



LSAMP **Inspire**  
PROGRAM

2015-16

# ANNUAL CONFERENCE

*Embracing the Whole Student Towards Success in STEM*

FEBRUARY 5-6, 2016



Renaissance Des Moines Savery Hotel  
Des Moines, Iowa



NEBRASKA  
WESLEYAN  
UNIVERSITY



***Welcome to the 2015-16 Annual Conference of the  
Iowa Illinois Nebraska LSAMP Alliance!***

Dear Conference Participants:

Nebraska Wesleyan University is pleased to host the fourth annual conference of the IINSPIRE Louis Stokes Alliance for Minority Participation (LSAMP). This year's theme is "Embracing the Whole Student Towards Success in STEM." With speakers, workshops, and presentations focused on supporting the whole student, we will learn how to support the Alliance in realizing its goal of doubling the number of underrepresented minority STEM graduates within five years.

We are fortunate this year to have seven dynamic speakers who will share their insights on embracing the whole student. A special thank you to Lori Adams, Lecturer, University of Iowa and Program Director, Iowa Biosciences Academy and Latham Science Engagement Initiative; Amanda Acevedo, Project Manager & Development Engineer, Intuitive Machines; Hernan Garcia-Ruiz, Assistant Professor, University of Nebraska-Lincoln; Victor G.J. Rodgers, Professor, University of California-Riverside; Vincent G.J. Rodgers, Professor, University of Iowa; David Stovall, Professor, University of Illinois-Chicago; and Brian Thomas, KIPNspire Group, for lifting up their wisdom and experience to us. These individuals are set to challenge us to explore new ways of thinking and to continue sharpening our focus on our most important asset for the future—our students.

I extend a personal thank you to the conference planning committee, comprised of campus directors and members of the Alliance Office, for organizing an outstanding event. I would also like to express a heartfelt appreciation for support from the National Science Foundation-LSAMP program that has allowed us to form the Iowa, Illinois, Nebraska Alliance.

I trust that each of us will take advantage of the conference to learn more about the Alliance and to network with those dedicated to student success. I am confident that I speak for the leaders of all of the IINSPIRE Louis Stokes Alliance institutions when I say that we are proud to be participants of the Alliance, and we are thankful for our campus representatives and mentors who work tirelessly to support students and meet the goals of this wonderfully worthwhile initiative.

Yours truly,

Frederik Ohles  
President  
Nebraska Wesleyan University

# Table of Contents

## About the Conference

4	Keynote & Invited Speakers
6	Conference Schedules
10	Speaker Biographies
12	Session Descriptions
16	Student Posters
23	Student Opportunities Fair Exhibitors
26	Acknowledgements

# Keynote & Invited Speakers



## David Stovall

*Professor, University of Illinois, Chicago*

Dr. Stovall studies the influence of race in urban education, community development, and housing. His work investigates the significance of race in the quality of schools located in communities that are changing both racially and economically. From a practical and theoretical perspective, his research draws from Critical Race Theory, educational policy analysis, sociology, urban planning, political science, community organizing, and youth culture.



## Lori Adams

*Lecturer, University of Iowa  
Program Director, Iowa Bioscience Academy  
Program Director, Latham Science Engagement Initiative*

Lori Adams received a BS in Crop Science from the University of Illinois Champaign-Urbana, a PhD in Genetics from Texas A&M in College Station, TX, and was a post-doctoral research scientist at the Boyce Thompson Institute in Cornell and then later at University of Wisconsin-Madison. At the University of Iowa (UI), Lori Co-Directs the NIH-funded “Iowa Biosciences Academy” program whose mission is to increase the diversity of students obtaining PhDs in the Biosciences and serves as Co-Director for the LSAMP-IINSPIRE alliance at the UI. Lori is also the Biology Honors Program advisor and Deputy Director of a new UI science communication outreach and engagement initiative. As a lecturer in the UI Department of Biology, Lori teaches several courses focused on developing research communication skills. Lori co-leads several student development seminars for the IBA program designed to prepare students for the rigors of graduate school and empower students to be leaders that value and promote diversity in the scientific community. Lori is recognized as a National Academies Education Mentor in the Life Sciences and a NIH National Research Mentoring Network Master Facilitator.



## Amanda Acevedo

*Project Manager and Development Engineer, Intuitive Machines*

Amanda Acevedo is a development engineer and project manager at Intuitive Machines, an engineering design and development think tank, in Houston, TX. She performs software development and integration, provides technical leadership for projects in the aerospace, energy and medical sectors and serves as the director of student programs. After graduating from the University of Iowa nearly 20 years ago she worked at Argonne National Laboratory developing control system software for the ATLAS accelerator. She moved to Houston, TX in 1998 to work at NASA/Johnson Space Center where she worked on multiple manned spaceflight programs including, Space Shuttle, X38, AERCam and Orion. She joined the Intuitive Machines team in 2014.



## Hernan Garcia-Ruiz

*Assistant Professor, University of Nebraska-Lincoln*

Dr. Garcia-Ruiz is a virologist interested in the molecular mechanisms of viral RNA replication and in antiviral RNA silencing. Prior to UNL he worked at the Donald Danforth Plant Science Center, where he was a research scientist. Hernan completed his postdoctoral work at the Oregon State University Center for Genomics and Biocomputing, with support from a Helen Hay Whitney fellowship. At UNL Hernan is the State Virologist and teaches a Molecular Virology class. His research focuses on the interconnection between RNA replication and RNA silencing mechanisms in viruses using yeast and plants as model systems in combination with genomic and bioinformatics approaches.

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## Victor Rodgers

*Professor, University of California-Riverside*



Victor G. J. Rodgers is the inaugural Jacques S. Yeager, Sr. Professor of Bioengineering at the University of California, Riverside. He is a fellow of the American Association for the Advancement of Science (AAAS) and the American Institute for Medical and Biological Engineering (AIMBE). Rodgers has won numerous awards for teaching and research, including the Distinguished Engineering Educator Award from the Orange County Engineering Council; Distinguished Engineering Educator Award from the California Engineering Council; Black Achiever in Chemical Engineering Award from the Minority Affairs Committee of American Institute of Chemical Engineers; and the Distinguished Educator Award from the University of Iowa, where he began his career in academia. He earned his BSChE in chemical engineering from the University of Dayton; his MSChE in chemical engineering from the University of Pittsburgh; and his DSc in chemical engineering with a biomedical engineering certificate from Washington University in St. Louis. Rodgers' research focuses on applications of transport phenomena and thermodynamics in solving medical and bioscience-related problems. Consequently, he has extensive collaborations with faculty in medicine including those at The University of Iowa and the University of California, Riverside.

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## Vincent Rodgers

*Professor, University of Iowa*



Dr. Vincent Rodgers is a Professor in the Department of Physics. Dr. Rodgers is the director of the research group called - the Diffeo-morphism and Geometry Group. The research conducted by this group spans several areas of mathematical and theoretical physics and includes the study of the nature of classical and quantum gravity, superstrings and supergravity, quantum field theories, and cosmology and the early universe. He has over 50 publications in his field and has given more than 70 invited talks. At present his research group consists of four PhD students and two undergraduate students. He also serves the co-director of the Café Scientifique of Iowa City, and co-coordinator of the Hawk-Eyes on Science – the outreach project of the Department of Physics and Astronomy. Both he and Dr. Lori Adams direct the Iowa Biosciences Academy and the University of Iowa component of the IINSPIRE-LSAMP Program.

