



LSAMP **inspire**
PROGRAM

2017-18
ANNUAL CONFERENCE

Blending STEM and Society

FEBRUARY 2-3, 2018



Marriott Hotel & Conference Center

Coralville, Iowa



OFFICE OF THE EXECUTIVE
VICE PRESIDENT AND PROVOST

111 Jessup Hall
Iowa City, Iowa 52242-1316
319-335-3565 Fax 319-335-3560
www.provost.uiowa.edu

Dear Conference Participant:

The University of Iowa is pleased to host the 2017-2018 annual conference of the IINSPIRE-Louis Stokes Alliance for Minority Participation (LSAMP). This year's theme, "Blending STEM and Society", offers a great opportunity for us to consider the ways in which science, technology, engineering and math are inextricably intertwined. From having access to clean drinking water to making informed decisions about healthcare, STEM surrounds us.

This is also a time to celebrate the importance of diversity. Supporting a diverse workforce brings a wide range of perspectives and experiences to solve complex programs, and increases the likelihood that research questions related to human health and the environment are relevant to all populations. Conferences like this one develop the talent we need to solve society's greatest challenges.

Thank you to all who helped make this conference possible. We also appreciate the support from the National Science Foundation-LSAMP program that will allow the Alliance to meet the goal of doubling the number of underrepresented minority STEM graduates within five years.

At the University of Iowa, we challenge students to "Excel, Stretch, Engage, Choose, Serve". It is my hope that you meet this challenge as you participate in this conference and consider ways in which you will impact society through STEM.

Sincerely,

Susan J. Curry, Ph.D.
Interim Executive Vice President and Provost

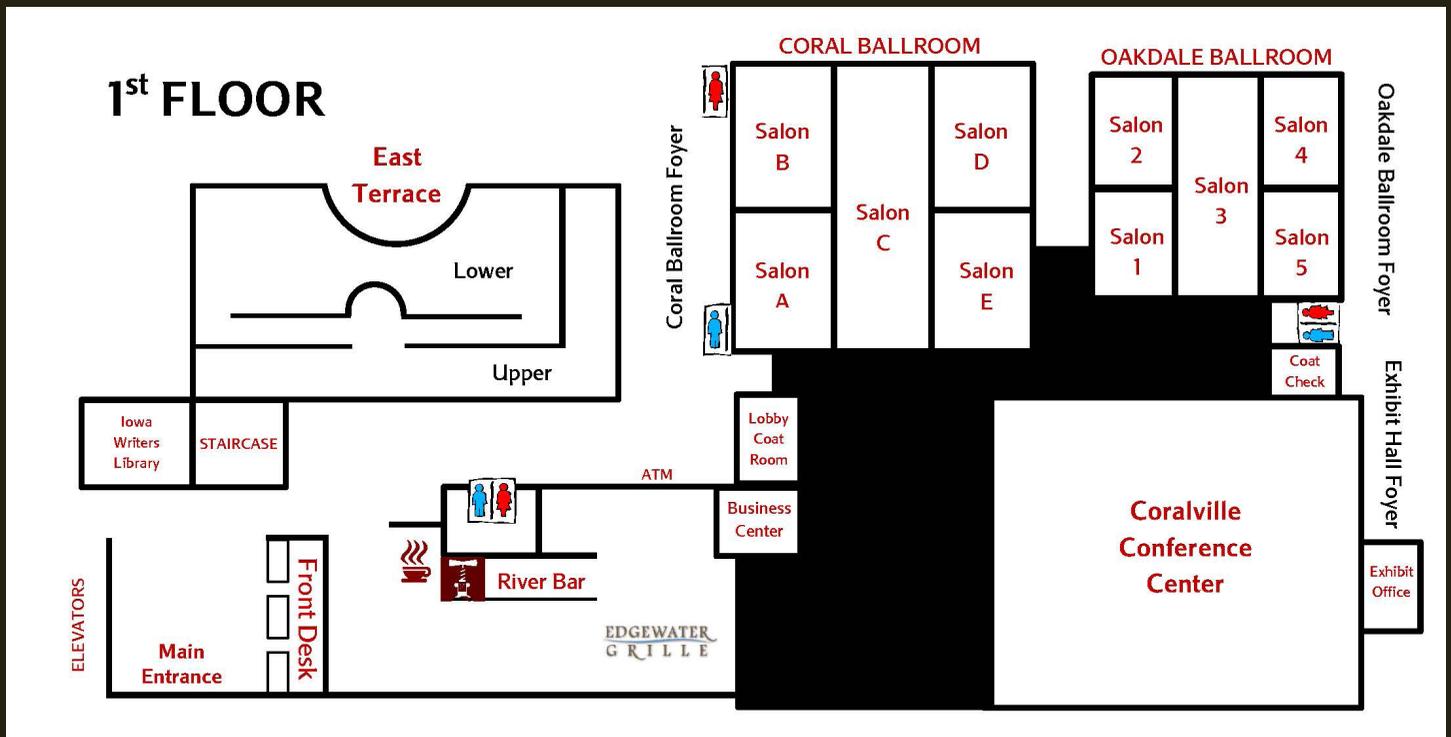


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Venue Map



Keynote & Invited Speakers



Sanethia Thomas

*PhD Candidate, NSF Graduate Research Fellow, GEM Fellow
University of Florida*

Sanethia Thomas is a PhD Candidate, a National Science Foundation (NSF) Graduate Research Fellow, and GEM fellow at the University of Florida in the Human Experience Research Lab under Dr. Juan Gilbert. She holds a bachelor's degree in Information Technology from the University of Texas El Paso and a Masters in Youth Development Leadership from Clemson University, where she graduated in the top ten percent and was inducted into Phi Kappa Phi Honor Society. She was also inducted in the first African American Honor Society Beta Eta Sigma and Golden Key International Honor Society for the top fifteen percent of graduate students. Her experiences have spanned across private and public sector, from America Online (AOL) to Government and to K-12.

Sanethia Thomas represented the United States of America by playing basketball in Amsterdam, Belgium, and Paris. Her basketball experiences have fueled her research in developing technologies that will assist athletes in transitional skills and mental health. Her research is interdisciplinary as it includes the fields of

Human Computer Interaction (HCI), Athlete Development, Artificial Intelligence and Affective Computing. Specifically she explores the concept using Natural Language Interfaces and Intelligent Embodied Conversational Agents to help athletes. Her research also touches areas in User Experience, Human-Centered Computing, Educational Technologies, and Athlete Development. Sanethia Thomas has made notable contributions by publishing in the Journal of Higher Education Athletics & Innovation and several conference venues.

Outside of graduate school Sanethia has helped over 500 students and student-athletes prepare college by helping them increase their SAT/ACT scores through her non-profit organization Score High Coach.

Antentor Hinton

Burroughs Wellcome Fund Postdoctoral Enrichment Scholar, University of Iowa

Dr. Hinton is a Burroughs Wellcome Fund Postdoctoral Enrichment Scholar at the University of Iowa in the Department of Internal Medicine in the Division of Endocrinology in Dr. E. Dale Abel's Laboratory, the Chair and DEO of Internal Medicine and Director of the Fraternal Order of Eagles Diabetes Research Center. Under the co-mentorship of Dr. E. Dale Abel and Dr. Renata Pereira, he studies how insulin stimulation increases OPA-1 oligomerization and how this mechanism contributes to OPA-1 dependent activation of mitochondrial function in skeletal muscle cells. Interestingly, Dr. Hinton has mentored 29 students and two are in medical school in Japan, one is in Medical School at the University of Iowa, and lastly, one just completed a Master's Degree and has just been accepted to Medical School. Moreover, 16 of Dr. Hinton's current mentees are in a Ph.D. Program, and nine are in undergraduate school. In 2016, Dr. Antentor Othrell Hinton, Jr. graduated from the Integrative Molecular and Biomedical Science Ph.D. Program (IMBS) at Baylor College of Medicine. Before his doctorate, Dr. Hinton graduated from the NIH SMART Post baccalaureate Research Education Program (PREP) at Baylor College of Medicine in 2010, where he finished first in the class. Lastly, Dr. Hinton's humble beginning started at the Winston-Salem State University, where he earned a Bachelor's of Science degree in biology.



Juanita Limas

PhD Candidate, University of North Carolina at Chapel Hill

Juanita Limas is originally from Iowa and graduated with a B.S. in Biochemistry from the University of Iowa. She served 2.5 years in the Peace Corps as a Community Health Volunteer in Nicaragua. She then pursued a master's degree in Biomedical Sciences at Barry University in Miami, FL, and began a career as a full-time community college instructor teaching anatomy and physiology to pre-med, nursing, and dental hygiene students. She taught at Kirkwood Community College for 5 years and was the first LSAMP Campus Director, initiating Kirkwood's first STEM club as well as creating a new cohort of LSAMP students.

Juanita is active in community outreach as a second-year graduate student: She is the president of the UNC SACNAS chapter, is a member of the Carolina First-Generation PhD students group (mentoring other first-generation undergraduate students), and active in the Initiative for Maximizing Student Diversity program, helping recruit new biomedical PhD students. She is a member of the North Carolina Society for Hispanic Professionals and speaks to community groups about her Peace Corps experience. Juanita's PhD research focuses on understanding the mechanisms of oncogenic DNA replication stress. Oncogenes (genes that cause cancer) lead to DNA replication stress, but the mechanism by which this happens is unclear and is the topic of her thesis. Her long-term goal is two-fold: (1) she would like to move the cell cycle regulation/cancer field forward, answering key questions about how oncogenes hijack the cell cycle leading to carcinogenesis. (2) Juanita also wants to advance the national dialogue on diversifying the professoriate. Mentors have encouraged and supported her and she would like to become a future scientist/Principal Investigator to pursue research but to also to mentor, encourage, and support students just as has been done for her.



Sunday Faronbi

Coach, Speaker, Trainer, Rehoboth Consulting Inc.

After a career that spanned more than 25 years as an engineer and project manager, Sunny Faronbi is using the skills he developed while leading project teams to help others improve their leadership and communication skills.

As a leadership coach, speaker and trainer, Sunny helps organizations by coaching their people to develop the necessary people skills that prepare them for leadership positions. He is a member of the John Maxwell Team of coaches and speakers, and is also a certified Emotional Intelligence coach.

Sunny is known as an engaging speaker and has received excellent reviews from his audiences.

CONFERENCE SCHEDULE

Friday, February 2		
12:00 - 12:50 PM	<i>Optional Lunch</i>	Coral Ballroom Foyer
12:00 - 12:50 PM	<p>PRE-CONFERENCE SESSIONS</p> <p>All Audiences: LSAMP 101</p> <p>Student Session A: IINSPIRE LSAMP Student Engagement Survey</p> <p>Faculty/Staff Session A: BIRDS OF A FEATHER: LSAMPing at Small Universities</p> <p>Faculty/Staff Session B: BIRDS OF A FEATHER: LSAMPing at Public Universities</p> <p>Faculty/Staff Session C: BIRDS OF A FEATHER: LSAMPing at 2-year Colleges</p>	<p>Coral Ballroom - Salon A</p> <p>Coral Ballroom - Salon B</p> <p>Coral Ballroom - Salon C West</p> <p>Coral Ballroom - Salon C East</p> <p>Coral Ballroom - Salon D</p>
1:00 - 1:50 PM	<p>WELCOME & OPENING KEYNOTE</p> <p><i>Susan Curry, University of Iowa</i> <i>John Buse, Kirkwood Community College</i></p> <p>YOU HAVE THE ANSWER: INNOVATING SOLUTIONS FOR SOCIETY'S PROBLEMS THROUGH A HUMAN CENTERED COMPUTING APPROACH <i>Sanethia Thomas, University of Florida</i></p>	Coral Ballroom - Salon C
2:00 - 2:50 PM	<p>SESSIONS</p> <p>All Audiences: Student Oral Poster Presentations - Group 1</p> <p>Student Session A: Responsibility - Thy Name is Integrity</p> <p>Faculty/Staff Session A: Who will tell our stories? Understanding the Narratives of SOC in STEM</p> <p>Faculty Session B: Using Societal Issues to Attract and Engage STEM Students in the Classroom (<i>Session ends at 5:00pm</i>)</p>	<p>Coral Ballroom - Salon A</p> <p>Coral Ballroom - Salon D</p> <p>Coral Ballroom - Salon B</p> <p>Coral Ballroom - Salon C</p>
3:00 - 3:50 PM	<p>SESSIONS</p> <p>All Audiences: Student Oral Poster Presentations - Group 2</p> <p>Student Session A: Working Daily in a Global Workforce</p> <p>Faculty/Staff Session A: Maturity & Sustainability Workshop</p>	<p>Coral Ballroom - Salon A</p> <p>Coral Ballroom - Salon B</p> <p>Coral Ballroom - Salon D</p>

Friday, February 2 (cont.)

