of our chapter's first Biomaterials Day! The theme of our meeting, "Putting the pieces together: Students, Researchers, Biomaterials and Commercialization," will focus on bringing researchers together to make new strides in the Biomaterials field.

During the course of the day there will be technical talks from leaders in the Biomaterials field, information about the process of commercializing ideas and products, and we will end the day with success stories from businesses who have translated their research from development to a business.

We would like to thank the Society For Biomaterials national organization for awarding our chapter a grant to host Biomaterials Day. Our sponsors, the University of South Dakota Biomedical Engineering Program, Bose ElectroForce and the South Dakota Biotech Association, whose generous donations helped make today possible. Thank you to our speakers who donated their time to make today informative and interesting: Dr. Kurt Kasper, Dr. Omathanu Perumal, Dr. Grant Crawford, DeVee Dykstra, David Landry, Dr. Gary Archambault, Dr. Ron Utecht, and Dr. Todd Menkhaus. We would like to thank the students in our chapter who worked hard to organize Biomaterials Day. Last, but not least, a very special thank you to our chapter advisor, Dr. Gopinath Mani, who is a driving force behind our chapter's success.

Thank you for attending our event and we look forward to meeting you!

Berit Foss and Annemarie Gallo

*Biomaterials Day Co-Chairs  
University of South Dakota*

# BIOMATERIALS DAY

## SPONSORS



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# UNIVERSITY OF SOUTH DAKOTA

## BIOMEDICAL ENGINEERING PROGRAM

Biomedical engineering (BME) focuses on the application of engineering and science methodologies to the analysis of biological and physiological problems and to the development and delivery of health-care technologies.

The biomedical engineer serves as an interface between traditional engineering disciplines and living systems and may work in either direction, applying the patterns of living organisms to engineering design or engineering new approaches to human health. Both the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees are cross-disciplinary degrees. The objective of the M.S. program is to prepare a student for research and development careers in biomedical industry and for additional training at the doctoral level. The Ph.D. program will prepare a student for a career as a researcher who advances the frontiers of biomedical science and engineering with attention to generating new ideas for commercialization.



**Dr. Daniel Engebretson**

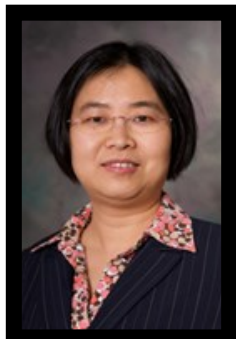
Chair of the Biomedical Engineering Program



**Dr. Gopinath Mani**

Assistant Professor Biomedical Engineering Program

Society for Biomaterials Advisor



**Dr. Ying Deng**

Assistant Professor Biomedical Engineering Program

# UNIVERSITY OF SOUTH DAKOTA

## BIOMEDICAL ENGINEERING PROGRAM

### THE GEAR CENTER



The University of South Dakota's Biomedical Research Program is based in Sioux Falls at the Graduate Education and Applied Research Center (GEAR Center), 4800 N. Career Ave., Suite 221, Sioux Falls, SD 57107.



The South Dakota Public University and Research Center (University Center) is a collaboration of the South Dakota Board of Regents and all of the regental universities in the state. The GEAR Center was opened in Spring, 2009 in Sioux Falls to stimulate applied research and commercialization in South Dakota. The U's Biomedical Engineering program and Center for Research & Development of Light-activated Materials are both housed in the GEAR CENTER.

#### VISION



The GEAR Center is a collaborative environment where innovative solutions are sought to relevant problems and where entrepreneurship is encouraged.

#### FOCUS



The cohesive research focus of the GEAR Center creates a critical mass of expertise and resources, and is aligned with state priorities in biomedical and material sciences and biotechnology.

#### SHIFTING SOUTH DAKOTA TECHNOLOGIES INTO HIGH GEAR





- Encouraging collaborations between researchers at regental universities; other universities and colleges; government agencies; small businesses; and industries with related interests
- Developing technologies which enable biomedical/biological devices, materials, processes, and services
- Providing educational and research opportunities for graduate and post-graduate students
- Training the next wave of the state's high technology workforce

# AGENDA

## May 7, 2013: Early Arrival Activities

Time	Session	Topic
6:30 pm – 8:00 pm		Early Arrival Networking Mixer (GEAR center)