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## Brian Thomas

*Founder, KIPNspire Group*



Brian Thomas is an experienced manufacturing professional who has drive, determination, and proven success across multiple disciplines. Brian's passion for education and knowledge sharing inspired him to found his organization KIPNspire Group "Where Knowledge Is Power". Brian is a native of Dallas, Texas and graduate of the University of Arkansas @ Pine Bluff (Summa Cum Laude). Brian has worked for multiple Fortune 500 organizations while continuing to motivate the masses through KIPNspire

# CONFERENCE SCHEDULE: Students

Friday, February 5

Schedule		
7:30 — 8:15am	<b>Registration and Breakfast</b>	Lobby, 2nd Floor
8:15 — 9:30am	<b>WELCOME &amp; OPENING KEYNOTE</b> <b>BEING HOLISTICALLY WHOLE: STEM, Race, and Bringing Unspoken Truths to Light</b> <i>Dr. David Holger, Iowa State University</i> <i>Dr. Frederik Ohles, Nebraska Wesleyan University</i> <i>Dr. David Stovall, University of Illinois-Chicago</i>	Herbert Hoover Terrace Room
9:30 — 9:45am	<b>Break</b>	
9:45 — 10:45am	<b>STUDENT PROFESSIONAL DEVELOPMENT SEMINARS</b> <b>Seminar A:</b> <b>STRATEGIES FOR EFFECTIVE RESEARCH MENTORING</b> <b>Seminar B:</b> <b>ENTERING INDUSTRY—Reaching for the Edges of Your Discipline</b> <i>(ends at 10:15am)</i> <b>Seminar C:</b> <b>SURVIVING ACADEMIC RESEARCH</b> <i>(begins at 10:15am)</i>	Savery II Room  Eleanor Roosevelt Room  Eleanor Roosevelt Room
10:45 — 11:00am	<b>Break</b>	Lobby
11:00 — 12:00pm	<b>STUDENT RESEARCH EXPERIENCES PANEL</b>	Herbert Hoover Terrace Room
12:00 — 12:15pm	<b>Break</b>	
12:15 — 1:30pm	<b>Plated Lunch</b> <b>SCIENCE AND CIVILIZATION: A Physicist Perspective</b> <i>Dr. Judy Muyskens, Nebraska Wesleyan University</i> <i>Dr. Vincent Rodgers, University of Iowa</i>	Herbert Hoover Terrace Room
1:30 — 1:45pm	<b>Break</b>	
1:45 — 2:45pm	<b>STUDENT PROFESSIONAL DEVELOPMENT SEMINARS</b> <b>Seminar A:</b> <b>UNDERGRADUATE RESEARCH: What is it Really?</b> <b>Seminar B:</b> <b>RAISING YOUR “BATTING AVERAGE” IN THE JOB MARKET</b>	Savery II Room  Eleanor Roosevelt Room
2:45 — 4:00pm	<b>STUDENT OPPORTUNITIES FAIR</b>	Lobby, 2nd Floor
3:45 — 5:15pm	<b>STUDENT POSTER SESSION</b>	Des Moines Room
5:15 — 6:00PM	<b>Break</b>	
6:00 — 8:00PM	<b>STUDENT NETWORKING SESSION</b> <b>NETWORKING FUNDAMENTALS</b> <i>Brian Thomas, KIPNspire Group</i>	Herbert Hoover Terrace Room

## Saturday, February 6

Schedule		
7:30 — 8:30am	<b>Breakfast</b>	Lobby, 2nd Floor
8:00 — 9:00am	<b>STUDENT PROFESSIONAL DEVELOPMENT SEMINARS</b>  <b>THE “READ IT” THEORY TO SUCCESS</b> <i>Brian Thomas, KIPNspire Group</i>	Herbert Hoover Terrace Room
9:00 — 10:00am	<b>PLENARY SESSION</b>  <b>ENGINEERING IN MEDICINE AND OTHER UNEXPECTED PLACES</b> <i>Dr. Victor Rodgers, University of California-Riverside</i>	Herbert Hoover Terrace Room
10:00— 10:15pm	<b>Break</b>	
10:15 — 11:15pm	<b>STUDENT PROFESSIONAL DEVELOPMENT SEMINARS</b>  <b>Seminar A:</b> <b>RESEARCH LIFE-BALANCE: An Open Discussion from Students about their Coping Strategies</b>  <b>Seminar B:</b> <b>GRAD SCHOOL AND BEYOND FROM FOUR PERSPECTIVES</b>	Savery II Room  Eleanor Roosevelt Room
11:15— 11:30pm	<b>Break</b>	
11:30 — 12:30PM	<b>Boxed Lunches</b>  <b>AWARDS CEREMONY &amp; CLOSING REMARKS</b>	Herbert Hoover Terrace Room

# CONFERENCE SCHEDULE: Faculty, Staff, and Professionals

Friday, February 5

Schedule		
7:30 — 8:15am	<b>Registration and Breakfast</b>	Lobby, 2nd Floor
8:15 — 9:30am	<b>WELCOME &amp; OPENING KEYNOTE</b> <b>BEING HOLISTICALLY WHOLE: STEM, Race, and Bringing Unspoken Truths to Light</b> <i>Dr. David Holger, Iowa State University</i> <i>Dr. Frederik Ohles, Nebraska Wesleyan University</i> <i>Dr. David Stovall, University of Illinois-Chicago</i>	Herbert Hoover Terrace Room
9:30 — 9:45am	<b>Break</b>	
9:45 — 12:00pm	<b>SUPPORTING THE WHOLE STUDENT: Pedagogy Workshop</b>	Savery I Room
12:00 — 12:15pm	<b>Break</b>	Lobby
12:15 — 1:30pm	<b>Plated Lunch</b> <b>SCIENCE AND CIVILIZATION: A Physicist Perspective</b> <i>Dr. Judy Muyskens, Nebraska Wesleyan University</i>	Herbert Hoover Terrace Room
1:30 — 1:45pm	<b>Break</b>	
1:45 — 2:45pm	<b>SUPPORTING THE WHOLE STUDENT: Pedagogy Workshop</b>	Savery I Room
2:45 — 4:00pm	<b>STUDENT OPPORTUNITIES FAIR</b>	Lobby, 2nd Floor
3:45 — 5:15pm	<b>STUDENT POSTER SESSION</b>	Des Moines Room

## Saturday, February 6

Schedule		
7:30 — 8:30am	<b>Breakfast</b>	Lobby, 2nd Floor
8:00 — 9:00am	<b>SENTIPENSANTE PEDAGOGY (sensing/thinking): Education for Wholeness, Social Justice, and Liberation</b>	Savery I Room
9:00 — 10:00am	<b>PLENARY SESSION</b>  <b>ENGINEERING IN MEDICINE AND OTHER UNEXPECTED PLACES</b> <i>Dr. Victor Rodgers, University of California-Riverside</i>	Herbert Hoover Terrace Room
10:00— 10:15pm	<b>Break</b>	
10:15 — 11:15pm	<b>STRATEGIES FOR EFFECTIVE RESEARCH MENTORING</b>	Savery I Room
11:15— 11:30pm	<b>Break</b>	
11:30 — 12:30PM	<b>Boxed Lunches</b>  <b>AWARDS CEREMONY &amp; CLOSING REMARKS</b>	Herbert Hoover Terrace Room

# Presenter Biographies

**Jeniffer Caballero** is currently a Sophomore at Doane College in Crete, Nebraska. She is a double major in Biology and Spanish. While being a full-time student and volunteer member of the Fire and Rescue Department in Crete, Jeniffer also works as a certified nursing assistant (CNA) and a Certified Medication Aide (CMA) in a Crete local nursing home. Jeniffer started doing research in the lab the summer after her Freshman year and is currently now working with Bio-films at Doane. With her activities and some shadowing, Jeniffer's interest are clearly in the medical field; she anticipates going to Physicians Assistant (PA) school to pursue her career goals.

**Mary Darrow** is the Assistant Director and Evaluation Coordinator of the IINSPIRE LSAMP Alliance and at Iowa State University. Mary was also the former Transfer Coordinator for Iowa State's College of Engineering and Project Manager of Iowa State University's NSF STEM Talent Expansion Program (STEP). She has been a collaborator on several research projects with Iowa State's Office of Community College Research and Policy (OCCRP) studying STEM community college pathways to the baccalaureate for underrepresented minority and female students.

**Edson deOliveira** was born in Angola and immigrated to the U.S. when he was six. He attends Nebraska Wesleyan University and will graduate in May 2016 with a Bachelor's of Science in Biology. As an IINSPIRE LSAMP research funded student, he conducted his senior research on the Expression of Recombinant dCTP-deaminase gene in *Dictyostelium discoideum* in the summer of 2014. Since August of 2015 Edson has been on a Boren scholarship as well as a second LSAMP student grant researching Hantavirus, i.e., a zoonotic infection transmitted via inhalation of aerosolized particles from urine or feces of an infected animal that harbors the virus, at the Museu Nacional do Brazil in Rio de Janeiro. After completing his time in Brazil, he hopes to attend the University of Nebraska Medical Center (UNMC) where he can apply and build on his experiences in Brazil with research and infectious disease.