4:00 - 4:50 PM	STUDENT OPPORTUNITIES FAIR SESSIONS Faculty/Staff Session A: STEM-Pros at Upper Iowa: A Glimpse of the Future? Faculty/Staff Session B: The ISU Undergraduate Research Certificate	Coral Ballroom Foyer Coral Ballroom - Salon B Coral Ballroom - Salon D
5:00 - 6:30 PM	STUDENT POSTER SESSION & RECEPTION	Coral Ballroom - Salon A
6:30 - 7:00 PM	BREAK	
7:00 - 8:30 PM	STUDENT NETWORKING PROGRAM & DINNER BUILDING RELATIONAL SKILLS TO BOOST YOUR CAREER <i>Sunday Faronbi, Rehoboth Consulting Inc.</i>	Coral Ballroom - Salon C

Saturday, February 3

7:30 - 8:30 AM	<i>Breakfast</i>	Coral Ballroom - Salon C
8:00 - 8:50 AM	MORNING KEYNOTE THE TRIAL AND TRIBULATIONS OF GRADUATE SCHOOL: HOW DO I MAKE AN IMPACT? <i>Antentor Hinton, University of Iowa</i>	Coral Ballroom - Salon C
9:00 - 9:50 AM	SESSIONS Student Session A: You are Defined by "Grit": An in Depth Look at How GRIT Can Get You What You Want Students Session B: Self- Empowerment for Underrepresented Students in STEM Faculty/Staff Session A: An Interdisciplinary Research Approach to Cultivate a Science Technology Engineering Math (STEM) Identity for Student Success Faculty/Staff Session B: IINSPIRE LSAMP Career Development Study: Preliminary Findings	Coral Ballroom - Salon A Coral Ballroom - Salon B Coral Ballroom - Salon E Coral Ballroom - Salon D

CONFERENCE SCHEDULE

Saturday, February 3 (cont.)

10:00 - 10:50 AM	<p>SESSIONS</p> <p>Student Session A: Creating Successful Applications for Research Opportunities</p> <p>Student Session B: Graduate and Medical School Preparation</p> <p>Student Session C: Writing a Personal Statement for Graduate School</p> <p>Faculty/Staff Session A: Creating STEM Themed Courses for a General Audience</p> <p>Faculty/Staff Session B: Teaching Inclusively in the Classroom and Research Lab: Professional Development by the CIRTLL Network to Engage Current and Future STEM Faculty</p>	<p>Coral Ballroom - Salon C</p> <p>Coral Ballroom - Salon D</p> <p>Coral Ballroom - Salon E</p> <p>Coral Ballroom - Salon A</p> <p>Coral Ballroom - Salon B</p>
11:00 - 11:50 AM	<p>SESSIONS</p> <p>Student Session A: A Celebration of Individual Differences in a Colorblind World</p> <p>Student Session B: Creating your Individual Development Plan: Professional Development by the CIRTLL Network to Engage Future STEM Graduate Students</p> <p>Student Session C: Graduation is Around the Corner, Now What?</p> <p>Faculty/Staff Session A: Designing and Evaluating a Forensic Science Online Course for Underrepresented Minority Students</p> <p>Faculty/Staff Session B: Recruitment Strategies: How to Identify and Recruit STEM Students at a Community College?</p>	<p>Coral Ballroom - Salon E</p> <p>Coral Ballroom - Salon B</p> <p>Coral Ballroom - Salon C</p> <p>Coral Ballroom - Salon A</p> <p>Coral Ballroom - Salon D</p>
11:50 - 12:10 PM	BUFFET LUNCH	
12:10 - 1:00 PM	<p>INVITED SPEAKER & LUNCH</p> <p>WHAT DOES IT MEAN TO “BLEND” STEM AND SOCIETY? <i>Juanita Limas, University of North Carolina at Chapel Hill</i></p>	<p>Coral Ballroom - Salon C</p>
1:10 - 2:00 PM	STUDENT STEM RESEARCH PANEL	<p>Coral Ballroom - Salon C</p>
2:10 - 3:00 PM	AWARDS CEREMONY & CLOSING REMARKS	<p>Coral Ballroom - Salon C</p>

PRE-CONFERENCE SESSION DESCRIPTIONS: Friday, February 2

12:00 - 12:50 PM

LSAMP 101 – Coral Ballroom - Salon A
All Audiences

SPEAKER

Mary Darrow, Iowa State University
Danielle Mitchell, Iowa State University
Diane Rover, Iowa State University

This session is intended for faculty, staff, and students who are new to IINSPIRE LSAMP. We will present goals of our 16 institution alliance, provide highlights of our accomplishments in the first 6 years, and discuss how faculty, staff, and students can get involved.

IINSPIRE STUDENT ENGAGEMENT SURVEY – Coral Ballroom - Salon B
Faculty, Staff, and Professional Session

SPEAKERS

Saba Rasheed Ali, University of Iowa
Sarah L. Rodriguez, Iowa State University
J.Y. Cindy Kim, University of Iowa
Meng Xiao, Iowa State University

Social Cognitive Career Theory (SCCT; Lent, Brown, & Hackett, 1994) describes processes by which students select careers and majors in academia. Originating from social constructivism, the SCCT theorizes career choices as outcomes of career-related value in social interactions and experiential activities for adolescents and young adults. This learning process is a function of the individuals' environments, their individual characteristics and personal inputs (e.g., race/ethnicity, gender, social class), and socialization processes. Through continued exposure to the aforementioned learning processes, individuals develop self-efficacy for specific activities and tasks, while simultaneously forming expectations about future outcomes of their performance (outcome expectations). Over time, individuals are able to develop specific vocational and education interests through these mechanisms, and leads to choices and goal actions of further activities towards vocational decisions and persistence.

With SCCT as the framework, a survey was developed to collect data at all 16 institutions participating in IINSPIRE-LSAMP Alliance programming and experiences to better understand the factors influencing student persistence in Science, Technology, Engineering, and Mathematics (STEM) majors. Items focus on measuring research/academic self-efficacy, research/academic outcome expectations, ethnic identity and other group representation, and science identity. The survey was distributed to all students that have been a part of the IINSPIRE-LSAMP Alliance. This session offers an opportunity for students and alumni who have not completed the survey to complete the survey while attending the conference. This session is completely voluntary.

PRE-CONFERENCE SESSION DESCRIPTIONS: Friday, February 2

12:00 - 12:50 PM *(cont.)*

BIRDS OF A FEATHER SESSION:

LSAMPING AT SMALL UNIVERSITIES – Coral Ballroom - Salon C West

Faculty, Staff, and Professional Session

SESSION MODERATOR

Katherine McCarville, Upper Iowa University

All LSAMP programs face challenges, but some of these are even more difficult at smaller universities that may not have a well-developed “grants culture.” Budgeting and fiscal management of grant funds; mechanisms for building support among faculty, students and staff; changing enrollment patterns; persuading additional faculty to learn more about diversity and inclusive pedagogies; and other topics will be explored. Solutions and suggestions will be shared among the participants, with the goal of creating a support network.

BIRDS OF A FEATHER SESSION:

LSAMPING AT PUBLIC UNIVERSITIES – Coral Ballroom - Salon C East

Faculty, Staff, and Professional Session

SESSION MODERATOR

Vincent Rodgers, University of Iowa

Derrick Rollins, Iowa State University

Join a roundtable discussion about opportunities, best practices, and challenges of building and managing a LSAMP program on a large university campus. Budgeting and fiscal management of grant funds; mechanisms for building support among faculty, students and staff; persuading additional faculty to learn more about diversity and inclusive pedagogies; and other topics will be explored. Solutions and suggestions will be shared among the participants, with the goal of creating a support network.

BIRDS OF A FEATHER SESSION:

LSAMPING AT 2-YEAR COLLEGES – Coral Ballroom D

Faculty, Staff, and Professional Session

SESSION MODERATOR

Brian Ritter, Eastern Iowa Community College District

Join a roundtable discussion about opportunities, best practices, and challenges of building and managing a LSAMP program on a 2-year college campus. Budgeting and fiscal management of grant funds; mechanisms for building support among faculty, students and staff; persuading additional faculty to learn more about diversity and inclusive pedagogies; and other topics will be explored. Solutions and suggestions will be shared among the participants, with the goal of creating a support network.

1:00 - 1:50 PM

Welcome & Opening Keynote Presentation

Coral Ballroom - Salon C



Sanethia Thomas

You Have The Answer: Innovating Solutions for Society's Problems through a Human Centered Computing Approach

Human Centered Computing (HCC) is focused on designing, building, and evaluating computational technologies as they relate to the human condition and reflecting on how these technologies affect society. Within HCC, technologies are developed to address national social matters by applying an interdisciplinary approach. The goal is to build innovative solutions to real-world problems by integrating people, information, culture, policy, and technology to address societal issues. By understanding humans, both as individuals and in social groups, HCC inherits the complexity of human-information and human-computer interaction with software engineering and systems integration. HCC is research that focuses on humans first and then technology. Sanethia will discuss her career experiences as a HCC PhD student and how her work and the work of her research team blends STEM and society to solve problems.

SESSION DESCRIPTIONS: Friday, February 2

2:00 - 2:50 PM

STUDENT ORAL POSTER PRESENTATIONS: GROUP 1 – Coral Ballroom - Salon A

All Audiences

PRESENTATIONS

Bicyclist Safety

Zoe Horak, *University of Iowa*

A Data Driven Framework for Smart Decision Making in Small and Shrinking Communities

Matthew Lechowicz, *Iowa State University*

The Effect of Surface Properties on Growth Rate of a Pseudomonas Aeruginosa Biofilm in a Glucose-Based Minimal Mineral Medium

Helena Valquier-Flynn, *Doane University*

The Association of Adiponectin and Inflammatory Signals in Alzheimer's Disease

Ana Collazo-Martinez, *Iowa State University*

RESPONSIBILITY – THY NAME IS INTEGRITY – Coral Ballroom - Salon D

Student Session

SPEAKER

Sunday Faronbi, *Rehoboth Consulting Inc.*

Are you dependable? Can others count on you to follow through and deliver on what you promise? Do you make every attempt to deliver on your promises no matter what? Or do you only follow through when it's convenient? Do you keep your word even when it's difficult, just because keeping your commitments is important to you? As a STEM professional, the manner in which you answer these questions can go a long way to determine your success in life. If care is not taken, permanent damage can be the end result. Lives could be ruined. Careers may be destroyed. During this keynote presentation, participants will see the connection between seemingly innocuous behaviors and the impact of those behaviors on the respect and the level of trustworthiness they receive. More importantly, they will gain insights into what they need to do to become people of excellence and integrity - people that their organizations will find indispensable to their success and future.

WHO WILL TELL OUR STORIES?

UNDERSTANDING THE NARRATIVES OF STUDENT OF COLOR IN STEM – Coral Ballroom Salon B

Faculty, Staff, and Professional Session

SPEAKERS

Tyanez Jones, *Iowa State University*

Carmen Jones, *Iowa State University*

This session will explore external factors that influenced students of color (SOC) to major in STEM fields and how those influencers nurtured their STEM identity. External factors were defined as key people, events, and experiences that significantly influenced choice of major.

The presenters will discuss how impacting factors helped SOC recognize and overcome the dominant narrative about who can excel in STEM fields and how those factors helped build positive STEM identities. In previous research, we evaluated first year students in STEM. This research will focus on STEM seniors. We will provide the analysis of

identifiable factors that had a positive impact on STEM degree persistence and the experiences that helped shaped their STEM identity.

Researchers utilized focus groups as a means of allowing students to participate in STEM identity talk, which was an important method for participants to understand and negotiate their sense of belonging in a STEM field. It also helped students expand their personal STEM identity narratives. This session will benefit those interested in STEM identity development of students of color (SOC) at a predominantly white institution (PWI).

USING SOCIETAL ISSUES TO ATTRACT AND ENGAGE STEM STUDENTS IN THE CLASSROOM – Coral Ballroom - Salon C

Faculty Session - 2:00-4:50 PM

SPEAKERS

Cailin Huyck Orr, SERC at Carleton College

Jim Swartz, Grinnell College

Societal issues are a powerful way to engage students in STEM and transcend disciplinary boundaries. Regardless of their major, teaching about topics such as energy, food, water, and hazards, are applicable to what students learn in the classroom across the curriculum and may apply to their personal life and/or what they see in the news. Further, there is an increasing need for not only STEM literacy, but also an interdisciplinary approach to addressing the complex issues facing society such as environmental justice, sustainability, and environmental ethics. Real-world issues can engage and energize students and offer an opportunity to go out into the community to apply classroom knowledge and perform hands-on work. Engaged, student-centered pedagogy using societal issues can motivate students to take action in their community through the use of community partnerships, place-based approaches, research projects.