## May 8, 2013: Biomaterials Day

Time	Session	Topic
8:00-9:00 am		Exhibitor and Poster Setup
9:00 – 9:30 am		Registration and Breakfast
9:30 – 9:40 am		Welcome & Opening Remarks
9:40 – 10:40 am	I	Keynote Speaker: Dr. Kurt Kasper, <i>Rice University</i> Translational Biomaterial-based Approaches for Tissue Engineering
10:40-11:00 am		Coffee Break
11:00 – 11:30 am		Invited Speaker: Dr. Omathanu Perumal, <i>SDSU</i> Corn Protein based Nanocarriers for Drug Delivery Applications
11:30 – 12:00 am		Invited Speaker: Dr. Grant Crawford, <i>SDSMT</i> Hierarchical TiO <sub>2</sub> Nanotube Coatings for Titanium Implants
12:00 – 1:00 pm		Lunch and Exhibitor/Poster Walk-through
1:00 – 2:15 pm	II	Bringing Research to Life 
2:30 – 3:30 pm		Poster Presentations and Exhibition
3:30 – 4:15 pm	III	Success: Putting the Pieces Together 
4:15 – 4:30 pm		Closing Remarks & Poster Awards
4:30 PM		Reception with light refreshments



# SESSION DESCRIPTIONS

## **SESSION I: KEYNOTE & PLENARY SPEAKERS**

The first session will be technical talks highlighting the diversity of the Biomaterials field. The Keynote Speaker is Dr. Kurt Kasper from Rice University located in Houston, Texas. Dr. Kasper will present on “Translational Biomaterial-based Approaches for Tissue Engineering.” Plenary speakers are Dr. Omathanu Perumal, from South Dakota State University, and Dr. Grant Crawford, from the South Dakota School of Mines and Technology. Dr. Perumal’s presentation will discuss “Corn Protein based Nanocarriers for Drug Delivery Applications,” and Dr. Crawford will focus on “Hierarchical TiO<sub>2</sub> Nanotube Coatings for Titanium Implants.” Time is allotted at the end of each presentation for questions for each speaker.

## **SESSION II: BRINGING RESEARCH TO LIFE**

The second session is centered around the process of commercialization of research from patenting to finding sources of funding. The speakers for this session are DeVee Dykstra (University of South Dakota, Office of Research and Sponsored Programs), David Landry (Sanford Research), Dr. Gary Archambault (Small Business Innovation Research and Small Business Development).

## **SESSION III: SUCCESS: PUTTING THE PIECES TOGETHER**

The final session will have presentations from two South Dakota companies that took their research and ideas from the lab and created a successful business. These businesses are Alúmend and Nano-Fiber Separations.

## KEYNOTE SPEAKER



**DR. KURT KASPTER, PHD**

*TRANSLATIONAL BIOMATERIAL-BASED  
APPROACHES FOR TISSUE ENGINEERING*  
RICE UNIVERSITY

Dr. Kurt Kasper holds an appointment as Faculty Fellow in the Department of Bioengineering at Rice University. He received his bachelor degree in biomedical engineering from Case Western Reserve University and his doctorate in bioengineering from Rice University. His research focuses upon the development and evaluation of novel biomaterial-based approaches for tissue regeneration, cell encapsulation, and the controlled delivery of therapeutics. Kasper is principal investigator on a research project grant from the National Institutes of Health to develop injectable hydrogel systems for the delivery of growth factors and adult-derived stem cells to promote tissue regeneration in bone and cartilage defects. He also serves as principal investigator of a project sponsored by the Department of Defense to develop biomaterial-based approaches for craniofacial bone regeneration. His research has resulted in over 65 peer-reviewed publications, and he has authored more than 10 book chapters. Kasper has been recognized recently with a variety of awards and honors, including the Young Investigator Award of the Society For Biomaterials (2013), the Young Alumnus Award of the Alumni Association of Case Western Reserve University (2012), the Hershel M. Rich Invention Award of Rice University (2011), the Graduate Student Association's Faculty Teaching and Mentoring Award of Rice University (2011), and the Young Investigator Award of the North American Chapter of the Tissue Engineering and Regenerative Medicine International Society (2011). Kasper serves on the editorial boards of the journals *Tissue Engineering, Parts A, B and C* as well as *Experimental Biology and Medicine*. His professional society memberships include the Society For Biomaterials, the Tissue Engineering and Regenerative Medicine International Society, the Biomedical Engineering Society, the American Institute of Chemical Engineers, the American Chemical Society, the Controlled Release Society, and the American Society for Engineering Education.