**Brittnie Dotson** is a senior at the University of Northern Iowa studying Biology with an emphasis in Pre-Physician Assistant and a minor in Chemistry. Upon graduating in May 2016, she plans to spend her gap year working as a medical scribe near home in Gary, IN, in order to receive adequate patient care and shadowing hours. After her gap year, Brittnie plans to enroll in an exceptional Physician Assistant school. At UNI, She's involved in Black Student Union, Ethnic Student Promoters, UNI Biology Ambassadors, LSAMP, McNair Scholars program and I've been doing undergraduate research for about two years now. She's done cell biology research at UNI with Dr. Kavita Dhanwada, and now, is conducting research with NASA in three different fields such as biology, chemistry and geology.

**Cailin Huyck Orr** is the Assistant Director of the Science Education Resource Center (SERC) at Carleton College where she does project management and programming for faculty professional development and dissemination of best practices for science teaching, community visioning and bringing science into broader use. She is also on the leadership team of the NSF Science Talent Expansion Program InTeGrate helping faculty members make program-level changes to support all students and increase STEM students preparation for the workforce.

**Norma Pérez-Kahler** loves her broad and diverse career in higher education, both as professor and administrator. A native of Bogotá, Colombia, she earned a BA and a MA from the University of Northern Iowa, and a Doctorate in Educational Administration with emphasis in Adult & Higher Education from the University of South Dakota. Dr. P-K started her teaching career at Iowa State University, and continued at Morningside College in Sioux City, IA, where she was tenured Associate Professor of Spanish and Chair of the Department of Modern Languages. For the last six years, Norma has been Coordinator of the TRIO-Student Support Services (SSS) Program at Des Moines Area Community College (DMACC). As a committed advocate of access to education for all, she develops and increases the support mechanisms for low-income and first-generation students at DMACC. In addition, since her arrival at DMACC, she is very active and instrumental in identifying and developing new initiatives and strategies for the recruitment and integration of the Latino student population to DMACC's urban campus. She feels privileged to be a voice, a mentor and a role model for many underrepresented student populations, traditional and non-traditional students, as well as faculty, interns and staff with whom she has been fortunate to work.

**Derrick Keith Rollins, Sr.** grew up in inner city Kansas City, Missouri. He received a B.S. degree in chemical engineering from the University of Kansas in 1979. In the fall of 1985 he returned to college and earned the following degrees from The Ohio State University: an M.S. degree in chemical engineering in 1987, an M.S. degree in statistics in 1989, and a Ph.D. in chemical engineering in 1990. Professor Rollins joined the Iowa State University (ISU) faculty in the fall of 1990 in a unique joint appointment between the Statistics Department and the Chemical Engineering Department. Since coming to Iowa State, Dr. Rollins has received many research grants and awards including the 2012 McDonald Mentoring Award from the Tau Beta Pi National Engineering Honor Society, 2005 Regents Faculty Excellence Award given by the Iowa Board of Regents, the 2000 ISU Presidential Service Award, and in 1994 the National Science Foundation Presidential Faculty Fellows Award, which was considered the highest honor the federal government gives young scientists and engineers. His research areas include glucose monitoring, modeling and control for diabetic people and for improving cancer protocols in Biomedical Engineering; Bio- and Material- Informatics and datamining; and development of processes for non-destructive testing procedures. He is the ISU Director for IINSPIRE LSAMP.

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**Diane Rover** has been a Professor in the Department of Electrical and Computer Engineering at Iowa State University since 2001. She currently serves as the director for two large-scale, NSF-funded programs: IINSPIRE LSAMP, and SP@ISU, a campus-wide program to support the broader impacts work of faculty. She has also been the principal investigator on NSF STEP and S-STEM grants at Iowa State that have focused on the recruitment, retention and success of engineering students.

Dr. Rover received a B.S. degree in computer science in 1984, and the M.S. and Ph.D. degrees in computer engineering in 1986 and 1989, respectively, from Iowa State University. She was the first woman to receive a Ph.D. in computer engineering at ISU. Her teaching and research has focused on the areas of embedded computer systems, reconfigurable hardware, integrated program development and performance environments for parallel and distributed systems, visualization, performance monitoring and evaluation, and engineering education.

Dr. Rover is a 2012 ASEE Fellow and member of the IEEE Computer Society, the IEEE Education Society, and the ASEE. She currently serves as a representative for Iowa State's membership in the National Center for Women and Information Technology (NCWIT). She received an NSF CAREER Award in 1996.

**Don Sakaguchi** is a Professor of Genetics, Development and Cell Biology at Iowa State University. His research area is focused on development of experimental strategies for brain rescue and repair. He conducted a postdoctoral fellowship at the University of California - San Diego. Prior to that he completed his B.S. and Ph.D. at the State University of New York in Albany, majoring in biology and neurobiology, respectively. In addition to teaching biology and neuroscience courses at Iowa State, professor Sakaguchi has also been an invited lecturer for advanced neuroscience courses at the University of Coimbra in Portugal and Ege University in Izmir, Turkey.

**Jim Swartz** is a Professor of Chemistry at Grinnell College. He attended De Anza College and Stanislaus State College in California. He received a PhD in chemistry at the University of California at Santa Cruz. After postdoctoral research at CalTech he joined the faculty at Grinnell College in 1980. Jim coordinated the NSF-funded Project Kaleidoscope Pedagogies of Engagement faculty development project. In July, 2012 he was appointed as Interim Associate Vice President of Analytical Support/Institutional Research (a new office) at Grinnell. He currently is a team chair for the Higher Learning Commission of the North Central Association. He serves on the Advisory Council of the Iowa Energy Center, which he chaired from 2008-11. Dr. Swartz has served as a consultant to approximately 50 colleges and universities in curriculum development and the planning of science facilities.

**U. Sunday Tim** is Associate Professor of Agricultural and Biosystems Engineering and IINSPIRE LSAMP faculty Leader at Iowa State University. Dr. Tim earned his Bachelor of Engineering degree in Structural Engineering and PhD degree in Civil and Environmental Engineering from Concordia University, Canada. He has been Program Director and co-PI of several NSF REU Site programs and the USDA-NIFA Minority Scholars Program. His research interests include environmental modeling, environmental forensics, geographic information systems, virtual reality, data analytics, and distributed computing.

**Jordan Zonner** is a sophomore at Doane College majoring in Biology with a minor in Software Development. She is from Dallas, Texas and wants to continue her education either as an MD or PhD student. Jordan and her roommate recently started a program for diversity and inclusion at Doane and she is very passionate about advocating for minorities, especially in STEM fields.

# Session Descriptions

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## **STRATEGIES FOR EFFECTIVE RESEARCH MENTORING** | Savery II Room

Student Session

9:45—10:45am

Friday, February 5

### **SPEAKER**

Lori Adams, *University of Iowa*

This interactive session presents an overview of evidence-based materials being disseminated and further developed through the National Research Mentoring Network (NRMN). Strategies for effective research mentoring will be discussed, participants will engage in exemplar activities and learn how to effectively utilize these materials with their undergraduate research mentors.

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## **ENTERING INDUSTRY — Reaching for the Edges of Your Discipline** | Eleanor Roosevelt Room

Student Session

9:45—10:15am

Friday, February 5

### **SPEAKER**

Amanda Acevedo, *Intuitive Machines*

There are unique opportunities in industry today to make a profound impact. These opportunities are found in spaces that are no longer neatly aligned with the way companies traditionally organize teams and projects. There is an urgent need in the technology sector for team members who enjoy living on the edges of their discipline. A STEM education and career strategy can make you one of the most valuable members of any team.

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## **SURVIVING ACADEMIC RESEARCH** | Eleanor Roosevelt Room

Student Session

10:15—11:45am

Friday, February 5

### **SPEAKER**

Hernan Garcia-Ruiz, *University of Nebraska-Lincoln*

Through his own eyes and experiences, Prof. Hernan Garcia-Ruiz will discuss how his research ideas unfolded, the trials and trepidation, and how failure can be used to build even stronger research ideas. His own research will serve as the platform for this discussion that will also address the link between financial support and research opportunities.

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## **STUDENT RESEARCH EXPERIENCES PANEL** | Herbert Hoover Terrace Room

Student Session

11:00—12:00am

Friday, February 5

### **SPEAKERS**

Elias De Haro, *Kirkwood Community College*

Edson deOliveira, *Nebraska Wesleyan University*

Brittie Dotson, *University of Northern Iowa*

Mechelle Johnson, *Kirkwood Community College*

Jordan Zonner, *Doane College*

Students who participated in an undergraduate research experience (REU) share details about finding and applying for an REU, as well as the overall research experience. The audience will have an opportunity to ask questions of the student panel.

