1994-2019

Celebrating 25 Years

The Oklahoma Louis Stokes Alliance for Minority Participation

OK-LSAMP 25th Annual Research Symposium

October 5, 2019

Oklahoma State University
Student Union
Stillwater, Oklahoma

DIVISION OF INSTITUTIONAL DIVERSITY

NSF HRD-1408748
NSF HRD-1612560
NSF HRD-1702495
2415 Eisenhower Ave
Alexandria, VA 22314
www.nsf.gov

CONFERENCE PRESENTATION OPPORTUNITIES

Scholars you are strongly encouraged and urged to present your research at the following conferences.

Oklahoma Research Day

March 2020

Southwestern Oklahoma State University,
Weatherford, Oklahoma
www.oklahomaresearchday.com/

Oklahoma
Research Day

OK-LSAMP 25th Annual Research Symposium

AGENDA

October 4th, 2019 Home2Suites, Stillwater OK			
6:00 PM - 8:00 PM	Reception	Student Networking Event	Lobby/Patio
6:00 PM - 7:30 PM	Alliance Meeting	OK-LSAMP Administration, Campus Program Managers and Invited Guests	
October 5th, 2019 Oklahoma State University, Student Union			
8:30 AM - 11:00 AM	Registration/ Check-In	Poster Set-up: ALL POSTERS MUST BE IN PLACE BY 9AM	203 Theater Lounge
9:00 AM - 9:15 AM	Opening Remarks and Introductions	Brenda L. Morales, OK-LSAMP Director Jason F. Kirksey, PhD, OK-LSAMP Principal Investigator Vice President for Institutional Diversity, Oklahoma State University	203 Theater
9:15 AM - 10:15 AM	Workshop	International Research Experiences Panel Moderator: Tomica Blocker, MD/PhD, Pediatric Resident, Children's Medical Center, Dallas TX . OK-LSAMP and BD Fellow alum Panelists: Elisabeth Allbritton, Karina Flores, Mike Gorbet, Tabby Gunnars, Theresa Hinkle.	203 Theater
9:45 AM - 10:15 AM	Judges Meeting	Judges Orientation	408 Case Study 1
10:15 AM - 10:30 AM		BREAK	
10:00 AM - 12:00 AM	Scholar Headshots	Professional photography headshots being taken	4th floor SU
10:30 AM - 11:30 AM	Non-Life Sciences	Poster Presentations: Each presenter must be by their poster	413 Exhibit Rm 1
	Life Sciences	Poster Presentations: Each presenter must be by their poster	417 Exhibit Rm 2
11:45 AM - 1:30 PM		LUNCH	265 Ballroom
	Keynote Address	Cammi Valdez, PhD Director, McNair Scholars Program, Wellesley College, Boston MA	265 Ballroom
1:30 PM - 1:45 PM	Group Photo		Ballroom Lobby
1:45 PM - 3:00 PM	Oral Presentations	*For Specific Times, See "Presentations Listed Alphabetically"* Chemistry Biological Sciences & Environmental Science Biology Physics, Engineering & Computer Science	 270 French Lounge 297 Suite 1600 408 Case Study 1 412 Council Rm
1:45 PM - 2:45 PM	Workshop	Building your Online Research Profile Clarke Iavokasis, Assistant Professor, Library Scholarly Services	450 Oklahoma Rm
3:00 PM - 3:15 PM		BREAK	
3:15 PM - 4:15 PM	Workshop	Faculty Session - NSF Funding for Basic Research Rita Miller, PhD, Professor and NSF Program Director	450 Oklahoma Rm
3:15 PM - 4:15 PM	Workshop	3 minute thesis (3MT) presentation preparation Carol Powers, PhD, Coordinator Graduate Student Professional Development	203 Theater
4:30 PM - 5:00 PM	Awards Presentation & Closing Remarks	1st, 2nd, and 3rd Place Presentations Life Science Poster Presentations Non Life Science Poster Presentations Oral Presentations Jovette Dew, PhD, Assistant Vice President for Institutional Diversity, Oklahoma State University	203 Theater

TABLE OF CONTENTS

Wi-Fi Access

Click on guest and use the following credentials

oklsamp_guest@okstate.edu

Symp2019

Join the OK-LSAMP Program on social media

Keep us updated on your accomplishments and we will feature them on our website or social media.

KEYNOTE SPEAKER

Dr. Cammi Valdez is a vascular biologist, college administrator, faculty member, and champion of making STEM accessible. As a Latina woman scientist, she is a strong advocate for empowering and advancing women, first generation students, and people of color in STEM. As an educator in this area, she promotes this work through the McNair Scholars Program at Wellesley and on national stages as an invited speaker at conferences. She is passionate about changing the landscape and the makeup of the people within higher education at all levels - students, faculty, and staff - to become more diverse, inclusive, and representative of the people in our society. Together we can make this a reality!

Currently, she serves as the inaugural Director of the Ronald E. McNair Postbacalaureate Achievement Program at Wellesley College, which provides academic and professional support to first generation, low income, and students of color on their path to STEM graduate education. At Wellesley, Dr. Valdez is very engaged in the conversations about making inclusive spaces where all students, staff, and faculty feel a sense of belonging on campus through her work on the Committee for Diversity, Staff of Color @ Wellesley, and Immigration Working Group. Prior to coming to Wellesley, Dr. Valdez served as the Assistant Director for Undergraduate Research and Fellowships at Harvard University. In this role, she built the Harvard-Amgen Scholars Program from scratch, ran the Harvard Mellon Mays Undergraduate Fellowship, and managed the professional programming activities of the Harvard Undergraduate Research Village.

Dr. Valdez's research focuses on understanding the pathology and physiology of vascular diseases present in the eye using mouse models. She is interested in investigating endothelial cell (EC)-pericyte interactions in the microvasculature (arterioles, capillaries, and venules) of the retina in animal models of disease. Her research primarily focuses on capillaries, which are formed by two cell types: EC's create the inner layer and pericytes form the outer layer. Her previous work was centered on understanding the role of pericyte loss in diabetic retinopathy, the eye disease in diabetes. Through this research, Dr. Valdez was able to experimentally show for the first time that conditional loss of pericytes in adult mice caused microvascular destabilization - acellular capillaries, microaneurysms, and leakage - which has implications for diabetic retinopathy. Along with her collaborators at Harvard Medical School/Schepens Eye Research Institute/Massachusetts Eye and Ear Infirmary, she is studying the EC-pericyte interactions in models of CADASIL (cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy), the most common monogenic cause of SVD.

Through her teaching Dr. Valdez aims to inspire students to explore and pursue STEM. She teaches a first year seminar "The Eye: A Window into Vascular Diseases" (BISC 103Y), which focuses on principles of the cardiovascular system from a physiological and cellular approach. This course also examines how vascular diseases in the eye have larger implications for cardiovascular diseases systemically. In addition, Dr. Valdez co-teaches an advanced writing seminar on applying to graduate school with Professor Jeannine Johnson, Director and Senior Lecturer in the Writing Program.

Dr. Valdez received a B.S. Professional in Chemistry and a B.S. in Mathematics from Southwestern Oklahoma State University and earned her PhD in Biological Chemistry and Molecular Pharmacology from Harvard University. During graduate school, her scholarship and work was recognized with the NSF Graduate Research Fellowship, NASPA Massachusetts Richard F. Stevens Outstanding Graduate Student Award, 60th Nobel Laureate Meeting Harvard Ambassador, and serving as a Harvard GSAS Commencement Marshal. Her research in vascular biology has been published in numerous journals including *The American Journal of Pathology* as well as *Current Diabetes Report*.

International Experiences Panel ***9:15-10:15pm (203 Theater)***

Moderator:

Tomica Blocker, MD/PhD

Tomica is currently a pediatric resident at Children's Medical Center, in Dallas TX. "They call us residents because we spend so many hours in the hospital, that we practically live there! Even still, it's vital to me, that I make time for research"

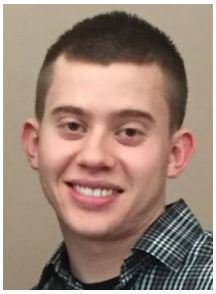
Her first research experience began at her alma mater, the only HBCU in the state of Oklahoma, Langston University. there, her curiosity and intelligence were nurtured in the form of on-site research as well as summer internships. Those opportunities allowed her to travel the nation, and even the world, to perform and present my research.

Since then, she has completed a PhD in Zoology, at OSU, where I was an OK-LSAMP BD Fellow, then an NSF Graduate Research Fellow (GRFP). Following that, she returned home to Kansas, to complete an MD at the University of Kansas. Throughout that time, research has continued to shape her and her life, teaching her to ask questions, think critically, and solve problems

Panelists:

Karina Flores,

Karina is a first generation student at the University of Oklahoma and a Senior studying biology with an emphasis in infectious diseases. Karina began her college career as pre-med student but quickly realized she enjoyed conducting research once she joined her first lab at the Sam Noble museum of Natural history. She then sought out additional opportunities to enhance her research experience at OU like partaking in campus program and organizations such as OK-LSAMP, SACNAS, and McNair. After a semester in the lab at the Sam Noble museum of Natural history, she joined the lab of Dr. McCall researching Chagas Disease, a parasitic disease endemic to Central and South America. It was here were her passion for infectious diseases took off. Karina has been in Dr. McCall's lab for a year and a half, of which she has had the opportunity to begin her scientific career by presenting research in numerous conferences. Karina has had the opportunity to be a part of two summer research experiences- summer 2018 in Costa Rica researching the prevalence of Avian malaria and bird specificity at Las Cruces Biological station and summer 2019 at New York University, developing tools to study Zika virus infection in vivo based on Cre-lox reporter systems. These research experiences have allowed her to connect with the scientific community all over the world through conferences and graduate school programs such as the Princeton Molecular Biology Scholars Program. After graduating from OU, Karina plans to attend graduate school and obtain a PhD in Microbiology and Infectious Diseases in hopes of contributing to her passion of biology making an impact to society through scientific findings for the betterment of her community and the world.



Mike Gorbet

Michael-Joseph Gorbet obtained his Bachelor's of Science degree in Chemistry in 2016, from Southwestern Oklahoma State University, Department of Chemistry and Physics. During his undergraduate education, he was involved in bioinorganic synthesis chemistry making contrast agents and oxidation catalysts for three years. Gorbet also participated in internships at both Georgia Tech University and the University of Hull, UK. After a year as a Ph.D. student in the Chemistry and Biochemistry department at the University of Oklahoma, he transferred to Dr. Ranjan's lab at Oklahoma State University as a National Science Foundation Bridge to the Doctorate Fellow and graduate research assistant.

Gorbet is a proficient synthetic chemist working with both organic and inorganic chemistry with a future aim in contributing to making a targeted cancer therapy using a nanoparticle-based delivery system. Specific areas of current work and research interest include:

- Nanoparticle synthesis for real-time imaging of immune response
- Organic/Ligand Synthesis with Metal Complexation for cell-based targeting
- Device induced nanoparticle synthesis for cancer therapy

Tabitha Gunnars

Tabby Gunnars is currently a 2nd year Master's student of the department of Integrative Biology. Her research interests consists of environmental/anthropogenic factors and how they affect the lives of mammals. Tabby is currently researching the visual field of bottlenose dolphins which will help identify their blind spots. This will contribute to Dr. Bruck's research on using UAVs (drones) that will capture hormone samples from the breath of dolphin blowholes. Through this research she hopes to inspire younger students within underrepresented communities to pursue a career in the STEM field.

Theresa Hinkle

Theresa Hinkle is a senior at Cameron University pursuing a dual degree in chemistry and biology. She graduated high school from Webbers Falls, Oklahoma. During the summer of 2017 she participated in the Ecosystems REU at the University of Arkansas. There she worked on a viable food hub model for northwest Arkansas and presented her research at the Arkansas Water Resources Centers annual Water Research Conference. She then began research with Dr. E. Ann Nalley, a former American Chemical Society president and worked on the synthesis of novel esters by microwave reaction. She presented this research at various local, regional, and national meetings across the united states. She was the recipient of the ACS Bridge travel award(funded by the NSF) of $2,000 which supported her travel to the 2019 ACS Spring National Meeting in Orlando, Florida. Recently, Theresa was accepted to an international REU in France where she and Dr. Nalley collaborated with Dr. Etienne Grau from the university of Bordeaux. The goal of their collaboration was to synthesize a "green" polymer from "natural products" by means of microwave.

Workshops

Building Your Online Research Profile ***1:45pm (450 Oklahoma Rm)***

Clarke Iakovakis, presenter

Clarke Iakovakis is the Scholarly Services Librarian at Oklahoma State Librarian. He provides support with questions relating to publishing, open access, copyright, and scholarly metrics. He is also liaison to the History and Political Science departments.

3 minute thesis (3MT) presentation preparation ***3:15pm-4:15 (203 Theater)***

Dr. Carol Powers, presenter

Dr. Carol Powers is the Coordinator for Graduate Professional Development at the OSU Graduate College. After earning her Ph.D. at the University of Minnesota in Applied Plant Sciences, she worked in the seed industry for five years before coming to OSU. Dr. Powers worked with the Wheat Genetics group before moving to the Graduate College in 2018. She helps coordinate the OSU 3 Minute Thesis® competition each autumn and enjoys training students on how to give effective 3MT® talks.

NSF Funding for Basic Research ***3:15-4:15pm (450 Oklahoma Rm)***

Rita Miller, PhD, presenter

Dr. Rita K. Miller is a Professor of Biochemistry and Molecular Biology at O.S.U., Stillwater. Concurrently, she is serving as a rotating Program Director at the National Science Foundation in the Molecular and Cellular Biosciences Division in the Biosciences Directorate (BIO/MCB). Dr. Miller's laboratory at O.S.U. studies the regulatory mechanisms that control microtubules, a protein polymer that is critical for separating the genetic material during cell-division. Dr. Miller earned her Ph.D. at Northwestern University Medical School. She conducted her postdoctoral work at Princeton University, where she identified one of the first linkages between the two major cytoskeletal-polymer systems in cells.

LOUIS STOKES & LSAMP

In 1991, the National Science Foundation created six multi-institutional Alliance for Minority Participation (AMP) programs. In 1998, **Congressman Louis Stokes'** name was added to the program.

Congressman Stokes passed away 2015. The LSAMP community and the nation has lost a great man. You can read all about Congressman Stokes' career at: http://history.house.gov/People/Detail?id=22311

Dr. A. James Hicks was named LSAMP program director in 1997. He received a Ph.D. in biology from the University of Illinois at Urbana and additional training at Harvard University, the National Institutes of Health, and the Missouri Botanical Gardens. When Dr. Hicks took over LSAMP, there were 25 Alliances in the nation. Today, there are more than 40 active LSAMP alliances with over 800 colleges and universities involved in increasing the quality and quantity of students from underrepresented populations who receive degrees in science, technology, engineering, and mathematics.

A Brief History of OK-LSAMP

In 1992, the Oklahoma State Regents organized the Oklahoma Alliance for Minority Participation in Science, Engineering, and Mathematics (OKAMP SEM). Dr. Earl Mitchell, Oklahoma State University (OSU) Professor, was chosen to serve as Chair of the Alliance. In 1993, Dr. Mitchell, with the help of Dr. Ann Ackerman from South Oklahoma City Junior College, wrote and submitted an AMP proposal to the National Science Foundation (NSF). Included in the proposal was additional matching support for the program at the regional universities provided by the Oklahoma State Regents for Higher Education. In 1994, OSU, as the lead institution, along with seven partner institutions was awarded the grant. The OKAMP program was established to address the critical undersupply of minority students pursuing BS degrees in Science, Mathematics, Engineering, and Technology (SMET).

Historically 11 Oklahoma institutions of higher education have made up the Oklahoma consortium. In this new phase Oklahoma Panhandle State University will become the 12th institution to join the Oklahoma Alliance. Through the years, many changes have been made including the addition of Congressman Louis Stokes' name to the AMP programs nation-wide, and the change of SMET to Science, Technology, Engineering, and Mathematics (STEM). A graduate school initiative - the Bridge to the Doctorate (BD) program was implemented with Oklahoma providing graduate support for 9 cohorts of BD Fellows since the BD initiative began.

In 2018-2019, the Oklahoma Alliance had 267 Scholars; of those 68 completed Bachelor of Science degrees and 18 of the graduates were admitted to graduate schools for a total of 26% of scholars. During the academic year 69% of the Alliance scholars participated in research activities, and 31% of the scholars participated in summer research or internship experiences at national and international locations. This academic year there were a total of thirty-three scholars participating in 37 international experiences.