This workshop for faculty members will use resources from the IINSPIRE Alliance community and the InTeGrate STEM Talent Expansion Program Center to highlight how issues of interest to students might be brought into the STEM classroom. Topics will include high impact pedagogical approaches, service learning, and engaging community partners. We will provide opportunity for participants to share and discuss their own approaches and consider how they can overcome barriers. Participants will leave the session with a personal action plan for next steps.

3:00 - 3:50 PM

STUDENT ORAL POSTER PRESENTATIONS: GROUP 2 – Coral Ballroom - Salon A

All Audiences

PRESENTATIONS

Food Waste Education for Elementary School Students

Betrina Brewer, Des Moines Area Community College

Clinical Neuropsychology and Brain Sciences

Taha Gesalla, University of Iowa

Does Executive Functioning Mediate Links Between Childhood Attention-Deficit Hyperactivity Disorder Symptoms and Substance Use and Related Problems in Adulthood?

Elissa Monteiro, University of Iowa

Investigating Structural Characteristics of Mo-based High Entropy Alloys

Mouhamad Said Diallo, Iowa State University

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WORKING DAILY IN GLOBAL WORKFORCE – Coral Ballroom - Salon B

Student Session

SPEAKERS

Adin Mann, Emerson - Fisher Controls

Participating in the current global workforce involves having colleagues in several world areas working jointly on projects. This provides many opportunities and challenges. The opportunities include the differences in time, capabilities, creativity, vision, attitudes, motivation, and perspective, to name a few. The challenges arise from the same list. The session will provide examples of a global working group with specific examples of how to rely on the advantages of a global working group and work through the disadvantages.

MATURITY & SUSTAINABILITY WORKSHOP – Coral Ballroom - Salon D

Faculty, Staff, and Professional Session

SPEAKERS

Mary Darrow, Iowa State University

Diane Rover, Iowa State University

A high-quality student experience model supported by mentoring, participation in research, opportunities for building networks, professional development, and a community with other URM STEM students (through alliance activities) has been a key IINSPIRE LSAMP strategy for engaging local teams and resources in the goals of IINSPIRE LSAMP. Learn about this model and discuss how this approach is leading to program sustainability and maturity at the campus level.

4:00 - 4:50 PM

STEM-PROS AT UPPER IOWA: A GLIMPSE OF THE FUTURE? – Coral Ballroom - Salon B

Faculty, Staff, and Professional Session

SPEAKERS

Kata McCarville, Upper Iowa University

Nigel George, Upper Iowa University

Family support is a big part of why we think students succeed or fail—our NSF S-STEM project at Upper Iowa University is organized around that idea. Half of our S-STEM Scholars in the 2017-18 cohort are LSAMP-eligible. Our S-STEM Scholars participated in UIU's first-year seminar this fall, and we conducted our S-STEM family orientation program in early November. We will briefly present what we did in our attempts to attract and recruit students into the cohort, increase student persistence and academic achievement, and support family engagement. We will share some lessons learned (what worked and what did not). As students and their family situations change in response to societal change, we suggest that some of what we have discovered might be on the horizon for more selective institutions. We hope to engage our audience in a lively discussion of some interesting (puzzling?) aspects of student motivation, family dynamics, and student behavior and decision-making.

THE ISU UNDERGRADUATE RESEARCH CERTIFICATE – Coral Ballroom - Salon D
Faculty, Staff, and Professional Session

SPEAKERS

U. Sunday Tim, Iowa State University

A growing number of undergraduate students are participating in mentored research, scholarship or creative activities that lead to an original, intellectual, and creative contribution to their field. It is imperative to make these activities central to the student academic experience. Leveraging programs offered by the IINSPIRE LSAMP, the ISU Undergraduate Research Certificate is intended to: support the systematic development of the undergraduate student as a researcher; document student co-curricular activities within the student experiential model, and provide students with an added credential to present to graduate schools and employers, but to also. This session will provide details of the URC, including its goals, requirements, implementation, and broader impacts. How other institutions within the alliance can adopt and implement that URC will be discussed

7:00 - 8:30 PM

Invited Speaker

Coral Ballroom - Salon C



Sunday Faronbi

Building Relational Skills to Boost Your Career

You've been working hard through your college years. As a STEM professional, your hard work is about to pay off. You've received and accepted an offer of your dream job. It's the beginning of good things to come. But your technical ability is just the launch-pad. The trajectory of your career is heavily dependent on the relationships you develop. Join us during this networking session to learn practical tips that will help you develop the skills necessary for building strong relationships. The connections you develop will continually give your career the necessary boost it needs at the appropriate times.

SESSION DESCRIPTIONS: Saturday, February 3

8:00-8:50 AM

Keynote Presentation

Coral Ballroom - Salon C



Antentor Hinton

THE TRIALS AND TRIBULATIONS OF GRADUATE SCHOOL: HOW TO MAKE AN IMPACT

This presentation covers how to transition from undergraduate school to graduate or professional school and how to make your mark through time management and effective mentoring. In addition, this talk will also teach one how to identify their learning style, love language so that they know how they want their mentor to show love, help teach one how to network, and how to overcome challenges through renewing your mind with a champion's mindset. Lastly, the presentation will focus on how to overcome the challenges with interviewing and what sets one above the other applicants.

9:00-9:50 AM

YOU ARE DEFINED BY “GRIT”:

AN IN DEPTH LOOK AT HOW GRIT CAN GET YOU WHAT YOU WANT – Coral Ballroom - Salon A

Student Session

SPEAKER

Antentor Hinton, University of Iowa

Saneitha Thomas, University of Florida

In this session, our keynote speakers will talk about how hard work, a champion’s mindset, determination, and belief in yourself (i.e. “grit”) can pave an unlikely road to success. Both will present highlights, experiences, and insights from their career pathway to graduate school and present strategies for on how to deal with yourself, how to imbue yourself with confidence, and how to improve your self image as an underrepresented minority (URM) student in STEM.

SELF-EMPOWERMENT FOR UNDERREPRESENTED STUDENTS IN STEM – Coral Ballroom - Salon B

Student Session

SPEAKERS

Chavely Calleja, Grinnell College

Erica Satchell, Grinnell College

As underrepresented students at a PWI, we wish to engage our audience in a creative discussion about using resources available and creating new resources to further our academic and personal success. We will pose multiple questions and answer them for ourselves to engage conversation. These questions will include discussion of imposter syndrome, documented under-preparation, transition shock as well as lack of embodied mentors. We have found our own transition to a PWI challenging but negotiable and by overcoming and working through our personal issues of asking for support we have developed a greater level of comfort by accepting support from as many resources as possible. We have learned how to make allies with faculty, staff, and our peers. We have learned who we can and can’t trust and talk to honestly about our concerns. We have familiarized ourselves with staff offices and student groups dedicated to helping us succeed and to create new opportunities for leadership where they do not already exist. We want to brainstorm with a more diverse group of students from a variety of institutions about how we can all do better together.

AN INTERDISCIPLINARY RESEARCH APPROACH TO CULTIVATE A SCIENCE

TECHNOLOGY ENGINEERING MATH IDENTITY FOR STUDENT SUCCESS – Coral Ballroom - Salon E

Faculty, Staff, and Professional Session

SPEAKERS

Christopher D. Wentworth, Doane University

Christopher J. Huber, Doane University

Undergraduate research is a useful tool for improving retention of students in STEM majors, but providing these opportunities in a sustainable way at a Predominantly Undergraduate Institution is challenging because students are usually only spending 1 or 2 years conducting research on a part-time basis, leading to the disruption in transfer of knowledge and continuity of the research project. In this presentation, we describe how faculty from the Biology, Chemistry, and Physics & Engineering Departments at Doane University created a biofilm-themed research program called the Center for Undergraduate Research on Biofilms (CURB) that involves students from many different STEM majors in an on-going research experience that provides a supportive environment. This program solves some of the challenges faced by undergraduate research programs at primarily undergraduate institutions because students are all

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linked in one cohort and work with many different faculty members who can provide guidance from various disciplines. This presentation describes the structure and operation of CURB, including the specific activities that help students develop their identity as STEM researchers.

IINSPIRE LSAMP CAREER DEVELOPMENT STUDY: PRELIMINARY FINDINGS – Coral Ballroom - Salon D
Faculty, Staff, and Professional Session

SPEAKERS

Saba Rasheed Ali, University of Iowa

Sarah L. Rodriguez, Iowa State University

J.Y. Cindy Kim, University of Iowa

Meng Xiao, Iowa State University

As the demand for science, technology, engineering and mathematics (STEM) graduates grows, the discussion around educational best practices and policies becomes more important. This session will present preliminary quantitative findings on career development from 16 IINSPIRE LSAMP institutions. This research examined micro-level influences related to how students move within the STEM disciplines and access resources as well as macro-level influences related to program interventions that influenced STEM success. Researchers utilized Social Career Cognitive Theory (SCCT) as a framework to answer the following research questions:

1. Using SCCT, how is engagement in IINSPIRE activities associated with URM students' persistence, performance, and career choice behavior?
2. Are there statistically significant differences among the SCCT variables moderated by institution type, gender, race, social class, and/or the interaction of gender, social class, and race?

Implications will be presented to inform policy practice, and future research based on findings. This study will make students of STEM fields be aware of the ways about how to achieve academic successful and get a better job. Faculty members and institution staff will know how to better serve URM students in STEM.

10:00 - 10:50 AM

CREATING SUCCESSFUL APPLICATIONS FOR RESEARCH OPPORTUNITIES – Coral Ballroom - Salon C
Student Session

PANELISTS

Jodi Graff, University of Iowa

Steve Karsjen, Iowa State University

Denise Martinez, University of Iowa

Raj Raman, Iowa State University

Diana Sproles, University of Iowa

Did you ever wonder what it means to do research in one of the STEM fields? How/when do you start? What exactly you are doing? This session will provide answers to these questions and will give students a great opportunity to meet with a panel of REU leaders from Iowa State University and the University of Iowa. This a great introduction to students who are thinking of applying for undergraduate research. Students will get an opportunity to engage with the panelists and ask questions about how to submit a winning application for their competitive research opportunities and programs.

GRADUATE AND MEDICAL SCHOOL PREPARATION – Coral Ballroom - Salon D

Student Session

MODERATOR

Vincent Rodgers, University of Iowa

PANELISTS

Franklin Bright, University of Iowa

Christopher Coffman, University of Iowa

Victoria Parker, University of Iowa

Jessica Thomas, University of Iowa

Kristen Turner, University of Iowa

Brittany Williams, University of Iowa

Every wonder what it takes to go to graduate school or medical school? Or perhaps you are wondering what are the benefits of a graduate degree like an MS degree or PhD or even the MD? What does it cost and how many more years of school will I need? The panelists in this session are here to answer those questions. There are students just like you who not too long ago had the same questions and concerns. They will give you their own personal stories, strategies that can help you forge your own future. Its never too early to ask how its all works so come join us where you can openly ask questions, take the mystery out of graduate and medical school and prepare yourself for the next decade of your own career.

WRITING A PERSONAL STATEMENT FOR GRADUATE SCHOOL – Coral Ballroom - Salon E

Student Session

SPEAKER

Lori Adams, University of Iowa

Personal statements are often a required component of graduate school applications. In this workshop, participants will learn how personal statements are used by graduate admissions committees, what to (and not to) include in a personal statement, and learn about the ways in which personal and research statements differ. Participants will reflect on ways to include their LSAMP experience into their personal story and leave with a draft of their own personal statement. Laptops or other electronic writing devices are highly encouraged

CREATING STEM THEMED COURSES FOR A GENERAL AUDIENCE – Coral Ballroom - Salon A

Faculty, Staff, and Professional Session

SPEAKER

Cynthia Farthing, University of Iowa

How can we get students who may or may not be science majors to think about the impacts of science and technology on their daily lives? Using popular non-fiction books provides an opportunity to reach a wide range of students and discuss issues that may not be highlighted in typical STEM courses. This presentation will focus on a first-year seminar course developed at the University of Iowa based on the book *Hidden Figures* by Margot Lee Shetterly. The book tells the story of the human “computers” employed at NASA and their contributions to space exploration while shining a light on racial and gender discrimination the women overcame. Topics from the course and sample activities will be shared with the audience. We will also discuss opportunities to make a course like this more interdisciplinary (for example, by partnering with humanities or social science faculty) and brainstorm possibilities for similar courses.

