GRSP

GRADUATE RESEARCH SCHOLARS PROGRAM

DECEMBER 2019 - VOLUME 12

Alabama EPSCoR

Alabama's Graduate Research Scholars Program

- GRSP -

Is unique Among National EPSCoR Programs. Few states have committed major resources toward the sponsorship and development of its next generation of researchers, scientists, and innovators.

The GRSP is a state investment in Alabama's universities that will expand research output, attract quality graduate students and make our universities more competitive for quality faculty hires. The program will provide a highly trained workforce to fuel the growth of high technology companies in Alabama. A significant goal of the GRSP is to encourage interdisciplinary training and research, to train professionals for careers in the scrutinized fields, and to encourage individuals from underrepresented groups to consider careers in these fields.

Table of Contents

Message from the ALEPSCoR Steering Committee Chair 4

Message from the ALEPSCoR Executive Director 5

Overview 6

Tables and Statistics 7

GRSP Presenter to the Alabama Commission on Higher Education 8

Featured Research Scholars (New Awardees) 9-35

New GRSP Round 14 Awardees 10
Renewing GRSP Round 14 Awardees 37-47
GRSP and Beyond 48-51
Campus Coordinators / Staff 52-57

Appendices 58-73
Index of Scholars 59
- Alumni Roster 60
- Quick Reference Guide 61-72
- AL EPSCoR Steering Committee 73

Dr. Chris Lawson, Alabama EPSCoR Executive Director, 205.975.5059, Lawson@uab.edu
Charlotte Nix, Alabama EPSCoR Program Administrator, 205.348.7079, cnix@ua.edu
Briauna Perryman, Alabama EPSCoR Program Coordinator, 205.996.7168, brianuap@uab.edu

University of Alabama at Birmingham, 770P Administration Building
Mailing Address: AB770P, 1720 2nd Avenue South, Birmingham, AL 35294-0107
Physical Address: 701 20th Street South, Birmingham, AL 35233
www.alepscor.org

Message from Alabama EPSCoR Steering Committee Chair

October 2019

Dear Colleagues,

In FY 2019 the Alabama Legislature invested in Alabama's future research capacity and economic prosperity by continuing the appropriation to Alabama EPSCoR (Established Program to Stimulate Competitive Research) (ALEPSCoR). This program, managed through the Alabama Commission on Higher Education (ACHE), funds the Graduate Research Scholars Program (GRSP). The GRSP, now fourteen years old, is a program that has offered research opportunities to over 300 graduate students with up to $25,000/year (sometimes multi-year) awards under the guidance of some of Alabama's finest research scientists since 2006.

At the GRSP Campus Coordinators' meeting in May 2019, forty-two Round 14 recipients were chosen from sixty-seven applications. Twenty-five of these are new to the program. These students will conduct EPSCoR supported research in Alabama through grants from the National Science Foundation (NSF), Department of Energy (DOE), and the National Aeronautics and Space Association (NASA). As of December 2019, the GRSP has assisted in the accomplishment of 187 Ph.D.s and sixty-five Master's. Projections for 2020 include three MS and twenty-two more Ph.D. degrees.

I invite you to glance through the following pages to discover some of the exciting research being done by these students in areas such as: using electrospinning and additive manufacturing to develop kink-resistant vascular grafts, how neuropeptide expression affects mental health, how urban environments enhance the production of wildlife, methane production for biofuels, solar powered batteries, fiber optic sensors for use in extreme environments, muscle structures and how to prevent muscle disease, and polymer based materials for use in space just to name a few.

Thank you for your interest in the Alabama EPSCoR Program and especially the Graduate Research Scholars Program.

Sincerely,

Christopher S. Brown, PhD
Chair, Alabama EPSCoR Steering Committee
Vice President for Research
University of Alabama at Birmingham

Message from the Alabama ESPCoR Executive Director

October 2019

The Graduate Research Scholars Program (GRSP), now in Round Fourteen, continues to be a great opportunity for outstanding Alabama students and mentoring faculty members. Each year as we gather updates from students on the impact of the GRSP, I am always very impressed by the accomplishments and how the program has affected their lives.

The updates tell us that several are serving as assistant professors, research scientists, computational scientists, testing engineers, or continuing their education towards a Ph.D.

Our GRSP presenter at the December 2019 meeting of the Alabama Commission on Higher Education is Ryan Gott, a GRSP recipient from Rounds 13 and 14. Ryan earned his BS and MS degrees in Aerospace Engineering at UAH and is now studying atmospheric plasmas while pursuing his Ph.D. at UAH.

I know you join me is wishing all GRSP students much success in their chosen professions. I encourage you to take a few minutes to review the wonderful array of GRSP research and career paths and see how the GRSP has impacted our students, our institutions, and our state. Alabama's GRSP is an investment in Alabama's future.

Sincerely,

Chris M. Lawson

Chris Lawson, Ph.D.
Alabama EPSCoR Executive Director
Chair, EPSCoR/IDeA Coalition Board
Department of Physics, University of Alabama at Birmingham

Overview

The Alabama Experimental Program to Stimulate Competitive Research (ALEPSCoR) Graduate Research Scholars Program (GRSP) was established in 2006 by the Alabama State Legislature through a $1 million increase in a line item appropriation to the Alabama Commission on Higher Education, fiscal agent for funds to the ALEPSCoR Program. The intent of the legislative funding is three-fold: 1) to strengthen and enhance the research capacity of ALEPSCoR institutions[1] by positioning them to be more competitive in attracting eminent senior faculty, 2) to retain for Alabama the best and brightest graduate students for careers in disciplines related to science and engineering, and 3) to address the economic need for highly trained professionals to ensure the growth of emerging technology companies in this state.