ADMINISTRATION

Oklahoma State University, Lead Institution

Jason F. Kirksey, Ph.D., Principal Investigator
405-744-9154, jason.kirksey@okstate.edu
Dr. Kirksey is the Vice President for Institutional Diversity at Oklahoma State University (OSU). In this role, he serves as the chief diversity officer for the entire OSU system. In addition, Dr. Kirksey serves as director of the African American Studies Center and Associate Professor in the Department of Political Science. His research interests include minority politics (especially African American and women), urban politics, the election system, and American government.

Brenda L. Morales, M.S., Director
405-744-6710, brenda.morales@okstate.edu
Brenda received her B.S. degree from the University of Texas Pan-American, which led her to Oklahoma State University through a National Science Foundation - Research Experience for Undergraduates (NSF - REU). In Fall 2002 she made Oklahoma State University her choice to pursue a Master of Science degree in Psychology. She became Director of the OK-LSAMP program and the Bridge to the Doctorate program in 2016. The OK-LSAMP program is a consortium of 11 Oklahoma colleges and universities in which Brenda oversees the day-to-day and long-term activities associated with the NSF grant.

Darlene Croci, Grant Coordinator
405-744-7820, darlene.croci@okstate.edu
Darlene received her BS degree in Human Environmental Sciences from Oklahoma State University (OSU) in 1991. Upon graduation, she began working for OSU serving in various roles across campus. Darlene worked for 5 years for the Oklahoma Department of Career and Technology Education before returning to OSU in 2004. She served a five year term on the OSU Staff Advisory Council (SAC) - 2010-2015. Darlene became Grant Coordinator for OK-LSAMP September 2015.

Sandra Whalen., Program Evaluator
405-325-2158, swhalen@ou.edu
Sandra received her M.Ed. In Adult and Higher Education from the University of Oklahoma and is Director of the Center for Institutional Data Exchange and Analysis (C-IDEA) at the University of Oklahoma. One of the main functions of the center is to coordinate the Consortium for Student Retention and Data Exchange (CSRDE). She has helped transition the CSRDE from solely a data exchange group to a national organization supporting higher education institutions interested in improving the success of their students. Sandra was instrumental in establishing the National Symposium on Student Retention in 2005, and creating the CSRDE monthly webinar series in 2007. Under her leadership, the CSRDE published "Building Bridges for Student Success: A Sourcebook for Colleges and Universities" in 2003.

CAMPUS PROGRAM MANAGERS

Cameron University
Michael Husak, Ph.D., 580-581-2374, michaelh@cameron.edu
Dr. Husak received a BS and MS in biology from Angelo State University and a Ph.D. in biological sciences with an emphasis in ecology and evolution from Mississippi State University. He is currently an Associate Professor of Biology at Cameron University and the Curator of the Cameron University Museum of Zoology. Dr. Husak's research interests include vertebrate ecology and the evolution of life history strategies in birds.

East Central University
Karen Williams, Ph.D., 580-559-5394, kwillims@ecok.edu
Dr. Williams earned a BS in Physics and Mathematics from Arkansas Tech University, a MS in Physics from the University of Arkansas, and a PhD in Physics Education from The University of Oklahoma. Her research interests are varied from how students learn physics to ultrasound physics to applying photothermal deflection spectroscopy to the analysis of species in a flame. She is an American Association of Physics Teachers Fellow, Vice Chair Physical Sciences Section and Recording Secretary for the OK Academy of Science and Professor in the Physics Department at East Central University.

Langston University
Sharon Lewis, Ph.D., 405-466-3316, salewis@langston.edu
Dr. Lewis has a BS in zoology from Howard University as well as an MS in chemistry and a Ph.D. in chemistry/biochemistry from the University of Oklahoma. Her research interests include bioinformatics of bipolar disorder and asphalt chemistry. Currently, Dr. Lewis serves as an Associate Professor of Chemistry.

Oklahoma State University
Camille Frye DeYong, Ph.D., 405-744-6055, camille.deyong@okstate.edu
Dr. DeYong received a BS in math education and MS and PhD in Industrial Engineering and Management from Oklahoma State University. Her research interests include organizational performance metrics, quality management and customer satisfaction measurement. She is an Associate Professor in Industrial Engineering and Management at OSU.

Northeastern State University
Jody Buckholtz, Ph.D., 918-444-3839, buckholt@nsuok.edu
Dr. Buckholtz received a BS from the University of Central Arkansas and an MS and Ph.D. from the University of Arkansas. Her research interests include electrochemistry-oxygen reduction reaction catalysis, construction of reference electrodes for use in nonaqueous solutions, nitrate determination in rural well-water supplies, and ionic liquid uses as solvents for cellulose degradation. Dr. Buckholtz is an Associate Professor AISES Advisor and Supplemental Instruction Coordinator.

Northwestern Oklahoma State University
Tim Maharry, Ph.D., 580-327-8583, tjmaharry@nwosu.edu
Dr. Maharry has a BA with distinction in mathematics from Hastings College as well as an MS in applied mathematics and a Ph.D. in statistics from Oklahoma State University. His research interests include math education, statistical literacy, and numerical analysis. Currently, Dr. Maharry serves as Chair and an Associate Professor in the Department of Mathematics and Computer Sciences.

Southeastern Oklahoma State University

Brad Ludrick, Ph.D., 580-745-2668, bludrick@se.edu

Dr. Ludrick received his BS in biology and a M.Ed. in science education from Southeastern Oklahoma State University. At Texas A & M, he received an Ed.D. in science education. His research interests include studying the nematicidal effects of transformed Escherichia coli in small ruminants and improving the scientific inquiry skills of the secondary science teacher. Dr. Ludrick is an Associate Professor in the Department of Biological Sciences.

Southwestern Oklahoma State University

Tim Hubin, Ph.D., 580-774-3026, tim.hubin@swosu.edu

Dr. Hubin received a BS in chemistry and a BS in secondary science education from Kansas State University and worked as a postdoc at Caltech. Currently, he is working on the development and screening of transition metal complexes as drug molecules for several diseases including cancer, HIV, malaria, and fungal infections. He is also continuing a long -term project on "green" oxidation catalysts able to work in water and produce only water as byproduct. Dr. Hubin has received several awards for combined teaching and research accomplishments, including Oklahoma awards as a DaVinci Scholar and the Oklahoma Medal for Excellence, as well as the national award designation as a Henry-Dreyfus Teacher-Scholar.

University of Central Oklahoma

Greg Wilson, Ph.D., 405-974-3497, gwilson@uco.edu

Dr. Wilson has a BA in biology from Central College, an MS from Fort Hays State University, and a Ph.D. in zoology from Oklahoma State University. His research interests include using molecular techniques to investigate questions relating to genetics, phylogeography, molecular ecology, and systematics in an array of organisms, especially mammals. He is particularly interested in how heterogeneous landscapes impact contemporary genetic structure of extant populations. Currently, Dr. Wilson is the Assistant Vice President, Office of Research and Grants and a Professor in the Biology Department.

University of Oklahoma

Rodney Bates, Ph.D., 405-325-7407, rbates5@ou.edu

Dr. Rodney Bates is Director of Graduate Student and Postdoc Retention and Support in the Graduate College. Dr. Bates supports many aspects of the Graduate College's mission by providing direct mentorship and coaching to graduate students and postdocs, working with academic units to improve their climates, providing workshops and training to faculty, and enhancing the Graduate College's ability to recruit, support, and retain students and postdocs from historically underrepresented groups.

University of Tulsa

J. C. Diaz, Ph.D., 918-631-2228, diaz@utulsa.edu

Dr. Diaz has a BS in mathematics from Universidad de los Andes and a MA and Ph.D. from Rice University. His research interests include human computer interaction, informational technology, and robotics. One of Dr. Diaz's accomplishments is a yearly summer robotics workshop for high school students for which OK-LSAMP Scholars from the University of Tulsa have served as mentors.

ORAL PRESENTATIONS

Listed Alphabetically

First Name	Last Name	University	Discipline	Time	Room #
Rainee	Deroin	OSU	Environmental Science	1:45-2:00	297 Suite 1600
Jennifer	Escobar	OU	Chemical Biosciences	2:05-2:20	270 French Lounge
Karina	Flores	OU	Biology	1:45-2:00	408 Case Study 1
Tayler	Hedgecock	SE	Biology	2:25-2:40	408 Case Study 1
Jose Juan	Macias Jr.	OU	Chemistry and Biochemistry	2:25-2:40	270 French Lounge
Cayla	Moore	LU	Biology	2:05-2:20	408 Case Study 1
Erik	Perez	OSU	Mechanical Engineering	2:45-3:00	412 Council Room
Shawn	Ray	OSU	Mechanical Engineering Pre-Med	2:25-2:40	412 Council Room
Erin	Richardson	LU	Chemistry	1:45-2:00	270 French Lounge
Fernando	Salazar	ECU	Physics	1:45-2:00	412 Council Room
Casandra	Salinas	OSU	Biochemistry & Molecular Biology	2:05-2:20	297 Suite 1600
Diana	Soriano	OSU	Microbiology & Psychology	2:25-2:40	297 Suite 1600
Alfredo	Velasco II	TU	Computer Science	2:05-2:20	412 Council Room
Marissa	Wilson	LU	Biology	2:45-3:00	408 Case Study 1

ORAL PRESENTATIONS

Listed by Room Number

First Name	Last Name	University	Discipline	Time	Room #
Erin	Richardson	LU	Chemistry	1:45-2:00	270 French Lounge
Jennifer	Escobar	OU	Chemical Biosciences	2:05-2:20	270 French Lounge
Jose Juan	Macias Jr.	OU	Chemistry and Biochemistry	2:25-2:40	270 French Lounge
Rainee	Deroin	OSU	Environmental Science	1:45-2:00	297 Suite 1600
Casandra	Salinas	OSU	Biochemistry & Molecular Biology	2:05-2:20	297 Suite 1600
Diana	Soriano	OSU	Microbiology & Psychology	2:25-2:40	297 Suite 1600
Karina	Flores	OU	Biology	1:45-2:00	408 Case Study 1
Cayla	Moore	LU	Biology	2:05-2:20	408 Case Study 1
Tayler	Hedgecock	SE	Biology	2:25-2:40	408 Case Study 1
Marissa	Wilson	LU	Biology	2:45-3:00	408 Case Study 1
Fernando	Salazar	ECU	Physics	1:45-2:00	412 Council Room
Alfredo	Velasco II	TU	Computer Science	2:05-2:20	412 Council Room
Shawn	Ray	OSU	Mechanical Engineering Pre-Med	2:25-2:40	412 Council Room
Erik	Perez	OSU	Mechanical Engineering	2:45-3:00	412 Council Room

ORAL PRESENTATION ABSTRACTS

408 Case Study 1 1:45-2:00

DEVELOPING TOOLS TO STUDY ZIKA VIRUS INFECTION *IN VIVO* BASED ON *CRE-LOXP* REPORTER SYSTEMS

Author(s): **Karina Flores**, Margarita Rangel, Maria Noval, Kenneth Stapleford
University of Scholar: University of Oklahoma, Norman, OK, USA
Location of Research: New York University, New York, NY, USA
Funding: New York University School of Medicine, OK-LSAMP, McNair Scholars Program
Mentor(s): Dr. Kenneth Stapleford, New York University School of Medicine

Zika virus (ZIKV) is a mosquito-borne virus transmitted by *Aedes sp.* of mosquitoes. ZIKV has become a major public health concern after an explosive outbreak in the Americas in 2015-2016, which was linked to congenital microcephaly and Guillain-Barré syndrome in adults. To date, there are no approved vaccines or effective antivirals against ZIKV, highlighting the need to develop new strategies to understand fundamental aspects of ZIKV biology. The *Cre-loxP* system has been shown to be a powerful genetic tool to edit genomes in mammalian models. This system can be used to study genes of interest in specific tissues or cells and/or in a time specific manner. In addition, previous studies have shown that the ZIKV genome can be modified and tolerate insertions of reporter genes without altering viral fitness. In this study, we coupled both concepts and developed a ZIKV-Cre reporter system that will allow tracking of the course of ZIKV infection *in vivo* by studying infected cells in *Cre-loxP* mouse models. We developed two ZIKV variants that encode the Cre recombinase, with or without a green fluorescent protein tag (GFP) to allow visualization of Cre expression in cells. The ZIKV-Cre variants and a control ZIKV-mCherry variant were tested for stability, fitness and functionality. We addressed Cre functionality *in vitro* by infecting flox-stop reporter fibroblasts. The results of this study will provide the foundation needed to establish a *Cre-loxP* system for ZIKV that will be used to

408 Case Study 1 2:05-2:20

OCIMUM TENUIFLORUM DECREASES THE RATE OF GROWTH AND METASTATIC POTENTIAL OF MURINE 4T1 MAMMARY CARCINOMA CELLS

Cayla A. Moore[1], Michael Donkor[2], Harlan Jones[2]
[1]Department of Biology, Langston University, 701 Sammy Davis Jr Dr., Langston, Oklahoma 73050 [2]Department of Cell Biology and Immunology, UNT Health Science Center, 3500 Camp Bowie Blvd., Fort Worth, Texas 76107

Despite advancement in the management of metastatic breast cancer, nearly 30% of metastatic cases are estimated to be fatal. Combination therapies involving chemotherapy and radiation, aimed at reducing metastasis and mortality, have faced challenges due to their detrimental effects on immune cells and the ability to permanently damage nerve cells. This reduces their effectiveness of treatment in combination with immunotherapy, a current trend in the treatment of breast cancer. Therefore, there is a need for an alternative anti-tumor therapy that can augment the effect of immunotherapy in harnessing the body's anti-cancer immune defenses. *Ocimum tenuiflorum (O. tenuiflorum)* has been used in Indian culture for its adaptive properties in treating systematic diseases as well as localized infections. The **purpose** of this study was to determine the anti-tumor effect of natural plants such as *O. tenuiflorum* on 4T1 tumor cells. We **hypothesized** that *O. tenuiflorum* decreases the rate of growth and metastatic potential of 4T1 tumor cells. 4T1 murine mammary carcinoma cells were grown in a culture medium and exposed to increasing concentrations of *O. tenuiflorum*. The metastatic potential was determined using the scratch assay technique. **Results** showed that exposing 4T1 cells to

Key words: 4T1 tumor cells, cell culture, scratch assay, metastases

Funding: Research reported in this publication was supported by the National Institute of Cancer (NCI) under Award number 1 P20 CA233355-01 (Vishwanatha). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health

408 Case Study 1 2:25-2:40

Analysis of suicide incidence between Native American and United States total population.

Tayler Hedgecock, Caitlin Cosby, Brad Ludrick, Teresa Golden, Ning Wu

Department of Biological Sciences, Southeastern Oklahoma State University, Durant, Oklahoma 74701.