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## **SUPPORTING THE WHOLE STUDENT : Pedagogy Workshop** | Savery I Room

Faculty, Staff, and Professional Session

9:45—12:00pm

Friday, February 5

1:45—12:45pm

Friday, February 5

### **SPEAKERS**

Jim Swartz, *Grinnell College*

Cailin Orr, *SERC at Carlton College*

Norma Perez-Kahler, *Des Moines Area Community College*

Mary Darrow, *Iowa State University*

Multifaceted approaches to supporting students in STEM majors are the most effective strategies regardless of the student population but especially important for increasing the success of underrepresented minority students in STEM. Faculty, departments, and institutions have a number of options when it comes to creating a sense of belonging, strengthening mentoring and advising, and helping students feel comfortable seeking help.

Attendees will have the opportunity to work together in groups to develop plans, consider how they can collaborate, and suggest ways that the alliance can support them in their efforts. **Attendees are encouraged to bring a laptop or tablet computer.**

Topics will include strategies for supporting students in and out of the classroom, and building student capacity and continuity through their academic career. It will be based on material from the InTeGrate STEM Talent Expansion Program work.

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## **UNDERGRADUATE RESEARCH: What is it Really?** | Savery II Room

Student Session

1:45—12:45pm

Friday, February 5

### **SPEAKERS**

Lori Adams, *University of Iowa*

Hernan Garcia-Ruiz, *University of Nebraska-Lincoln*

Victor Rodgers, *University of California-Riverside*

The three panelist are all experienced with research and mentoring students. They will demystify the concept of research, discuss realistic goals for the research student and what is expected in the laboratory or theory meetings.

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## **RAISING YOUR "BATTING AVERAGE" IN THE JOB MARKET** | Eleanor Roosevelt Room

Student Session

1:45—12:45pm

Friday, February 5

### **MODERATORS**

Derrick Rollins, *Iowa State University*

U Sunday Tim, *Iowa State University*

This session is a panel of experts that hire students for internships, co-ops, and permanent employment for positions ranging from research to many corporate jobs seeking STEM majors. They experts will discuss how you can increase your chances of getting offers for employment specifically in their program/company and more generally.

# Session Descriptions

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## **NETWORKING FUNDAMENTALS** | Herbert Hoover Terrace Room

Student Session

6:00—8:00pm

Friday, February 5

### **SPEAKER**

Brian Thomas, *KIPNspire Group*

There a critical skill, techniques, and social navigation STEM professional must acquire to secure employment. In fact, today's job market demands applicants understand online and face-to-face networking, as well as non-verbal cues in informal social interactions. This interactive workshop will share valuable insider insight on the important of networking and brand management toward establishing a strong professional identity. Through hands-on workshop activities and conference events, students will be given the opportunity to ask specific questions and practice what they've learned through the conference. This workshop will include a speed networking in a relaxing and fun environment. ***Dinner is provided.***

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## **THE "READ IT" THEORY TO SUCCESS** | Herbert Hoover Terrace Room

Student Session

8:00—9:00am

Saturday, February 6

### **SPEAKER**

Brian Thomas, *KIPNspire Group*

In a world of fitting in and constant connectivity, there is a simple theory can that can assist you on your path to success and separate you *from the norm*. Brian Thomas the Founder of KIPNspire presents to you, the "Read It" Theory to Success. Among the dirt roads, highways, and waterways to success, you will face many challenges. This theory simply provides the lay of the land. It's up to *YOU to navigate accordingly*. Join Brian Thomas to be educated and motivated to cross the *finish line by taking the path of GREATNESS*. ***Breakfast is provided.***

**R** – Resume (*This is a non-verbal definition of who you are professionally*)

**E** – Experience (*What have you've done that excites and how has it prepared you*)

**A** – Attitude (*Your attitude will determine your altitude*)

**D** – Determination (*To win you must believe that you will not fail; Persevere*)

**I** – Intelligence (*Socially, Emotionally, and Technically*)

**T** – Timing (*You don't know when your name will be called; Are you prepared*)

The "IT" Factor

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## **SENTIPENSANTE PEDAGOGY (sensing/thinking):**

### **Education for Wholeness, Social Justice, and Liberation** | Savery I Room

Faculty, Staff, and Professional Session

8:00—9:00am

Saturday, February 6

### **MODERATORS**

Mary Darrow, *Iowa State University*

Diane Rover, *Iowa State University*

Over coffee and a tasty breakfast, participants will engage in facilitated roundtable conversations related to what Laura Rendon calls the "Privileged Agreements Governing the Current Pedagogical Dreamfield" versus her proposed "Sentipensante (Sensing/Thinking) Pedagogy." Participants will be asked to choose between one of these opposing views to pedagogical practice. Materials will be distributed electronically for review prior to this session. ***Breakfast is provided.***

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## **RESEARCH LIFE-BALANCE: An Open Discussion from Students about their Coping Strategies** | Savery II Room

Student Session

10:15—11:15am

Saturday, February 6

### **SPEAKERS**

Elias De Haro, *Kirkwood Community College*

Edson deOliveira, *Nebraska Wesleyan University*

Jennifer Caballero, *Doane College*

Brittie Dotson, *University of Northern Iowa*

Mechelle Johnson, *Kirkwood Community College*

Jasmin Sandoval, *Doane College*

In the early part of the career, many research scientists report that struggle to maintain a reasonable work-life balance. This is brought on by the pressure to produce visible results, that help the scientist stand out in a very competitive environment as well as the sheer passion to do science. In this panel, student will discuss how they deal with finances, their long term goals and how they cope with the “Work-Life Balance” phenomenon.

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## **GRAD SCHOOL AND BEYOND FROM FOUR PERSPECTIVES** | Eleanor Roosevelt Room

Student Session

10:15—11:15am

Saturday, February 6

### **SPEAKERS**

Kendra Allen, *Iowa State University*

Paul Faronbi, *Iowa State University*

Thomas Mansell, *Iowa State University*

Victoria Parker, *University of Iowa*

Donald S. Sakaguchi, *Iowa State University*

Thinking about going to grad school? Already been accepted to go to grad school? Or maybe you just want to network with some professors and grad students? Then this group of panelists is for you! They range from experienced grad school students to successful research professors. 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, post-doctorate, and professorship 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 grad school or how to get there if you're still in the planning stages. You won't want to miss this!

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## **STRATEGIES FOR EFFECTIVE RESEARCH MENTORING** | Savery I Room

Faculty, Staff, and Professional Session

10:15—11:15am

Saturday, February 6

### **SPEAKER**

Lori Adams, *University of Iowa*

This interactive session presents an overview of evidence-based materials being disseminated and further developed through the National Research Mentoring Network (NRMN). Strategies for effective research mentoring will be discussed, participants will engage in exemplar activities and learn how to effectively utilize these materials with their undergraduate research mentees.

# Student Posters

## 1. INTEGRATING CAD FOR GRAIN HANDLING EQUIPMENT DESIGN

**Abdesalam Ali** and Mehari Tekeste

*Iowa State University*

Simulation of granular materials (grain, soil, rocks) interaction with off-road equipment in agriculture and construction industry has opportunities to accelerate simulation based new equipment design and improve efficiency of equipment performances. Generating numerical shape and size of granular materials into Computer Aided Engineering (CAE) simulation is challenging. The purpose of this project was to validate additive manufacturing 3D scanning technology and reconstructed CAD grain shape and size into Discrete Element Modeling for particulate systems simulation of grain handling equipment. 3D scanning-CAD-simulation engineering work flow was proposed and validated for generating corn particle model. As technology advance in reverse engineering with improved resolution, the simulation based engineering workflow will be utilized for other granular materials simulation.

## 2. INVESTIGATIONS OF CHANGES IN TERTIARY STRUCTURE AND STABILITY OF OSTEOCALCIN IN DIFFERENT CROWDING CONDITIONS BY FLUORESCENCE AND UV-VIS SPECTROSCOPY

**Jeniffer Caballero**<sup>1</sup> and Erin Wilson<sup>2</sup>

<sup>1</sup>*Doane College* and <sup>2</sup>*Westminster College*

Structure of proteins determines function; the protein's environment, usually crowded with large and small molecules, affects the overall structure. Those contributions to folding are being explored by using a variety of crowded conditions to see how they affect the secondary (helix, sheet or random coil) and tertiary (specific overall 3-D folding) of the protein osteocalcin. Osteocalcin is normally unfolded in dilute solution (solution with only a few other scattered things like ions and buffer molecules), but it folds when calcium ions are added. The tertiary structure of the protein was explored using fluorescence, UV-Vis and temperature stability fluorescence experiments. For the fluorescence results, it appears that the protein experiences a gradual shift of the fluorescence wavelength to lower wavelengths in all conditions. In solution, that is all that happens. But in Ficoll-70 and with Ca<sup>2+</sup>, there is also a period of increasing wavelength. That might indicate an unfolding event. For Ficoll, the protein denatures at low temperature, but for Ca<sup>2+</sup> denaturation occurs at 50-55 degrees Celsius. This indicates that Ca<sup>2+</sup> stabilizes the structure, making it resistant to being unfolded by heat.