Initially GRSP funding was targeted to support graduate students associated with the four (4) Centers of Excellence funded by the National Science Foundation (NSF) EPSCoR Infrastructure Improvement Award (RII-2). In FY 2007-08, the program was expanded to include qualified students at all ALEPSCoR universities whose proposed research or field of study and career interests are congruent with the funded science and technology EPSCoR programs of the National Science Foundation (NSF), Department of Energy (DOE), National Aeronautics Space Administration (NASA), U.S. Department of Agriculture (USDA), and the Environmental Protection Agency (EPA).

The success of Alabama's long term commitment to promoting the education and careers of its most talented graduate students cannot be overstated. Since 2006, the Legislature has appropriated over $10.8 million in support of the GRSP. As of December 2019 more than 307 students have been recipients of 549 awards, with a number of students benefitting from multi-year full and partial awards. This support has led to the achievement of 187 Ph.D. and 65 Master's degrees.

The highly competitive process includes the circulation of a Request for Proposals, rigorous internal institutional review and ranking of applications, and selection by members of a peer review team which makes recommendations for final awards. The fourteenth round of competition was conducted April-May 2019. Of the 67 applications, 42 awards were granted which included 25 new GRSP recipients.

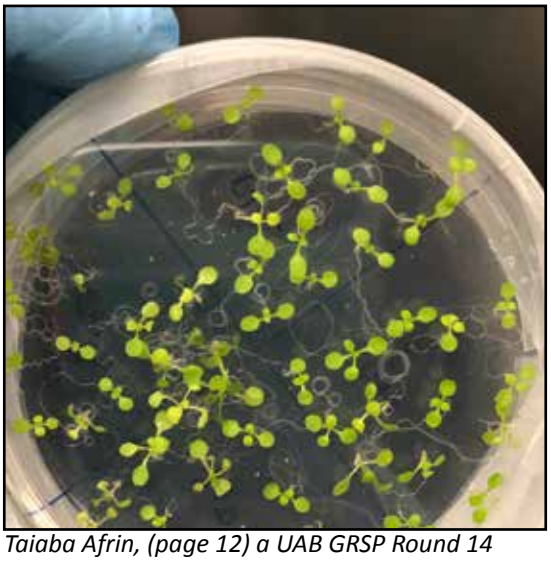
[1]Alabama A&M University, Auburn University, Tuskegee University, The University of Alabama, University of Alabama at Birmingham, University of Alabama in Huntsville, and University of South Alabama. In May 2018 Alabama State University became a member of Alabama EPSCoR and participated in the Round 14 competition in 2019.

Rounds 1-14 Degrees Achieved/Expected

	MA/MS	PhD
2007	1	1
2008	6	9
2009	8	10
2010	4	21
2011	7	25
2012	2	11
2013	4	15
2014	7	15
2015	7	16
2016	3	23
2017	5	17
2018	6	13
2019	5	11
	65	**187**
2020	3	22
2021	3	12
2022		7
2023		3
	71	231

MA/MS Degrees by Subject 2007-2019

1	Aerospace Engineering
1	Animal Science
1	Anthropology
1	Basic Medical Sciences
1	Bioengineering, Computer Science
8	Biological Science
5	Chemical Engineering
1	Chemistry
1	Electrical and Computer Engineering
1	Electrical Engineering
1	Environmental and Civil Engineering
2	Environmental Engineering
1	Environmental Science
1	Forestry
18	Materials Engineering
11	Mechanical Engineering
1	Natural Resources, Environmental Studies
7	Physics
1	Plant and Soil Science
1	Wildlife
65	



Taiaba Afrin, (page 12) a UAB GRSP Round 14 Awardee, is researching plants and has prepared a sample of baby Arabidopsis in a petridish for heat stress.

PhD Degrees by Subject 2007-2019

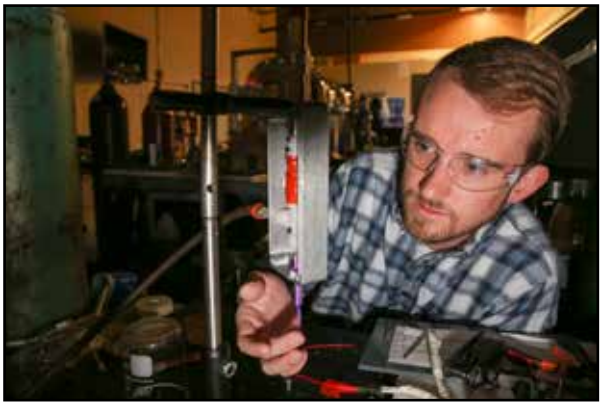
2	Aero Space Eng and Mechanics
1	Agriculture and Environmental Sciences
1	Air Quality and Land Use Change
1	Analytical Chemistry
1	Applied Physics
2	Basic Medical Sciences
3	Biochemistry
1	Biochemistry and Molecular Biology
1	Bioengineering, Biology, Chemistry
1	Bioengineering, Chemistry, Life Sciences
9	Biological Science
4	Biomedical Engineering
1	Biomedical/ Biotechnology
1	Bio-Nanocomposite Materials
1	Bio-Nanotechnology, Materials Science
1	Biosystems Engineering
1	Biotechnology
1	Biotechnology Science and Engineering
1	Cellular and Molecular Biology
9	Chemical Engineering
6	Chemical and Biological Engineering
7	Chemistry
2	Civil and Environmental Engineering
2	Civil Engineering
1	Civil, Construction and Environmental Engineering
2	Computer Science
1	Computer Science and Software Engineering
1	Drug Delivery
1	Educational Research
8	Electrical and Computer Engineering
4	Electrical Engineering
1	Electrochemical Engineering
1	Energy, Fuel Cells
1	Engineering Science and Mechanics
1	Entolomology/Microbiology
2	Fish Genomics
1	Food Science
1	Forestry
3	Inorganic Chemistry
1	Integrative Animal Behavior
9	Material Science
1	Materials Engineering
26	Materials Science and Engineering
1	Materials Science, Physics
1	Mathematics
2	Mechanical and Aerospace Engineering
11	Mechanical Engineering
1	Mechanical Engineering/Manufacturing
1	Mechanical Engineering/Materials Processing
5	Metallurgical and Materials Engineering
2	Microbiology
2	Molecular Biology
1	Neuroscience
3	Optical Science and Engineering
23	Physics
1	Polymer and Fiber Engineering
1	Space Science
2	Structural Biology
2	Veterinary Biological Sciences
1	Veterinary Medicine
1	Wildlife
187	