The suicide rates in the Native American population have been known to be higher than that of the US total population. However, there are few detailed reports addressing in this aspect. This study focusses on exploring the degree of difference in suicide rates between American Indian/Alaska Native (AI/AN) and the US total population at particular age groups as well as examining gender differences. Data for suicide quantity and total population numbers were retrieved from the CDC and US Census Bureau databases spanning 10 years (2006 to 2015). The percent of suicides contributed by AI/AN to the US total suicide was 1.13-1.31% from 2006-2015. The rate of suicide per 100,000 individuals in the population showed that the highest suicide rates occurred in the 20-24 age group for AI/AN and 25-34 age group for the US total population. The top three age groups for suicide rate were (1) 15-19, (2) 20-24, and (3) 25-34 with (2) > (1) or (3) in AI/AN and (3) > (2) > (1) for their analogs in US total population. Cross comparison of suicide rates amongst the gender groups showed that the highest rates for AI/AN males were ages 20-24 followed by 25-34. However, for US total male population it was 45-54 followed by 55-64. The AI/AN female population showed the highest suicide rates in the 15-19 and 20-24 age groups compared to 45-54 followed by 55-64 in the US total female population. Among all AI/AN age groups, the male suicide rates were significantly higher than that of the females, except for the 10-14 age group where they were statistically similar, with the top

408 Case Study 1 2:45-3:00

Dysregulated Immunity Research Techniques

Authors: Marissa D. Wilson
University of Scholar: Langston University
Location of Research: Johnson Space Center, Houston, Texas, USA
Country Funding: Minority University Research and Education Program (MUREP) And Oklahoma Louis Stokes Alliances for Minority Participation (OK-LSAMP)
Mentors: NASA Mentor: Brian Crucian, Ph.D., Johnson Space Center

Immune dysregulation occurs due to exposure to microgravity. As a result, the goal is to learn techniques to measure and understand the immune dysregulation. First, I isolated Peripheral Blood Mononuclear Cells (PBMCs) from tubes of acid citrate dextrose (ACD) containing blood. After PBMC isolation, I stimulated cells under with four mitogens, staphylococcal enterotoxins A and B (SEA and SEB), phytohaemagglutinin (PHA), Cluster of Differentiation 3 and 28 (CD3 and CD28), and phorbol myristate acetate (PMA), in addition to a tube without stimulation. Two conditions existed for this experiment: static and simulated microgravity via clinostat. Cell activation analysis via Gallios Flow Cytometer showed that stimulated cells under microgravity had severely lower T cell activation rates. Whole blood analysis, although a less lengthy process, also had lower activation for the T cells. Intracellular staining involved PBMC isolation, stimulation, and staining. After PBMC isolation, all cells received Brefeldin A to plug the Golgi apparatus and Monensin to stop the Golgi apparatus. These reagents plugged and deactivated the Golgi apparatus, respectively. As a result, cytokines collected inside without the ability to transport those proteins. Therefore, the visibility of the cells that produce cytokines decreased. The addition of mitogens Phorbol Myristate Acetate Ionomycin (PMAI) and SEA with SEB stimulated the cells. CO_2 Incubation for a minimum of five hours was vital to receiving accurate simulation of the human body's condition. Afterward, perm wash buffer enabled disruption of the cell's membrane to allow the mitogens inside the cell. Anti-human Tumor Necrosis Factor-alpha (TNF-a), interferon-gamma-a, CD4 APC

412 Council Room 1:45-2:00

HIGH TEMPERTURE STUDY OF THE REATION OF SILICON, TITANIUM, AND YTTRIUM OXIDES

Authors: Lizbeth Robles-Fernandez, Fernando Salazar-Salas, and Dwight L. Myers
University of Scholar: East Central University, Ada, OK. USA
Location of Research: Center for Undergraduate Research and Learning (CURL) Lab, Ada, OK, USA
Mentor: Dwight L. Myers, East Central University

Reactions of titanium oxide and silicon dioxide are of importance in materials used in high temperature environments. There are questions concerning the reaction of titanium dioxide (rutile) with silica. Both are important as potential materials or reaction products in thermal barrier coatings or environmental barrier coatings in combustion environments, as for example in gas turbine technologies. The extent of reaction and temperature range are important questions to answer for this chemical system. Experimental evidence would suggest that a third cation is necessary to have compound formation. Presently we are exploring the reaction of titanium dioxide with silicon dioxide with small amounts of yttrium oxide being added. Mixtures of the three oxides are being subjected to heatings at various temperatures from ca. 1200-1500^{o}C. Samples are characterized before and after heating by means of X-ray diffraction and diffuse reflectance infrared spectroscopy, transmission infrared spectroscopy, and/or diffuse reflectance UV/Vis spectroscopy as appropriate. Results to date will be presented.

412 Council Room 2:05-2:20

LOOK4TRS: A DE-NOVO TOOL FOR DETECTING SIMPLE TANDEM REPEATS USING SELF-SUPERVISION HIDDEN MARKOV MODELS

Author(s): **Alfredo Velasco II**, Benjamin T. James, Vincent D. Wells, and Hani Z. Girgis
University of Scholar: University of Tulsa, Tulsa, OK, USA
Location of Research: University of Tulsa, Tulsa, OK, USA
Funding: Oklahoma Center for the Advancement of Science and Technology, University of Tulsa College of Engineering and Natural Sciences, and Tulsa Undergraduate Research Challenge Program
Mentor: Dr. Hani Girgis
Simple tandem repeats, microsatellites in particular, have regulatory functions, links to several diseases and applications in biotechnology. There is an immediate need for an accurate tool for detecting microsatellites in newly sequenced genomes. The current available tools are either sensitive or specific but not both; some tools require adjusting parameters manually. We propose Look4TRs, the first application of self-supervised hidden Markov models to discovering microsatellites. Look4TRs adapts itself to the input genomes, balancing high sensitivity and low false positive rate. It auto-calibrates itself. We evaluated Look4TRs on 26 eukaryotic genomes. Based on F measure, which combines sensitivity and false positive rate, Look4TRs outperformed TRF and MISA—the most widely used tools—by 78 and 84%. Look4TRs outperformed the second and the third best tools, MsDetector and Tantan, by 17 and 34%. On eight bacterial genomes, Look4TRs outperformed the second and the third best tools by 27 and 137%.

412 Council Room 2:25-2:40

Abstract:

The popularity of robotic exoskeletons in rehabilitation has recently been on the rise. However, one of the main limitations of these robotic exoskeletons is the large weight that is put onto the user and its lack of mobility. Researchers have been looking into creating lightweight artificial muscles to help reduce the weight of these robotic exoskeleton systems and better the rehabilitation process for its users. These artificial muscles are being created by coiling cheap nylon string and applying heat to the coil so that it can produce a contracting force [2]. The current research that is being done is to first see if these artificial muscles can be recreated in a lab and produce similar results as done in other research labs. This research paper shows that it is possible to recreate artificial muscles by coiling nylon string, and contracting, thus producing a force, when heated. For future application, the artificial muscles will be made and tested using conductive nylon to determine if an electric current can heat the coils to produce the needed contracting force.

412 Council Room 2:45-3:00

OCEAN POWERED TECHNOLOGY FOR WAVES-2-WATER (OPT-W_2)™

Author(s): Dr. Khaled Sallam and **Erik Perez**
University of Scholar: Oklahoma State University, Mechanical & Aerospace Engineering, Tulsa, Oklahoma.
Location of Research: Helmerich Research Center, Tulsa, Oklahoma.
Funding: OK-LSAMP
Mentor: Dr. Khaled Sallam, Mechanical & Aerospace Engineering, Oklahoma State University, Tulsa, Oklahoma

In the age of climate change, many coastal areas in North and Central America are experiencing more destructive hurricanes than before, e.g. the recent Dorian hurricane that reached category 5 intensity while making landfall in the Bahamas. The clean-up process is often long and is done without power or access to clean water. Our lab team is working on conceiving a solution that can supply clean water to those disaster-hit coastal areas without the use of electric power or gas-powered generators. Our team will harvest the mechanical energy in the ocean waves to directly power an innovative and efficient water desalination unit. Our design, Ocean Powered Technology for Wave-2-Water, OPT-W_2™, will be competing at the national level for the *American-Made Challenges Waves-to-Water Prize*, totaling $2.5M, launched by The Water Power Technologies Office at the U.S. Department of Energy. This competition consists of 4 stages: Concept, Design, Create, and Drink. To win the prize, our design has to harvest the power in the ocean's waves to create a desalination system that could be used for disaster relief purposes. The desalination system itself must showcase small, modular and cost-competitive qualities. Our calculations show how much energy is available in the ocean waves and how much energy is needed for water desalination. Different water desalination technologies will be presented and compared based on efficiency and modular quality.

297 Suite 1600 1:45-2:00

Water, Soil and Bio-Fuel Land Management Stewardship in the Great Plains, USA

Rainee DeRoin, Adrian Saenz, Rodney Will, and Chris Zou
Location of Research: Oklahoma State University, Stillwater OK, USA
Funding: The United States Department of Agriculture National Institute of Food and Agriculture (Grant Number 2013-05799-1001450), the National Science Foundation (OIA-1301789), The Oklahoma-Louis Stokes Alliance for Minority Participation Bridge to Doctorate Fellowship (Grant Number HRD 1408748), The McNair (P217A170248-18)

Eastern redcedar represents a modern-day challenge to Oklahoma as it has encroached over eight million acres of land since 2002. This conversion is detrimental to the ecological and economic value of the land, reducing ecosystem water provisioning in particular. Eastern redcedar trees consume more water, so much so that less is available for municipal and agricultural uses as well as ecological stream flows. Currently, efforts to reduce eastern redcedar encroachment have been unsuccessful; however, studies have shown eastern redcedar biomass to be a potential ethanol feedstock for the state. The purpose of this study is to compare eastern redcedar removal and replacement with native prairie or planted switchgrass on surface runoff, sediment yield, and biomass production. Four eastern redcedar and three grassland micro-catchments (three to five ha

in area) in rangeland near Stillwater, Oklahoma, USA were gaged with H flumes since 2011. ISCO automatic water samples were instrumented in 2014. One eastern redcedar micro-catchment was restored to native prairie in 2016. A grassland micro-catchment and another eastern redcedar micro -catchment was converted to switchgrass biofuel production in 2017. Preliminary analysis shows that removal of eastern redcedar increased water yield by four to five fold. Growing switchgrass produced more biomass than restoration to native prairie, but water yield did not differ between the two. Sediment concentrations from encroached eastern redcedar watersheds were higher compared to native prairie watersheds. After harvest, previously encroached watersheds

297 Suite 1600 2:05-2:20

ABNORMAL ION CONCENTRATION IN CYSTIC FIBROSIS LUNGS IMPACT RHAMNOLIPID PRODUCTION IN *PSEUDOMONAS AERUGINOSA*

Author(s): **Casandra Salinas**, Michelle M. King, Breaanna Russ, Amber Price, Marianna A. Patrauchan
University of Scholar: Oklahoma State University
Location of Research: Department of Microbiology and Molecular Genetics, Stillwater, OK
Funding: OK-LSAMP, McNair, NIH, NSF
Mentor(s): Dr. Marianna A. Patrauchan, Michelle M. King, Department of Microbiology and Molecular Genetics

Pseudomonas aeruginosa causes severe acute and chronic infections in immunocompromised patients, most known for infecting the lungs of Cystic Fibrosis (CF) patients. CF patients have a dysfunctional chloride channel, which results in a disruption of ion homeostasis, including Ca and Fe. With the disease progression, the lung capacity decreases limiting gas exchange. *P. aeruginosa* is able to adapt and survive in the host environment. Understanding the mechanisms of such adaptations will aid in discovering innovative treatments against infections. One of the pathogen's many virulence factors is its ability to swarm, which contributes to the formation of biofilms and relies on the production of biosurfactant rhamnolipid. The latter also aids in the evasion of the host immune response. Previously, we have demonstrated that the elevated concentrations of Ca, Fe, NaCl, and MgCl impact swarming behavior. We **hypothesized** that the chemical conditions in the CF lungs affect the regulation of rhamnolipid biosynthesis. We aimed to determine the impact of these conditions on the expression of *rhlA*, required for production of rhamnolipid. For this, we used a promoter construct (P*rhlA-gfp* fusion), containing *rhlA* promoter upstream of *gfp*. Thus far, we have determined that the presence of elevated Ca increased *rhlA* promoter activity. Our data also indicate a loss of *rhlA* promoter activity when the cells carrying the construct are exposed to 5% CO_2. This abolishment of the *rhlA* promoter activity occurs even at elevated Fe and Ca. These results show multifactorial

297 Suite 1600 2:25-2:40

XYLOSE INDUCED CELLULASE GENE EXPRESSION IN *TRICHODERMA REESEI* QM6A.

Author(s): **Diana G. Soriano**, Dr. Rolf A. Prade
University of Scholar: Oklahoma State University, Stillwater, OK, USA
Location of Research: Oklahoma State University, Stillwater, OK, USA
Funding: National Science Foundation (NSF) and the Oklahoma Louis Stokes Alliance for Minority Participation (OK- LSAMP).
Mentor(s): Dr. Rolf A. Prade, Oklahoma State University

Abstract

Lignocellulosic biomass (LCB) is one of the most abundant renewable hydrocarbon source on earth. Two-thirds of LCB is composed of hemicellulose (C5-sugars) and cellulose (C6-sugars). LCB enzymatic deconstruction mechanisms are widely distributed. The canonical enzyme set (cellobiohydrolase (s), endoglucanase(s) and β-glucosidase(s)) breakdown cellulose molecules to create glucose as the final product. Many pretreatment technologies have been developed to overcome this natural physical resistance of LCB to an enzyme-driven digestion process. The end result on LCB pretreatments is that there is always partial decomposition of the hemicellulosic fraction, which contains an abundance of the C5-sugar xylose.

Large-scale productions of enzymes that breakdown LCBs, fungi have generally been used as cell factories to manufacture cellulases, xylanases and other auxiliary activities. There have been substantial efforts to increase recombinant protein yields in *Trichoderma reesei* by transcription factor engineering, decline of extracellular protease activity, identification of promoters and protein secretion signals. Fungi have been genetically engineered to secrete economically adequate yields of enzymes. Operational expenses of synthesizing them continue to be excessive. Xylose found in pentosan-containing pretreated biomass liquors (PPTB) is a cheap substitute carbon source that can be recycled as a substrate to manufacture enzymes.

The research resolves the problem by restructuring the *Trichoderma reesei* native cellulase gene regulatory circuit, switching the induction mechanism from cellulose to xylose. Replacing expensive substrates with an inexpensive by-product carbon source, not only reduces enzyme production costs, but also lowers operational costs.

270 French Lounge 1:45-2:00

Assessing Natural Countermeasures To Reduce Space Induced Immune Dysregulation

Author(s): **Erin Richardson**, Brian Crucian Ph.D., George Makedonas Ph.D.
University of Scholar: Langston University, Langston, OK, USA
Location of Research: NASA Johnson Space Center, Houston, TX, USA
Funding: LUNAR-BC, OK-LSAMP, NASA
Mentor(s): John Coleman Ph.D., Langston University, Byron Quinn Ph.D., Langston University

A wealth of evidence in the literature suggests spaceflight affects the immune system negatively. To enable deep-space exploration missions it is imperative to correct this immune dysregulation with an effective countermeasure. Natural compounds that can boost the immune system, such as plant derivatives, may potential benefits. Black Walnut Hulls (BWH) possesses anti-viral, anti-bacterial, and anti-parasitic action, it is hypothesized that BWH may act as a potential countermeasure. BWH extracts were prepped in in ethanol (70%) or water (100%) by soaking the raw material powder and then extracts were incubated with peripheral blood mononuclear cells (PBMCs) isolated from normal human donors. After 24 hour incubation period, the cells were stimulated with PHA for 24 hours in simulated microgravity, and static conditions in parallel. After the stimulation period, cells were stained with fluorescent-labeled antibodies, CD 3, CD 4, and CD 8 to determine population, and CD 25 and CD 69 to determine percentage activation. When stimulated with PHA and BWH, activation reached 55.9% compared to PHA only stimulated cells at 18.4%. Our preliminary data suggest BWH is a promising countermeasure to simulated microgravity T–cell reactivation. Further studies will be to continue to test various concentrations of the BWH extract.

270 French Lounge 2:05-2:20

IMPACT OF TRADITIONAL AND NEW DENTURE BASE FABRICATION METHODS ON PHYSICAL PROPERTIES

Author(s): **Jennifer Escobar**, Dr. Sharukh Khajotia, Dr. Esteban Florez, and Dr. Al Sakka
University of Scholar: University of Oklahoma, Norman, OK, USA
Location of Research: The University of Oklahoma Health Sciences Center, Department of Restorative Sciences, Division of Dental Biomaterials College of Dentistry, Oklahoma City, OK
Funding: OK-LSAMP and McNair
Mentor(s): Dr. Sharukh Khajotia, The University of Oklahoma Health Sciences Center

Dentures are removable dental prostheses that are used to replace missing teeth and soft tissues within the oral cavity. The traditional method of denture fabrication can be time-consuming and costly, and can involve multiple patient visits. Through recent advances in technology, dentures can be fabricated using cutting-edge CAD/CAM (3-D milling) or additive manufacturing (3-D printing) technologies that are theorized to cost less than traditional fabrication and requires fewer patient visits. In this study, we are going to investigate how clinically-relevant properties of dentures base resins are affected by the type of fabrication method of the base. The different fabrication methods to be tested are Heat-activated compression molding, 3-D printing, and 3-D milling. The properties tested will be color stability, water sorption, water solubility, and surface roughness. One hundred and eight specimens will be fabricated using each method (n=9/property/resin). We hypothesize that the newer denture fabrication methods will result in comparable or better properties than the traditional laboratory fabrication method. The knowledge gained from this study will be beneficial to the dental profession because it will permit identification of the fabrication method that produces the best properties, thereby resulting in longer lasting and more cost-effective dentures for all patients.

270 French Lounge 2:25-2:40

Title: Regulation of WRKY Transcription Factors in the Initial Stages of Viral Infection in *Solanum Lycopersicum*.