## 3. ELUCIDATING THE MECHANISM OF TRANSLOCATION AND THE EFFECT OF LIGHT ON BIOSURFACTANT PRODUCTION IN PSEUDOMONAS SYRINGAE

**Mariama D. Carter**<sup>1,2</sup>, Regina McGrane<sup>2</sup> and Gwyn A. Beattie<sup>1</sup>

<sup>1</sup>*Dept of Plant Pathology & Microbiology, Iowa State University*; <sup>2</sup>*Microbiology Undergraduate Program, Iowa State University*

In the foliar pathogen *Pseudomonas syringae*, motility is important in leaf colonization and virulence. Previous studies showed that red and far-red light represses a specific type of movement called swarming, while blue light represses the effect of red and far-red light. Swarming motility is a cell coordinated movement that is powered by flagella and requires biosurfactant secretion to lower the surface tension. We investigated if light, specifically white, blue, red, and far-red light, affects biosurfactant production. *P. syringae* strain B728a produces two biosurfactants: syringafactin, a lipopeptide necessary for swarming motility, and 3-(3-hydroxyalkanoyloxy) alkanolic acid (HAA), a compound that contributes to the separation of tendrils during swarming. To visualize and quantify biosurfactant production, we grew colonies under different light conditions and sprayed them with atomized mineral oil. Using mutants deficient in the production of each biosurfactant, we detected that white light does not affect syringafactin production but, does repress HAA production. We were also interested in a novel phenotype we call translocation, a negative bacterial interaction in which swarming colonies repel or induce the movement of adjacent colonies. Of the mutants tested, we observed that the B728a wild type was only able to induce translocation in three syringafactin deficient mutants. The use of extracted syringafactin in swarming assays showed that syringafactin, alone, can promote translocation. Moreover, B728a can cause other strains and species of foliar bacteria to translocate. Thus, our findings support a model of surfactant-mediated niche clearing as a mechanism of colonizing a competitive leaf surface.

#### 4. REINFORCEMENT PARTICLE SIZE IMPACT ON COLD ROLLED BONDED (CRB) MANUFACTURED LAMINATE COMPOSITES

Elias De Haro Jr.<sup>1</sup>, Mina Bastwros<sup>2</sup>, Gap-Yong Kim<sup>2</sup>.

<sup>1</sup>Kirkwood Community College, Cedar Rapids, IA, <sup>2</sup>Iowa State University, Ames, IA

Cold rolled bonded (CRB) has been used to manufacture laminate metal composites on an industrial scale. In this study, the role of reinforcement particle sizes, ranging from nanoscale to micron scales, on the bond strength between laminate layers of CRB-produced aluminum-silicon-carbide (Al1100-SiC) composite has been investigated. The bond strength was tested using a T-peel machine. A scanning electron microscope was used to characterize the bond structures between peeled substrate. According to test data, nanoparticles did not strengthen the bond between laminate layers, but instead decreased it when compared to non-reinforced, bonded aluminum. On the other hand, the larger micron-sized particles increased the bond strength between laminate layers. The 10  $\mu\text{m}$  particles showed a significant increase in bond strength over the unreinforced and nanoparticle-reinforced aluminum. The largest particle size (60  $\mu\text{m}$ ) samples had substrates break during the T-peeling test due to the significant increase in bond strength, indicating a bond strength higher than the strength of the aluminum substrate. It has been concluded that larger particles provide a stronger bond due to mechanical interlocking caused by particle morphology.

#### 5. BIOGEOCHEMICAL EVOLUTION OF THE ATMOSPHERE: THE BETA PROJECT

**Brittnie Dotson**, Steven Gomez, Carissa Herkelman, Jose Lopez, Bobbi Minard, Kathryn Patrick, Jessica Wayson, Joshua Sebree, Alexa Sedlacek, Xinhua Shen

*Department of Chemistry and Biochemistry, and Department of Earth Science, University of Northern Iowa*

The interactions between the atmosphere and biosphere throughout Earth's history play an important role in the dynamic climate system. The BETA Project involves undergraduate students in a multidisciplinary study of the biogeochemical evolution of Earth's atmosphere at three key intervals of Earth's history. (1) The anoxic atmosphere that supported Earth's first life, (2) the Devonian, a period when forest ecosystems radiated onto the land surface and caused major CO<sub>2</sub> drawdown from the atmosphere and (3) the modern agricultural sources of atmospheric NH<sub>3</sub>. For the first interval, aerosols are generated and analyzed in order to study Ancient Earth. For the second interval, carbon isotopic compositions and Srisotopic compositions from marine carbonates will be analyzed to prove global cooling, a drop in CO<sub>2</sub> and a rise in O<sub>2</sub>. And for the third interval, there's an investigation of how reduced nitrogen interacts with fog in northern Iowa, particularly in the Cedar Valley region. Our interdisciplinary team includes undergraduate Earth Science, Environmental Science, Biology, Biochemistry, and All Science Teaching majors from the University of Northern Iowa. The team is led by faculty from the Earth Science Department and Chemistry and Biochemistry Department at UNI in collaboration with scientists from NASA Goddard Space Flight Center. The team will use a combination of laboratory simulations, field work and analysis, and weather and climate modeling to study atmospheric changes at these intervals of Earth's history.

#### 6. ISOLATION OF BACTERIOPHAGE BATTLESTAR AND LIL SEBASTIAN

**Madeline Galaska** and Kate Engel

*Nebraska Wesleyan University*

Mycobacteriophage is a term used for type of virus that infects mycobacteria. Over the semester, students at Nebraska Wesleyan University (NWU) have conducted an experiment to isolate and analyze unique mycobacteria phage. This was done in cooperation with SEA-PHAGES program founded by Graham Hatful, a leading researcher in the field of bacteriophages. Students used mycobacterium smegmatis and various enrichment methods to grow phage. For this study, we have selected two isolated mycobacteriophage, Battlestar and FreshPrince to analyze and compare clarify, morphology, and DNA.

#### 7. Brandon Hoskins

*University of Northern Iowa*

Bacteriophages are viruses that parasitize bacteria, like *Bacillus anthracis*, the causal agent of anthrax disease and the source of 'bio-weaponized' anthrax spores. Our research on phages of *B. anthracis* continues efforts to reduce the bio-terror and disease threats posed by anthrax spores. Having previously selected phages that bind and kill *B. anthracis* spores, special interest is now focused on smaller phages with the same capabilities. Since 1998, we've developed phage-based study

# Student Posters (cont.)

systems that can kill anthrax spores, kill anthrax bacteria and detect anthrax spores from air samples using electronic (QCM) spore detector prototype. The detector produced poor signal quality due to characteristic of the unintentionally selected larger phages. 'Wild' soil phage populations are comprised of mostly smaller phages, with a minority of larger phages. The smaller phages offer qualities that overcome two problems with our previous work: 1) Small ('tail-less') phages provide a more uniform QCM electrode surface and improved signal quality, 2) Smaller, phages yield higher resolution cryo-electron micrographic images. We propose to improve methods for isolation and growing 'smaller' phages and to produce 20 small phage isolates. We will optimize sucrose density gradient centrifugation (SDGC) procedures that separate phages by size. SDGC fractionations of our large and small phage standard will dictate sucrose gradient compositions that allow iterative separation of our bulk soil phage population into small and larger phage fraction. Standard 'triple-serially-isolation' techniques will then produce 20 pure virus 'isolates', which will be characterized by DNA size analysis and by cryo-electron microscopic imaging.