SESSION DESCRIPTIONS: Saturday, February 3

TEACHING INCLUSIVELY IN THE CLASSROOM AND RESEARCH LAB: PROFESSIONAL DEVELOPMENT BY THE CIRTL NETWORK TO ENGAGE CURRENT AND FUTURE STEM FACULTY – Coral Ballroom - Salon B

Faculty, Staff, and Professional Session

SPEAKERS

Don Gillian-Daniel, University of Wisconsin-Madison

Sarah Larsen, University of Iowa

Tonya L. Peeples, University of Iowa

As instructors we strive to create diverse, equitable and inclusive classrooms. Yet disparities exist on our campuses, and in our departments, and unless we have the real conversation little will change. During this session attendees will engage in hands-on and experiential activities that are designed to raise awareness about issues impacting both minoritized students and faculty, and use that cognizance to build new knowledge and skills to teach more inclusively. The Center for the Integration of Research, Teaching, and Learning (CIRTL; <http://www.cirtl.net>) Network is a National Science Foundation Center for Learning and Teaching in higher education. The Network's goal is to improve the STEM learning of all students at every college and university, and thereby to increase the diversity in STEM fields and the STEM literacy of the nation. Participants in this workshop will do the following: (a) reflect on individual and student identity and the impact identity has on learning, (b) learn about inclusive teaching practices and reflect on incorporating one or more into personal instructional use; and (c) learn about how current and future graduate students as well as current faculty can participate in CIRTL Network programming, and in turn enhance their teaching practices for diverse learners.

11:00-11:50 AM

A CELEBRATION OF INDIVIDUAL DIFFERENCES IN A COLORBLIND WORLD – Coral Ballroom - Salon E

Student Session

SPEAKER

J.Y. Cindy Kim, University of Iowa

Only 13% of the STEM workforce and 16% of all STEM undergraduate degree recipients are comprised of Black, LatinX, and Native American individuals (i.e., underrepresented minorities [URMs]; National Science Foundation, 2016). Sustainable racial/ethnic diversification in STEM environments requires a paradigmatic shift from the traditional 'student-deficit' type approach, which focuses on URMs' lack of access to resources and lower preparedness levels, to a more comprehensive social systems approach, that illuminates and addresses psychosocial barriers to better foster STEM climates that signal intellectual safety and belonging (Beasley & Fischer, 2012; Ben-Zeev et al., 2017). Considering social contextual phenomena that occur in higher education and the field of STEM, such as stereotype threat, colorblindness, microaggressions, racism, sexism, eventuate in underperformance and have shown to be strong predictors for URMs' early exit from STEM majors than lack of academic preparation. The colorblind ideology downplays differences based on visibility, which can elicit distrust, disengagement, and cognitive depletion in students of color. Whereas, the ideology of multiculturalism encourages the acknowledgement of individual differences and increases perseverance, ambition, and success in their endeavors. As a critical foundation to racial sensitivity, racial awareness is a necessity for future professionals who want to be prepared to succeed in an increasingly diverse society. The workshop will provide (1) a space for students to reflect on how social stereotypes can affect performance in STEM, and (2) engage in difficult dialogues with fellow students on finding ways to cope and better raise awareness on how their individual differences can strengthen their careers in STEM

**CREATING YOUR INDIVIDUAL DEVELOPMENT PLAN:
PROFESSIONAL DEVELOPMENT BY THE CIRTL NETWORK TO
ENGAGE FUTURE STEM GRADUATE STUDENTS** – Coral Ballroom - Salon B

Student Session

SPEAKERS

Don Gillian-Daniel, University of Wisconsin-Madison

Sarah Larsen, University of Iowa

Tonya L. Peeples, University of Iowa

An individual development plan (IDP) helps undergraduate and graduate students do the following: (a) assess their current skills, interests, and strengths, (b) make a plan for developing new skills to meet academic and professional goals; and (c) communicate with supervisors, advisors, and mentors about evolving professional and personal goals. During this session, we will discuss how to define achievable goals, identify local and national resources, and develop strategies for implementing and sustaining your plans. Participants will use this information to begin creating a personalized plan that takes into account graduate school and career interests and addresses the development of knowledge and skills for professional growth. The Center for the Integration of Research, Teaching, and Learning (CIRTL; <http://www.cirtl.net>) Network is a National Science Foundation Center for Learning and Teaching in higher education. The goal of the CIRTL Network is to improve the STEM learning of all students at every college and university, and thereby to increase the diversity in STEM fields and the STEM literacy of the nation. Participants in this workshop will also learn about how as future graduate students they can participate in CIRTL Network programming.

GRADUATION IS AROUND THE CORNER, NOW WHAT? – Coral Ballroom - Salon C

Student Session

PANELISTS

Paul Faronbi, General Mills

Rodrique Mbog, University of Connecticut (UConn)

Jan Michael Lopez, Pratt & Whitney, Puerto Rico

Queenster Nartey, ORISE Fellow/US FDA

Lizeth Tamayo, MPH Candidate/Susan G. Komen Fellow

Thinking about going to grad school or a career in industry? Or maybe you just want to network with some former IINSPIRE students. Then this group of panelists is for you! The goal of this panel, comprised of current grad students and post-baccalaureate students in STEM, is to share their experiences and address questions through an interactive dialogue with current students. They're here to provide you with the knowledge to what has made them successful in their respective field on their journey from undergrad, to graduate, professional and everything in between. Feel free to ask any questions about their path or why they chose their career. It is our hope that after leaving this session, you get a better understanding on how to be successful in the "real world" whether that is grad school or industry or how to get there if you're still in the planning stages. You won't want to miss this!

SESSION DESCRIPTIONS: Saturday, February 3

DESIGNING AND EVALUATING A FORENSIC SCIENCE ONLINE COURSE FOR UNDERREPRESENTED MINORITY STUDENTS— Coral Ballroom - Salon A

Faculty, Staff, and Professional Session

SPEAKERS

Doug Elrick, Iowa State University

Jiaqi Yu, Iowa State University

Connie Hargrave, Iowa State University

This presentation focuses on a study conducted on the designing and evaluation of a forensic science online course with hands on practical exercises offered to high school students in the Midwest. Key features for attendees will be our design process and highlighted evaluation results. These will be shared during the presentation to demonstrate how we provide a STEM content-rich, self-directed, informal learning environment that effectively engages underrepresented minority students. We aim to share our best practices on course development and evaluation and inform other instructors or researchers who intend to design or evaluate their own online courses in similar contexts.

The participants in the class were part of an extracurricular STEM education program that is associated with a large Midwestern university. As part of the STEM education program, students are required to take 40 hours of STEM training during the summers between their 8th and 12th grades. This online course was developed to meet this requirement as forensic science disciplines associated with a wide variety of STEM topics that are introduced in a realistic investigative format.

RECRUITMENT STRATEGIES: HOW TO IDENTIFY AND RECRUIT STEM STUDENTS AT A COMMUNITY COLLEGE? – Coral Ballroom - Salon D

Faculty, Staff, and Professional Session

SPEAKERS

Jana Fowler, Kirkwood Community College

Susan Harthun, Kirkwood Community College

Ted Weiland, Kirkwood Community College

How do we identify and recruit LSAMP eligible STEM students on our campuses? Our goal is to build a pipeline of highly motivated and talented STEM students. We know these students are on our campuses, the challenge is how to identify and recruit these students! Please join us in a lively sharing session, where we will discuss the ups and downs of identification and recruitment of LSAMP students.

12:10-1:00 PM

Invited Lunch Speaker

Coral Ballroom - Salon C



Juanita Limas

What does it mean to “blend” STEM and society?

URMs are in a unique position to help move STEM fields forward by the perspectives they bring to their research as well as to their community. Historically there has been a disconnect between scientists and the general public. Many don't understand what scientists do, and scientists sometimes face challenges translating their research to non-scientists. Today's climate makes it even more critical to improve lines of communication between these two groups. URMs can facilitate this dialogue bridging gaps and opening lines of communication, in essence, blending STEM and society.

SESSION DESCRIPTIONS: Saturday, February 3

1:10-2:00 PM

STUDENT STEM RESEARCH PANEL – Coral Ballroom - Salon C

All Attendees

SESSION MODERATOR

Queenster Nartey, Grinnell College

PANELISTS

Taha Gesalla, University of Iowa

Juanita Limas, University of North Carolina at Chapel Hill

Paul Faronbi, Iowa State University

This goal of this panel, comprised of current students and post-baccalaureate students in STEM, is to share their experiences and address questions through an interactive dialogue with current students. Some topics the panel will address include: how to better explain science to nonscientists, especially family members that are not familiar with the work but are an important support system, how to balance being a “working student” with part time jobs while taking a full load of classes, and discovering the intersectionality between STEM and other disciplines. The panel will dedicate most of the time answering student questions that can be asked anonymously if needed. Students are highly encouraged to ask questions that they have been struggling with because there is a good probability that someone else has the same problem.

Student Oral Presentations

BICYCLIST SAFETY

Zoe Horak, Cara Hamann, MPH, PhD and Steven Spears, PhD
University of Iowa

In 2015, there were an estimated 45,000 bicyclist injuries and over 700 bicyclist deaths. Cyclist injuries often occur when there is poor awareness from motor-vehicle drivers. Research shows that the Netherlands, Denmark, and Germany all have significantly higher percentages of cyclists than the United States; however, in contrast to those countries, the United States has significantly higher cyclist fatality rates. Females are more risk averse than males and tend to recognize the negative consequences of sharing the road in traffic more than males do. While there is closer to an equal split of male and female cyclists in the Netherlands there is closer to 70% male cyclists in the United States. These findings show that there is a discrepancy in cyclist safety between Europe and the United States. This study investigates how on-bicycle systems affect driver performance and whether cyclists will have additional feelings of safety. On-bicycle systems include, but are not limited to, cameras and lights that have been previously tested to provide researchers with driver and cyclist data. This research expands upon previous findings by investigating driver passing behavior, cyclist stress, and cyclist confidence with and without an advanced bicycle daytime running light system. Furthermore, my focus will be on the stress differences of female cyclists versus male cyclists. Results will provide information about safety system effectiveness, and will inform interventions designed to encourage cycling.

A DATA DRIVEN FRAMEWORK FOR SMART DECISION MAKING IN SMALL AND SHRINKING COMMUNITIES

Matthew Lechowicz, Kimberly Zarecor and Sara Hamideh
Iowa State University

Many American rural communities have been in decline since the 1980s. In the Midwest, most communities have experienced this through shrinking populations, an exodus of younger people, job losses, and aging infrastructure. Evidence shows that these trends have continued over several decades and are unlikely to be reversed. This project aims to fill this gap by developing a new shrink-smart concept for small communities that utilizes data-driven tools to assist them in actively planning for shrinkage. This study has three goals: 1) to demonstrate the feasibility of applying the shrink-smart concept to rural communities, 2) to assess the feasibility of measuring smart shrinkage through data-driven analysis, and 3) to test visualization methods for data analysis and communication to stakeholders. The research will be transformative for the study of small and shrinking communities because of its powerful integrated methodology that combines quantitative data-driven analysis with qualitative understanding of smart shrinkage that is verified through community engagement, spatial analysis, and on-the-ground data collection. This integrated methodology creates a new framework to help community stakeholders understand how and why some small and rural communities are able to protect their quality of life even as they lose population. This approach will also provide new opportunities for communities across the United States to make smart decisions that are likely to mitigate the negative effects of shrinkage before signs of decline appear. In addressing small and rural communities, this project brings attention to underrepresented cases in the research literature.

THE EFFECT OF SURFACE PROPERTIES ON GROWTH RATE OF A PSEUDOMONAS AERUGINOSA BIOFILM IN A GLUCOSE-BASED MINIMAL MINERAL MEDIUM

Helena Valquier-Flynn¹, Christina L Wilson¹, Andrea E Holmes¹ and Christopher D Wentworth²
¹*Department of Chemistry, Doane University,* ²*Department of Physics and Engineering, Doane University*

A biofilm is an accumulation of microbial cells that adhere to a surface and form a polysaccharide matrix. Biofilms can grow on medical implants and other biomedical devices. This is not an ideal situation for patients with implants as biofilm formation may cause an infection requiring treatment and expensive replacement of the device, which makes developing materials for medical devices that inhibit biofilm growth an important research subject. *Pseudomonas aeruginosa* is one example of an opportunistic pathogen involved in biofilm infection of humans. In this investigation, we looked at several properties of surfaces that could impact the growth rate of a biofilm. We considered three surface materials that differ in hydrophobicity and surface profile characteristics, and measured the biofilm growth rate of the PA01 strain of *P. aeruginosa* during the early stages of biofilm formation. The surface materials used were polycarbonate, glass, and slippery BMA-EDMA. We measured hydrophobicity using water contact angle, and average roughness, skewness, and kurtosis of the profile distribution using a laser scanning microscope. We found that the growth rate

Student Oral Presentations

was weakly correlated with surface hydrophobicity and surface roughness, while it was strongly correlated with surface skewness and kurtosis. This suggests controlling surface topography features could be a key to inhibiting biofilm growth.