Recent studies have found that during times of drought, members of the Solanaceae family showed signs of enhanced drought tolerance when infected with Tobacco Mosaic Virus (TMV), Cucumber Mosaic Virus (CMV), or Bromo Mosaic Virus (BMV). This project will further our understanding of this phenomenon by addition of the Satellite Tobacco Mosaic Virus (STMV). While STMV does not alter the visible phenotypic symptoms of TMV, our preliminary data show that there may be drastic changes in gene regulation. We hypothesize that STMV may further the beneficial effects of TMV by reducing the detrimental effects of infection. This project aims to map the regulation of WRKY transcription factors in the initial stages of viral by TMV and STMV in *Solanum Lycopersicum*. We've extracted the RNA and have created primers for some WRKY transcription factors of interest. We are in the process of creating cDNA and will use ddPCR to attain an absolute count of our target DNA. Understanding how gene expression changes upon initial infection will allow us to identify the overlap between defense genes. We can then later probe these genes to see which are responsible for the long-term effects of drought tolerance. This research will contribute to the long-term goal of learning to manipulate viruses to prevent agricultural loss in times of drought.

POSTER PRESENTATIONS

Listed Alphabetically

Non-Life Sciences

First Name	Last Name	University	Discipline	Poster #
Elisabeth	Allbritton	SWOSU	Chemistry	16
Dylan	Barber	ECU	Medical Physics	15
Alexandra	Bejarano	TU	Computer Science	9
Dineh	Bohan	ECU	Mathematics	11
Taleigh	Davis	SWOSU	Chemistry	12
Kyle	Deason	NSU	Mathematics	19
Victor	Franco	OSU	Mechanical Engineering	6
Tyler	Gore	NSU	Chemistry	17
Theresa	Hinkle	CU	Chemistry and Biology	7
SheKayla	Love	CU	Physics	5
Jose Juan	Macias Jr.	OU	Chemistry and Biochemistry	1
Abner	Nimsey	SWOSU	Chemistry	8
Pamela	Okaro	TU	Chemical Engineering	4
Arturo	Ortega Jr.	ECU	Physics and Mathematics	13
Restituto	Paris III	CU	Chemistry	20
Shawn	Ray	OSU	Mechanical Engineering Pre-Med	2
Daniel	Salinas	OSU	Aerospace Engineering	10
Alfredo	Velasco II	TU	Computer Science	14
Joseph	Wagner	UCO	Engineering Physics/Mechanical Engrg	3
Zsabre	Wright	LU	Chemistry	18

Life Sciences

First Name	Last Name	University	Discipline	Poster #
Briana	Anderson	LU	Biology	26
Brenden	Determann II	OSU	Microbiology & Molecular Genetics	32
Christy	Eslinger	OSU	Epigenetics & Molecular Biology	23
Ann Marie	Flusche	TU	Cancer Biology	35
Getsemani	Garcia-Perez	ECU	Biology	39
Carina	Gutierrez	UCO	Biology	37
Brandon	Henriquez	OSU	Entomology and Plant Pathology	36
Angelica	Manning	SWOSU	Biology	29
Sergio	Mares	OSU	Microbiology & Molecular Genetics	38
Teresa	Mccarrell	OSU	Microbiology	21
Jacee	McCoy	OSU	Microbiology & Molecular Genetics	34
Myshal	Morris	LU	Biology	22
Sierra	Posey	OSU	Microbiology	30
Lizbeth	Robles	ECU	Molecular Biology	33
Blanca	Rodriguez	CU	Biology	28
Casandra	Salinas	OSU	Biochemistry & Molecular Biology	40
Lakota	Sauceda	UCO	Biomedical Sciences	31
Cheyenne	Smith	OSU	Zoology	25
Diana	Soriano	OSU	Microbiology & Psychology	27
Becca	Wells	NSU	Biology	41
Aspen	Wright	CU	Biology	24

POSTER PRESENTATION ABSTRACTS

P01

Title: Regulation of WRKY Transcription Factors in the Initial Stages of Viral Infection in *Solanum Lycopersicum*.

Recent studies have found that during times of drought, members of the Solanaceae family showed signs of enhanced drought tolerance when infected with Tobacco Mosaic Virus (TMV), Cucumber Mosaic Virus (CMV), or Bromo Mosaic Virus (BMV). This project will further our understanding of this phenomenon by addition of the Satellite Tobacco Mosaic Virus (STMV). While STMV does not alter the visible phenotypic symptoms of TMV, our preliminary data show that there may be drastic changes in gene regulation. We hypothesize that STMV may further the beneficial effects of TMV by reducing the detrimental effects of infection. This project aims to map the regulation of WRKY transcription factors in the initial stages of viral by TMV and STMV in *Solanum Lycopersicum*. We've extracted the RNA and have created primers for some WRKY transcription factors of interest. We are in the process of creating cDNA and will use ddPCR to attain an absolute count of our target DNA. Understanding how gene expression changes upon initial infection will allow us to identify the overlap between defense genes. We can then later probe these genes to see which are responsible for the long-term effects of drought tolerance. This research will contribute to the long-term goal of learning to manipulate viruses to prevent agricultural loss in times of drought.

P02

Abstract:

The popularity of robotic exoskeletons in rehabilitation has recently been on the rise. However, one of the main limitations of these robotic exoskeletons is the large weight that is put onto the user and its lack of mobility. Researchers have been looking into creating lightweight artificial muscles to help reduce the weight of these robotic exoskeleton systems and better the rehabilitation process for its users. These artificial muscles are being created by coiling cheap nylon string and applying heat to the coil so that it can produce a contracting force [2]. The current research that is being done is to first see if these artificial muscles can be recreated in a lab and produce similar results as done in other research labs. This research paper shows that it is possible to recreate artificial muscles by coiling nylon string, and contracting, thus producing a force, when heated. For future application, the artificial muscles will be made and tested using conductive nylon to determine if an electric current can heat the coils to produce the needed contracting force.

P03

Development of a Computational Model to Optimize Algae based Bio-mixing

Joseph Wagner[1,*], Johannes Blaschke[2], Gang Xu[3]
[1] Department of Engineering and Physics (jwagner9@uco.edu)
[2] Post Doc at Lawrence Berkeley National Lab (jpblascke@lbl.gov)
[3] Department of Engineering and Physics (gxu@uco.edu)

In an effort to replace petroleum-based fuels, industry is working to develop affordable and efficient biofuels. However, one problem industry has yet to solve is producing cost efficient biofuel. Therefore my research this is to improve the production methods of the biofuels. A key component of biofuel production is the thorough and timely mixing of the raw materials that make up the resulting fuel. Recent studies have proven that motile microorganisms, such as swimming flagellated green algae, can have a substantial influence on biomixing at microscopic levels. Despite this knowledge, little is known about the effect of active swimming in a majority of biological environments under specific mixing conditions. To determine the exact mixing effects of flagellated green algae in biomixtures, such as biofuel, a computational fluid dynamics model of a beating flagellum was created. This computational model was created with the use of FHDeX and AMReX, which solve for the fluid interactions and created a solid model. By doing this green algae can be simulated to swim and show the mixing effects in biofuel. The results of this model show that flagellum motion has a significant effect on the bio mixing process.

P04

INTEGRATED RENEWABLE ENERGY SYSTEMS.

Author(s): Pamela Okaro
University of Scholar: University of Tulsa, Tulsa, OK, USA
Location of Research: University of Tulsa, Tulsa, OK, USA
Funding: The National Science Foundation (NSF)
Mentor(s): Dr Kaveh Ashenayi

The increase in the cost of electricity in airports has led airports all over the world to consider harnessing renewable energy sources as a form of power supply. Integrated Renewable Energy Systems (IRES) are systems that utilize two or more types of renewable energy source. The goal of this paper was to investigate the feasibility of an IRES for the Tulsa International Airport. The system being considered would use solar, wind, and biomass resources. Data from the national renewable energy laboratory (NREL) database would have been used to evaluate feasibility of the IRES. However, this data was not made available on time. Therefore, this project remains inconclusive. This paper therefore focuses on discussing what an IRES is, the design and integration approaches, and concludes with why an IRES should be considered as a form of power supply in the near future.

P05

SEASONAL VARIATION OF F2 PEAK OF IONOSPHERE

Author(s): **She'Kayla Love** and Susmita Hazra
University of Scholar: Cameron University, Lawton, OK, USA
Location of Research: Cameron University, Lawton, OK, USA
Funding: OK-LSAMP
Mentor(s): Dr. Susmita Hazra, Cameron University

The environment in the top layer of the Earth's atmosphere, which we call the Ionosphere, changes from hour to hour and from day to day, due to its interaction with the Sun. As a part of this research, we are studying the F2 peak of the ionosphere using ionosonde data. We are using the data from Ahmedabad (latitude 23.00 degree, longitude 72.50 degree) station and Norilsk (latitude 69.20 degree, longitude 88.00 degree) station. We will also be using predicted ionosphere data from the International Reference Ionosphere model to compare to the actual data that was collected by the digisounde. During winter time of the year 2012, Ahmedabad's F2 peak varies around ~5 MHz to ~15 MHz and the height varies from ~220 km to ~270 km. The IRI model predicted that the frequency should have been ~13 MHz to ~14 MHz and the height's around ~270 km to ~300 km. Norilsk's winter time F2 peak varies between ~2 MHz to ~3 MHz with a height between ~250 km to ~350 km. The results are compared with IRI (International Reference Ionosphere) model for both F2 peak frequency and height. This research work will be important in terms of space plasma studies and space weather predictions, which play a significant role in radio and satellite communication as well as GPS navigation.

P06

Mechanical and electrochemical characterization of Solid state electrolyte for Li ion battery

Author(s): **Victor Franco** , Bertan Ozdogru , Ömer Özgür Çapraz
University of Scholar: Oklahoma State University, Stillwater, OK, USA
Location of Research: Oklahoma State University, Stillwater, OK, USA
Funding: OK-LSAMP, McNair
Mentor(s): Ömer Özgür Çapraz, Bertan Ozdogru

Lithium ion batteries are becoming increasingly popular as a source to power complex technologies such as the smart phones we use every day. Unfortunately, the world is experiencing a large depletion of Lithium (Li) due to upcoming advancements in electronics such as smart phones and electric cars. My research focuses on solid state batteries in comparison to traditional batteries. Solid state batteries can offer greater advantages than traditional batteries as solid electrolyte can serve as a separator eliminating the need for a separator in solid state batteries. By eliminating a liquid separator, the battery is much safer as it has been documented that liquid electrolytes have been documented to obviate flammability issues which can be dangerous in a world where everything is beginning to be powered by batteries. My main focus in the research was to design a custom cell design able to house and test a metal reacting to an electrode. The design was modified and manufactured to meet specific specifications for our lab. The design has then been completed and is currently running test for graduate student research. I will use my design to test a solid electrolyte ,LAGP, along with a gold electrode to identify any possible deformation and damage mechanisms that can occur during cyclic voltammetry. This test should show how the reversibility of chemo-mechanical strains in electrodes of solid state batteries differ from those of liquid electrolyte batteries.

P07

Green one-step, one-pot route to cyclic carbonates for the synthesis of polyurethanes

Theresa Hinkle(1) and E. Ann Nalley(1), and Dr Etienne Grau(2), (1) Department of Chemistry, Physics & Engineering, Cameron University, Lawton, OK 73505, Assistant Professor, Laboratoire de Chimie des Polymères Organiques (LCPO), UMR5629 Université de Bordeaux/CNRS/IPB, ENSCBP 16 avenue Pey Berland 33607 Pessac Cedex, France

As recent literature indicates, microwaves are quickly becoming an accepted tool for investigators in the organic laboratory. Microwave synthesis enables reactions to proceed more rapidly with greater yields than many conventional techniques. In parallel, there is a growing concerned about the isocyanate chemistry used to produce polyurethanes. Indeed, isocyanate are known to be toxic and are synthesized from phosgene an event more toxic gas. An alternative route to the isocyanate/alcohol chemistry is the cyclic carbonate aminolysis. However, the conventional synthesis of cyclic carbonate requires two-step procedure: epoxidation of double bond followed by carbonation.

In this research, we investigated the use of microwaves to synthesize cyclic carbonate from natural products such as soybean oil in one-pot, one-step reaction. These monomers can then be converted to polymers, which are produced using derivatized “natural products”. We will compare the efficiency of microwave/ conventional synthesis of polymers.

P08

MONO- AND BIS-CROSS-BRIDGED TETRAAZAMACROCYCLES WITH THIOL PENDANT ARMS FOR BIOMOLECULE CONJEGATION

Author(s): **A. James Nimsey**, Angelica J. Manning
University of Scholar: Southwestern Oklahoma State University, Weatherford, OK, USA
Location of Research: Southwestern Oklahoma State University, Weatherford, OK, USA
Funding: the National Science Foundation (NSF) the National Institutes of Health (NIH)
Mentor(s): Dr. Tim Hubin, Southwestern Oklahoma State University

Cross-bridged tetraazamacrocycles have made important contributions as ligands that strongly bind transition metal ions. This property is very useful when the metal complex is intended for use under harsh conditions. Applications that have benefited from such complexes are: oxidation catalysis, medical imaging, and protein-binding drug molecules. Bis cross-bridged tetraazamacrocycles, and their transition metal complexes, have become one of the most effective classes of CXCR4 chemokine receptor antagonists. These cell surface receptors are important to a number of disease states, including HIV, cardiovascular disease, and cancer. Our group has continued to produce new analogues of these compounds in an effort to improve further the efficacy, specificity, and drug-like properties of this class of compounds. In this presentation, we will describe the synthesis, chemical characterization, and biological activity of a new series of bis cross-bridged tetraazamacrocyles in which the cross-bridged macrocycle is appended with either a thiol or primary amine pendant arm. These pendant arms are intended to allow onjugation to biologically active compounds, or biomolecules such as proteins and nucleic acids themselves. Once conjugated, the bis cross-bridged tetraazamacrocycle unit would serve as the targeting unit which would bind specifically to cells expressing high concentrations of CXCR4 on their surfaces, such as certain cancer cells. The conjugated protein or nucleic acid could then perform various therapeutic, imaging, or catalytic roles. Synthetic and characterization methods and results for these novel compounds will be presented.

P09

WIFI LEAF DETECTION SYSTEM

Author(s): **Alexandra Bejarano**
University of Scholar: The University of Tulsa, Tulsa, OK, USA
Location of Research: University of Notre Dame, Notre Dame, IN, USA
Funding: National Science Foundation (NSF), OK-LSAMP
Mentor(s): Dr. Aaron Striegel, University of Notre Dame

Every fall many places in the US are faced with the management of fallen leaves. In several cities, including the area around the University of Notre Dame, the local municipality is in charge of leaf pick up and disposal to prevent people from simply burning leaves and polluting the air. The issue then lies in knowing the best time to go around and collect leaves. Currently, city vehicles are scheduled to pass through neighborhoods, possibly wasting resources if no/few leaves are there for pick up, or one has to schedule a pickup. So, what if there was a way to automatically know when to go around and collect leaves?

We know that leaves can weaken the strength of WiFi signals. But how reliably could WiFi be used to sense leaves or the lack of leaves on trees? This research was motivated by the following questions: Can one efficiently infer the impact of leaves on WiFi with captures of data packets transmitted over WiFi to possibly determine the most efficient time for leaf pick up? Are packet captures too noisy? Are there enough packets?
Currently, for this research, captures of unencrypted data packets have been collected with Wireshark, an open-source packet capture and analysis software, on a Raspberry Pi in multiple locations and on multiple WiFi channels. And code has been written to read the packet captures and analyze the information within the files, specifically the access points, signal strength, and number of packets.

P10

Ducted and unducted performance of a geared turbofan assembly for small unmanned aircraft systems

Salinas Daniel, and Kelley David
Oklahoma State University, Stillwater, Oklahoma, 74074, United States

Funding**: Oklsamp, McNair**
Mentor: **Dr. Kurt Rouser, Oklahoma State University, Aerospace Propulsion and Power**

The purpose of this study is to investigate a geared turbofan assembly for small unmanned aircraft systems (SUAS) weighing less than 55lbs while noting the performance effects of a duct. The assembly features an off-the-shelf 120mm fan driven by a KingTech K-45TP turboprop engine. This assembly is expected to benefit range and endurance due to the lower thrust specific fuel consumption of a turbofan compared to other types of gas-powered propulsion systems. Testing of the assembly was conducted in a 3-ft by 3-ft wind tunnel section with varying freestream speeds up to 50 miles per hour (mph). The turbofan assembly was run from 2000 to 7000 shaft rotations per minute (RPM), and the attached fan was meant to run with and without a duct. Data to be presented included fuel consumption and RPM of the turboprop engine and the thrust produced by the assembly. Preliminary results were inconclusive but merit further research with new ducted propeller arrangement.