## 8. ISOLATION AND CHARACTERIZATION OF "ZEENON"; A CLUSTER C1 SIPHOVIRIDAE

Emilly D. Andrade, Alison N. Brozek, Taylor M. Buhr, Brittney A. DeWald, Nicholas A. Johnson, **Ziomara N. Jurado**, Alyssa D. Marian, Kristina R. McInnes, Carlie J. Pickrel, Morgan E. Schultz, Spencer E. Sharp, Cassandra K. Sulski, Jalyn V. Wurm, Tai C. Zollars, Rachael M. Granville, Angela L. McKinney Ph.D., & Jerald S. Bricker, *Department of Biology, Nebraska Wesleyan University, Lincoln, NE, 68504*

Beginning in 2013, Nebraska Wesleyan University (NWU) participated in the Science Education Alliance Phage Hunters Genomics and Evolutionary Sciences (SEA-PHAGES) program. Mycobacteriophages infecting *Mycobacterium smegmatis* were isolated from soil samples collected from the NWU campus in Lincoln, NE, using the enrichment procedure. The virus was purified, quantified, and characterized using standard laboratory methods. The placement of phage "Zeenon" as a member of the Siphoviridae is supported by plaque morphology and electron microscopy. In addition, DNA analysis indicates Zeenon is a member of the C1 cluster. The genome size of this virus is 238 putative genes comprised of 155,292 base pairs with a GC content of 64.7%. A genomic comparison of Zeenon indicates it is most closely related to phage Shrimp, another C1 mycobacteriophage.

## 9. DOES THE PRESENCE OR ABSENCE OF A PREDATOR INFLUENCE FOX SQUIRREL (*SCIURUS NIGER*) BRAVERY?

Elizabeth Jones, **Aly Johnson**, and Cody Arenz  
*Department of Biology, Nebraska Wesleyan University, Lincoln, NE 68504*

Squirrels eat the same quantity of food far from cover as they do nearby, but significantly faster due to the effects of predation risk on foraging time and meal size. Their vigilance is also higher far from cover due to the changes in their food handling time. Our research explored this phenomenon in fox squirrels (*Sciurus niger*) by examining whether or not an increased level of predation risk would result in a decreased level of fox squirrel bravery (as defined by a significant reduction in squirrel foraging activity). Coating small leaves with peanut butter and shelled walnut halves, placing this food 0.3 meters from a tree base, and using a mock predator at various distances away from the food or not using the predator at all, we observed that squirrels across Nebraska Wesleyan University's campus (1) approached quickly and ate over a long period of time, (2) approached over a long period of time and ate quickly, or (3) attempted to approach food, but never acted on it. Afterwards, we conducted a Chi-Square analysis of our hypothesis versus results, ANOVA, and various T-tests. Our T-tests compared two variables and supported a significant difference between the presence and absence of a predator. Also, our Chi-Square analysis found that there is no significant difference between time budgets of squirrels in the presence or absence of a predator. Finally, we concluded that fox squirrels across campus are surprisingly braver than we had predicted.

## 10. DIMETHYLMERCURY: SOURCE OF MONOMETHYLMERCURY IN FOG

**Mechelle Johnson**<sup>1</sup> and Kenneth Coale, PhD<sup>2</sup>  
<sup>1</sup>Kirkwood Community College, <sup>2</sup>Moss Landing Marine Laboratories

Dimethylmercury (DMHg) and monomethylmercury (MMHg) are naturally occurring neurotoxins found in marine systems. MMHg bioaccumulates in tissues causing increased concentrations in the food web. Studies show that fog transports MMHg from oceans to land, then accumulated by terrestrial biota. DMHg evasion proposed as a potential source of MMHg to fog, but the mechanism of conversion remains unknown. This study shows that photodemethylation factors in the conversion of

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DMHg to MMHg, thus a potential source of MMHg in fog. Seawater samples were collected from a CTD rosette in the Pacific Ocean. Samples were incubated both in sunlight and darkness, where DMHg was subsequently analyzed. Differences between light and dark-incubated samples inform the lability of MMHg to photolysis. Results show whereas photodemethylation doesn't occur in natural seawater, it does occur under acidic conditions. Since fog water is acidic, these findings suggest photodemethylation may occur atmospherically. These experiments inform the source and cycling of mercury from oceans to terrestrial ecosystems.

## 11. USE OF PULSE WIDTH MODULATION FOR ROBOT MOTOR CONTROL

**Modeste M. Kenne**

*Iowa State University*

The Diligent Motor Robot Kit (MRK) provides the perfect starting point for robotics and has the power to be used for advanced designs and applications. Pulse Width Modulation (PWM) was a key idea used in my project to control motors. I used the duty cycle to specify how long the motor is on during a given period of time by applying pulses to a dual H-Bridge. This was done using the C programming language within the MPLAB programming environment. During my research, I learned how to control a robot's motor with the use of PWM after familiarizing myself with C coding. For this reason, the correlation between my project and the results are quite amazing because by expanding the robot's capabilities, my experience as increased to allow me to pursue a wide range of programming fields ranging from entertainment to bioinformatics, which is very helpful nowadays and would be useful for future researches.

## 12. ANALYSIS OF IPOMOEA LEAF MARGIN DEVELOPMENT

Julie Kang and **Jose Lopez**

*University of Northern Iowa*

Ipomoea (morning glory) is the largest family in the Convolvulaceae. Cultivation of morning glories began in Japan late Edo period and this horticultural success resulted in thousands of plants varying in flower color and leaf shapes. Morning glories have many different leaf shapes some of which are simple and others lobed, making morning glories a great specimen in which to study leaf margin development. The marginal meristem plays an important role during leaf expansion and is thought to regulate leaf shape by promoting cell divisions and controlling cell inhibition along the leaf margins. Both the adaxial (upper) and abaxial (lower) sides of the leaf must also have the proper cells and cell orientation in order for leaf expansion to occur.

## 13. ORGANIC SYNTHESIS OF SOME QUINAZOLINE DERIVATIVES

**Rodrigue Mbog**<sup>1</sup>, Sherif Ibrahim<sup>1</sup>, Andrew Pieper<sup>2</sup>, Gregory Friestad<sup>1</sup>

<sup>1</sup>*Department of Chemistry, University of Iowa*; <sup>2</sup>*Department of Psychiatry, University of Iowa*

Quinazoline is a heterocyclic compound made up of two fused six membered simple aromatic rings. Quinazoline derivatives have been a subject of attention in the synthesis and bioactivity studies, for example, as antifungal, anticancer, antimicrobial, antiviral, anti-protozoan, anti-inflammatory, diuretic, muscle relaxant, anti-tubercular, anti-depressant, anticonvulsant and herbicide. Some derivatives of quinazoline such as the substituted quinazolin-2-yl-guanidines show potential in medicinal chemistry approaches to treatment of neuropsychiatric disorders. This project reports preparation of new series of quinazolin-2-yl-guanidines from readily available commercial anilines. Incorporating functionalities into the starting anilines lead to a series of new quinazolin-2-yl-guanidine with variation at the 6-position, including halide, alkyl, and alkoxy groups, as well as alternative substitution patterns. The substitution are chosen to facilitate optimization of physical and biological properties, and to enable preparation of click-chemistry conjugates to investigate mechanism of action.

## 14. Gabriel Maldonado Casalduc, Iowa State University

Amiotrophic lateral sclerosis (ALS) is a neurodegenerative disease that is characterized by the degeneration of motor neurons and ultimately their death. There are two types of ALS: familial and sporadic. While some information is known about the genetics of familial ALS, the genes linked to sporadic ALS are less clear. Recent large-scale studies have identified a number of new genes associated with sporadic ALS. However, the precise function of these genes and how mutated versions lead to the disease is not well understood. The zebrafish, *Danio rerio*, is used as a model organism for laboratory

# Student Posters (cont.)

studies because its genome is sequenced and known to be quite similar to humans. The goal of my project is to localize where and when the mRNA for different ALS-associated genes is expressed during zebrafish development. Therefore, I designed and cloned RNA probes for in situ hybridization studies on whole developing zebrafish. I observed the expression of several mRNAs in subsets of cells in the zebrafish brain. Studies are ongoing to visualize the mRNA in developing motor neurons.