THE ASSOCIATION OF ADIPONECTIN AND INFLAMMATORY SIGNALS IN ALZHEIMER'S DISEASE

Ana D. Collazo Martinez¹ and Auriel A. Willette, PhD, MS^{1,2,3}

¹Department of Food Science and Human Nutrition, Iowa State University, ²Department of Psychology, Iowa State University,

³Department of Neurology, University of Iowa

Alzheimer's disease (AD) is the most common cause of dementia, accounting for 60-80% of all cases. There is an increasing need of identifying AD biomarkers to ensure early diagnosis, and proper care. Adiponectin (APN) is a metabolic hormone produced by the adipose tissue, also known as an adipokine. One of APN targets is the hippocampus, which is one of the brain regions initially affected in AD patients. In this study, we aimed to identify associations in the AD spectrum between blood markers and APN. In order to do that, APN levels were downloaded and studied from the Alzheimer's Disease Neuroimaging Initiative (ADNI). SPSS linear mixed models assessed plasma APN main effects on neurocognitive scores, known AD biomarkers, metabolic markers and inflammation markers. Increased plasma APN was correlated with higher tau ($p=0.023$, $F=5.225$), anti-inflammatory IL-13 ($p=0.004$, $F=8.252$), and IL-3 ($p=0.007$, $F=7.324$). High levels of APN also predicted lower levels of several inflammation markers including TNF- α ($p=0.019$, $F=5.583$), CRP ($p=0.037$, $F=4.357$), and C peptide ($p<0.001$, $F=54.331$). APN was also negatively correlated with insulin resistance (HOMA IR) ($p<0.001$, $F=28.469$). No significant associations were shown in analyses with neurocognitive scores. In summary, higher APN is associated with elevated levels of baseline tau in patients in the AD spectrum; elevated plasma APN might be associated with lower levels of inflammatory signals and lower insulin resistance. Overall these results show that more research should be done looking at the effects of adipokine levels, specifically APN, and AD diagnosis and progression.

FOOD WASTE EDUCATION FOR ELEMENTARY SCHOOL STUDENTS

Betrina Brewer¹ and Shweta Chopra, PhD²

¹Des Moines Area Community College, ²Iowa State University

By 2050 there is projected to be 9 billion people worldwide. A major concern is will there be enough food. Food waste minimization is an important way to maximize food security. The Food and Agriculture Organization, or F.O.A., of the United Nations estimates one-third of global food production is lost or wasted. There are some global endeavors, such as the Food Loss and Waste Protocol in place to help pinpoint, measure, and reduce food waste. In developed countries, a great amount of food waste is at the consumer level. Institutional food sectors, such as schools, are also a major source of food waste. It is our aim to teach children how food waste affects our economy (cost), landfills, air, water, and soil, or C-L.A.W.S., through questionnaires and interactive teaching tools. The target group of this research is elementary school children beginning at second (2nd) grade. We want to equip the children with the tools to make educated decisions regarding food waste and its reduction. We also endeavor to exhibit how food waste can be repurposed, such as composting. Through teaching the children it is our goal that they will carry what they learned in school to their homes and community. We want them to be knowledgeable of how lessening food waste can aid in lowering pollution, cost, and landfill usage, and heighten food security.

CLINICAL NEUROPSYCHOLOGY AND BRAIN SCIENCES

Taha Gesalla¹, Derrick K. Rollins² and Yong Mei²

¹Des Moines Area Community College, ²Iowa State University

Continuous-time glucose monitoring (CGM) conclusively improves glucose control by providing frequently sampled information that allows the user to associate changes in their glucose levels with changes in their behavior by using Block-oriented modeling (BOM) which is a multiple-input modeling approach for nonlinear dynamic processes. Current implementation of BOM into feedforward control (FFC) results in linearization of the model and decomposition into separate components for each input. This work presents a multiple-input BOM FFC approach that does not linearize and decompose the BOM into separate components for each input. This implementation uses a new FFC law that uses the complete BOM in the time domain. The approach is demonstrated with a Wiener model for a simulated continuous stirred tank reactor (CSTR) with four (4) measured inputs. The Wiener model is nonlinear in the physically-based

dynamic parameters of the transfer functions and linear in the static parameters of the static gain function. The static gain function has a second order linear regression form with interaction and quadratic terms. The Wiener model is built under open-loop conditions using a Box-Behnken statistical experimental design consisting of 27 sequential step tests. Under a sequence of multiple input changes, the addition of this feedforward controller to the feedback controller reduced the standard deviation of the controlled variable from its set point by 70% in comparison to the response with only feedback control.

DOES EXECUTIVE FUNCTIONING MEDIATE LINKS BETWEEN CHILDHOOD ATTENTION-DEFICIT HYPERACTIVITY DISORDER SYMPTOMS AND SUBSTANCE USE AND RELATED PROBLEMS IN ADULTHOOD?

Elissa Monteiro, Jaclyn Kamradt, Allison Momany and Molly Nikolas, PhD
Psychological and Brain Sciences, University of Iowa

Previous literature has established robust associations between childhood attention-deficit/hyperactivity disorder (ADHD) and increased risk of substance use and substance related problems in adulthood. However, work has only begun to examine factors that may account for this association via mediation or moderation. The aim of this study was to determine whether deficits in executive functioning account for the relationship between childhood ADHD symptoms and substance use and related problems. Participants included 349 young adults ages 18-38 years (M=23.33 years, SD=4.79, 54.7% male). Participants completed a multi-informant assessment protocol, including self and informant retrospective measures of childhood ADHD symptoms and ratings of substance use and related problems. Participants' executive functioning was measured with a series of neurocognitive tasks and with self- and informant- ratings of executive functioning. A multiple mediation framework examined whether executive function deficits help to explain these associations. Significant direct associations between ADHD and increased substance use and related problems emerged. Indirect effects involving neuropsychological deficits were non-significant via neurocognitive measures of executive functioning. However, indirect effects involving self- and informant- ratings did seem to mediate these associations via a specific subdomain, restraint. This indicates that executive function processes mediate the association between childhood ADHD and substance use and related problems via restraint.

INVESTIGATING STRUCTURAL CHARACTERISTICS OF MO-BASED HIGH ENTROPY ALLOYS

Mouhamad Said Diallo, Aayush Sharma, Pratik Ray and Ganesh Balasubramanian
Iowa State University

High-entropy alloys (HEAs) are multiple principal elements in equimolar or near equimolar ratios which contain at least 5 principal atomic concentrations between 5 and 35 %. HEAs containing Molybdenum (Mo) are known for their high-temperature strength and superior corrosion resistance. In the present work, we aim to characterize Mo-based HEAs (quaternary and quinary like Mo-Ta-W-Ti-Zr) to analyze phase stability, structural characteristics and oxidation behavior. First, homogeneous material casting experiments would be carried out to make the alloys at desired concentration which will then be subjected to techniques like x-ray diffraction (XRD) to analyze structural characteristics.

Student Posters

CHARACTERIZING FEAR BEHAVIOR IN YOUNG CHICKENS: EFFECTS OF TIME, PREDATOR STIMULI, AND ENVIRONMENTAL CUES

Kayli Ahuja, Parul Dadhwal and Aditi Marella

Department of Psychology & Neuroscience, Augustana College

Posttraumatic stress disorder is characterized by intense fear experienced when an individual is exposed to a stimulus that was present at the time of the traumatic event, or similar to that original stimulus. This association of fear, thought to occur via Pavlovian conditioning, has led to interest in animal fear conditioning as possible models of PTSD. We investigated the role of visual and olfactory environmental cues in triggering fear memories by placing chicks individually in a unique testing environment where chicks in the experimental group were presented with audio-visual predator cues and control chicks remained in the testing environment in the absence of any predator cues. We were interested in characterizing the fear behavior of chicks (operationalized as a reduction in activity) in response to this model of fear conditioning and, in particular, to test whether experimental chicks would show fear memory when they were reintroduced to the environment 24h after exposure to predator cues. Our data revealed several main effects and interactions that will be discussed, including changes in fear behavior due to passage of time alone, possible impact of olfactory cues on fear behavior, fear in response to the predator stimuli, and possible evidence of fear memory.

DELETION OF OPA-1 ALTERS CALCIUM HOMEOSTASIS AND LEADS TO AN INCREASE IN MCU PROTEIN LEVELS

Serif Bacevac, Dale Abel, Renata Pereira and Antentor Hinton

University of Iowa

Optic atrophy 1 (Opa-1) is the mitochondrial GTPase responsible for inner membrane fusion. We have demonstrated that depletion of OPA-1 using adenovirus cre (AAV-cre) decreases mitochondrial respiration, increases ER stress markers, and FGF-21 protein levels in primary myoblasts and myotubes in an OPA-1 deficient mouse model. However, we are unsure how the deletion of OPA-1 leads to an increase in FGF-21 protein levels and an increase in ER stress markers. Therefore, we hypothesize that deletion of OPA-1 disturbs calcium homeostasis through altering expression levels of mitochondrial calcium uniporter (MCU) in skeletal muscle which leads to an increase in FGF-21 levels. We used western blot, immunostaining, and FlexStation analysis to measure calcium levels and calcium associated proteins. We found that the loss of OPA-1 in primary myoblasts and myotubes and the deletion of OPA-1 in skeletal muscle increased MCU protein levels, and that blockade of MCU in OPA-1 deficient primary myoblasts increased calcium levels in the cytoplasm. Together, we showed that calcium may increase in the cytoplasm after OPA-1 deletion and this alteration in calcium homeostasis may be due to an increased expression of MCU. We also showed that this increase in calcium and calcium associated proteins may mediate the increase in FGF-21.

EVALUATING THE HYDROLOGIC EFFECTS OF STREAM SEDIMENT DYNAMICS USING A LABORATORY FLUME

Abdul Bagi¹, Andrew Crag², David Webber², U. Sunday Tim² and Steve Mickelson²

¹*Des Moines Area Community College*, ²*Iowa State University*

The hydrologic effects of stream sediment dynamics were examined using a 38 ft-long x 4 ft-wide laboratory flume located in the Department of Agricultural & Biosystems Engineering, Iowa State University. Eight 3 ft-long partial dams or levees were fabricated from Styrofoam, and affixed to the bottom of the flume in a staggered "spur dike" arrangement with an equal distance of 16 inches between each barrier. A plastic-based sand-sized granular material (melamine) was used to simulate sediment transported in streamflow. Results of two separate flow trial "cases" showed that each levee was subject to sediment deposition, which generally occurred on the downslope side of levee. It was also observed that sediment deposition decreased at each levee moving downstream along the flume flow path.

QUANTIFICATIONS OF BIOFILMS ON POROUS OIL-INFUSED POLYMERIC SURFACES WITH FLUORESCENCE MICROSCOPY

Bailey Brigham, Christina Wilson, Jasmin Sandoval, Michael Kangas, Brett Schofield and Andrea Holmes

Doane University

Biofilms present a problem in the medical field because of their resistance to treatments such as antibiotics which can lead to infections and costly medical procedures. One promising method to prevent biofilm growth is to coat surfaces

with Slippery Lubricant Infused Polymers (SLIPS) which has been shown to possess anti-biofouling properties to reduce the growth of these bacteria. The purpose of this study was to determine the effectiveness of slippery BMA-EDMA, a liquid perfluoropolyether infused porous polymer, on *Pseudomonas Aeruginosa* (PA) strain 14 biofilm formation in a drip flow reactor. To assess how the biofilms react to this environment, fluorescence microscopy and ImageJ was used to quantify and visualize the growth.

EFFECTS OF PYRUVATE KINASE ON FDG AND GREY MATTER VOLUME

Jonathan Cerna, Brandon Klinedinst and Auriel Willette

Iowa State University

Characteristic pathologies of Alzheimer's Disease (AD) have been previously attributed to accumulation of beta-amyloid, neurofibrillary tangles of hyper-phosphorylated tau, along with genetic predispositions to the disease. However, compelling evidence is now showing that another root cause that might have been overlooked is the critical role that mitochondrial function and other bioenergetic pathways might play in the progression of AD. Considering the recent acknowledgement of the importance of bioenergetic pathways in the progression of AD, my research focus attempts to identify critical biomarkers that might aid to identify signs of dysfunction in the mitochondria and surrounding cytoplasmic proteins in order to understand and potentially foresee ongoing degradations in the cellular machinery of the brain.