P11

USING REGULAR SEASON NBA DATA TO PREDICT PLAYOFF SUCCESS
Author(s): Dineh Bohan and Dr. Lastrina
University **of Scholar: East Central University**
Location of Research: East Central University, Ada, OK, USA
Funding: OK-LSAMP and NASA
Mentor(s): Dr. Lastrina, East Central University

Abstract

There are many factors that contribute to team success in the National Basketball Association (NBA). The phrase, "defense wins games, but rebounding wins championships", is a common adage that is said among professional sports commentators, coaches, and fans. Do teams that win championships excel in rebounding? Do teams that have a good defense win more games than teams that just have a good offense? What statistics contribute most to steam success? To test the claim and examine the questions, we looked at team box score per 100 possession data from the past 20 seasons (excluding the 1998-1999 and 2011-2012 seasons due to NBA lockout). There were 23 statistical categories that we chose. We organized each category from greatest to least and gave the top three teams in a category a +1 and the bottom three teams a -1. The teams between the top and bottom three received a 0. The top and bottom three represents the top and bottom 10%. After organizing each statistical category and marking either a +1, -1, or 0 we added the markings together to make what we called the Total Team Score (TTS). We predicted that teams with a high positive TTS would have a higher win total than teams with a low negative TTS. We predicted that in head to head playoff matches teams with the higher TTS would have a higher winning percentage than teams with a lower TTS.

P12

Modified tetraazamacrocycles as improved CXCR4 antagonists
Author: **Taleigh Davis** and Timothy J. Hubin
University of Scholar: Southwestern Oklahoma State University, Weatherford, OK, USA Location of Research: Southwestern Oklahoma State University, Weatherford, OK, USA
Funding: OK-LSAMP
Mentor(s): Dr. Tim Hubin, Southwestern Oklahoma State University

CXCR4 chemokine receptors are found on the surface of immune, and other, cells, and together with the specific natural ligand, stromal cell-derived factor-1α (SDF-1α, also known as CXCL12), have been revealed to play a role in a number of disease states. Within the last ten years the CXCR4 and CCR5 co-receptors have been revealed as the entry route for HIV into cells, generating interest in a new therapeutic approach to treatment via fusion inhibitor drugs rather than the current preference for reverse transcriptase and protease inhibitors. CXCR4 expression has also been reported in at least 23 different cancers. CXCL12 stimulation of tumor growth, angiogenesis, and metastasis of breast cancer cells have been described. Target organs for breast metastases such as liver, lung, and bone have high levels of CXCL12, triggering the specific migration of breast tumor cells that express the CXCR4 receptor. Due to the wide-ranging potential biomedical applications that might result, our aim is to develop new antagonists for the CXCR4 co-receptor. They are conformationally fixed macrocyclic compounds where the unrestrained equivalent is a known CXCR4 antagonist. The SWOSU-Hull collaboration has produced well over 50 metal complexes of bis-tetraazamacrocycle ligands for screening as CXCR4 antagonists. The bis-linked complexes are highly efficient antagonists, while single-macrocycle analogues are much less effective. Our objectives were to synthesize analogues of our most effective bis-tetraazamacrocycle metal complexes and to characterize their chemical and physical properties in preparation for determining their antagonism of CXCR4.

P13

Predicting the NFL using Deep Learning

Arturo Ortega, Kaibree Dunkerson, Dr. Nicholas Jacobs
East Central University, Ada, OK, USA
Dr. Nicholas Jacobs
East Central University, Ada, OK, USA

Data was scraped from the ProFootballReference.com website using Python and Jupyter notebooks. Only statistics from offensive specialist; Quarterbacks, Running Backs, Tight Ends, and Wide Receivers were used to predict wins and losses. This was done using Deep Learning and the TensorFlow module. 2019 season predictions were made and analyzed.

P14

HEBBPLOT: AN INTELLIGENT TOOL FOR LEARNING AND VISUALIZING CHROMATIN MARK SIGNATURES

Author(s): Hani Z. Girgis, **Alfredo Velasco II**, and Zachary E. Reyes
University of Scholar: University of Tulsa, Tulsa, OK, USA
Location of Research: University of Tulsa, Tulsa, OK, USA
Funding: College of Engineering and Natural Sciences and the Faculty Research Grant Program at the University of Tulsa
Mentor: Dr. Hani Girgis

Histone modifications play important roles in gene regulation, heredity, imprinting, and many human diseases. The histone code is complex and consists of more than 100 marks. Therefore, biologists need computational tools to characterize general signatures representing the distributions of tens of chromatin marks around thousands of regions. To this end, we developed a software tool, HebbPlot, which utilizes a Hebbian neural network in learning a general chromatin signature from regions with a common function. Hebbian networks can learn the associations between tens of marks and thousands of regions. HebbPlot presents a signature as an easily interpretable digital image. Moreover, signatures produced by HebbPlot can be compared quantitatively. We validated HebbPlot in multiple case studies. The results of these case studies are novel or validating results already reported in the literature, indicating the accuracy of HebbPlot. Our results indicate that promoters have a directional chromatin signature; several marks tend to stretch downstream or upstream. In addition, the signatures of high- and low-CpG promoters are different; H3K4me3, H3K9ac, and H3K27ac are the most different marks. Further, we identified some histone modifications — H3K36me3, H3K79me1, H3K79me2, and H4K8ac — that are associated with coding regions of active genes. Other marks — H4K12ac, H3K14ac, H3K27me3, and H2AK5ac — were found to be weakly associated with coding regions of inactive genes. Lastly, using HebbPlot, we produced a visual catalog of the signatures of multiple genetic elements in 57 cell types available through the Roadmap Epigenomics Project. Furthermore,

P15

The Genetic Map of the Major Epitopes of the Ebola Virus Glycoprotein (GP) via RNA Phage Display Technology

Dylan Barber[1], , Jessica Thomas[3], Sanjeev Gurshanel[4], Jaylah Stanley[2] Alain Bopda Waffo[2]

[1]East Central University, [2]Alabama State University, [3]Southern University at New Orleans, [4]University of Central Florida.

Supported by: NSF-REU (DBI-1659166) to Dr. Komal Vig (PI) and by NSFCREST (HRD-1241701) to Dr. Shree S. Singh (PI).

Abstract:

There is currently no antiviral drug licensed by the U.S. Food and Drug Administration (FDA) to treat Ebola Virus Disease in citizens. The major epitopes GP of the Ebola Virus (EBOV) are the primary proteins for its infection process. These proteins can be genetically isolated and used to combat the infective ability and induce immune response via phage display technology. Phage display using the RNA Qβ Coliphage offers an alternative to the normative DNA phages for the modeling of RNA viruses such as EBOV. This is due to its adaptability in mutation caused by a faulty read though protein coding for the A_1 Coat protein. In our study GP was amplified, screened, and purified into five different potential epitope fragment using Polymerase Chain Reaction and digestion by NotI. Those segments were as follows: GP_1 , GP_2 , GP_3 , GP_{1-2} , GP_{2-3} ,to ensure that all major parts of GP would be screened. By electrophoresis gel we saw that our PCR fragments were present. The vector pBRT7Qβ was prepared using Reverse Transcription-PCR from the wild type phage and cloned using *E. Coli.* MC101. Using electrophoresis gel, we again saw the resultant vector was of appropriate length. This vector was ligated with our digested PCR fragment to display the GP peptide on the icosahedral shell of Qβ. The recombinant plasmid was then transformed into our *E. Coli.* HB101 to produce hybrid phages. Phages were screened for

P16

TITLE: Primary amine pendant arms useful for conjugation of cross-bridged tetraazamacrocycles to other bioactive groups

AUTHORS (FIRST NAME, LAST NAME): Elisabeth M. Allbritton , Makynna R. Koper , Faith Okorocha , Timothy J. Hubin

INSTITUTIONS (ALL): 1. Chemistry, Southwestern Oklahoma State University, Weatherford, OK, United States.

ABSTRACT BODY:

Abstract: Cross-bridged tetraazamacrocycles have made important contributions as ligands that strongly bind transition metal ions. This property is very useful when the metal complex is intended for use under harsh conditions. One application that has benefited from such complexes is medical imaging, where radioactive transition metal ions can be stably bound to the cross-bridge ligand, injected into patients, and used to identify diseased tissues, such as cancerous tumors. Pendant arms can be added to the cross-bridged tetraazamacrocycle to allow conjugation to other biologically active compounds, or biomolecules such as proteins and nucleic acids themselves. The conjugated bioactive compound might perform various therapeutic activities, while the cross-bridged tetraazamacrocyle metal complex attached serves as an imaging agent to help illuminate the biological effect of its conjugated partner. In this project, we are developing the synthesis of a primary amine pendant arm to the known ethylene cross-bridged tetraazamacrocycles. This functional group is well-known for its ability to be conjugated to biomolecules. Synthetic and characterization methods and results for these novel compounds will be presented.

P17

Title: Integration of multi-gene biosynthetic pathways into *Chlamydomonas reinhardtii* using CRISPR/Cas9
Authors: Tyler, Gore, Shelyn Slavens, and Ty Johannes, PhD

Abstract:
Microalgae are versatile organisms with an enormous potential as cell factories because of their ability to convert CO_2, H_2O, and sunlight into desirable compounds applicable to various industrial applications. Yet, the current productivity of these compounds in microalgae are not economically viable in large scale applications. Thus, research efforts worldwide are being dedicated to increasing the efficiency of microalgae through genetic engineering. Although the ability to modify and improve microalgae has been limited by a lack of genetic tools recent developments have alleviated this issue. This work focuses on using CRISPR/Cas9 to integrate multi-gene pathways into specified locations of the nuclear genome of *Chlamydomonas reinhardtii*. The assembled pathways will more specifically include the *adh1* gene encoding alcohol dehydrogenase, an enzyme of importance in ethanol production, in addition to known selection markers such as *ble* that encodes for resistance to the antibiotic zeocin. This work will help advance genetic improvements of microalgae for large scale industrial applications.

P18

Heating Biological Samples to Optimum Temperature Utilizing an Electric Heating Pad
Author(s): **Zsabre Wright**, Cari Quick Campbell M.S., Byron Quinn Ph.D.,
University of Scholar: Langston University, Langston, OK, USA
Location of Research: Langston University Science Research Institute, Langston, OK, USA
Funding: LUNAR-BC
Mentor(s): John Coleman Ph.D., Langston University, Byron Quinn Ph.D., Langston University

The RockSat-C group travelled to the NASA Wallops base with a designed payload. The purpose of participating in RockSat-C was to test suborbital microgravity effects on immune cell regulation. This project is in conjunction with our current NASA project in which the Science Research Institute investigates natural countermeasures to astronauts' immune dysregulation during and after spaceflight. Our design created a payload by using 3-D printing that was placed upon a sounding rocket. However, we were not able to analyze or discuss results due to our cells not being viable upon launch. Our cells were in contact with heat for 48 hours and destroyed within the first few hours. The next task was to create an insulation system and heating system that will regulate the temperature of the cells inside the payload for a 48-hour period before launch.

P19

TITLE: Investigating fluctuations in water quality following point source removal in an urban stream, Town Branch Creek, Tahlequah OK.
AUTHOR(S): **Kyle Deason**, Courtney Stookey, Kate Woolman, Stephen Nikolai, Jahna Hill, Richard Zamor
UNIVERSITY OF SCHOLAR: Northeastern State University, Tahlequah, OK, USA
LOCATION OF RESEARCH: Grand River Damn Authority Scenic Rivers and Watersheds Laboratory, Tahlequah City Stormwater Department, Northeastern State University, Tahlequah, OK, USA

FUNDING SOURCE: OK-LSAMP
MENTOR(S): Dr. Jody Buckholtz and Dr. Richard Zamor, Northeastern State University

Abstract:

In the summer of 2018 the City of Tahlequah identified and removed a potential point source (i.e., a sewage leak) of pollution for Town Branch Creek, a local freshwater stream. Before addressing the leak *E.* coli levels in the stream exceeded 11,300 CFU for nearly 5 months. Following removal, *E. coli* levels in the stream were reduced but continued to fluctuate throughout late 2018 and early 2019 suggesting the existence of other potential sources of fecal contamination to the stream. We investigated water quality at seven sites for bi-weekly for eight weeks a year after the sewage leak was repaired to explore and identify potential relationships between elevated bacteria levels, high-flow events, wetland outflow, and university runoff/discharge into the stream. In addition to *E. coli* we also monitored the sites for other general water quality parameters including nutrients. Fecal coliform bacteria (*E. coli*) levels were variable across sites and dates, but generally showed increased *E. coli* levels with rain events and increased storm flow. Indeed, some sites showed levels of fecal contamination that are higher than the state standard for water quality recreation. However, sites did not necessarily show a clear upstream to downstream pattern in *E. coli* levels. This variability in *E. coli* levels between sites offers further opportunities for investigation into what sources could be potentially be causing the observed

P20

GREEN SYNTHESIS OF HETEROCYCLICS USING MICROWAVE AND ULTRASONIC ENERGY AND THEIR USE IN DRUG DESIGN

Author(s): **Restituto Paris III**, Stephen Myers, and E. Ann Nalley
University of Scholar: Cameron University
Location of Research: Cameron University, Lawton, OK, USA
Funding: The National Science Foundation (NSF) and the Oklahoma Louis Stokes Alliance for Minority Participation (OK-LSAMP)
Mentor(s): Dr. E. Ann Nalley, Cameron University

Allowing many chemical reactions to be completed within minutes, microwave heating and ultrasonic energy have revolutionized preparative chemistry. Both are green technologies, and as a result, are becoming widely adopted in both academic and industrial laboratories. This is especially true for microwave synthesis but not many applications of ultrasonic energy in organic synthesis have been reported. Heterocycles are very important functional groups, especially in medicinal chemistry. Not only are they pivotal in the synthesis of drugs but also form part of the structure of a diversity of drugs, vitamins, natural products and biomolecules. In this poster we will present the results of syntheses of imidazoles and azolines by both microwave and ultrasonic energy. Derivatives of these two classes of compounds are known for analgesic, anti-fungal, anti-hypertensive, anti-obesity, anti-cancer and other biological activity.

P21

CHARACTERIZING BACTERIA OF THE EXTREMOPHILIC MELTING POT HABITATS OF THE MCMURDO DRY VALLEYS

Authors: **Teresa Mccarrell**, Caleb Schuler, Abigail Jarratt, Bruce Boles, Jill Mikucki
University of Scholar: Oklahoma State University
Location of Research: University of Tennessee, Knoxville, TN, USA
Funding: NSF
Mentor: Dr. Jill Mikucki

Life exists in nearly every niche on Earth, and Antarctica does not present an exception. Extremophilic bacterial communities are found in Antarctic habitats such as the permanently cold and hypersaline environments within and below permafrost and in subglacial water bodies. The ability of psychrotolerant ("cold-tolerant") and halophilic ("salt-loving") bacteria to survive and replicate in Antarctica has astrobiological implications, because similar conditions of extreme cold and hypersalinity are expected in places such as on Jupiter's moon Europa, or around and below the ice caps on Mars. For this study, samples were collected from various locales in the McMurdo Dry Valleys of Antarctica, including around Blood Falls, the moraine of the Taylor Glacier, and within the proglacial Lake Bonny. Experiments were conducted on nine isolates in order to characterize how psychrophilic and halophilic they were, by growing them on media of various salinities and at various temperatures. Nucleic acids were extracted from them to compare their phylogenetic relationships based on sequence identity of the 16S rRNA gene. Some of the isolates have distinct phenotypes when grown on agar plates, such as bright pink pigment and or mucoidy colonies. These traits may help these organisms survive under conditions of strong UV radiation or limited nutrients. The unique adaptations of these bacteria that enable their survival in these environments could be similar to those exhibited by organisms on other worlds.