Ryan Gott
University of Alabama in Huntsville
Recipient, Rounds 13 and 14
NSF EPSCoR Track 1, # 1655280
Expected graduation in 2021; Ph.D. in Aerospace Engineering
Ryan.Gott@uah.edu

Ryan Gott was raised in Bowling Green, Kentucky where he graduated from the Gatton Academy of Mathematics and Science in 2013. He received his B.S. and M.S. degrees in Aerospace Engineering from the University of Alabama in Huntsville (UAH) in 2016 and 2018, respectively. His current research interests include the study of atmospheric plasmas and their applications to plant, water, and biomaterial treatments. During his undergraduate studies, Ryan worked for Boeing on the Space Launch System. After graduation, he interned for Plasma Processes working on microthrusters for small satellites. Recently, he spent 3 months at Sandia National Labs studying a plasma diagnostic technique known as Laser Collision Induced Fluorescence.

Ryan was a teaching assistant in 2016 and has been a research assistant with Dr. Gabe Xu in the UAH Plasma and Electrodynamics Research Lab since 2017. He began his graduate work studying a microplasma device with use as a cathode for electric propulsion. This work evolved into atmospheric plasma studies with a focus on environmental applications. His work on water purification led to his award of the GRSP fellowships in Rounds Thirteen and Fourteen.

Ryan and Dr. Xu have collaborated with numerous universities as part of Alabama EPSCoR's NSF Track 1 CPU2AL Grant program. These collaborations have led to the development of several novel plasma devices and the treatment of a variety of plants, water, and other biomaterials. The research group is currently working on ways to improve plasma-based treatments to increase efficiency and expand applications.



Ryan is pursuing his Doctorate in Aerospace Systems Engineering at UAH where he continues to work on plasma-based water purification. His time during his graduate program funded by the EPSCoR Graduate Research Scholars Program has enriched his graduate studies and allowed him to fully explore this exciting and promising research.

Alabama EPSCoR
Graduate Research Scholars Program

Featured Scholars

Round Fourteen Awardees are comprised of new and renewing students. A list of new awardees is below followed by short biographical sketches. A list of Renewing Round 14 awardees can be found on Page 36 with short updates beginning on page 38. Short updates on previously funded students begins on page 48.

New Round 14 GRSP Awardees				
Name	Inst	Target Degree	EPSCoR funding	Subject Area
Kiran Adhikari	UAB	PhD	NSF 1655280	Materials Science & Engineering
Taiaba Afrin	UAB	PhD	NSF 1350244	Biology
Sajid Ahmed	UA	PhD	NSF 1655280	Aerospace Engineering
Syed Salman Ahmed	TU	MS	NSF 1827690	Materials Science & Engineering
Miles Blanchet	AU	PhD	NSF 1809847	Physics
Chance Boudreaux	UA	PhD	NSF 1800214	Chemistry
Alex Bredar	AU	PhD	NSF 1809847	Chemistry
Stephanie Bulls	USA	MS	NSF 1833065	Biology
Ashlyn Burch	UAB	PhD	DOE SC0019137	Physics
Katherine Clohan	AU	PhD	DOE SC0018011	Chemistry /Biochemistry
Taylor Davis	UAB	PhD	NSF 1632881	Neurobiology
Lam Duong	AAMU	PhD	NSF 1655280	Biological & Environmental Engineering
Carson Graves	USA	MS	NASA NNX16AT47A	Chemical Engineering
Joshua Hall	AU	PhD	NSF 1564563	Biology
Zabed Iqbal	UAH	PhD	NSF 1653915	Electrical & Computer Engineering
Shardai Johnson	TU	PhD	NSF 1655280	Materials Science & Engineering
Hoque Nabil	UAH	PhD	NASA 80NSSC19M0033	Physics & Astronomy
Pinaki Nakod	UA	PhD	NSF 1604677	Chemical Engineering
Ayodeji Oludare Ipinmoroti	ASU	PhD	NSF 1241701	Microbiology
Sharvare Palwai	AAMU	PhD	NSF 1828729	Physics
Gabrielle Prince	USA	MS	NSF 1738564	Biology
Michael Russell	USA	MS	NSF 1738564	Biology
Irene Sanchez-Gonzalez	UA	PhD	NSF 1831512	Biology
John Schoelz	UAB	PhD	NSF 1552586	Biology
Md Tanmoy	USA	MS	NSF 1833016	Electrical Engineering