KETOGENIC DIET RESCUES CARDIAC HYPERTROPHY AND HEART FAILURE INDUCED BY LOSS OF THE MITOCHONDRIAL PYRUVATE CARRIER 1

Jesse Cochran¹, Paul Taufalele¹, Kevin Lin¹, Yuan Zhang¹, Tom Cassier¹, Lawrence Gray¹, Eric Taylor¹, Jared Rutter² and Dale Abel¹

¹*Fraternal Order of Eagles Diabetes Research Center, University of Iowa*, ²*Biochemistry, University of Utah*

The healthy adult heart utilizes substrates flexibility to maintain cardiac function. Glucose and lactate metabolism requires conversion to pyruvate, which is then transported into mitochondria for further oxidation. The mitochondrial pyruvate carrier (MPC) transports pyruvate across the mitochondrial inner membrane, the absence of which should severely restrict mitochondrial glucose/lactate oxidation. Cardiomyocyte-specific MPC1 knockout mice (cMPC1^{-/-}) were generated to investigate the role of pyruvate transport on cardiac function. CMPC1^{-/-} mice develop pathological cardiac hypertrophy at the age of 8 weeks and age-dependent heart failure by 18-weeks of age. Ketone bodies are an important alternative cardiac fuel, particularly in failing hearts. CMPC1^{-/-} mice were fed a ketogenic diet at different ages (3, 10 and 18 weeks old) to determine if ketones could rescue cardiac hypertrophy and heart failure induced by loss of MPC. Ketogenic diets commenced at 3-weeks of age revealed that cardiac hypertrophy and heart failure was completely prevented in cMPC1^{-/-} mice. Initiating ketogenic diet in 10 weeks- old cMPC1^{-/-} mice, after the development of compensated cardiac hypertrophy, led to regression of LV hypertrophy and maintenance of cardiac function. cMPC1^{-/-} mice that developed heart failure at the age of 18 weeks were fed the ketogenic diet for 3 weeks, yielding a significantly improved cardiac structure and function as indicated by decreased left ventricle mass and increased ejection fraction. In conclusion, ketogenic diets rescue cardiac hypertrophy and heart failure in MPC1 deficient hearts, supporting a model in which substrate limitation mediates the cardiomyopathy that develops in response to impaired pyruvate oxidation.

HISTORICAL ROOTS OF MATH AND PHYSICS IN THE BRITISH ISLES

Jeannie C. Dees

Wartburg College

In this presentation, you will find there were many self- taught mathematicians that lived in what is now called the British Isles. For twenty-three days, I have had the pleasure of back-packing around the United Kingdom and Scotland to see where, how, and why these brilliant minds came across some of Math and Physics greatest topics. From Sir Isaac Newton's discovery of gravity and Theory of Light to Sir William R Hamilton's notebook containing the work for classical mechanics and mathematical equations. The most general take away you should receive from this poster is that these great minds struggled with some of the same things that we all struggle with today.

Student Posters

DECISION-MAKING AND RISK-TAKING IN THE WISTAR HAN RAT

Diane Delgado^{1,2}, Marion Rivalan¹ and Lucille Alonso¹

¹Humboldt Universität zu Berlin, ²Wartburg College

Poor decision-making has been found to be a common trait among patients with mental illnesses, but also in healthy patients profiled as poor decision makers as assessed by the Iowa Gambling Task (IGT). The Rat Gambling Task (RGT) resembles the IGT but is used on rodents. Each rat's advantageous choice selection in the last 20 minutes of the RGT determines the rat's decision-making profile. Previously, poor decision makers were found to be more prone to risk taking than good decision makers as observed through the Dark/Light Box and the Elevated Plus Maze (EPM). The purpose of the current study was to further investigate the relationship between decision-making and risk-taking. We hypothesized that poor decision-making rats would be higher risk takers. Decision-making profiles were determined based on the amount of advantageous choices a rat made in order to obtain food rewards in the RGT. Risk-taking behavior was measured through the number of entries and the amount of time spent in the last third of the open arms of the EPM. Results from the RGT indicated there were inter-individual differences among each group of rats. However, no differences were observed between good decision makers and poor decision makers in the number of entries or the amount of time spent in the last third of the open arm of the EPM. Therefore, this study did not find any relationship between decision-making and risk-taking and was unable to replicate previous findings. Different methods between studies could have accounted for the different findings.

AN INTRODUCTION TO BIOLOGY: THE EFFECT OF TEMPERATURE ON THE REGENERATION RATE OF PLANARIA

Dwayne Emsweller

Upper Iowa University

This poster is about learning different scientific skills and procedures while studying the regeneration rate of planarian flat worms, and how the regeneration is affected by temperature. I hypothesized that cold temperature would prevent regeneration. To test this, planarian regeneration was compared between a control group at room temperature and an experimental group in the cold. In the experiment, I used a scalpel to sever the heads of planaria, placed both the heads and tails into water, and prepared to measure their length over the regeneration period. The experimental group was then kept at 4°C and the control group was at 22°C. After two days, the planaria of the experimental group died, while the control group survived two weeks. Therefore, I concluded that cold temperatures prevented the survival of the planaria; however, I was unable to determine the effect of cold on regeneration rate. This was one of my first experiences working with a scientific project of my own, and even though I could not determine whether the hypothesis was supported, I was still able to learn a lot about planaria and how they survive in different environments. I also learned about how to work with lab partners, practiced critical thinking skills, and realized that it's ok to make and learn from mistakes. These skills will help me as I move on to more challenging labs and advanced classes in the sciences.

BIOCHAR'S VARYING EFFECTS ON NATIVE, INVASIVE, AND EXOTIC GRASS SPECIES

Alexis Fletcher, Ivy Banks and Erin Lahowetz

Doane University

Over the course of our summer research, we studied the effects of two specific biochars on various species of native, exotic, and invasive grass species. Biochar is the result of organic material burned at extremely high temperatures with a low oxygen content. We created biochar of coffee grounds and the readily available smooth brome grass, burning it at a pre-determined temperature with a specially designed machine reminiscent of a very small oven. The grasslands of Nebraska are plagued with various non-native species that threaten to completely overwhelm and exterminate the organisms that actually belong here. With the loss of just one species, it could set off a chain reaction that exterminates countless others. Our goal was to determine just what the application of these two biochars would cause, and if it would positively or negatively impact not only the invasive and exotic grasses, but the native as well. One of the most well known invaders of the Nebraska prairies is smooth brome grass, originally brought to our soils from Europe in the 18th century, with the intention of using it as livestock feed; that is, in fact, still the purpose it serves to this day. However, it has grown far beyond anyone's wildest predictions, and past our control as well; if it's allowed to continue its alarmingly fast spread, we could see a complete end to several very important species in a delicate ecosystem within our lifetimes.

DEVELOPING AND EVALUATION GRID SEARCH METHODOLOGY TO DETERMINE THE DEAD TIMES IN MULTIPLE INPUTS DYNAMIC MODELING

Taha Gesalla¹, Derrick K. Rollins² and Yong Mei²

¹*Des Moines Area Community College*, ²*Iowa State University*

Continuous-time glucose monitoring (CGM) conclusively improves glucose control by providing frequently sampled information that allows the user to associate changes in their glucose levels with changes in their behavior by using Block-oriented modeling (BOM) which is a multiple-input modeling approach for nonlinear dynamic processes. Current implementation of BOM into feedforward control (FFC) results in linearization of the model and decomposition into separate components for each input. This work presents a multiple-input BOM FFC approach that does not linearize and decompose the BOM into separate components for each input. This implementation uses a new FFC law that uses the complete BOM in the time domain. The approach is demonstrated with a Wiener model for a simulated continuous stirred tank reactor (CSTR) with four (4) measured inputs. The Wiener model is nonlinear in the physically-based dynamic parameters of the transfer functions and linear in the static parameters of the static gain function. The static gain function has a second order linear regression form with interaction and quadratic terms. The Wiener model is built under open-loop conditions using a Box-Behnken statistical experimental design consisting of 27 sequential step tests. Under a sequence of multiple input changes, the addition of this feedforward controller to the feedback controller reduced the standard deviation of the controlled variable from its set point by 70% in comparison to the response with only feedback control.

WHAT I LEARNED IN FORENSIC SCIENCE

Zory Hamblin

Upper Iowa University

In this poster, I present on my experience learning the laboratory techniques of forensic science in CHEM 103 Forensic Science Lab at Upper Iowa University. Through this experience, I learned hands-on techniques related to crime scene investigation, such as evidence gathering, analysis of glass, fingerprints, and fabric, as well as chemical investigation of urine samples and blood alcohol levels. I improved STEM skills including becoming comfortable with computers and instruments, practiced quantitative skills for solutions and analysis, and saw how chemistry was applied in these forensic techniques. The experience of this class was important to my overall understanding of what it means to be a forensic scientist. Many people have an incorrect understanding of forensic science based on examples in entertainment. Prior to my experience with my forensic science classes, I thought that the scientists were the evidence gatherers, but after taking the forensic science laboratory I now have a better understanding of the roles of the scientists and how they work with the police force in their separate areas. Before this class, I didn't think forensic science was "for me," but after taking this class, I realized I love the hands-on techniques, and the experience has confirmed my interest in this area. This poster would help other students gain an understanding of the lab procedures of forensic science.

COMPARING THE EFFECTS OF RESTRICTING IRRIGATION ON DIASCIA AND LOBELIA GROWTH AND DEVELOPMENT

Myra R. James¹, Nicholas J. Flax², Christopher J. Currey² and Alexander G. Litvin²

¹*Department of Mechanical Engineering*, ²*Department of Horticulture*, *Iowa State University*

Restricting irrigation can be a means for non-chemical growth control and resource conservation. There are a wide variety of spring bedding plant taxa and few species-specific reports of the effect of restricted irrigation. Our objectives were to quantify the effect of restricted irrigation on growth, quality, and water use of diascia (*Diascia barberae*) and lobelia (*Lobelia erinus*). Rooted cuttings of lobelia and diascia were individually planted into 11.4-cm-diameter petroleum-based plastic containers filled with a commercial peat-based soilless substrate amended with controlled release fertilizer, and grown in a glass-glazed greenhouse. Plants were provided with drip stakes connected to a capacitance soil moisture sensor-controlled irrigation system that maintained substrate volumetric water contents (VWC) of 0.20, 0.30, or 0.40 m³·m⁻³ throughout the experiment. Five and six weeks after treatments were initiated, data were collected for diascia and lobelia, respectively. Data recorded and calculated included the time to flower, height (diascia only), diameter, shoot dry mass (SDM), and total irrigation volume, and water use efficiency (WUE). Based on the results of this study, restricted irrigation reduces water use for both species, but the effect on growth control varied between lobelia (insensitive) and diascia (sensitive).

Student Posters

SYNTHESIS OF INDIUM BASED COORDINATION POLYMER

Paul Karanja, Boyce Chang, Giovanni Rodriguez and Martin Thuo
Iowa State University

Porous metal oxides with molecular sized periodic structures have attracted a lot of attention due to their range of application in storage and transformation of small molecules. More application includes indium nanoparticles in production of transparent conductive coatings in electronics. (1) Owing to its band gap of 3.4 -3.7 eV indium oxide is an n-type semiconductor especially when doped with tin, forming tin oxide. Production of indium oxide is difficult and expensive when methods such as sol gel and electrolytic refining are employed. We produce porous oxides by forming metal organic coordination polymers continuously etching metal particles. The coordination polymer formed is heat treated through which organic content is eliminated to form a porous material. We demonstrate that the absorptive properties and morphology of the material can be tuned by varying temperature. X-ray diffraction is also employed to ascertain the changes in crystal structure.

THE ANTITUMORIGENIC EFFECTS OF NATURAL COMPOUNDS, CONESSINE AND CARDAMONIN, ON MDA-MB-231 BREAST EPITHELIAL CELLS

Madison B. Kinder and Scott Gehler
Augustana College

Instead of eradicating cancer in the body, natural compounds, such as cardamonin and conessine, may be able to stifle cancer cells' migration and thus hinder tumor ability to metastasize. Conessine and cardamonin are natural compounds that have been shown to have antitumorigenic properties on some forms of cancer cells, but little has been researched on the effects of these compounds on breast epithelial cells. Conessine inhibited MDA-MB-231 cell proliferation in a dose-dependent manner, while increasing concentrations of cardamonin increased cell proliferation. However, MDA-MB-231 cell migration decreased when treated with either conessine or cardamonin using both scratch assays and transwell assays. Furthermore, conessine inhibited cell adhesion at varying concentrations with an approximately 39% reduction in cell adhesion when treated with 40uM conessine. However, cardamonin had no effect on cell adhesion. In addition, there was a 20-29% reduction in focal adhesion area, as assessed using an anti-FAK397 antibody, when treated with either conessine or cardamonin. These results suggest both conessine and cardamonin have inhibits both breast epithelial cell migration and adhesion. However, additional experiments are necessary to further elucidate the mechanisms by which these natural compounds mediate their effects.

DEVELOPMENT OF A COLORIMETRIC SENSOR ARRAY TO DETECT QUORUM SENSING MOLECULES IN BIOFILMS

Nathan Kyes, Josh Forrest, Sharmin Sikich, Michael Kangas and Andrea E. Holmes
Doane University

Biofilms are colonies of microorganisms that have the ability to adhere on various surfaces. They are important because biofilms can cause biomedical concerns including infections that are resistant to antibiotics. Quorum sensing molecules are a method of communication between cells of the biofilm and are used to regulate various processes in the cells. Colorimetric sensor arrays will allow for a non-destructive method to measure the quorum sensing compounds in situ. Selective and sensitive sensors to the detect quorum sensing compounds, such as farnesol in candida albicans, have been successfully developed and tested.

