

Redox State and Role of Arrestin Proteins in Response to Copper Nanoparticle in *Saccharomyces Cerevisiae* using Lattice Light Sheet Microscopy *Ni Putu Dewi*

Nurmalasari¹, Matthew J. Winans², Brandon Scott¹, Robert B. Anderson¹, Jennifer E.G. Gallagher², Steve J. Smith.¹

¹Department of Nanoscience and Nanoengineering, South Dakota School of Mines and Technology, ²Department of Biology, West Virginia University.

Characterization of hydrogel material properties for the development of the CellWell™ 2.5D cell culture and imaging platform *Ram Saraswat¹, Tyler Ryther¹, Scott Wood, PhD.¹*

¹South Dakota School of Mines and Technology.

Unbiased protein identification at a single DNA locus *Hannah*

Wollenzien,^{1,2,3} Mira Yousef,^{1,2,3,4} Ethan Thompson,^{1,2,3} Ellen Voigt,^{1,2,3} Moritz Mall⁵ Michael Kareta^{1,2,3}. ¹Genetics and Genomics, Sanford Research, Sioux Falls, SD ²Cancer Biology and Immunotherapies, Sanford Research ³Sanford School of Medicine, University of South Dakota, USA ⁴Department of Chemistry, Vanderbilt University ⁵Institute for Stem Cell Biology and Regenerative Medicine, Stanford University, Stanford, CA.

LCD 3D printing of a Photocurable Elastomer for Tissue Engineering *Beatriz L. de Souza¹, Paul Melino¹,*

Cheng Zhang², Mark A. Messerli³, Anamika Prasad¹, Todd Letcher.¹ ¹South Dakota State University, Mechanical Engineering Department, Brookings, SD, ²South Dakota State University, Chemistry Department, Brookings, SD, ³South Dakota State University, Biology & Microbiology, Brookings, SD.

The Role of High-Performance Computing and Resource Management in the Future Smart City *Timothy M. Hansen¹, Venkat Durvasulu¹, Fernando B. dos Reis¹, Prateek Munankarmi¹, Rupak Mahat¹, and Kapil Duwadi.¹* ¹South Dakota State University.

Prairie Soil Harbors Diverse Nitrogen-Fixing Streptomyces

Nabilah Alshibli¹, Amrit Koirala¹, and Volker S. Brözel¹.

¹Department of Biology and Microbiology, South Dakota State University, Brookings, SD

Developing food quality standards for distiller's dried grains-Evaluating Composition, Quality and Safety *Tanvee M.*

Deshpande¹ and Padmanaban K. Krishnan.¹ ¹South Dakota State University.

A step for sustainable solution of nutrient deficiency

Sadikshya Aryal.¹ ¹South Dakota State University.

Extraction of Bioactive Compounds from Distiller's Dried Grain By-Products for Food Applications *Brady Bury.¹* ¹South Dakota State University.

Elucidating the roles of repressor ARFs in soybean nodule development *Pratiksha KC¹, Spencer Schreier², Bhanu Prakash Petla¹, Senthil Subramanian.¹* ¹South Dakota State University, Brookings, ²University of Nevada, Reno

Subcritical Hydrolysis of Ice-Cream Wastewater: Modeling and Hydrolysates Properties *Maryam Enteshari¹, Sergio Martinez-Monteagudo.¹* ¹Dairy and Food Science Department, South Dakota State University, Alfred Dairy Science Hall, Brookings, SD.

Essential Minerals Modulate Carbohydrates Functionality: Toward Developing Novel Functional Foods *Aliza Sigdel,¹ Srinivas Janaswamy¹.* ¹South Dakota State University

Sweetpotato enriched wheat bread: A step towards addressing Vitamin A deficiency *Danial Mbogo¹, Mohamed Elfaruk², Tawanda Muzhingi¹, Srinivas Janaswamy.²* ¹Food Nutrition and Evaluation Lab, International Potato Center, Nairobi, Kenya ²Department of Dairy and Food Science, South Dakota State University, Brookings, SD.

Biodegradable Biopolymers for Renewable Water Treatment Technologies. *Most-Farzana Yesmin¹, Srinivas Janaswamy¹, Laurent Ahiablame.²* ¹Department of Dairy and Food Science, South Dakota State University, Brookings, South Dakota, ²Agriculture & Natural Resources, University of California Cooperative Extension, San Diego.