Kink-Resistant and Plasma Modified Vascular Grafts with In-vitro Arterial Pulse Sensing

Kiran Adhikari
University of Alabama at Birmingham
Round 14 Recipient
NSF EPSCoR Track 1 # 1655280; Center for Nanoscale Materials and Biointegration
Expected graduation in 2020, Ph.D .in Physics
kiranraj@uab.edu, kiranrajadh@gmail.com

Objective

To combine electrospinning and additive manufacturing techniques to develop and characterize kink-resistant vascular grafts. Also, integrate capacitance-based circuits to develop functional arterial pulse sensing technology.

Research Abstract

- Cardiovascular diseases (CVD) are major causes of death in the United States, treatment often requires the replacement of existing vessels in the body.
- In small-diameter vascular graft replacements, the high failure rate is attributed to a mechanical mismatch between existing vessels and the replacement graft. Also, long, small diameter grafts are prone to develop kinks and physically occlude blood flow.
- This research focuses on the development of kink-resistant vascular grafts combining two techniques, namely electrospinnng and 3D printing which has required mechanical properties.
- Surface modification by low temperature plasma to enhance the biocompatibility.
- Fabricate in vitro pulse sensing circuit for early detection of the arterial blockage.

List of Recent Publications/Presentations/ Honors

1. Adhikari, K.R., Tucker, B., Thomas, V., Chapter 'Tissue Engineering of Small Diameter Vascular Graft', Biointegration of Medical Implant Materials (second edition), Editor Chandra P Sharma, Elsevier, 2019

2. Poster presentation titled 'Enhanced Mechanical Characteristics of PET/PU Electrospun Vascular Grafts with Additive Manufacturing Reinforcement for Vascular Graft Applications' at UAB summer expo, July 2019, Birmingham AL
3. Oral presentation at 85th SESAPS on 'Fabrication and Characterization of Electrospun Vascular Graft from Polymer Blends', Nov 2018, Knoxville, TN
4. CVBE (Cardiovascular Bioengineering) symposium 2018, University of Alabama at Birmingham, AL
5. Poster presentation at 'Comprehensive Cardiovascular Center 7th Annual Symposium Focus on Heart Failure', Sept 2018, Birmingham, AL
6. Poster presentation at Materials in STEM(M-STEM), November 2018, Birmingham, AL

What inspired you to continue graduate education and/ or pursue research? Why this particular research topic?

Learning new things and acquiring in-depth knowledge in a variety of topics has always attracted me. I also love being a part of the scientific community who devote their lives to improving the understanding of nature and developing solutions to problems faced by humanity. The multidisciplinary nature of this research which requires a knowledge and the collaboration between the wide variety of scientific fields from physics to chemistry and from materials science to biomedical sciences attracted me the most. Moreover, this research topic has the potential to help improve treatment for millions of lives.

Future Plans

I would like to continue the life of the researcher. This could involve academic or industrial research and development.

Faculty Advisor

Dr. Vinoy Thomas
Materials Science and Engineering
University of Alabama at Birmingham
Business and Engineering Complex
1150 10th Ave S, Birmingham, AL 35294
205-975-4098/ vthomas@uab.edu

Elucidating the role of the pro-survival to pro-death molecular switch in the IRE1a signaling pathway in *Arabidopsis thaliana*

Taiaba Afrin
University of Alabama at Birmingham
Round 14 Recipient
NSF EPSCoR Co-funding, Grant No. 1350244
Expected graduation in 2022; Ph.D. in Plant Molecular Biology
taiaba@uab.edu

Objective
To understand the regulatory mechanism of microRNA 5658 and how this regulation impacts overall ER stress-mediated immune response of plants.

Research Abstract
- In the face of explosive population growth and decrease of arable land, humans will likely face a global food crisis by year 2050.
- Global warming escalates the concurrence of a number of biotic and abiotic stresses and adversely impacts plant growth, especially crop production.
- Endoplasmic Reticulum (ER) is a cellular organelle that plays a very important role in stress sensing.
- Through this project, we seek to understand the regulatory mechanisms of ER stress sensor IRE1a and its role in plant stress resilience.

List of Recent Publications/Presentations/ Honors
1. Afrin T, Diwan D, Sahawneh K and Pajerowska-Mukhtar KM. 2019. Multilevel Regulation of Endoplasmic Reticulum Stress Responses in Plants: Where Old Roads and New Paths Meet. J Exp Bot. (submitted).
2. Liu X, Afrin T, Pajerowska-Mukhtar KM. 2019. Arabidopsis GCN2 kinase contributes to ABA homeostasis and stomatal immunity. Commun Biol 2, 302.
3. Oral Presentation at Southern Section of American Society of Plant Biology Conference, Clemson, South Carolina, March 16-18, 2019.
4. Travel grant for Southern Section of American Society of Plant Biology (SS-ASPB) Conference, 2019 from Department of Biology, UAB
5. Oral Presentation at Southern Section of American Society of Plant Biology Conference, New Orleans, LA, March 24-26, 2018.
6. Travel grant for Southern Section of American Society of Plant Biology (SS-ASPB) Conference, 2018 from Department of Biology, UAB
7. Blazer Graduate Research Fellowship, UAB (2017-2018)

What inspired you to continue graduate education and/ or pursue research? Why this particular research topic?
I am from a country based on an agricultural economy. The focus of the research is to increase yield by overcoming the biotic and abiotic stresses, which is in line with the global goal for the plant research community to feed the future population. My mentor focuses on understanding the mechanisms of ER-mediated stress responses and how to imply the knowledge gained from the Arabidopsis model plant for improving the crop quality and quantity, which perfectly aligns with my long-term scientific interests.