## 15. MOBILE DATA ACQUISITION SYSTEM (MIDAS) DESIGNED TO BE VERSATILE

**Esdras M Murillo**, Shan He, Ulrike Passe  
Iowa State University

In a world where data monitoring has become an essential part of research, systems that allow users to have greater flexibility in the adaptation and integration of new measurement devices is crucial. MiDAS has a great adaptability to different scenarios of data collection, but also allows a user friendly environment with its versatility. One of the most important aspects that MiDAS is working toward is obtaining more reliable data. When collecting great amount of information data becomes sensitive, this means 'noise' could be introduced into the data collected breaking information veracity. The purpose of this MiDAS lab is to provide a case study for a distributed data acquisition system that would easily applied to different lab conditions. Currently this MiDAS is used on a distributed air data acquisition planned for validating computational fluid dynamics (CFD) models for passive heating and cooling simulations. Thus indoor air temperature stratification and air velocity was chosen to be the first measurements as the fundamental parameter of air motion. In the whole system the cable connection and sensor support needs to be designed considering the shipping and storage safety, and onsite labor requirement for assembly and disassembly. Different design options are compared while considering the flexible adjustment, budget and safety. A series of in-lab tests and on site experiments to analyze adaptability of different sensors, mobility, installation time, and the capability of a user friendly interface are carried out to verify the design credibility.

## 16. THE ANTIMICROBIAL EFFECTS OF COPPER-ALLOYS ON "HIGH-TOUCH" SURFACES IN HOSPITAL SETTINGS.

**Queenster Nartey** and Shannon Hinsia-Leasure Ph.D.  
Grinnell College

Hospital-acquired infections (HAIs) are infections patients acquire while receiving treatment for another condition in a healthcare setting. Every year, the Center for Disease and Control (CDC) estimates that HAIs infect about 1.7 million people and are associated to about 99,000 deaths in American hospitals. Our aim was to study the antimicrobial effects of copper-alloys on "high touch" surfaces at our local hospital, Grinnell Regional Medical Center. We hypothesized that across the 20 unique "high touch" areas sampled, the levels of bacteria would be much less on the copper-alloy surfaces compared to the non-copper surfaces. Samples were sterilely collected from these "high touch" surfaces in patient rooms, occupied and unoccupied, as well as other areas around the hospital. The processed samples were spread plated and colony forming units were counted after 24 and 48 hours of incubation at 37°C. We found that across the 20 unique items sampled, with a few exceptions, copper decreased the bacterial levels by approximately 88-100% in occupied rooms, and by 95-100% in unoccupied rooms (n = 20, p < 0.05). These results further support the antimicrobial effects of copper-alloys from previous studies, and future studies will include identification of the bacteria as well as testing for antibiotic resistance.

## 17. QUANTIFYING PSEUDOMONAS AERUGINOSA 14-GFP ATTACHMENT TO ABIOTIC POWDER SURFACES

**Jasmine Sandoval**<sup>1</sup> and Erin Wilson<sup>2</sup>  
<sup>1</sup>Doane College and <sup>2</sup>Westminster College

This research aimed to confirm initial attachment of biofilm to abiotic surfaces and to quantify the initially attached cells of bacteria on surface powders with *Pseudomonas aeruginosa* 14-GFP as the specimen. *Pseudomonas aeruginosa* is a bacterium that is known to cause infections in human beings, and the 14-GFP strain is a genetically modified strain that produces fluorescence through expression of green fluorescent protein (GFP). Several strategies of cell quantification were investigated including plate count, cell density, luminometer (ATP), fluorometer (fluorescence), and a protein assay. Calibration curves were achieved for all cell quantification techniques excluding plate counts and the best results were obtained from fluorescence measurements and protein assays. Cell attachment was confirmed for all three surfaces, but a protocol for quantification of the cells attached to the surfaces was still in the development process. Once the confirmation and quantification process is complete, determining the attachment and quantification of Pa14-GFP as a prototype for other

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biofilms could help scientists and the medical field in determining and developing surfaces with chemical properties that repel initial biofilm attachment. No initial attachment, no biofilm. The data and protocols obtained from this experiment could help in further development of cell quantification on powders of titanium and hydroxyapatite.

## 18. Jacob Torres

*Augustana College*

In urban areas, the amount of impervious surface and storm water infrastructure has altered natural streams and riparian areas, ultimately degrading their functionality. Urban development decreases water quality, which in turn, changes the aquatic insect community. Macroinvertebrates within urban streams are susceptible to habitat change, some being more tolerant than others to pollutants. Low levels of development (upstream percent impervious surface levels of 5-10% at watershed level), can eliminate or reduce many pollution intolerant native macroinvertebrate families. However, there is very little, if any, understanding of how increment levels of urbanization above these thresholds influences the remaining macroinvertebrate communities. In this study, we assessed the integrity of the macroinvertebrate community using the Family Biotic Index (FBI) within an urbanization gradient (15-65% upstream impervious surface) in Rock Island and Moline, IL.

## 19. SYNTHESIS AND CHARACTERIZATION OF LANTHANUM SULFATE COMPOUNDS AND ITS CONTRIBUTION TO THIN FILM TECHNOLOGY

**Steven Tucker**, Ashini S. Liyanage Jayasinghe, Tori Z. Forbes,  
*Department of Chemistry, University of Iowa, Iowa City, Iowa*

Thin films are nanometer thick coatings that are deposited on a substrate. The layers are formed by spin coating a solution containing the metal oxide precursors and then are heated to make the oxide thin film. Current techniques to make thin films require expensive instruments and toxic solvents. The overall goal of this project is to develop precursors for thin films using water as the solvent. Our initial work focuses on the use of lanthanum sulfate precursors for deposition of lanthanum oxide thin films. We have chosen sulfate as the counterion due to its importance in the deposition of hafnium oxide thin films (Ruther et al., *Inorg. Chem.* (2014)). In this work, we are exploring both room temperature and hydrothermal reactions to create soluble nanoscale molecular precursors that can be used in thin film materials.

## 20. EXPLORING ROLE OF HIF-1A IN ZEBRAFISH MODEL

**Gabrielle Woods**<sup>1</sup> and Melanie Torri<sup>2</sup>, Maura McGrail<sup>2</sup> and Jeffrey Essner<sup>2</sup>  
<sup>1</sup>*Des Moines Area Community College* and <sup>2</sup>*Iowa State University*

Zebrafish make outstanding experimental models for analyses of human health, development and pathology. This research examines a critical gene, hypoxia inducible factor-1alpha (hif-1a), which is important for a number of cellular responses needed in low oxygen conditions. Here we focus on the **angiogenesis pathway; this pathway is essential in human growth, development and diseases including cancer**. Tumor cells demand blood supply to disperse oxygen and nutrients; therefore, it is necessary for cancers to activate the **angiogenesis pathway** to survive. Hif-1a is a transcription factor that travels into the nucleus during hypoxia to induce expression of genes needed to survive low oxygen environments. One such target, Vascular Endothelial Growth Factor (**VEGF**) engenders **angiogenesis** to create new vasculature. CRISPRs targeting the 5' and 3' coding regions of the Hif-1a gene were microinjected into zebrafish embryos at the 1-cell stage induce mutation. The *fli1:egfp* transgenic line was used to enable observation of vascular development post mutagenesis. The F0 generation was grown to adulthood and incrossed; F1 embryos were then assayed to scan for phenotypes, identify mutant alleles, and to calculate CRISPR efficiencies.

# Student Posters (cont.)

## 21. TAMING A PATHOGEN: DEVELOPING METHODS TO INCREASE THE GENETIC TRACTABILITY OF *ERWINIA TRACHEIPHILA*

**Tina Wu**<sup>1,2</sup>, Olakunle Olawole<sup>1</sup>, Chiliang Chen<sup>1</sup>, Gwyn A. Beattie<sup>1</sup>

<sup>1</sup>Dept of Plant Pathology & Microbiology, Iowa State University; <sup>2</sup>Microbiology Undergraduate Program, Iowa State University

*Erwinia tracheiphila* causes bacterial wilt of economically important cucurbits including cucumber, melons, squash, and pumpkins. Managing this disease has relied on insecticides to control the cucumber beetles that transmit *E. tracheiphila*. Less costly and more eco-friendly management solutions may result from a better understanding of how specific genes contribute to the biology and pathogenesis of *E. tracheiphila*. Our objective is to develop genetic tools to make *E. tracheiphila* amenable to genetic manipulation. We explored the efficacy of several mutagenesis approaches by targeting two genes hypothesized to be involved in host preference (*eop1*) and pathogenesis (*dspE*). We tested insertional inactivation using an approach that requires the cloning of internal fragments of the targeted genes into suicide vector pKnockout- $\Omega$  and integration via homologous recombination (HR) by native recombinases. This approach was hindered by the fact that most vectors tested were maintained without integration. We are currently exploring the integration by native recombinases of a linear PCR product generated by splice-overlap-extension PCR (SOE-PCR); this product has a selectable kanamycin resistance marker spliced between two homologous regions upstream and downstream of the target genes. Additionally, because a native recombinase may not be active in *E. tracheiphila*, we are testing the Lambda Red recombination system to mediate the integration of the SOE PCR products by a phage recombinase. Increasing the genetic tractability of *E. tracheiphila* to gain a better understanding of the genetics of this pathogen will help create biological solutions to manage this disease.