STUDENT EXHIBITORS

The Bug Club – *Mitchel High School*, Learn about different types of bugs and how they are used in science. Become a member of the "I Ate a Bug" club

What's Living in Our Mouths? - *Harrisburg HOSA*, Learn what is in your mouth and do an activity where you get to put sealants on teeth!

The Volaré Project Flight Club – *Roosevelt High School*, Drones, aerial footage and more!

The It's All About Science Festival is an annual celebration and exploration of science, technology, engineering, and mathematics (STEM) for explorers of all ages. The mission of the Festival is to promote a science-centric community by showcasing "all things science" to the Sioux Empire.



Research Poster Competition and Science Fair Exposition

Saturday, June 9th
Sanford Research

Showcasing exciting STEM research conducted in our community. Visit with students and educators from the region to learn about their research in all spheres of science!

SCIENCE FAIR EXHIBITORS

Miss Carney's Cockroaches. *Aubree Boender*¹. ¹Boyden-Hull Elementary School, 5th Grade

Butterflies are Amazing *Alana DeBacker*¹. ¹Sioux Falls Challenge Center, 3rd Grade

Can More Nutritious Taste as Delicious? *Kennedi Boomsma*¹
*Hannah Anawski*¹. ¹Robert Bennis Elementary, 3rd Grade

Sockeye Salmon Spawning Biome *Tommy Bieh*¹. ¹Platte Geddes School, 5th Grade

HIGH SCHOOL STUDENTS

Constructing a Solar Graphene-Based Supercapacitor
*Madison Hetland*¹ ¹Mitchel High School

Subcellular Localization and Function of SUSD2: Differences between Breast and Ovarian Cancers *Rachel Heynen*¹, Jordan N. Sheets², and Kristi Eglund² ¹PROMISE Scholar Student, Western Christian High School, Hull, IA, USA ²Cancer Biology and Immunotherapies Group, Sanford Research, Sioux Falls, SD, USA

UNDERGRADUATE STUDENTS

I SBAP-Linked Bioconjugation of Oligonucleotides to Quantum Dots *Troy D. Hollinsworth*¹, *Austin E. Kroeger*¹, Dr. Barrett E. Eichler¹ ¹Augustana University, Sioux Falls, SD

Tracking gender differences in a mouse model of CLN6-Batten disease *McKayla J. Poppens*^{1,2}, Katherine A. White¹, Samantha S. Davis¹, Rachel Laufmann¹, Alexander Kloth², Jill M. Weimer^{1,3} ¹Pediatrics and Rare Diseases Group, Sanford Research, Sioux Falls, ²Department of Biology, Augustana University, Sioux Falls, ³Department of Pediatrics, Sanford School of Medicine, University of South Dakota, Sioux Falls.

The Genetic Origin of a Rare Mitochondrial Disorder *Lucas J. Bart*¹, Brooklyn L. DeVries¹, Joshua S. Reider¹, Matthew J. Moe¹, Madigan M. Moore¹, Peter F. Vitiello², Megan Landsverk^{2,3}, Seasson P. Vitiello¹ ¹Augustana University, Sioux Falls, SD, ²Sanford Research, Sioux Falls, SD ³Ambry Genetics, Aliso Viejo, CA.

Genomics of physiological adaptations of two milkweed species (Asclepias) in their hybrid zone *Avery Selberg*¹, C.F. Olson-Manning, PhD¹ ¹Augustana University

Flowers increase ecosystem biodiversity in Midwestern prairies *Lucas Goodman*¹, Nicholas Lyon¹, Diane Debinski² ¹Iowa State University, Ames, IA, ²Montana State University, Bozeman, MT

Targeted Development of Novel Arrhythmogenic Stem Cell Models: Phase II *Riley J. Leonard*^{1,3}, Emily C. Storm^{2,3}, Claudia C. Preston³, Randolph S. Faustino^{2,3} ¹SPUR Scholar from the Department of Biology, Saint John's University, ²Sanford School of Medicine, ³Genetics and Genomics Research Group, Sanford Research.