Future Plans
After graduation, I would like to continue my research in either academia or a research-based industry.

Faculty Advisor
Dr. Karolina Mukhtar
Department of Biology
University of Alabama at Birmingham
Campbell Hall, 1300 University Blvd.
Birmingham, Alabama 35233
(205) 934-8340
kmukhtar@uab.edu

Numerical Study of Unsteady Electromagnetic Fields Using the CESE Method

Sajid Ahmed
University of Alabama
Round 14 Recipient
NSF EPScoR Track 1, Grant #1652280
Expected graduation in 2022, Ph.D., Aerospace Engineering
sahmed5@crimson.ua.edu, sajid102@gmail.com

Objective

The objectives are to develop and validate a numerical solver for the Maxwell's equations using the space-time conservation element solution element (CESE) method and apply it to the simulation of an electromagnetic field around an electric propulsion system.

Research Abstract

- Solving the Maxwell's equations is required to describe the electromagnetic field in any system.
- Numerical accuracy is a concern for the currently existing Maxwell solvers, especially while dealing with the unsteady electromagnetic waves.
- The availability of an accurate multi-dimensional Maxwell's equation solver can improve the fidelity of simulating and understanding the plasma properties around and ion thruster of a space propulsion system.
- The use of the space-time conservation element solution element (CESE) method for solving the Maxwell equation can achieve good numerical accuracy and robustness with various mesh topologies.

List of Recent Publications/Presentations/ Honors
Poster Presentations

"Towards Modeling and Simulation of Low-Temperature Plasma for Ion Thruster" Chen, K-L, Ahmed, S., Cheng, G. C., Branam, R., CPU2AL Annual Meeting, 2019.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?

From my childhood, I am a great fan of sci-fi stories and the scientists were always heroes to me. I have always wanted to be a scientist and do research. Graduate education is the most suitable platform to learn how to do research. Electromagnetic rocket propulsion systems have a very bright future and I believe this will open the doorway to interstellar travel. Understanding electromagnetic interactions in plasma is a key component to this discipline. That gives me the urge to do research on this topic.

Future Plans

In the future, I want to pursue a position either as a faculty member or as a research scientist at a renowned university or organization.

Faculty Advisor

Dr. Gary C. Cheng
Aerospace Engineering and Mechanics
The University of Alabama
212 Hardaway Hall
P.O. Box 870280
Tuscaloosa, AL 35487
205-348-3327
gary.cheng@eng.ua.edu

Tribological and Corrosion Properties of Polymer Coated Metal Nanocomposites

Syed Salman Ahmed
Tuskegee University
Round 14 Recipient
NSF EPSCoR Co-funding grant #1827690
Expected graduation in 2021, M.S., Materials Science and Engineering
ssyed9358@tuskegee.edu

Objective
The aim of this research is to investigate the nanomechanical and nanowear properties of polyetherimide (PEI) composites reinforced with zinc titanate nanoparticles.

Research Abstract

- Metal components suffer due to wear, friction and corrosion issues, and if not noticed or addressed can cause dangerous unfortunate situations. In recent years, researchers have coated polymers on metals to address these issues.
- In our initial studies, we have also used a high temperature polyetherimide (PEI) polymer reinforced with zinc titanate (ZnTiO3) nanoparticles that has significantly increased the hardness and stiffness of the material and reduced wear.
- In the proposed study, we plan to extend this study and perform a comprehensive investigation by coating the ZnTiO3 added PEI on several commonly used metals in such applications, and perform the tribological (wear, scratch, friction) and corrosion characterization.
- We expect to thoroughly understand the behavior of these materials which can possibly reduce/resolve the above issues, and ultimately be used for large scale applications.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
I wanted to pursue graduate studies to gain knowledge about the interacting surfaces of machine parts in relative motion. Additionally, I also wanted to do research on friction, lubrication and wear properties through which the performance of machines can be greatly enhanced and potential hazards can be drastically reduced.

Future Plans
After completing my Master's, I plan on pursuing a Ph.D. in the same field.

Faculty Advisor
Dr. Shaik Zainuddin
Associate Professor
Department of Materials Science and Engineering
Tuskegee University
103 Chappie James Center
Tuskegee, Alabama 36088
334-724-4222
szainuddin@tuskegee.edu

Study of Catalytic Thin Film Metal Oxides

Miles Blanchet
Auburn University
Round 14 Recipient
NSF EPSCoR Co-funded Award # 1809847
Expected graduation in 2020, Ph.D., Physics
mdb0058@auburn.edu

Objective
To perform experimental data analysis on thin films of catalytically interesting metal oxide materials in order to characterize and study their physical properties. The research contributes to the existing body of knowledge on the materials, but it also supports my research group's broader goals of combining them into systems for performing full oxygen reaction catalysis, an important process in clean energy research.