P22

Loss of Angiopoietin 4 protects from renal fibrosis in mouse model of ureteral obstruction

Author(s): **Myshal Morris**, Swayam Srivastava PhD, Julie Goodwin MD, PhD
University of Scholar: Langston University
Location of Research: Yale University School of Medicine Section of Nephrology, New Haven, CT 06510 USA
Funding: OK-LSAMP, LUNAR BC (Langston University NASA Advanced Research Biology Center), KUH Undergraduate Summer Research Program at Yale University
Mentors: Swayam Srivastava PhD, Yale University School of Medicine

Nearly 45% of all deaths in the developed world are attributed to some type of chronic fibroproliferative disease along with chronic kidney diseases (CKD) affecting over 10% of the worldwide population. Kidney fibrosis is the final common pathway of progressive kidney diseases, which results in subsequent significant destruction of the normal kidney structure and its function. Fibrosis of the kidney is caused by prolonged injury and dysregulation of the normal wound healing process in association with an excessive deposition of extracellular matrix. However, the exact mechanisms of CKD remain unclear due to the complexity of various contributing factors. Thus, as an effort to repair kidney fibrosis, the Angiopoietin 4 like protein (ANGPTL4) is being examined as a possible treatment solution. ANGPTL4 is a protein that is used as a serum hormone for regulating lipid metabolism and previous research has shown it to contribute to wound healing in diabetic mice. So, in our study through using the Unilateral

Ureteral Obstruction mouse model, (UUO) we want to systematically asses the implications of kidney fibrosis interacting with ANGPTL4. After performing UUO we identified the effects of ANGPTL4 KO comparatively with wild type ANGPTL4 through western blot and qPCR analysis. Our results conclude with ANGPTL4 wild type having much lower fibrosis than that of the ANGPTL4 KO which may help improve future understandings of the mechanisms of kidney fibrosis.

P23

TNBS-INDUCED HYPERMETHYLATION RECRUITS MeCP2 BINDING IN *GLS* PROMOTER REGION

Arthurs: **Christy Eslinger**, Kenneth E. Miller and Subhas Das
University of Scholar: Oklahoma State University
Location of Research: Oklahoma State University-Center for Health Sciences Tulsa, OK, USA
Funding: OCAST grant #HR16-003 and NSF/OK-LSAMP grant HRD 1408748.

Approximately 3 million people suffer from inflammatory bowel disease (IBD), and roughly, 70,000 new cases diagnosed each year in the US. IBD is a dysregulated inflammatory response involving severe and recurring visceral pain. Only when we fully understand the pain pathways involved in the enteric nervous system can we hope to develop therapies that can specifically target visceral pain. We focus on glutaminase (GLS), an enzyme that catalyzes the production of glutamate. Glutamate, a neurotransmitter, plays an important role in nociceptive pain pathways. We have shown previously that 2,4,6 trinitrobenzesulfonic acid (TNBS)-induced colitis resulted in increased inflammation and upregulated GLS expression, therefore, increased pain in rats. The current project was undertaken to find out the role of DNA methylation in *GLS* gene regulation. Our current data showed that TNBS-induced colitis resulted in hypermethylation of the CpG dinucleotides in the promoter region of the *GLS*. This hypermethylation resulted in recruitment of methylated CpG binding protein 2 (MeCP2) to the promoter region leading to increased transcription of *GLS* gene. Blocking this hypermethylation by azacitidine, an FDA-approved demethylating agent, not only reduced the TNBS-induced inflammation but also reduced GLS expression and thus alleviated visceral pain. We confirmed this interaction between MeCP2 and *GLS* gene promoter region by a modified chromatin immunoprecipitation (ChIP) assay and methylation-specific PCR. Contrary to general understanding that MeCP2 binding results in transcriptional repression, we believe in this case that MeCP2 recruitment results in transcriptional activation and thus, increased *GLS* transcription. Azacitidine treatment reduced the methylation and thus reduced MeCP2-induced GLS expression. These data confirmed

P24

DIFFERENCES IN CODING SEQUENCE BETWEEN BATS AND HUMANS IN THE TUMOR SUPPRESSOR GENE TP53

Authors: **Aspen N. Wright**, Antony J. Miller, Dana N. Lee
University of Scholar: Cameron University, Lawton, OK, USA
Location of Research: Cameron University, Lawton, OK, USA
Funding: Cameron University Research Grant and Oklahoma IDeA Network of Biomedical Research Excellence (OK-INBRE)
Mentor: Dr. Dana Lee, Cameron University

The average human lifespan continues to increase, however, so does the susceptibility to develop age-related diseases. Because of this, the need to advance methods of disease treatment and prevention is urgent. Cancer, which is currently the second leading cause of death worldwide, is one of such diseases associated with aging. Despite the correlation with age and cancer incidence in humans, bats and elephants are two long-lived animals that rarely develop cancer. The TP53 gene exists in the DNA repair pathway and produces p53, a protein that triggers tumor suppression and prevents uncontrollable cell proliferation in response to DNA damage. Research has shown that multiple copies of the TP53 gene make elephants less likely to develop cancer, but the mechanism to explain why bats don't get cancer is unknown. The TP53 gene is also found in bats, but there is a lack of comparison between the nucleotide and amino acid sequence of the TP53 gene in humans and bats. We hypothesize differences might be present. We took wing punch samples of three species of bats (*Myotis velifer, Tadarida brasiliensis,* and *Eptesicus fuscus*), separated the RNA, converted it to cDNA, and isolated the TP53 gene using PCR and gel electrophoresis. The gene sequence was compared in bats and humans.

P25

Chemical Communication and the effect of Calling Behavior in *Hyla chrysoscelis*

Author(s): **Cheyenne Smith** and Michael Reichert
University of Scholar: Oklahoma State University, Stillwater, OK, USA
Location of Research: Oklahoma State University, Stillwater, OK, USA
Funding: The National Science Foundation (NSF) HRD 1408748, Funded OK-LSAMP Research Summer Experience (FORSE), and Reichert's Lab OSU Integrative Biology Department
Mentor(s): Dr. Michael Reichert, Oklahoma State University

Abstract:

Multimodal communication is where an animal signals through more than one sensory channel. In most anurans, acoustic signals are the primary modality for reproductive communication. However, most anurans' displays are not only acoustic but in fact are multimodal (e.g. visual and acoustic). One modality that has received little attention is the chemical modality. Calling anurans are most likely exposed to chemical cues, but the relationship between chemicals and calling behavior is poorly known. Our goal with this experiment was to establish whether advertising male gray treefrogs (*Hyla chrysoscelis*) can sense chemical cues released from conspecifics in water and adjust their mating calls. In order to test this, we caught male *H. chrysoscelis* and put them into cages. We proceeded to spray them with water that either a male (male cue treatment) or female (female cue treatment) conspecific had been soaking in, or a distilled water control, while recording their calls. We have a total of 67 recordings between our 3 treatment groups. The chemical did not affect the likelihood that males continued to call (male cue: 20/21called; female cue 17/20 called; control 22/26 called). We also tested whether our treatments had an effect on the males' call characteristics.

P26 THE CHARACTERIZATION OF EXOSOMAL PROTEINS FROM P19 CELLS

Authors: **Briana Anderson,** Antje Anji, Meena Kumari
University of scholar: Langston University
Location of research: Kansas State University, Manhattan, KS, USA
Funding: K-INBRE, OK-LSAMP
Mentors: Dr. Antje Anji and Dr. Meena Kumari, Kansas State University College of Veterinary Medicine

Extracellular vesicles (EVs) are nanoparticles ranging between 50-100 nm in diameter. They are released by almost all cells and can travel to neighboring or distant cells. They contain a cargo of genetic material, proteins, and lipids obtained from their parent cell. Extracellular vesicles have the ability to transfer this cargo to recipient cells, either in the vicinity of the parent cell or to cells in the distance. By doing so, they can influence cell function of the recipient cells. This unique property makes them important mediators of cell-to-cell communication. Extracellular vesicles are highly enriched in tetraspanins, a protein superfamily that organize membrane microdomains termed tetraspanin-enriched microdomains. Tetraspanins, including CD9 and CD81, are known markers for EVs and are used to validate exosomal preparations. Using antibodies CD9 and CD81, we performed Western blot analyses to confirm the presence of these proteins in our EV preparations. In addition, we performed electron microscopy analysis of our exosomal preparation to confirm the size of exosomes.

P27 XYLOSE INDUCED CELLULASE GENE EXPRESSION IN *TRICHODERMA REESEI* QM6A.

Author(s): **Diana G. Soriano**, Dr. Rolf A. Prade
University of Scholar: Oklahoma State University, Stillwater, OK, USA
Location of Research: Oklahoma State University, Stillwater, OK, USA
Funding: National Science Foundation (NSF) and the Oklahoma Louis Stokes Alliance for Minority Participation (OK- LSAMP).
Mentor(s): Dr. Rolf A. Prade, Oklahoma State University

Abstract

Lignocellulosic biomass (LCB) is one of the most abundant renewable hydrocarbon source on earth. Two-thirds of LCB is composed of hemicellulose (C5-sugars) and cellulose (C6-sugars). LCB enzymatic deconstruction mechanisms are widely distributed. The canonical enzyme set (cellobiohydrolase (s), endoglucanase(s) and β-glucosidase(s)) breakdown cellulose molecules to create glucose as the final product. Many pretreatment technologies have been developed to overcome this natural physical resistance of LCB to an enzyme-driven digestion process. The end result on LCB pretreatments is that there is always partial decomposition of the hemicellulosic fraction, which contains an abundance of the C5-sugar xylose.

Large-scale productions of enzymes that breakdown LCBs, fungi have generally been used as cell factories to manufacture cellulases, xylanases and other auxiliary activities. There have been substantial efforts to increase recombinant protein yields in *Trichoderma reesei* by transcription factor engineering, decline of extracellular protease activity, identification of promoters and protein secretion signals. Fungi have been genetically engineered to secrete economically adequate yields of enzymes. Operational expenses of synthesizing them continue to be excessive. Xylose found in pentosan-containing pretreated biomass liquors (PPTB) is a cheap substitute carbon source that can be recycled as a substrate to manufacture enzymes.

The research resolves the problem by restructuring the *Trichoderma reesei* native cellulase gene regulatory circuit, switching the induction mechanism from cellulose to xylose. Replacing expensive substrates with an inexpensive by-product carbon source, not only reduces enzyme production costs, but also lowers operational costs.

P28

THE SIMULTANEOUS MECHANISM OF THE OVER EXPRESSION OF MICRO RNA-155 AND MICRO RNA-21 IN B- CELL CHRONIC LYMPHOCYTIC LEUKEMIA

Authors: Dr. Antony Miller PhD and **Jazmine Rodriguez**
University of Scholar: Cameron University, Lawton, OK, USA
Funding: **TALK TO DR. MILLER ABT THIS ONE**
Mentor: Dr. Antony Miller, Cameron University

The aim of this research is to identify a possible mechanism for the simultaneous over-expression of micro RNA-155 (miRNA-155) and micro RNA-21 (miRNA-21) in patients with B-Cell Lymphoctic Leukemia (CLL). Since the presence of these biomarkers is associated with unfavorable prognoses and rapid disease progression in CLL patients, it is relevant that the simultaneous regulation, and any functional consequences present in such regulations, for these biomarkers is studied. Although previous research has determined that some individual miRNAs are involved in developmental timing, cell differentiation, proliferation, apoptosis, and tumorigenesis, the concurrent role of miRNA-155 and 21 has not yet been explored. We have currently amplified, cloned, and inserted the biomarker into cells and plan to further characterize the activity in the near future.

P29

The Goldilocks Effect: Using Response Surface Methodology to Optimize Conditions For Growing Large Crystals of Biological Macromolecules

Angelica Manning[1], Francis Acquah[1], and Blaine H.M. Mooers[1].
[1]Department of Biochemistry and Molecular Biology, University of Oklahoma Health Science Center, Oklahoma City, OK.

Introduction: Higher resolution X-ray diffraction data give more observations and thereby lead to more reliable models of protein and nucleic acid structures. Accurate structures are critical for success in structure-based drug design where short-range van der Waals interactions dominate ligand binding. Large crystals have large scattering volumes that yield greater scattering power and tolerance of higher radiation doses, thereby easing the collection of diffraction data to high resolution. We hypothesize that computer-generated optimal experimental designs can be used to optimize the factors important for growing large crystals (>200 μm long) while saving time and material. These optimal designs are advanced response surface methods (rsm).
Methods and Materials: We used a D-optimal design for three factors with 24 conditions optimally spaced on a hypersphere to grow large crystals of a gel-purified 44-nucleotide dsRNA from a trypanosome RNA editing substrate. The levels of the three factors were centered around a lead condition from earlier experiments. The 24 conditions were replicated in four blocks. The treatments were randomly assigned. Crystals were grown by vapor diffusion using the hanging drop method. Images of the crystals were made with a Leica M120 microscope. The ImageJ software was used to inscribed the crystal with a rectangle. The length of the rectangle was the response. The data were analyzed with the *rsm* package in the R software suite. After crystal growth stopped, we added 10 ul of saturated ammonium sulfate to the reservoir solution about every 24 hours for 5 days to promote further crystal growth.
Results: The optimal design sampled 3 factors at 22, 22, and

P30

ANTI FUNGAL ACTIVITY OF LYSOSOMAL PROTEINS AND THEIR EFFECTS ON *CRYPTOCOCCUS NEOFORMANS*

Authors: **Sierra Posey** and Dr. Karen Wozniak
University: Oklahoma State University Stillwater, OK, USA
Location of Research: Department of Microbiology and Molecular Genetics
Funding: OK-LSAMP
Mentor: Dr. Karen Wozniak, Oklahoma State University

Cryptococcus neoformans is an opportunistic fungal infection that is spread through airborne means. It affects immune compromised individuals and increases their susceptibility to the disease. Previous studies showed that dendritic cells (DCs) can kill *Cryptococcus* through phagocytosis and lysosomal killing from within the DC. The lysosomal extract from these DCs has anti-cryptococcal activity, and we now have mass spectrometry data identifying its contents. We hypothesized that DC lysosomal proteins nostrin, calmodulin, and coronin 1a have anti-fungal activity against *C.neoformans*. For these studies, we incubated lysosomal extract or these individual proteins with *C. neoformans* to measure anti-fungal activity. We also tested the proteins at different concentrations in order to determine the minimum concentration required for antifungal activity. Our results showed nostrin and coronin-1A had significant antifungal activity, while calmodulin did not have antifungal activity. In fact, incubation with calmodulin significantly increased cryptococcal growth. Testing of different nostrin concentrations showed that the higher concentration (4ug/ml) is required for antifungal activity. Future studies will continue to examine cytotoxicity of nostrin with mammalian cells, and nostrin will be tested as a therapy in a mouse model of pulmonary cryptococcosis. In addition, we will examine mechanisms of increased cryptococcal growth by calmodulin.

P31

ISOLATION AND CHARACTERIZATION OF ANTIBIOTIC PRODUCERS FROM OKLAHOMA SOIL.

Author(s): **Lakota Sauceda** and Edward Yoon
University of Scholar: University of Central Oklahoma, Edmond, OK, USA
Location of Research: University of Central Oklahoma, Edmond, OK, USA
Funding: Louis Stokes Oklahoma Alliance for Minority Participation in Science (OK-LSAMP)
Mentor(s): Dr. Hari Kotturi, Department of Biology, University of Central Oklahoma.

ABSTRACT
The purpose of this research is to address the problem of a declining supply of antibiotics. Because of antimicrobial resistance, common bacterial infections are increasingly becoming untreatable. When this happens, they are often referred to colloquially as superbugs, and the proliferation of superbugs is being seen worldwide. The pace of new antibiotic discovery is not keeping up with the rapid evolution of resistance in microbes. As a result, there has been more than a 30-year void in the discovery of new types of antibiotics with no registered classes of antibiotics discovered after the 1980s. The purpose of this research is to find new antibiotic producers from Oklahoma soil samples. This summer I have screened soil samples and found four potential antibiotic producers through the spread-patch protocol. Two cultures stain Gram-negative and the other two stain Gram-positive. Out of the nine tester strains used, the strains inhibited by one or all the isolated bacteria include *Bacillus subtilis, Staphylococcus aureus, Acinetobacter baylyi, Staphylococcus epidermidis,* and *Enterococcus faecium.* Further testing will be performed to differentiate the isolates based on biological characteristics instead of just morphological characteristics. Biochemical tests will be performed, and 16S rDNA sequencing will be used for identification of organisms. The active compound will be identified by using mass spectrometry.