## 22. THE EFFECTIVENESS OF ETIQUETTE STRATEGIES TO MITIGATE NEGATIVE EMOTIONS

Mariangely Iglesias Pena<sup>2</sup>, David A. Montealegre<sup>2</sup>, **Jordan G. Zonner**<sup>1</sup>, Euijung Yang<sup>4</sup>, Michael C. Dorneich<sup>3</sup>

<sup>1</sup>Doane College

This research explores the importance of applying human-to-human etiquette strategies to human computer interaction. The effectiveness of etiquette strategies was measured and compared to visualize their importance in the role of learning. In the past decade, the number of people taking online classes has increased. Simultaneously, people are using more technology, which increases the number of human-computer interactions. Etiquette strategies are strategic ways of phrasing communication; which people use to adapt their conversations appropriately. Unlike humans, computers lack the awareness and ability to adapt to these human emotions. For this research, the users were manipulated in order to induce negative emotions and mitigate them through etiquette strategies in the interest of testing their effectiveness. These strategies were evaluated in order to see if presenting the same information with different etiquette styles can positively affect the user's performance, motivation, and emotional state. The results demonstrated rising trends that certain etiquette strategies can positively affect the user's learning experience when used to mitigate negative emotions, such as frustration.

## 23. FABRICATION OF POLYMER MICROFIBERS FOR FUTURE DRUG DELIVERY AND CELL ENCAPSULATION

**Erik Zorrilla**<sup>1</sup> and Dr. Hashemi<sup>2</sup>

<sup>1</sup>Upper Iowa University and <sup>2</sup>Iowa State University

Fabrication of polymer microfibers has the potential to revolutionize the biomedical industry because they can be used for tissue engineering, drug delivery and cell encapsulation. Drug delivery through the use of polymer microfibers provides a composite approach to eliminate the use of pills and capsules which can lead to overdoses especially with elderly patients. Cell encapsulation aided by the use of fabricated microfibers can formulate new ways to treat many common diseases like HIV and Ebola and strengthen the host immune system through cell therapy. In this study the polymers Polycaprolactone (PCL) and Gelatin were blended at different ratios to achieve uniform biodegradable microfibers.

# Student Opportunities Fair Exhibitors

## **ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY (AURA)**

The IINSPIRE LSAMP Program, in partnership with the Association of Universities for Research in Astronomy (AURA), will offer internships during 2016. This program is intended to provide students with work and research experience in a major astronomical observatory. Although all applicants will be considered, special consideration will be given to engineering and computer science students. In addition, applicants are expected to have course work and experience that will enable them to contribute to the work of the observatory.

Intern positions encompass the entire range of technical and scientific skills involved in operating modern observatories. To accomplish research in astronomy using the most advanced telescopes, the staffs of AURA's observatories include electrical engineers, mechanical engineers, optical engineers, software engineers. These engineers work in partnership with our scientists and participate in the end-to-end development of some of the world's most advanced astronomical instrumentation. The experience gained by students in the learning and research environment we offer would be broadly applicable in a number of industrial settings as well.

The Association of Universities for Research in Astronomy (AURA) is a consortium of 39 US institutions and 7 international affiliates that operates world-class astronomical observatories. AURA's role is to establish, nurture, and promote public observatories and facilities that advance innovative astronomical research. In addition, AURA is deeply committed to public and educational outreach, and to diversity throughout the astronomical and scientific workforce.

## **CENTER FOR BIORENEWABLE CHEMICALS REU PROGRAM**

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.

## **CENUSA BIOENERGY RESEARCH INTERNSHIP FOR UNDERGRADUATE STUDENTS**

The summer 2016 CenUSA Bioenergy Research Internship Experience for Undergraduates will provide rich interdisciplinary training and engagement opportunities for undergraduate students in all areas of the bioenergy value chain to meet the workforce challenges of the emerging bioeconomy.

The research internship program will enroll a class of 12 students, with all students spending the first five days in the program at the Iowa State University host site. While a portion of the students will remain at Iowa State University, several of the students will then travel to one of CenUSA's partner institutions (depending on their research interests) to complete their summer program at a partner lab. All students will maintain contact with the program through distance technologies for weekly meetings, seminars, and final presentations.

For more information or to apply, visit: <http://www.abe.iastate.edu/cenusa/>

## **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/ccli/>

Contact: Steve Karsjen, Education Programs Director, [karsjen@ameslab.gov](mailto:karsjen@ameslab.gov)

## **HHMI SUMMER SCHOLARS PROGRAM**

The HHMI Summer Scholars Program seeks to increase minority participation in science by providing a summer research experience for minority community college student interested in transferring to a four-year university.

# Student Opportunities Fair Exhibitors (cont.)

## IOWA BIOSCIENCES PROGRAM

The Biosciences Program is a multidisciplinary entry program for 11 PhD degree granting departments and programs at The University of Iowa. The program provides students the flexibility of investigating several disciplines prior to affiliating with a specific degree program by allowing students to perform three research rotations in the laboratories of any of the Biosciences Program faculty, regardless of their departmental or program affiliation.

## 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/> and take a look at the faculty research interests as well as on-going work at our various federal facilities. Contact the professors directly about opportunities. [www.grad-college.iastate.edu](http://www.grad-college.iastate.edu) has detailed information about admissions requirements. The rate of admission varies for different programs, but approximately 50% of US applicants are accepted.

Approximately 90% of PhD students and 30% of masters students are offered assistantships with a monthly stipend averaging approximately \$2,000. Most students holding assistantships also receive tuition support.

## 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.

## 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. Nahant Marsh was used for skeet and trap shooting from the 1960's to the 1990's. Because of the lead left behind, the marsh was declared an EPA Superfund site and was cleaned up in 1999. After that time, the site was declared a preserve and educational center. The city of Davenport, the Nahant Board, Eastern Iowa Community College District, and River Action are all parts of Nahant Marsh.

Research is an integral part of Nahant Marsh. We are able to expand our knowledge of the ecosystems found here, which allows us to better maintain this amazing natural area. 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<sup>UP</sup>)

RISEUP 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. They perform research, under the guidance of laboratory staff scientists or engineers, on projects supporting the DOE mission.

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](mailto:karsjen@ameslab.gov)

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**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 weeks in duration. Each of the participating DOE laboratories, including the Ames Laboratory, offer different research opportunities and interested faculty members are encouraged to contact Ames Laboratory scientists in advance to discuss research projects of mutual interest. All VFP faculty applicants must submit at the time of application a research project proposal co-developed with the collaborating research staff located at the host DOE laboratory.

VFP website: <http://science.energy.gov/wdts/vfp/>  
Contact: Steve Karsjen, Education Programs Director, [karsjen@ameslab.gov](mailto:karsjen@ameslab.gov)

**AUGUSTANA COLLEGE**  
**ADMISSIONS AND UNDERGRADUATE RESEARCH**

Information will be available regarding research and internship opportunities, funding support, and transfer logistics. Augustana College is a liberal arts college located in , Illinois.

**THE UNIVERSITY OF IOWA**  
**ADMISSIONS AND COLLEGE OF ENGINEERING**

The University of Iowa is a Tier-1 research institution dedicated to developing the world's next wave of planners, problem solvers, and inventors. Iowa offers more than 200 areas of student, and students can easily combine multiple majors, minors, and certificates to develop a unique academic portfolio that helps them stand out when applying for jobs or graduate school. Undergraduate students pursuing a degree in science, technology, engineering, and mathematics learn from and work with expert faculty and staff, advancing cutting-edge research while gaining hands-on experience outside the classroom. Iowa offers 500+ student organizations covering topics ranging from academics and athletics to multicultural interests and student government, allowing students to form close-knit communities while exploring their passions.

# Acknowledgments

The IINSPIRE LSAMP Alliance thanks the following students, faculty, and staff for their assistance and commitment to making the annual conference a success.

## Annual Conference Planning Committee\*

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*Videography  
Ames, Iowa*

Amy Vinchattle  
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Ames, Iowa*

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\* Names are listed in alphabetical order



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