Research Abstract
- The realization of clean alternative energy sources is critical to a thriving society.
- An active research area making strides towards alternative energy sources is in material systems that perform oxygen reaction catalysis, a process for future metal-air batteries, water splitting and fuel cell technologies.
- There exists many materials that, when combined, will perform this full catalysis, and my research group is working to develop such material systems using inexpensive metals as the components.
- A thorough understanding of the properties of these materials is important for our group's goals.
- To this end, my research focuses on characterizing the physical properties of the materials my group uses in developing those material systems for full oxygen reaction catalysis.

- Samples of the materials are grown in our laboratory at Auburn University, and they are studied using a variety of experimental techniques taking place both on campus and around the country.

List of Recent Publications/Papers/Presentations/ Honors
Alexandria R. C. Bredar, Miles D Blanchet, Ryan B. Comes, Byron H. Farnum, "Evidence and Influence of Copper Vacancies in p-Type CuGaO2 Mesoporus Films" Applied Energy Materials 2, 19 (2019)

American Physical Society March Meeting 2019 – Boston, MA
"Electronic and Catalytic Behavior of Mn-based Spinels Grown by Molecular Beam Epitaxy"

Electronic Materials and Applications 2019 – Orlando, FL
"Electronic and Catalytic Behavior of Mn-based Spinels Grown by Molecular Beam Epitaxy"

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
I worked in the semiconductor industry as a technician immediately after my undergraduate education. I eventually desired greater fulfillment from my work and knew that a graduate degree would lead to that fulfillment. Condensed matter physics seemed the ideal choice for me, especially with my industry background.

Future Plans
After attaining my degree, I would like to return to industry, maybe the same semiconductor industry I was previously involved in. This time, I would have a better understanding of what's going on. I may also choose to continue academic research.

Faculty Advisor
Dr. Ryan Comes
Physics Department
Auburn University
Auburn, Alabama 36849
334-844-3641
ryan.comes@auburn.edu

Synthesis of Metal Complexes for Photocatalytic CO_2 Reduction

Chance Boudreaux
University of Alabama
Round 14 Recipient
NSF EPSCoR Co-funding, Award # 1800214
Expected graduation in 2021, Ph.D., Chemistry
cboudreaux@students.ua.edu

Objective
The project objective is to continue investigating the selective photoactivation of carbon dioxide to obtain a more efficient carbon fuel cycle, with respect to the current fuel infrastructure.

Research Abstract
Photosynthesis is an important process in the energy cycle of living beings. It stores solar energy within a chemical species, glucose, which ultimately becomes the energy that powers most processes in living beings. The current fuel infrastructure, combustion of carbon fuels, produces carbon dioxide as the main product. With current scientific knowledge, the activation of carbon dioxide is not industrially feasible. However, much like photosynthesis in plants, an industrial solar powered reduction of carbon dioxide to carbon monoxide would store solar energy into a chemical species. Carbon monoxide can be used in an industrial scale process, known as the Fisher-Tropsch process, to produce carbon fuels; such as diesel and gasoline. Therefore, converting the current fuel infrastructure into a renewable cycle. This research will systematically investigate the properties of a system required to do such a feat. The end goal of which will be a solar powered battery that will create carbon monoxide and oxygen in the process; therefore, converting the current fuel infrastructure into a renewable carbon neutral cycle through an artificial photosynthesis mimic.

List of Recent Publications/Presentations/ Honors
Boudreaux, C. M.; et al. Chem. Comm. 2017, 53, 11217-20
Rodrigues, R. R.; et al. ACS Appl. Energy Mater. 2019, 2, 37-46
Das, S.; et al. Inorgo. Chem. 2019, 58, 8012-20

Boudreaux, C. M.; et al. ACS National 2018, New Orleans
Boudreaux, C. M.; et al. Feeding and Powering the World 2017, Oxford

Graduate Assistance in Areas of National Need Fellowship, Jan. 2017-May 2018

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
For my graduate degree, I focused on finding a project that would suit my interest in organometallic chemistry particularly with ligand design and catalyst. This project fits my chemical interest with an important goal as well for our country and world by lowering our dependence on fossil fuels.

Future Plans
After completion of my PhD, I will seek opportunities to continue utilizing my research background in catalyst for solving key issues in energy.

Faculty Advisor
Dr. Elizabeth T. Papish
Department of Chemistry and Biochemistry
University of Alabama
Shelby Hall, 250 Hackberry Lane
Tuscaloosa, AL 35401
(205) 348-5822
etpapish@ua.edu

Terahertz Magneto-spectroscopy: Characterization of Cuprates and Nickelates

Ashlyn Damaris Burch
University of Alabama at Birmingham
Round 14 Recipient
DOE EPSCoR State Lab Partnership Grant # DE-SC0019137
Expected graduation in 2020, Ph.D., Physics
ashbur@uab.edu

Objective
Using terahertz spectroscopy under magnetic field, we will do a comparative characterization study of high-Tc superconducting lanthanum strontium copper oxide (LSCO) and the non-superconducting lanthanum strontium nickel oxide (LSNO) materials. We use this experimental technique to directly measure the material response to external electric and magnetic stimuli on ultrafast time scales.

Research Abstract

- Optical pump – THz probe spectroscopy is a unique method that uses frequencies on the order of 1012 Hz to probe a material's electronic response to external incident light.
- By placing this system under an external magnetic field, we can answer fundamental questions about the origin and persistence of superconductivity in these materials.
- This research on high transitional temperature superconductors has applications in medical, industrial, and other scientific realms, especially those requiring alternatives for more cost-efficient cryogenic cooling.