## PLENARY SPEAKERS



### **DR. OMATHANU PERUMAL, PHD**

**SOUTH DAKOTA STATE UNIVERSITY**

*CORN PROTEIN BASED NANOCARRIERS FOR DRUG DELIVERY APPLICATIONS*

Dr. Perumal is an associate professor of pharmaceuticals in the Department of Pharmaceutical Sciences at South Dakota State University. He was recently named as a Faculty Scholar in the College of Pharmacy. In addition he also serves as the Associate Director for Translational Cancer Research Center. He has over 15 years of experience in developing new drug delivery systems using various biomaterials. His research focuses on developing new drug delivery systems for cancer and other diseases. His group has developed novel protein based nanocarriers for various drug delivery applications. Dr. Perumal has over 45 publications, over 100 presentations, four book chapters and five patent applications. Dr. Perumal has secured over \$1.5 million funding from various funding sources. He has mentored six PhD students, two Master's students, thirteen undergraduate students, three post-docs and a visiting professor. Dr. Perumal is the founder and Chief Scientific Officer of Tranzderm Solutions Inc., a start-up company focused on protein based nanocarriers for skin drug delivery applications. He serves as the editor-in-chief of Journal of Biomedical Nanotechnology as well as Journal of Nanopharmaceutics and Drug Delivery. He also serves on the editorial boards of several other journals. He is the recipient of Patricia Walker Skin Cancer Research Award from Skin Cancer Foundation and F.O. Butler Award for excellence in research, Distinguished Researcher award and Intellectual Property & Commercialization award from South Dakota State University.



### **DR. GRANT CRAWFORD, PHD**

**SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY**

*HIERARCHICAL TiO<sub>2</sub> NANOTUBE COATINGS FOR TITANIUM IMPLANTS*

Dr. Crawford is an assistant professor in the Department of Materials and Metallurgical Engineering at South Dakota School of Mines and Technology. He is also a faculty member in the Biomedical Engineering Graduate (BME) Program at SDSM&T. He received his PhD in Materials Science Engineering from Arizona State University and BS in Metallurgical Engineering from South Dakota School of Mines and Technology. His research interests are in the areas of metallic biomaterials, electronic materials, mechanical behavior of materials, super alloys, corrosion, laser deposition, cold spray technology, and security printing technology. Dr. Crawford's research group currently studies various surface modifications for titanium implant materials including, 1) hierarchical TiO<sub>2</sub> nanotube coatings processed via laser deposition and anodic oxidation and, 2) bio-composite cold spray coatings.

## SESSION II SPEAKERS



UNIVERSITY OF  
SOUTH DAKOTA

**DEVÉE DYKSTRA, JD, MBA**

RESEARCH & SPONSORED PROGRAMS,

UNIVERSITY OF SOUTH DAKOTA

The logo for Sanford Health, featuring the word 'SANFORD' in a large, blue, serif font with a stylized 'S' inside the 'O', and the word 'HEALTH' in a smaller, blue, sans-serif font below it.

**SANFORD**<sup>™</sup>  
HEALTH

**DAVID W. LANDRY**

PROJECT DIRECTOR

SANFORD RESEARCH AND DEVELOPMENT



**DR. GARY ARCHAMBOULT, PhD**

SMALL BUSINESS INNOVATION RESEARCH

(SBIR) AND SMALL BUSINESS DEVELOPMENT

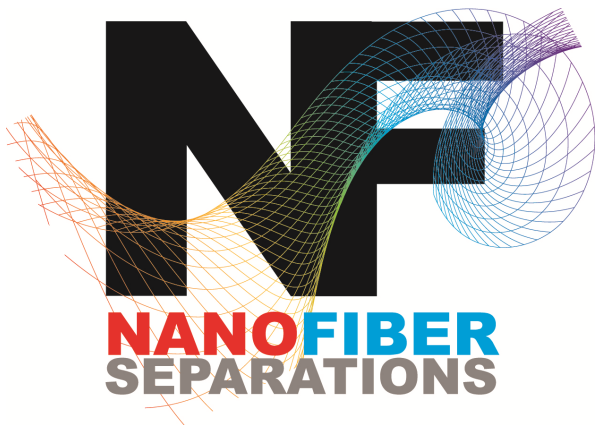
CENTER

## SESSION III SPEAKERS



**DR. RON UTECHT, PHD**

ALÚMEND'S CHIEF SCIENTIFIC OFFICER



**DR. TODD MENKHAUS, PHD**

NANOFIBER SEPARATIONS

# POSTER SESSION

(LISTED ALPHABETICALLY)

Ranjith Averineni and Omathanu Perumal, South Dakota State University; *Novel PEG-Zein Nanomicelles for Topical Delivery of Retinol*

Berit L. Foss, Thomas W. Maxwell, Ying Deng, The University of South Dakota; *Chondroprotective Supplementation Promotes the Mechanical Properties of Injectable Scaffold for Human Nucleus Pulposus Tissue Engineering*