P32

PULMONARY DENDRITIC CELL SUBSET INTERACTIONS WITH *CRYPTOCOCCUS NEOFORMANS*

Author(s): **Brenden Determann II.** Ashlee Hawkins. Karen L. Wozniak.
University of Scholar: Oklahoma State University, Stillwater, Oklahoma, USA
Location of Research: Oklahoma State University, Stillwater, OK, USA
Funding: National Institute of Health (Award: P20GM13648) and The Oklahoma Center for Respiratory and Infectious Disease (OCRID pilot grant)
Mentor(s): Karen L. Wozniak, Oklahoma State University

Cryptococcus neoformans, an opportunistic fungal pathogen acquired from the environment, is the known causative agent of cryptococcal meningitis. *C. neoformans* predominantly causes disease in immune compromised individuals resulting in over 180,000 annual deaths. Upon infection, *C. neoformans* is capable of being killed by innate phagocytes, or in some phagocytes, it can evade killing and replicate intracellularly. This intracellular survival and replication are thought to be a mechanism for dissemination of *C. neoformans* from the lung to the brain. Dendritic cells (DCs) are phagocytes and antigen presenting cells whose stimulation results in the activation of T lymphocytes. T cell antigen presentation and activation results in the successful clearance of *C. neoformans*. Previous studies showed that DCs have anti-fungal activity against *C. neoformans*. However, recent studies have shown that within the murine lung, there are two distinct subsets of conventional dendritic cells: $CD11b^{+}$ and $CD103^{+}$. We hypothesize that these DC subsets have different interactions with *C. neoformans*. For these studies, we purified DCs from murine lung tissue and conducted flow cytometric analysis to analyze DC-cryptococcal interaction. Flow cytometry revealed the presence of the two distinct subsets as well as successful interaction of each DC subset with *C. neoformans.* Further studies will test the antifungal activity of each subset with *C. neoformans* to determine antifungal ability. In addition, we will use fluorescence microscopy to visualize the uptake and intracellular morphology following uptake of *C. neoformans* by each DC subset. Understanding the various

P33

HIGH TEMPERTURE STUDY OF THE REATION OF SILICON, TITANIUM, AND YTTRIUM OXIDES

Authors: Lizbeth Robles-Fernandez, Fernando Salazar-Salas, and Dwight L. Myers
University of Scholar: East Central University, Ada, OK. USA
Location of Research: Center for Undergraduate Research and Learning (CURL) Lab, Ada, OK, USA
Mentor: Dwight L. Myers, East Central University

Reactions of titanium oxide and silicon dioxide are of importance in materials used in high temperature environments. There are questions concerning the reaction of titanium dioxide (rutile) with silica. Both are important as potential materials or reaction products in thermal barrier coatings or environmental barrier coatings in combustion environments, as for example in gas turbine technologies. The extent of reaction and temperature range are important questions to answer for this chemical system. Experimental evidence would suggest that a third cation is necessary to have compound formation. Presently we are exploring the reaction of titanium dioxide with silicon dioxide with small amounts of yttrium oxide being added. Mixtures of the three oxides are being subjected to heatings at various temperatures from ca. 1200-1500^{o}C. Samples are characterized before and after heating by means of X-ray diffraction and diffuse reflectance infrared spectroscopy, transmission infrared spectroscopy, and/or diffuse reflectance UV/Vis spectroscopy as appropriate. Results to date will be presented.

P34

INVESTIGATION OF CALCIUM- REGULATED VIRULENCE OF *PSUEDOMONAS AERUGINOSA* IN *GALLERIA MELLONELLA*

Authors: **Jacee L. McCoy**, Leah A. Kafer, Biraj Kayastha, Marianna A. Patrauchan
University of Scholar & Location: Department of Microbiology and Molecular Genetics, Oklahoma State University, Stillwater, OK
Funding: OK-LSAMP, NIGMS Diversity Supplement, NIH COBRE
Mentor: Dr. Marianna Patrauchan, Oklahoma State University

Pseudomonas aeruginosa is a Gram-negative opportunistic bacterium that can cause severe chronic infections in the lungs of Cystic Fibrosis (CF) patients, with elevated levels of Ca^{2+} in their body fluids. Our group has discovered that elevated amounts of Ca^{2+} commonly detected in CF lungs, enhance production of virulence factors in *P. aeruginosa.* We hypothesized that elevated Ca^{2+} enhances virulence in an animal host. Further, this study aims to determine the role of *EfhP* in Ca^{2+} - regulated virulence of *P. aeruginosa. EfhP* is a Ca^{2+}-binding protein, which has been shown to mediate Ca^{2+}-regulated production of several virulence factors as well as resistance to oxidative stress. To test this hypothesis and define the role of *EfhP* in Ca^{2+}-dependent virulence of this pathogen, we used *Galleria mellonella* wax worm as an animal virulence model. We injected the wax worms with the *EfhP* deletion mutant of *P. aeruginosa* and determined the pathogen's LD50, which were compared to those of the wild type. In addition, we monitored *P. aeruginosa* survival in the worms and the levels of Ca^{2+} within the hemolymph. We also assessed an immune response in the worms by using a Polyphenol Oxidase Assay (PPO). So far, we showed that the mutant lacking *EfhP* gene exhibited a significantly lower virulence than the wild type when grown at elevated Ca^{2+}. This research provides insight into the regulatory systems controlling virulence and pathogenic interactions within a host. This knowledge is essential for future development of medicinal approaches for preventing or controlling

P35

MATCHA TEA MEDIATES CANCER CELL PROLIFERATION IN HUMAN EMBRYONIC KIDNEY – 293 CELL CULTURE BY INHIBITING METABOLIC PATHWAYS NECESSARY FOR ADENOSINE TRIPHOSPHATE PRODUCTION

Author(s): **Ann Marie Flusche** and Professor Robert Sheaff
University of Scholar: University of Tulsa, Tulsa, OK, USA
Location of Research: University of Tulsa, Tulsa, OK, USA
Funding: the National Science Foundation (NSF), American Chemical Society (ACS), OK-LSAMP, Tulsa Undergraduate Research Challenge (TURC), and Chemistry Summer Undergraduate Research Program (CSURP)
Mentor(s): Professor Robert Sheaff, University of Tulsa and Professor JC Diaz, University of Tulsa

Green tea is one of the most ancient and popular beverages consumed around the world. Matcha green tea (a widely-known powdered form) is recognized for its potential anti-oxidant, anti-aging, and weight loss properties. Recently, a study focused on following the metabolic effects of Matcha green tea on breast cancer cells. The results showed that Matcha reduces mitochondrial metabolism, as well as glycolysis, maintaining cancer cells in a metabolically quiescent state. However, the underlying molecular mechanisms and components behind its proposed effects remain largely unknown. Our lab has discovered that metabolic pathways utilized for tumor survival and growth are inhibited when Matcha is present. In addition, Matcha targets cellular metabolism by blocking hexokinase phosphorylation of glucose, leading us to hypothesize that Matcha's anti-cancer activity may be due to inhibition of glucose metabolism. Immortalized cancer cells are glucose addicted, utilizing aerobic glycolysis (Warburg effect) to produce sufficient ATP and biomass. To test our hypothesis, we cultured Human Embryonic Kidney – 293 cells (which follow the Warburg effect), varied the growth media composition to force use of other metabolic pathways, incubated the cells with varied Matcha concentrations, and measured Adenosine Triphosphate (ATP) production using the CellTiter Glo™ Assay. We observed a dose-dependent decrease in ATP production when media with glucose and Matcha was introduced to the cells, but we

P36

CHANGING THE FORMULA BENEFITS THE MITES: GRAIN MITE RESPONSE TO DOG FOOD FORMULATIONS

Author(s): **Brandon Henriquez**, Ankur Limaje, and W. Wyatt Hoback
University of Scholar: Oklahoma State University
Location of Research: Oklahoma State University, Stillwater, OK, USA
Funding: OSU CASNR Research Grant, Department of Entomology and Plant Pathology
Mentor(s): Dr. W. Wyatt Hoback, Oklahoma State University

Grain mites, *Acarus siro,* are pests which can affect different types of stored grains and can also spread mold spores which can affect human health. Some dog foods consist of pieces with different textures and shapes and Smucker's is testing new proprietary formulas of Kibbles and Bits to determine susceptibility to mite infestation. In the experiment, three formulas and 5 or 6 shapes of dogfood were tested in benchtop trials. 35 ml vials had 3-5 pieces of individual shapes standardized by mass and then infested with approximately 25 mites. The mite infested vials along with controls were placed in tubs with mineral oil coating the bottom to prevent the spread of any escaped mites. The vials were placed in a growth chamber at 28°C and were kept in 70-85% relative humidity. After four weeks, the vials were removed from the chamber, and mites were counted. The control formula had very few mites on any piece shape. The first test formula had very high mite numbers (thousands per vial and high visible damage in the form of dust). The third test formula had high amounts of mold growth resulting in few mites, but unusable product. The results of these tests show that the existing formula is best at preventing mite population growth and that the new formulations must be altered or the product will lead to customer complaints.

P37

ISOLATION, CHARACTERIZATION AND ANNOTATION OF MICROBACTERIOPHAGE BUSEPHILIS FROM OKLAHOMA SOIL.

Author(s): Carina Gutierrez, Russell Smalley
University of Scholar: University of Central Oklahoma, Edmond, OK, USA
Location of Research: University of Central Oklahoma, Edmond, OK, USA
Funding: Louis Stokes Oklahoma Alliance for Minority Participation in Science (OK-LSAMP)
Mentor(s): Dr. Hari Kotturi, Department of Biology, University of Central Oklahoma.

ABSTRACT
Bacteriophages are viruses that infect and replicate in a bacterial host cell. The Oklahoma soil due to its diversity is a good source for finding new bacteriophages. Due to the emergence of drug-resistant bacteria, there is an increasing need for an alternative way to treat bacterial infections other than using antibiotics. In this work, we report the annotation of Microbacteriophage Busephilis. The phage was previously isolated from Oklahoma soil using *Microbacterium foliorum* as the host bacteria. This phage was sequenced using Illumina sequencing technology with a shotgun coverage of 79. Busephilis is a newly discovered bacteriophage from Oklahoma soil with a genome length of 52986 bp. It belongs to cluster EC with GC content of 68.8%. We used DNA master for genome annotation. That was followed by the identification of gene functions using the following programs: phagesdb, NCBI Blast, tRNAScan, and HHpred. Busephilis is a phage containing 89 genes with 30 genes having predicted gene functions and 59 with no known functions. The genome has no tRNA sequences and is 97% identical to another microbacteriophage KaHaiDragon in the same cluster.

P38

NOVEL COMPONENT OF THE CA^{2+} SIGNALING NETWORK, CARP, AS A BIOMARKER FOR *PSEUDOMONAS AERUGINOSA* INFECTION

Author(s): **Sergio Mares**, Michelle M. King, and Marianna Patrauchan
University of Scholar: Oklahoma State University, Stillwater, OK, USA
Location of Research: Oklahoma State University, Stillwater, OK, USA
Funding: the National Science Foundation (NSF) and
Mentor(s): Dr. Marianna Patrauchan

Antibiotic resistant pathogen *Pseudomonas aeruginosa* infects patients with Cystic Fibrosis (CF), burns, wounds, and implants. In the lungs of patients with CF, *P. aeruginosa* encounters elevated levels of calcium (Ca^{2+}). Previously, our group has shown that elevated Ca^{2+} enhances production of virulence factors in *P. aeruginosa.* We have identified a **Ca**$^{2+}$–**r**egulated β-**p**ropeller protein, CarP, which is essential for Ca^{2+} tolerance, regulation of intracellular Ca^{2}, and production of virulence factors. In addition, *carP* plays role in the ability of the pathogen to kill *Galleria mellonella* as a virulence model. Due to the importance of *carP* in *P. aeruginosa* virulence, we hypothesized that *carP* is highly conserved in *P. aeruginosa* clinical isolates. Data homology search retrieved 2269 nucleotide sequences with the sequence identity of 95.6%. The homolog sequences belong to *Pseudomonas* and more specifically 97.9% to *P. aeruginosa* strains, suggesting the predominant distribution among *P. aeruginosa.* 93.1% of the sequences indicate a high level of conservation of *carP* in clinical sources, as well as 5.2% in environmental sources. Identified mutations in the 2269 homologs do not impact the 3D protein structures. To test whether *carP* may serve as a biomarker for *P. aeruginosa,* we applied *carP* specific primers and successfully amplified *carP* homologs in non-sequenced *P. aeruginosa* clinical isolates from CF sputum and ocular infections. We also tested the high specificity of *carP* to *P. aeruginosa*, by using *carP* primers in other Non-pseudomonads, such as; *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella oxytoca*, and *Micrococcus luteus* and concluding the ampliciation

P39

Leaf HERBIVORE DAMAGE ON ASCLEPIAS viridis

Author: **Getsemani Garcia-Perez**
University of Scholar: East Central University
Location of Research: Nature Conservancy, Connerville, Oklahoma, United States of America
Funding: NASA and Oka' Institute
Mentor: Dr. Leah S. Dudley, East Central University

Several experiments have shown that herbivores affect plant resistance, growth, and survival. In the current study, we focused on milkweed due to the interest in this species in monarch conservation efforts. Plants were selected across three sites that differed in plant water availability. We randomly chose one leaf per plant and collected and pressed the leaf. The position of the leaf collected was recorded based on the leaves remaining on the main stem. Collections occurred towards the end of the season so that herbivore damage would have accumulated from young plant, through flowering, and fruit dehiscence. Collected leaves were scanned and leaf tissue removed estimated by measuring missing leaf tissue, using a digital application, Image J. We tested, using linear regression, the hypothesis that the older leaves, more basal, would have greater damage compared to younger leaves, higher up on the stem.

P40

ABNORMAL ION CONCENTRATION IN CYSTIC FIBROSIS LUNGS IMPACT RHAMNOLIPID PRODUCTION IN *PSEUDOMONAS AERUGINOSA*

Author(s): **Casandra Salinas**, Michelle M. King, Breaanna Russ, Amber Price, Marianna A. Patrauchan
University of Scholar: Oklahoma State University
Location of Research: Department of Microbiology and Molecular Genetics, Stillwater, OK
Funding: OK-LSAMP, McNair, NIH, NSF
Mentor(s): Dr. Marianna A. Patrauchan, Michelle M. King, Department of Microbiology and Molecular Genetics

Pseudomonas aeruginosa causes severe acute and chronic infections in immunocompromised patients, most known for infecting the lungs of Cystic Fibrosis (CF) patients. CF patients have a dysfunctional chloride channel, which results in a disruption of ion homeostasis, including Ca and Fe. With the disease progression, the lung capacity decreases limiting gas exchange. *P. aeruginosa* is able to adapt and survive in the host environment. Understanding the mechanisms of such adaptations will aid in discovering innovative treatments against infections. One of the pathogen's many virulence factors is its ability to swarm, which contributes to the formation of biofilms and relies on the production of biosurfactant rhamnolipid. The latter also aids in the evasion of the host immune response. Previously, we have demonstrated that the elevated concentrations of Ca, Fe, NaCl, and MgCl impact swarming behavior. We **hypothesized** that the chemical conditions in the CF lungs affect the regulation of rhamnolipid biosynthesis. We aimed to determine the impact of these conditions on the expression of *rhlA* , required for production of rhamnolipid. For this, we used a promoter construct (P*rhlA-gfp* fusion), containing *rhlA* promoter upstream of *gfp*. Thus far, we have determined that the presence of elevated Ca increased *rhlA* promoter activity. Our data also indicate a loss of *rhlA* promoter activity when the cells carrying the construct are exposed to 5% CO_2. This abolishment of the *rhlA* promoter activity occurs even at elevated Fe and Ca. These results show multifactorial

P41

Genetic profile of feral hog populations at Sequoyah National Wildlife Refuge in Vian, OK

Becca Wells and Michael J. Shaughnessy, Jr.
Department of Natural Sciences, Northeastern State University, Tahlequah, OK 74464

In recent years, feral hogs have become a high-profile invasive species in Oklahoma. The Sequoyah National Wildlife Refuge in Vian, OK is home to a large population of feral hogs. This population is subject to periodic aerial shootings in addition to regular management efforts, such as trapping and night shooting. In March 2019, 136 feral hogs on the refuge were removed from the population via aerial shooting. Furthermore, 100 pigs were trapped and dispatched on the refuge in the month leading up to the shooting. Liver tissues were collected from both the trapped pigs and those culled during the aerial shooting. These tissues were sent for sequencing and used to build a genetic profile of feral hogs on the refuge. Samples from pigs that were trapped and those that were removed by shooting were compared in order to determine if there is genetic selectivity for either method. Furthermore, genetic variability of the feral hog population on the refuge was compared to that of feral hog populations across the state, allowing for the identification of genetic events, such as genetic drift and bottlenecks, on the refuge which may be induced by management efforts and indicate the effectiveness of such efforts. These analyses give insight into the dynamics of feral hog populations in the Sequoyah National Wildlife Refuge and in Northeastern Oklahoma as a whole. This information is critical when designing management strategies for an invasive species with broadly distributed metapopulations.