List of Recent Publications/Presentations/ Honors
Publications

- Jeremy A. Curtis*, Ashlyn D. Burch*, Biplob Barman, A. Garrison Linn, Luke M. McClintock, Aidan L. O'Beirne, Matt J. Stiles, John L. Reno, Stephen A. McGill, Denis Karaiskaj, and David J. Hilton, "Broadband Ultrafast Terahertz Spectroscopy in the 25 Tesla Split-Florida Helix," Review of Scientific Instruments 89, 073901 (2018). *indicates co-first authorship
- Ashlyn D. Burch, Jeremy A. Curtis, Biplob Barman, A. Garrison Linn, Luke M. McLintock, Aidan L. O'Beirne, Matthew J. Stiles, John. L. Reno, Stephen A. McGill, Denis Karaiskaj, and David J. Hilton, "Ultrafast Time-Domain Spectrometer in the 25 T Split Florida-Helix Magnet," in Conference on Lasers and Electro-Optics, OSA Technical Digest (Optical Society of America, 2019), paper STu4F.1.
- 2019 CINT Annual Meeting in Santa Fe, NM (poster)
- 2019 Optical Terahertz Science and Technology conference in Santa Fe, NM (talk) "Using THz Spectroscopy to Study Non-Equilibrium Dynamics in MoS2 with the 25 T Split Florida-Helix"
- 2019 APS March Meeting in Boston, MS (talk) "Excitation Dynamics of MoS2 Using Optical Pump-THz Probe Magneto-spectroscopy," Abstract: http://meetings.aps.org/Meeting/MAR19/Session/C33.4
- 2018 CINT Annual Meeting in Santa Fe, NM (poster)
- Recipient, DOE Office of Science Graduate Student Research award, 2018

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
When I first walked into my first physics classroom as an undergraduate freshman, I knew that I wanted to continue with graduate education and pursue a life of research. I loved being challenged, and physics was one of the topics that I found the most interesting and motivating with its endless questions. Beyond just a pure personal interest in the material, I pursued condensed matter physics specifically because of how the research was directly applicable to society. These applications range from better developing electronics to finding alternative efficient materials for use in medical and industrial fields. I found studying these various material systems using THz spectroscopy under magnetic fields particularly challenging. They required extensive flexibility and creativity in engineering experimental techniques and layouts.

Future Plans
Upon graduation, I plan to complete a post-doc term at a national laboratory, preferably at the Center for Integrated Nanotechnologies at Sandia National Laboratories or Los Alamos National Laboratories.

Faculty Advisor
Dr. David J. Hilton
Physics Department
University of Alabama at Birmingham
Campbell Hall, Rm. 310
1300 University Blvd.
Birmingham, AL 35233
205.934.4736
dhilton@uab.edu

Examining the Methyl-Arginine Post-Translational Modification in Methyl Coenzyme-M Reductase

Katherine Clohan Glasaway
Auburn University
Round 14 Recipient
DOE EPSCoR Award # DE-SC0018011
Expected graduation in 2021, Ph.D. in Chemistry and Biochemistry
kgc0025@auburn.edu; katherineclohan@gmail.com

Objective
The enzyme methyl coenzyme-M reductase (Mcr) is responsible for methane production in anaerobic organisms. Mcr has a unique methyl-arginine post-translational modification, and this study will examine the role of this modification in the enzyme.

Research Abstract
- Methanogens are microorganisms that produce methane while living in oxygen-free environments, which can include rice paddies, the gut of a cow, or even soil.
- The growth of the agricultural world has led to an increase in the amount of atmospheric methane, which traps heat in the atmosphere and contributes to global climate change.
- One of Mcr's post-translational modifications is a methylated arginine residue near the active site; the purpose of this modification for the enzyme is unknown.
- The long-term goal of this research is the reduction of methane produced, whether that be through inhibition of the enzyme, or the conversion of methane into a useable biofuel through the oxidation of methane.
- Knowing how structure of Mcr enables it to produce methane is important, as both of these goals depend on this knowledge.

List of Recent Publications/Presentations/ Honors
Katherine Clohan, Zhe Lyu, Chau-wen Chou, Hao Shi, Ricky Patel, Robel Ghebreab, Evert C. Duin, William B. Whitman. Methanogenesis Marker Protein 10 Required for Methylation of the Arginine at the Active Site of Methyl Coenzyme-M Reductase of Methanococcus Maripaludis. Presented at the GRC Molecular Basis of Microbial One-Carbon Metabolism, Newry, ME, July 29-August 3, 2018.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
As an undergraduate biology major, I discovered that I loved chemistry and how it explained everything in biology. I came to graduate school to get an even deeper understanding of how chemistry works within living systems. I was first attracted to this research by the challenge of working with anaerobic organisms and grew to enjoy it even more when I saw how imperative this research was.

Future Plans
I love teaching and finding ways to help students understand chemistry, so I want to go into academia once I am finished with my PhD.

Faculty Advisor
Dr. Evert Duin
Department of Chemistry & Biochemistry
Auburn University
179 Chemistry Building
Auburn, AL 36849-5312
334-844-6072
duinedu@auburn.edu

The role of urbanization in the establishment and spread of invasive species

Joshua Hall
Auburn University
Round 14 Recipient
NSF EPSCoR Co-funding Award, # 1564563
Expected graduation in 2019, Ph.D., Chemistry
jmh0131@auburn.edu

Objective
I will utilize brown anole lizards (Anolis sagrei) to assess how urban environments enhance reproduction in an urban-exploiting invasive species. This work will bolster our general understanding of the influence that urbanization has on wildlife and specifically determine how enhanced reproduction in urban areas affects the successful establishment of invasive ectotherms.