DEFICITS IN REM SLEEP TWITCHING INDICATE DEVELOPMENTAL DELAY IN AUTISM MOUSE MODEL

Rikki S. Laser^{1,2}, Zipeng You¹, Cassandra M. Coleman¹, Greta Sokoloff¹ and Mark S. Blumberg^{1,3,4}

¹Department of Psychological and Brain Sciences, ²Iowa Biosciences Academy, ³Department of Biology, ⁴Iowa Neuroscience Institute, The University of Iowa

Autism is a neurodevelopmental disorder that affects approximately 1% of the population. Although primarily known for producing deficits in social behavior, autism is also characterized by motor deficits. As social deficits are not noticed until children begin school, these motor deficits may be the key to earlier diagnosis. Previous studies have shown abnormalities in rolling, crawling, and walking, which are expressed from a few months of age to a year. In contrast, myoclonic twitching begins in the womb. Here, in order to see if myoclonic twitching can be a sensitive indicator of

motor deficits in autism, we compared the twitch activity of infant 16p11.2 del/+ mice—thought to provide one model of autism—to the twitch activity of wild-type littermates. Through the use of high-speed videography and motion tracking, we found lower rates of twitching and altered twitch-burst organization at postnatal days 4 and 6 in the 16p11.2 del/+ mice. Our findings suggest that, early in development in this mouse model of autism, twitching can be used to detect subtle sleep-related differences in motor behavior. This approach may prove useful for detecting risk in autism and other neurodevelopmental disorders.

A DATA DRIVEN FRAMEWORK FOR SMART DECISION MAKING IN SMALL AND SHRINKING COMMUNITIES

Matthew Lechowicz, Kimberly Zarecor and Sara Hamideh

Iowa State University

Many American rural communities have been in decline since the 1980s. In the Midwest, most communities have experienced this through shrinking populations, an exodus of younger people, job losses, and aging infrastructure. Evidence shows that these trends have continued over several decades and are unlikely to be reversed. This project aims to fill this gap by developing a new shrink-smart concept for small communities that utilizes data-driven tools to assist them in actively planning for shrinkage. This study has three goals: 1) to demonstrate the feasibility of applying the shrink-smart concept to rural communities, 2) to assess the feasibility of measuring smart shrinkage through data-driven analysis, and 3) to test visualization methods for data analysis and communication to stakeholders. The research will be transformative for the study of small and shrinking communities because of its powerful integrated methodology that combines quantitative data-driven analysis with qualitative understanding of smart shrinkage that is verified through community engagement, spatial analysis, and on-the-ground data collection. This integrated methodology creates a new framework to help community stakeholders understand how and why some small and rural communities are able to protect their quality of life even as they lose population. This approach will also provide new opportunities for communities across the United States to make smart decisions that are likely to mitigate the negative effects of shrinkage before signs of decline appear. In addressing small and rural communities, this project brings attention to underrepresented cases in the research literature.

MECHANISMS FOR INSULIN-DEPENDENT REGULATION OF SKELETAL MUSCLE MITOCHONDRIA BY OPA-1

Yahang Li, Serif Bacevac, Ariana Dewan, Margaret Mungai, Jordan Samuel, Antentor Othrell Hinton, Renata Pereira Alambert and E. Dale Abel

University of Iowa

Optic atrophy 1 (Opa-1) is the mitochondrial GTPase responsible for inner membrane fusion. Insulin has been shown to increase mitochondrial fusion in cardiomyocytes. OPA-1 also mediates cristae remodeling to enhance mitochondrial bioenergetics, by forming oligomers. Oligomerization of OPA1 is independent of its ability to increase mitochondrial fusion, however, it is unknown if insulin signaling increases OPA1 oligomerization. We hypothesize that insulin stimulation will increase OPA-1 protein levels, increase mitochondrial respiration, and increase OPA-1 oligomerization in primary skeletal muscle cells. To determine this, we used primary OPA11 fl/fl myoblasts and myotubes and gave insulin stimulation after starvation to determine mitochondrial respiration, protein levels of OPA-1 and pAKT. We showed that insulin stimulation increased Opa-1 and pAKT levels and increased mitochondrial respiration. We also demonstrated that depletion of OPA-1 using adenovirus cre (AAV-cre) decreases mitochondrial respiration and increases ER stress and FGF-21 in primary myoblasts and primary myotubes. Furthermore, we demonstrated that downregulation of OPA-1 decreases mitochondrial respiration after insulin treatment in primary myotubes. Lastly, we showed we can detect oligomers in primary myoblasts and myotubes. Together we have demonstrated that insulin increases OPA-1 protein levels and that downregulation of OPA1 alters metabolic responses to insulin.

DISCOVERY OF PHAGES BUSTERM & CLOVERFIELD

Emily Miller and Allie Wilson

Nebraska Wesleyan University

During the Fall semester of the 2017 school year, the Introduction to Biology Inquiry class participated in the Science Education Alliance Phages Program (SEA-Phages Program). From collected soil samples students attempted to isolate and discover a novel bacteriophage. The objective of this experiment was achieved through isolation, purification, amplification, extraction and characterization of the bacteriophage. These methods aided in the discovery of new information for the phage database (The Actinobacteriophage database: phagesdb.org).

Student Posters

EFFECTS OF SEX HORMONES ON NEURITE DEVELOPMENT IN PC12 CELLS

JulieAnna Olague, Abby Mokhtary, Zane Strawser and Keith J. McClung
Wartburg College

Neuronal differentiation is vital to the composition and development in the nervous system (Dobashi et al. 1995). Creating neuron development models in cell culture has been difficult (Singh et al. 2008), therefore, Rat Pheochromocytoma cells from the PC12 line are commonly used as models for experiments pertaining to neuronal differentiation (Manger 2006), NGF, nerve growth factors, are neurotrophins that are important and essential for neuronal development, growth, and survival (Liu 2013). NGF promotes neurite outgrowth in PC12 models, and NGF with estradiol enhances the neurite outgrowth (Ferriere et al. 2013). Although a receptor for testosterone is present on PC12 cells, little is known about the impact testosterone may have on neurite outgrowth (Estrada et al. 2006, Alexaki et al. 2006).

To determine the impact of sex hormones on neurite outgrowth, experimental treatments were conducted with a PC12 model. Treatments consisted of estradiol, estradiol with NGF, testosterone, testosterone with NGF, and NGF as our positive control, as well as a negative control group with no treatment. Analysis was completed through fluorescent and phase microscopy to observe the length of neurite outgrowth. Our data suggests that the presence of either estradiol or testosterone, with and without NGF, promotes neurite outgrowth in PC12 cells.

MICE LACKING OPA1 IN ADIPOSE TISSUE ARE RESISTANT TO DIET-INDUCED OBESITY AND INSULIN RESISTANCE

Angela Olvera, Renata Pereira, J. White, S. Fang, R. McGlaufflin, M. J. Potthoff and E. D. Abel
FOE Diabetes Research Center, University of Iowa, Carver College of Medicine

Optic Atrophy 1 (OPA1) is a mitochondrial protein that plays fundamental roles in mitochondrial fusion, cristae morphology and respiratory function. Normal mitochondria function is important for adipocytes to maintain balance between energy storage, in white adipose tissue, and expenditure, in brown and beige adipose tissues. However, the specific contribution of OPA1 to adipose tissue physiology in vivo is not known. To study the contribution of OPA1 to energy balance in diet-induced obesity (DIO), we generated mice lacking OPA1 specifically in adipocytes (KO mice). Under basal conditions, young (10 weeks of age) KO mice had similar body mass compared to wild type (WT) mice, however BAT was enlarged and resembled WAT histologically. After weaning mice were placed on a control diet (10% fat) or a high-fat diet (60% fat) for 12 weeks. Surprisingly, OPA1 deletion prevented DI weight gain at the expense of reduced total fat mass and decreased individual fat pad weights. Energy expenditure was increased in KO, without significant changes in food intake and activity levels. Moreover, DI insulin resistance was also attenuated in KO mice, as shown by improved glucose and insulin tolerance and reduced serum insulin levels. Fibroblast Growth Factor 21 (FGF21) circulating levels were elevated in KO mice, which correlated with increased FGF21 protein levels in WAT and BAT. Taken together, these data identify a role for OPA1 in lipid metabolism, completely preventing fat mass expansion in response to a HFD and improving insulin sensitivity, by mechanisms that may involve induction of FGF21.

BITS AND PIECES: STEGANALYSIS FOR LEAST SIGNIFICANT BIT REPLACEMENT

Macy Neblett², **Madelaine Quistgaard**⁴, Amanda Rae³, Kahlil Sample¹, Anna Steffensmeier³, Jennifer Newman³ and Stephanie Reinders³

¹Albany State University, ²Fayetteville State University, ³Iowa State University, ⁴Upper Iowa University

Steganography is the practice of hiding a message (called a “payload”) in a digital image (a “cover image”) in a way that is undetectable to the human eye. A “stego image” is the result of hiding a payload in a cover image. This is commonly used by criminals/terrorists to communicate. The attempt to detect whether a digital image has a hidden payload is referred to as steganalysis, and this technique is used by computer forensics analysts to identify these types of attacks. We create stego images by implementing least significant bit (LSB) replacement embedding, a steganographic method for hiding a payload in a cover image. Following best practices in the field, we use grayscale png images as our cover images. A common assumption made by steganalysts is that message texts are encrypted in such a way that the resulting payloads are binary strings with roughly uniform distributions of zeros and ones. We pseudo-randomly generate strings of zeros and ones to use as payloads. While changes made to the LSBs of the cover images are visually imperceptible, they can be detected by the “chi-square attack”, a steganalysis method based on a chi-square goodness-of-fit test. We demonstrate this technique by applying chi-square tests to our cover and stego images to detect the hidden payloads.

NO SIGNIFICANT INFLUENCE OF FOOD PRESENCE ON THE ESCAPE BEHAVIOR OF FOX SQUIRRELS (SCIURUS NIGER)

Konpal Rafique and Grace Moravec
Nebraska Wesleyan University

The opportunity to participate in a Biology Inquiry course studying the behaviors of Fox Squirrels on the Nebraska Wesleyan Campus was presented to first year students during the Fall Semester. After observation of the behavioral patterns of Fox Squirrels, students were given asked to choose an underlying biological phenomenon to research in depth. Studying the effects of the Optimal Escape Theory was decided upon for this project. According to the escape theory proposed by Ydenberg and Dill (1986), an animal should start to flee when its estimate of the cost of staying exceeds its estimate of the cost of flight. In addition, when a perceived predator approaches the animal and its risk outweighs the benefit of the resources in the area, the animal flees. The distance at which the risk of the predator outweighs the benefit of a given area is known as the flight initiation distance (Ydenberg and Dill 1986). Essentially, the conditions of food presence and optimal escape were being observed through experimentation. The squirrels, when approached by a perceived predator (human), must balance the benefit of staying with the risk of harm by predators. The hypothesis, that stated the presence of food will add to the benefit perceived by Fox Squirrels and result in a decreased flight initiation distance, was studied through the application of a T-Test and ANOVA test on collected data. In the end, the hypothesis was not confirmed – possibly due to an element of predator awareness that arose with the lack of food.

A BIOPSYCHOSOCIAL INVESTIGATION OF PUBERTAL TIMING EFFECTS ON ADOLESCENT MENTAL HEALTH

Callie Shannon, Josie Ullsperger and Molly Nikolas
University of Iowa

Extensive research examining prevalence rates of adolescent psychopathology has shown that individuals progressing through this developmental period are at high risk for mental health issues. More specifically, there is robust evidence indicating that adolescents who enter puberty earlier relative to their peers appear to be at even greater risk for developing mental health problems, potentially due to the upsurge in hormones at puberty and their downstream effects on neural functionings. The current study aimed to assess the relationship between pubertal timing and adolescent mental health, as well as the role of neurocognitive functioning and personality traits as potential mechanisms of pubertal timing effects on psychopathology. That is, do early-developing adolescents, who also have particular neurocognitive or personality profiles, have increased risk for externalizing or internalizing behavior problems compared to other early-developing adolescents. In order to address these aims, 150 adolescents age ten to fourteen were brought in to the lab to complete a series of neurocognitive tests, questionnaires about personality, behavior, and pubertal maturation, and have their height and weight measured. Additionally, one parent was brought in to complete a diagnostic interview, and fill out questionnaires about the child's developmental health history. As data analyses begin, we hope to expand upon the current understanding of the association between pubertal timing and adolescent mental health, as well as pathways of these effects which may also vary by sex. Findings from the current study will have important implications for psychoeducation, prevention, and intervention efforts for early-developing adolescents. We hope this research helps ease the effects of the pubertal transition for all adolescents, but particularly early developing youth with certain personality traits and neurocognitive profiles.

RESEARCH INTERNSHIP AT IOWA STATE UNIVERSITY

Omeiza Suleman
Upper Iowa University

During the summer of 2017, I was a Research Intern at Iowa State University. While at the Biorenewables Department, I learned research methods among other undergraduate and graduate students. These research methods included fieldwork and lab work.