REGISTERED ATTENDEES

Name	Institution	Academic Discipline
Adams, Henry	Oklahoma State University	Plant Biology, Ecology, & Evolution
Alcala, Esmeralda	University of Oklahoma	Microbiology
Alcantar, Isabelle	Oklahoma State University	Mechanical Engineering Technologies
Allbritton, Elisabeth	Southwestern OSU	Chemistry
Anderson, Briana	Langston University	Biology
Austin, Aaron	Oklahoma State University	Physics
Barber, Dylan	East Central University	Medical Physics
Barnes, Cody	Oklahoma State University	Integrative Biology
Bazile, Patricia	Langston University	Biology
Bejarano, Alexandra	University of Tulsa	Computer Science
Beker, Beth	Oklahoma State University	Computer Science
Biddy, Trey	Southwestern OSU	Engineering Technology
Bikkina, Prem	Oklahoma State University	Chemical Engineering
Blake, Morgan	Southeastern OSU	Zoology, Fisheries & Wildlife Science
Blocker. Tomica	Children's Health	Biology/Zoology/Medicine
Bohan, Dineh	East Central University	Mathematics
Bonser, Lisa	Northeastern State University	Molecular Biology
Borunda, Mario	Oklahoma State University	Physics
Buchanan, Austin	Oklahoma State University	Industrial Engineering & Management
Buckholtz, Jody	Northeastern State University	Chemistry
Burgess, Alexis	Southeastern OSU	Medical Sciences
Campbell, Brian	Southwestern OSU	Chemistry & Physics
Carter, Cord Malik	Univ of AR Medical Sciences	Pharmaceutical Sciences
Cook. Mariah	Southwestern OSU	Chemistry
Cosby, Caitlin	Southeastern OSU	Biology/Chemistry
Craft, Kaci	Langston University	Biology
Croci, Darlene	Oklahoma State University	OK-LSAMP
Cross, Stacii	Langston University	Biology
Davis, Taleigh	Southwestern OSU	Chemistry
Deason, Kyle	Northeastern State University	Mathematics
Deroin, Rainee	Oklahoma State University	Environmental Science
Determann II, Brenden	Oklahoma State University	Microbiology & Molecular Genetics
Dew, Jovette	Oklahoma State University	Diversity Academic Support

Name	Institution	Academic Discipline
Diaz, J. C.	University of Tulsa	Sci & Eng
Dindy, Imani	Oklahoma State University	Physics
Dixon, Kierra	Oklahoma State University	Zoology and Microbiology
Dreadfulwater, Stormie	Oklahoma State University	Microbiology/Cell & Molecular Biology
Dunlap, Rylee	Southeastern OSU	Biology
Easter, Katie	Northeastern State University	Biology
Elix, Desheika	Cameron University	
Escobar, Jennifer	University of Oklahoma	Chemical Biosciences
Eslinger, Christy	Oklahoma State University	Epigenetics & Molecular Biology
Fails, Tyler	Langston University	Computer Science
Fernandez, Gabriela	Oklahoma State University	Environmental Engineering
Fitzgerald, Robin	Oklahoma State University	Talent Search
Flores, Karina	University of Oklahoma	Biology
Flusche, Ann Marie	University of Tulsa	Cancer Biology
Francis, Paul	Cameron University	
Francis, Sheila	Cameron University	
Franco, Victor	Oklahoma State University	Mechanical Engineering
Frazier, Allexus	Langston University	Computer Science
Garcia, Leslie	Southwestern OSU	Chemistry
Garcia-Perez, Getsemani	East Central University	Biology
Gonzales, Patricia	Northeastern State University	
Gore, Tyler	Northeastern State University	Chemistry
Griffin, Charity	University of Oklahoma	Microbiology (Biotechnology)
Gunnars, Tabby	Oklahoma State University	Integrative Biology
Gutierrez, Carina	University of Central Oklahoma	Biology
Halcomb, Bethany	Oklahoma State University	Talent Search
Haley, Joe	Oklahoma State University	Physics
Hallenbeck, Doug	Oklahoma State University	VP for Student Affairs
Hansen Gonzalez, Meadow	University of Tulsa	Biology
Hartnett, Rachel	Oklahoma State University	Integrative Biology
Hatter, Bethany	Oklahoma State University	Nutritional Sciences
Hawkins, Ashlee	Oklahoma State University	Microbiology & Molecular Genetics
Hedgecock, Tayler	Southeastern OSU	Biology
Henriquez, Brandon	Oklahoma State University	Entomology and Plant Pathology
Herrera, Brandy	University of Oklahoma	Mathematics
Hinkle, Theresa	Cameron University	Chemistry and Biology
Hubin, Tim	Southwestern OSU	Chemistry
Hummingbird, Chandler	University of Tulsa	Computer Science/Game Development
Hussaini, Syed R	University of Tulsa	Chemistry & Biochemistry
Hutchison Ybarra, Julissa	University of Oklahoma	Mathematics
Iakovakis, Clarke	Oklahoma State University	Library
Johnson, Courtney	Southwestern OSU	

Name	Institution	Academic Discipline
Kim, Seok Jhin	Oklahoma State University	Engineering
Kirksey, Jason	Oklahoma State University	Vice President for Institutional Diversity
Knox, Cheyenne	Oklahoma State University	Zoology/Biology Major
Lahiri, Mayukh	Oklahoma State University	Physics
Lee, Chunghao	University of Oklahoma	Bioengineering
Lewis, Sharon	Langston University	Chemistry
Lightning, Lizzie	Northeastern State University	Environmental Chemistry
Lopez, Alexandra	Oklahoma State University	Biosystems Engineering
Lora, Ricky	Oklahoma State University	Construction Engineering Technology
Love Sr., Brandon	Cameron University	
Love, SheKayla	Cameron University	Physics
Lusk, Jada	Oklahoma State University	Microbiology/Cell & Molecular Biology
Lutter, Erika	Oklahoma State University	Microbiology
Macias Jr., Jose Juan	University of Oklahoma	Chemistry and Biochemistry
Maharry, Tim	Northwestern OSU	Math & Computer Science
Maltos, Jordy	Southeastern OSU	Biology/Chemistry
Manning, Angelica	Southwestern OSU	Biology
Mares, Sergio	Oklahoma State University	Microbiology & Molecular Genetics
Mason, Sherrita	Langston University	
Mccarrell, Teresa	Oklahoma State University	Microbiology
McCoy, Jacee	Oklahoma State University	Microbiology & Molecular Genetics
McDowell, Brittiana	Langston University	Chemistry
Meyers, Derek	Oklahoma State University	Physics
Miller, Dashari	Langston University	Biology
Miller, Rita	National Science Foundation	Biology
Mitchell, Earl	Oklahoma State University	Biochemistry & Molecular Biology
Montes, Yehoshua	Cameron University	Chemistry
Moore, Cayla	Langston University	Biology
Moore, Celois	Langston University	Biology
Moore, Leslie	Southeastern OSU	Psychology
Morales, Brenda	Oklahoma State University	OK-LSAMP Director
Morris, Myshal	Langston University	Biology
Motte, Charmaine	Oklahoma State University	Graduate College
Murray, Kyra	Langston University	Biology
Myers, Dwight	East Central University	Chemistry
Naidoo, Gnanambal	Langston University	Biology
Nalley, Ann	Cameron University	Chemistry
Nimsey, Abner	Southwestern OSU	Chemistry

Name	Institution	Academic Discipline
Ojha, Sohita	Langston University	Molecular Biology
Okaro, Pamela	University of Tulsa	Chemical Engineering
Oliver, Stacie	Southeastern OSU	Biological Sciences
Ortega Jr., Arturo	East Central University	Physics and Mathematics
Palmer, Leland	University of Oklahoma	Physics
Paris III, Restituto	Cameron University	Chemistry
Patrauchan, Marianna	Oklahoma State University	Microbiology & Molecular Genetics
Peal, Lila	Langston University	Biochemistry and Molecular Biology
Perez Vega, Brittany	Southeastern OSU	Biochemistry
Perez, Erik	OSU- Tulsa	Mechanical Engineering
Porter, Kay	Oklahoma State University	OK-LSAMP Retired
Porter, Tajinee	Langston University	Biology
Portillo, Dylan	University of Oklahoma	Chemical Engineering
Posey, Sierra	Oklahoma State University	Microbiology
Powers, Carol	Oklahoma State University	Graduate Professional Development
Ramanathan, Ranjith	Oklahoma State University	Animal & Food Sciences
Ray, Shawn	Oklahoma State University	Mechanical Engineering Pre-Med
Richardson, Erin	Langston University	Chemistry
Robles, Lizbeth	East Central University	Molecular Biology
Rodriguez, Blanca	Cameron University	Biology
Romano, Sandra	National Science Foundation	Program Director
Rubio, Asuncion	Southeastern OSU	Biology/Chemistry
Sachan, Ritesh	Oklahoma State University	Mechanical & Aerospace Engineering
Salazar, Fernando	East Central University	Physics
Salinas, Casandra	Oklahoma State University	Biochemistry & Molecular Biology
Salinas, Daniel	Oklahoma State University	Aerospace Engineering
Sallam, Khaled	Oklahoma State University	Mechanical & Aerospace Engineering
Sauceda, Lakota	University of Central Oklahoma	Biomedical Sciences
Scheets, Kay	Oklahoma State University	Plant Biology, Ecology, and Evolution
Scott, Donovan	University of Central Oklahoma	Mechanical Engineering
Shamsuddin, Rittika	Oklahoma State University	Computer Science
Smith, Cheyenne	Oklahoma State University	Zoology
Soriano, Diana	Oklahoma State University	Microbiology & Psychology
Spence, Alexis	Southeastern OSU	Biology/Chemistry
Spencer, Robin	Oklahoma State University	Microbiology/Cell & Molecular Biology
Starks, Mia	Langston University	Computer Science
Sutton, Autumn	Oklahoma State University	Entomology
Swaringim-Griffin, Julie	Oklahoma State University	Talent Search
Thomas, Lexus	Southeastern OSU	Biology/Chemistry
Underwood, Von	Cameron University	Dean, School of Arts & Sciences

Name	Institution	Academic Discipline
Vaidyanathan, Ranji	Oklahoma State University	Materials Science and Engineering
Valdez, Cammi	Wellesley College	Biochemistry & Molecular Pharmacology
Vaughan, Melville	University of Central Oklahoma	Biology
Vazquez Gomez, Sergio	Southeastern OSU	Biology/Chemistry
Velasco II, Alfredo	University of Tulsa	Computer Science
Vora, Hitesh	Oklahoma State University	Engineering Technology
Wagner, Joseph	University of Central Oklahoma	Engineering Physics/Mechanical Engrg
Wang, Shuodao	Oklahoma State University	Mechanical Engineering
Ware, Ciboney	Northeastern State University	
Warren, Ka'Shay	Oklahoma State University	Information Assurance
Washington, Angela	Northeastern State University	
Weaver, Hallie	Langston University	Chemistry
Wells, Becca	Northeastern State University	Biology
Wheat, Cheyanne	University of Tulsa	Computer Simulation & Gaming
Wheeler, Aaron	Oklahoma State University	Chemical Engineering
White, Nicholas	Southeastern OSU	Chemistry
Williams, Karen	East Central University	Physics
Wilson, Marissa	Langston University	Biology
Wozniak, Karen	Oklahoma State University	Microbiology
Wright, Aspen	Cameron University	Biology
Wright, Zsabre	Langston University	Chemistry
Wu, Ning	Southeastern OSU	Biological Sciences
Xu, Gang	University of Central Oklahoma	Biomedical & Mechanical Engineering
Yoo, Heejin	Oklahoma State University	Plant Biology, Ecology, & Evolution
Yost, Andrew	Oklahoma State University	Physics

SPECIAL THANKS

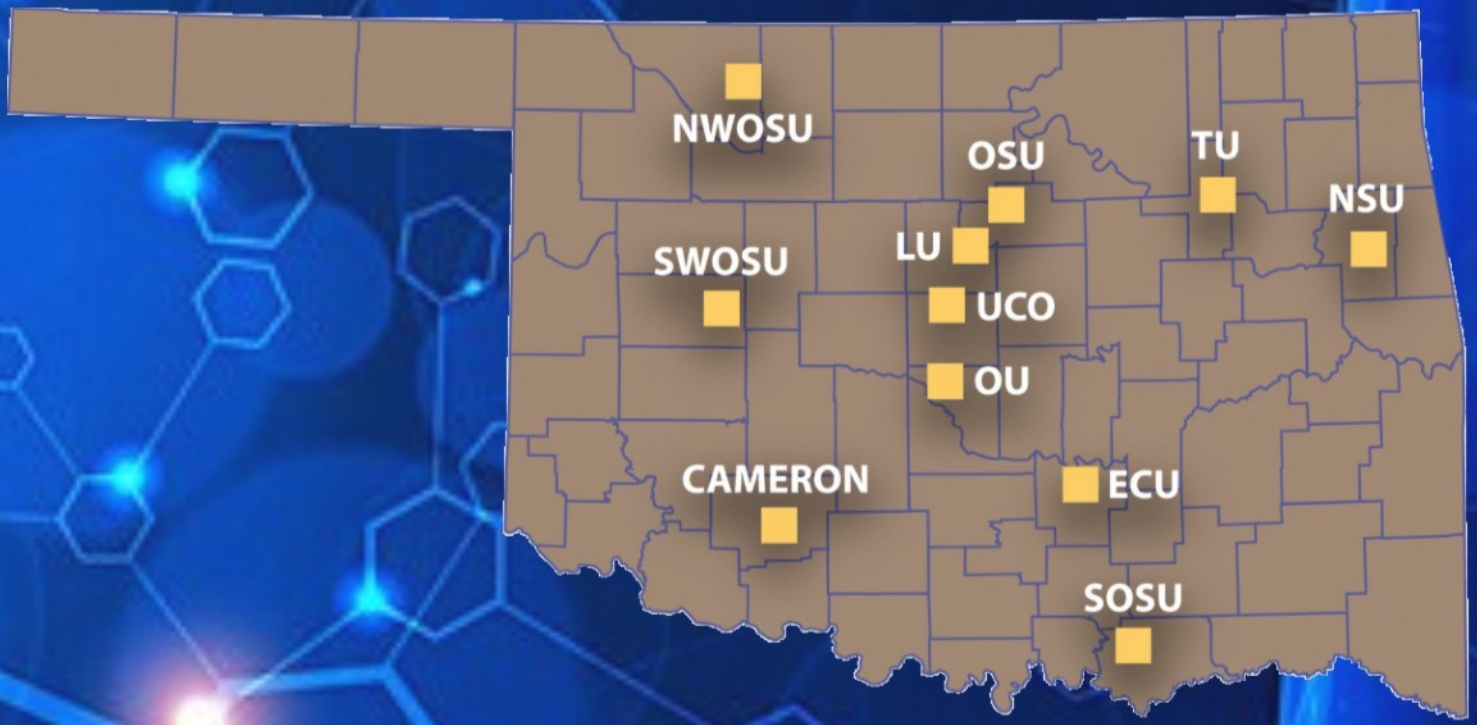
OK-LSAMP would like to thank the ***Division of Institutional Diversity*** (ID) for continued support and connections created among the other ID programs and organizations. Institutional Diversity also contributes to lunch at the symposium.

MOST OF ALL, OK-LSAMP would like to give praise and special thanks to the faculty and industry ***Mentors***. This program would not be the success it is without the expert support and guidance mentors provide to the scholars as they explore and enhance their research and scientific skills. We cannot say "Thank you" enough.

OK-LSAMP would especially like to thank the ***National Science Foundation*** and the LSAMP Program Director, ***Dr. A. James Hicks, Ph.D., Martha James and Dr. Leroy Jones, Ph.D.*** for their continued support of both the undergraduate and graduate LSAMP programs.

OK-LSAMP is eternally grateful for the hard work and dedication of the ***OK-LSAMP Staff*** on each campus. Their mentoring and guidance keeps scholars on track academically and professionally so they are ready for the rigors of graduate school, academia and/or industry careers. Thank you Darlene, Casandra and Courtney for all you do to ensure that OK-LSAMP and the Annual Research is a great success. Thank you to all the volunteers that made this possible.

Thank you for Attending!



CONNECT WITH US:

https://www.facebook.com/groups/oklsamp/

@oklsamp

@oklsamp