Annemarie Gallo, Gopinath Mani, The University of South Dakota; *Co-Delivery of Paclitaxel and Nitric Oxide from Abluminal and Luminal Surfaces of a Coronary Stent*

Sandeep Kakade, Gopinath Mani, The University of South Dakota; *Effect of Vitamin-C on the Growth of Endothelial Cells for Stent and Vascular Graft Applications*

Joshua Klonoski, Tom Bickett, Wendi Mottishaw, James B. Dale, Michael S. Chaussee, Grigoriy Sereda, Victor C. Huber, University of South Dakota; *Contribution of Vaccine-Induced Antibodies Toward Protection Against Influenza Virus: Streptococcus pyogenes Super-infection*

Sujan Lamichhane, Susan Lancaster, Eagappanath Thiruppathi, Gopinath Mani, The University of South Dakota; *Interaction of Endothelial and Smooth Muscle Cells with Paclitaxel-Immobilized Self Assembled Monolayers*

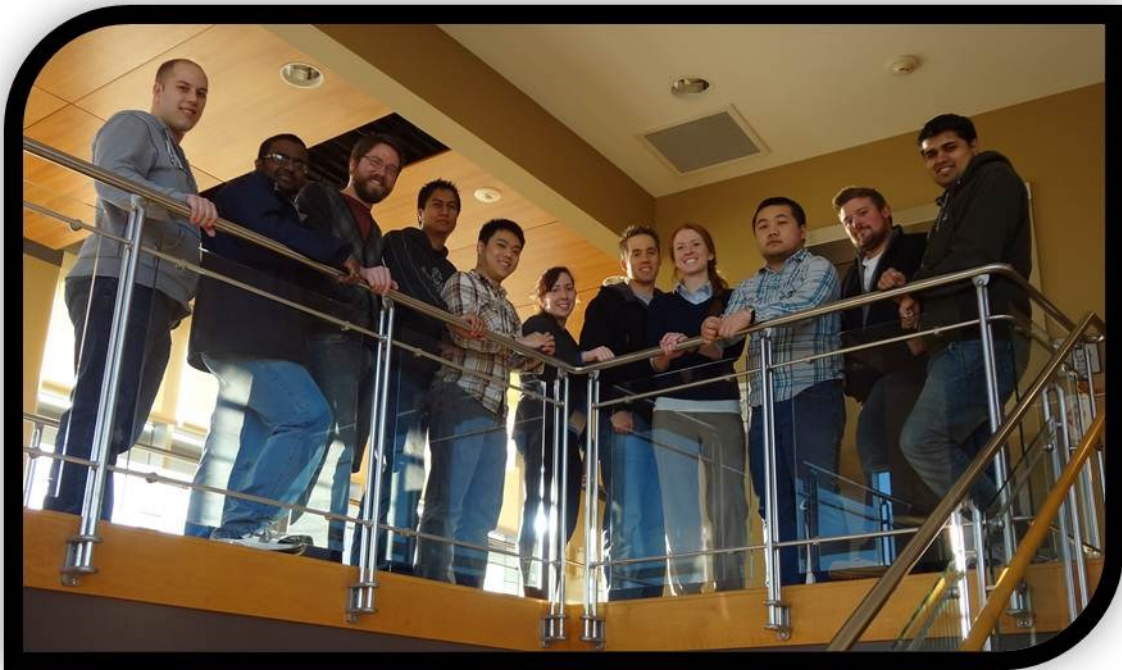
Austin Letcher and Mat Amundson, Augustana College and The University of South Dakota; *Synthesis of 1-Butyl-3-Methylimidazolium Derivatives*

Grigoriy Sereda, Brandon Burum, Wendi Mottishaw, Khaled Mahran, Subramanian Thirumen, David Christianson, The University of South Dakota; *Design of Nanoscale Compositions for Remineralization of Human Dentin*

Eagappanath Thiruppathi, Sandeep Kakade, Gopinath Mani, The University of South Dakota; *Delivery of Vitamin-C (L-Ascorbic Acid) from Coronary Stent Material Surfaces*

Eagappanath Thiruppathi, Jon R Peacock, Gopinath Mani, The University of South Dakota; *Surface Functionalization of Cobalt-Chromium Alloy Using Phosphoric and Phosphonoacetic Acids*

**THANK YOU FOR ATTENDING  
THE UNIVERSITY OF SOUTH DAKOTA'S  
BIOMATERIALS DAY**



**The University of South Dakota's Student Chapter of the Society for Biomaterials**