EDUCATORS

Hands-On vs Virtual Labs: Student Motivation and Retention *Julie A. Olson*^{1,2} ¹Mitchell Senior High, Mitchell, SD ²University of South Dakota, Vermillion, SD

Exterior Girder Rotation During Deck Placement *Darwin Daugaard*¹, Katelyn Freeseaman^{1,2}, Brent Phares^{1,2} ¹Iowa State University ²Institute for Transportation

GRADUATE STUDENT/ POST-DOCTORAL FELLOWS

Diversity of Nitrogen - fixing Bacteria in Sioux Prairie Soil *Bikram Kumar Das*¹, Nabilah Alshibli¹, Amrit Koirala¹, and Volker Brözel¹ ¹South Dakota State University, Brookings, SD

Interactions between Squall Lines and Supercells *Michael Montalbano*¹ ¹South Dakota School of Mines and Technology

Multiphoton Induced Fluorescence and Second Harmonic Imaging of Drug-eluted Arterial walls for Non-invasive photo-polymerizable stents *Tochukwu Emeakaroha*¹, Sam Young², Ron Utecht², Steve Smith¹ ¹Department of Nanoscience and Nano engineering, South Dakota School of Mines and Technology, Rapid City, ²Alumend LLC, Sioux Falls.

Toward development of the CellWell - a novel micropatterned semi-3D cell culture scaffold *Ram Saraswati*¹, Tyler Ryther¹, Scott Wood, PhD¹ ¹South Dakota School of Mines and Technology

LCA- Modelling of Integrated Crop Livestock System *Prashansa Shrestha*¹, Heidi L. Sieverding¹, James J. Stone¹ ¹South Dakota School of Mines and Technology, Rapid City, SD

Thermoplastic fiber reinforced composites *Krishnan Veluswamy*¹, David R Salem¹ ¹South Dakota School of Mines and Technology

Thermal and Mechanical Properties of Micro-Channeled Sandwich Composites for Application in Space Structures *Eric Schmid*¹, Marc Robinson¹, William Cross¹, David Salem¹ ¹South Dakota School of Mines & Technology

Subcellular characterization of Notch signaling deficient kidney epithelium using transmission electron microscopy I. *Ratnayake*¹, S. Smith¹, I. Chandrasekar², K. Surendran² and P. Ahrenkiel¹ ¹Nanoscience and Nanoengineering, SDSMT, ²USD Sanford School of Medicine.

Nonmuscle Myosin IIB Tension Sensor reveals Intracellular and Membrane Force Mechanics and Tension in Live cells. *Divya Kota*¹, Ryan G. Hart², Jing Liu^{1,3}, Indra Chandrasekar^{2,4}, Steve J. Smith¹ ¹South Dakota School of Mines and Technology; ²Enabling Technologies Group, Sanford Research; ³Indiana University–Purdue University Indianapolis; ⁴USD Sanford School of Medicine.

Power Dependence of Near-Infrared to Visible Upconversion Luminescence from Single NaYF₄:Yb³⁺:Tm³⁺ Nanoparticles on Silver Nanowires *Anahita Haghizadeh*¹, Amy Hor¹, Jon Fisher¹, Dr. Stanley May², and Dr. Steve Smith¹ ¹Nanoscience and Nanoengineering, South Dakota School of Mines and Technology; ²Department of Chemistry, USD.

Methods for reducing dislocation density in GaAs grown on flexible-Ge *Xavier Pasala*¹, Nathan Smaglik², Nikhil Pokharel³, Monika Rathi⁴ ¹South Dakota School of Mines & Technology, SD, ²University of Houston, TX.

Comparison of commercial and laser deposited WE43 magnesium alloy *Leila Sorkhi*¹, Grant A. Crawford¹. ¹South Dakota School of Mines & Technology, Rapid City, SD.

Conversion of value added chemicals from Alkali Lignin using Subcritical water and Catalyst *Balawanthrao Jadhav*¹, Ranen Roy¹ and Douglas E Raynie¹ ¹South Dakota State University.

Evaluation of Quantitative Percussion Diagnostics for Non-Destructive Evaluation of Laser Additive Manufacturing and Cold Spray Deposition *Mahsa Amiri*¹, James C. Earthman², Grant A. Crawford¹ ¹Materials and Metallurgical Engineering, South Dakota School of Mines and Technology ²Chemical Engineering and Materials Science, University of California Irvine.

Np115 Regulates Pluripotent Micro RNA expression *Emily C. Storm*¹, Claudia C. Preston¹, Tyler A. Bradley¹, Randolph S. Faustino^{1,2} ¹Genetics and Genomics Research Group, Sanford Research; ²USD Sanford School of Medicine.

Double Heterostructures Produced with Metalorganic Chemical Vapor Deposition *Nate Smaglik*¹, Nikhil Pokharel¹, Phil Ahrenkiel¹ ¹South Dakota School of Mines and Technology