Fieldwork included data collection at the Iowa State farms. This soil compaction research was conducted at a construction site. Lab work included analyzing data collected in the field. This data was used to make predictions for the harvest and future seasons. Lab work was also comprised of 3D modelling for various farm parts. This summer research helped give insight to Masters and Ph.D. programs and job searches with regards to the STEM fields and research.

Student Posters

DEVELOPMENT OF CANCER CELLS IN ZEBRAFISH

Victoria E. Villanueva, Jeffery Essner, Maura McGrail, Melanie Torrie, Trevor Weiss, Nicole Ackerman, Quihan Jiang, Torrie Dash
Iowa State University

Genes P53 and Rb1 are tumor suppressors crucial to cell regulation. P53 and Rb1 play a critical role in regulating cell growth and controlling cell division which prevent the progression of cancer. This project is designed to observe the development and the spreading of cancer cells in zebrafish by blood vessels or other growths when these genes are not suppressed. This is done by observing single mutant (p53, Rb1) and double mutant zebrafish (p53 and Rb1). Cmyb-egfp transgenic line is used as a marker in this experiment to determine the location of where stem cells will travel to and whether they contribute to cancer formation as well as how they contribute. By mutating zebrafish with CRISPR/Cas9, we are able to gain a better understanding and determine if our single or double mutant genes will enhance cancer development through blood vessels or other growths. We also aim to gain insight on whether our double mutant (P53 and Rb1) will have a stronger effect on the development of cancer cells.

TEACHER QUESTIONING: A CASE STUDY OF A KINDERGARTEN TEACHER

Ayanna Wallican Green and Dr. Chepina Rumsey
University of Northern Iowa

When talking to younger children you may “dumb” concepts down so they will understand what you are saying. Kindergarteners are young scholars and may understand questions that you may not expect them to be able to understand. As I observed one Kindergarten classrooms lesson from each month of the 2016-2017 school year I explored the various types of questions the teacher asked. The questions were not just yes or no questions. Some questions get complex which lead us to create categories based on literature that was written for teachers to understand how to create questions for their young scholars. My poster shows the types of questions that were asked from September to May and how they have evolved in one Kindergarten classroom.

SVYM INTERNSHIP EXPERIENCE

Erik Zorrilla
Upper Iowa University

Swami Vivekananda Youth Movement (SVYM) is an organization has been around since 1984 in the state of Karnatka, India. Initially, the goal was to provide cost-effective medical treatments for the poorer and tribal communities around the Mysore area. The organization has impacted over 2.5 million people, provided over 522 full-time jobs (80% locals) and initiated over 40 community based projects. As a result, the organization has established partnerships with over 100 international universities (including Ivy League institutions) along with government agencies throughout India. This summer I traveled to India where I volunteered for 4 weeks with SVYM and traveled alone for 1 week. When I arrived to the Bangalore International Airport I was greeted by a crowd of strangers and was given the task of finding the driver. I was then driven down south three hours to Mysore, where I was introduced to the SVYM program along with South Indian culture.

Student Opportunities Fair Exhibitors

BIOLOGICAL MATERIALS AND PROCESSES

RESEARCH EXPERIENCE FOR UNDERGRADUATE STUDENTS (BioMAP REU)

The Department of Chemical and Biological Engineering at Iowa State University hosts the Biological Materials and Processes Experience for Undergraduates (BioMaP REU) summer research experience for undergraduate students. This opportunity is open to U.S. citizens and permanent residents. The program creates novel research experiences for undergrad students from around the country in the areas of biological materials and processes. Students are active members of interdisciplinary groups and interact with faculty, post-doctoral researchers, graduate students and industry. Students may also participate in cohort experiences such as short courses, joint seminars/meetings, workshops, tours of research facilities and field trips.

CENTER FOR BIORENEWABLE CHEMICALS REU PROGRAM (CBiRC)

The National Science Foundation's (NSF) Engineering Research Center's Center for Biorenewable Chemicals (CBiRC) will host REU students who will work toward achieving CBiRC's core mission of transforming the US chemical industry by integrating biological and chemical catalysis systems to produce biorenewable chemicals. The REU students will work in CBiRC labs conducting fundamental research to address the underlying technical challenges in the development of new integrated catalytic systems for the conversion of bio-based feedstocks to industrial chemicals.

COMMUNITY COLLEGE INTERNSHIP (CCI)

U.S. DEPARTMENT OF ENERGY'S AMES LABORATORY AT IOWA STATE UNIVERSITY

The Community College Internship (CCI) program seeks to encourage community college students to enter technical careers relevant to the DOE mission by providing technical training experiences at the DOE laboratories. Selected students participate as interns appointed at participating DOE laboratories, including the Ames Laboratory. They work on technologies or instrumentation projects or major research facilities supporting DOE's mission, under the guidance of laboratory staff scientists or engineers. Applications for the CCI program are solicited annually for the summer term. Internship appointments are 10 weeks in duration. CCI website: <http://science.energy.gov/wdts/cci/>.

IOWA LAKESIDE LABORATORY

Lakeside Lab is owned by the state of Iowa and operated through the Board of Regents. Its mission is twofold: 1) to provide science classes and research opportunities for university students, and 2) to offer Outreach Programs and provide services through the state universities. Lakeside's 147-acre campus is located on scenic West Okoboji Lake, on Little Miller's Bay.

IOWA STATE UNIVERSITY GRADUATE COLLEGE

Iowa State's vision is to be the best at advancing the land-grant ideals and putting science and technology to work. Our commitment in the Graduate College is to help you become a broadly educated, global citizen who is culturally informed, technologically adept, ready to lead, and prepared for your career. You will develop collaborative relationships with faculty who are national and international leaders in their fields of study. Find your program of interest on the Graduate College website <http://www.grad-college.iastate.edu/>.

IOWA STATE UNIVERSITY MCNAIR PROGRAM

The Iowa State University McNair Program prepares qualified undergraduates for entry to graduate school and completion of a doctoral degree. The primary goal of McNair is to increase the attainment of PhD degrees by students from disadvantaged and underrepresented populations. McNair Scholars are afforded many opportunities during their two years of active participation. Activities and services range from working with a professor on a research project to knowing how to survive the critical first year of graduate school.

IOWA STATE UNIVERSITY TRANSFER ADMISSIONS OFFICE

The Office of Admissions at Iowa State University is dedicated to helping you answer any questions you have regarding admission requirements and campus life. Specifically, Transfer Admissions is here to help you understand how credits transfer to the University vs. apply to your program as well as introduce you to transfer planning resources so you can plan your transfer successfully. Transfer Admissions has close relationships with all 15 Iowa community colleges as well as institutions in the contiguous states.

Student Opportunities Fair Exhibitors

NAHANT MARSH

Nahant Marsh is a 256 acre treasure nestled in Southwest Davenport. It is part of the 513 acre wetland complex that is bordered by the Mississippi River, Interstate 280, and Highway 22. Nahant Marsh preserve is one of the largest urban wetlands on the Upper Mississippi River. Research is an integral part of Nahant Marsh. Research projects also allow students to participate in exciting projects and gain hands-on experience in their field of study. We offer research opportunities in the fields of Wildlife Biology, Ecology, Animal Behavior, Botany, Hydrology, Chemistry, Genetics, Geology, Geography, Toxicology, and many more.

RESEARCH INNOVATION IN SCIENCE ENRICHMENT UNIVERSITY PROGRAM (RISE^{UP})

RISE^{UP} is a new summer research and experiential learning program at Iowa State University available to minority community college students. Students participate in professional development activities that prepare them for transfer to baccalaureate degree programs in STEM while working alongside faculty in research.

SCIENCE UNDERGRADUATE LABORATORY INTERNSHIP (SULI) U.S. DEPARTMENT OF ENERGY'S AMES LABORATORY AT IOWA STATE UNIVERSITY

The Science Undergraduate Laboratory Internship (SULI) program encourages undergraduate students to pursue science, technology, engineering, and mathematics (STEM) careers by providing research experiences at the Department of Energy (DOE) laboratories. Selected students participate as interns appointed at participating DOE laboratories, including the Ames Laboratory. Applications for the SULI program are solicited annually for three separate internship terms. Internship appointments are 10 weeks in duration for the summer term (May through August) or 16 weeks in duration for the fall term (August through December) and spring term (January through May) terms. SULI website: <http://science.energy.gov/wdts/suli/> Contact: Steve Karsjen, Education Programs Director, karsjen@ameslab.gov

THE UNIVERSITY OF IOWA - CENTER FOR DIVERSITY AND ENRICHMENT

The Center for Diversity and Enrichment provides academic and personal support for underrepresented and first generation students at the University of Iowa. Our pillars involve student success and enrichment, college access, community building, and diversity training. Part of our mission is to help recruit, retain, and graduate underrepresented students by providing them academic and personal support while they are enrolled at the University of Iowa.

THE UNIVERSITY OF IOWA - COLLEGE OF ENGINEERING

The College of Engineering is one of 11 colleges that comprise The University of Iowa. With educational courses dating back over 100 years, the College today has an enrollment of 2,482 students – 2,202 of who are undergraduates. About 51% of undergraduate students come from the state of Iowa (82% from Iowa and Illinois), with the remaining 49% percent attending from contiguous states and abroad. This is the 6th year in a row that engineering first-year student enrollment exceeded 400.

THE UNIVERSITY OF IOWA - DEPARTMENT OF BIOLOGY

The mission of the Department of Biology at the University of Iowa is to provide excellence in undergraduate and graduate education. We strive to provide the attention and opportunities students at all levels need to succeed in biology.

UNIVERSITY OF NEBRASKA MEDICAL CENTER - SUMMER HEALTH PROFESSIONS EDUCATION PROGRAM (SHPEP)

The Summer Health Professions Education Program (SHPEP) is a free 6-week summer enrichment program focused on improving access to information and resources for college students interested in the health professions. SHPEP's goal is to strengthen the academic proficiency and career development of students underrepresented in the health professions and prepare them for a successful application and matriculation to health professions schools.

VISITING FACULTY PROGRAM (VFP)

U.S. DEPARTMENT OF ENERGY'S AMES LABORATORY AT IOWA STATE UNIVERSITY

The Visiting Faculty Program (VFP) seeks to increase the research competitiveness of faculty members and their students at institutions historically underrepresented in the research community in order to expand the workforce vital to the Department of Energy (DOE) mission areas. As part of the program, selected university/college faculty members collaborate with DOE laboratory research staff on a research project of mutual interest. Faculty member participants may invite up to two students (one of which may be a graduate student) to participate in the research project. Applications for the VFP are solicited annually for appointments to the summer term (May through August), which is 10

Acknowledgments

Annual Conference Planning Committee

Lori Adams
University of Iowa

Vincent Rodgers
University of Iowa

Jeffrey Ratliff-Crain
Augustana College

Jim Swartz
Grinnell College

Diane Rover
Iowa State University

Mary Darrow
Iowa State University

Danielle Mitchell
Iowa State University

Annual Conference Program Committee*

Lorenzo Baber
Iowa State University

Marvin Bausman
Kirkwood Community College

Brad Chamberlain
Luther College

Chandana Karunatilaka
Des Moines Area Community College

Kata McCarville
Upper Iowa University

Sharmin Sikich
Doane University

Derrick Rollins
Iowa State University

U. Sunday Tim
Iowa State University

Janyce Woodard
Little Priest Tribal College

Program Assistants & Volunteers

Franklin Bright
University of Iowa

Christopher Coffman
University of Iowa

Paul Faronbi
General Mills

Jay Garaycochea
Wartburg College

Myra James
Iowa State University

Samatha Larimer Bousquet
Wartburg College

Melissa Licht
University of Iowa

Queenster Nartey
ORISE Fellow/US FDA

Kristen Turner
University of Iowa

Dara Wegman-Geedy
University of Iowa

Brittany Williams
University of Iowa

Arnold Woods
Iowa State University

Photography

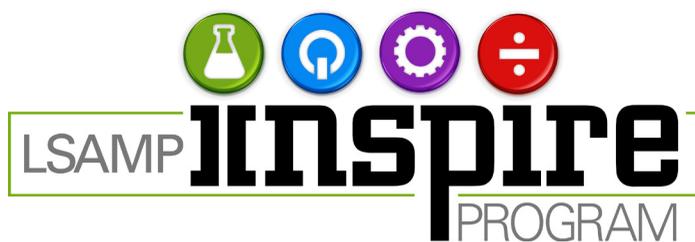
Amy Vinchattle
Photography
Ames, Iowa

Venue & Hotel

Michael Kasper
Sales Manager
Marriott Hotel & Conference Center

Katelynn Oberbroeckling
Senior Event Manager
Marriott Hotel & Conference Center

*Listed alphabetically by last name



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