Research Abstract

- Invasive species are introduced to new areas by humans through port cities; thus, species that quickly adapt to urban habitats are likely to establish and spread.
- Understanding why invasive species thrive in cities would help reduce their numbers, prevent future introductions, and reduce associated economic costs.
- By studying reproduction in invasive lizards from city and natural habitats, I will determine how urbanization enhances lizard reproduction, which increases the probability of invasion success.
- Many destructive invasive species are reptiles; thus, my research will inform management practices that help prevent the spread of multiple harmful species.

List of Recent Publications/Presentations/ Honors
Publications:

- Tiatragul S, Hall JM, Pavlik NG, and Warner DA. 2019. Lizard nest environments differ between suburban and forest habitats. The Biological Journal of the Linnean Society, 126(3), 392-403.
- Mitchell TS, Hall JM, and Warner DA. 2018. Female investment in offspring size and number shifts seasonally in a lizard with single-egg clutches. Evolutionary Ecology, 32 (2-3), 231-245.
- Hall JM, Buckelew A, Lovern M, Secor SM, and Warner DA. 2018. Seasonal shifts in reproduction depend on prey availability for an income breeder. Physiological and Biochemical Zoology, 91(6), 1129-1147.
- Hall JM and Warner DA. 2018. Thermal spikes from the urban heat island increase mortality and alter physiology of lizard embryos. Journal of Experimental Biology, 221(14), jeb181552.
- Hall JM and Warner DA. 2017. Body size and reproduction of a non-native lizard are enhanced in an urban environment. The Biological Journal of the Linnean So

- Harry Merriwether Fellowship, Auburn University, 2019
- Margaret McNeal Arant Award for Outstanding Achievement in Zoology, Auburn University, 2018
- Best Student Presentation, Zoology, Tennessee Academy of Science, 2018
- Best Student Presentation, Tennessee Herpetological Society Annual Meeting, 2018

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
I've been obsessed with knowledge since I was a young boy and have always loved reading about and learning new things. In college, I developed a curiosity for the natural world and decided to get a PhD in biology. Prior to starting my PhD, I spent several years teaching high school biology. During this time, I learned that a passion for learning could be contagious and passed on to future generations through teaching. Once my PhD is completed, I plan to return to teaching in some capacity so that I can continue to inspire future generations of students to become lifelong learners.

Future Plans
After my PhD, I will continue in academia, eventually achieving the position of professor. In this position, I will work alongside land-management and conservation professionals to prevent the establishment and spread of invasive species and conserve the rich biodiversity of the southeastern United States.

Faculty Advisor
Dr. Daniel Warner
Department of Biological Sciences
Auburn University
101 Rouse Life Sciences Building
Auburn, AL 36849
(334) 844-4999
daw0036@auburn.edu

Grating Lobe Reduction in Scanning Phased Array Antennas with Large Element Spacing

Zabed Iqbal
University of Alabama in Huntsville
Round 14 Recipient
NSF EPSCoR Co-funding, # 1653915
Expected graduation in 2020, Ph.D., Electrical Engineering
zi0003@uah.edu; zabed.uah@gmail.com

Objective
The aim of this research is to mitigate the grating lobe issues in wide-angle scanning phased array antennas with large element spacing.

Research Abstract
- Phased array antenna is an array of antenna elements, capable of shaping its radiation patterns and electronically steering its main beam through controlling the relative magnitude and phase of each antenna element.
- Currently there are several challenges for successful realization of a wide-angle scanning phased array antenna with large element spacing. The grating lobe issue is the most critical and one of the main challenges in the design and implementation of such state-of-the-art phased array antennas.
- As a result, it is highly desirable to develop a novel method to reduce the grating lobes in phased array antennas with large element spacing, using low profile and reconfigurable antenna elements. Potential applications of the proposed phased arrays include, but not limited to, radar, millimeter-wave communications, satellites, unmanned vehicle systems, and remote sensing.

List of Recent Publications/Presentations/ Honors
- Z. Iqbal and M. Pour, "Exploiting higher order modes of patch antennas for wide-angle scanning arrays," IEEE Transactions on Antennas and Propagation, DOI: 10.1109/TAP.2019.2934822, Aug 2019.
- Z. Iqbal and M. Pour, "Null steering with amplitude control in multi-mode circular microstrip patch antenna," Progress in Electromagnetics Research, vol. 82, 107-112, 2019.
- M. Pour, M. Henley, A. Young, and Z. Iqbal "Cross-polarization of offset reflector antennas with microstrip primary feeds," IEEE Antennas and Wireless Propagation Letter, vol. 18, no. 5. Pp. 926-930, May 2019.
- Z. Iqbal and M. Pour, "Grating lobe reduction in scanning phased array antennas with large element spacing," IEEE Transactions on Antennas and Propagation, vol. 66, no. 12, pp. 6965-6974, Dec 2018.
- Z. Iqbal and M. Pour, "A modified-binomial linear array with reduced grating lobes and one-wavelength element spacing" IEEE Antennas and Propagation Society (APS/URSI) International Symposium, Atlanta, GA, July-2019.
- Z. Iqbal and Z. A. Pour "A pattern reconfigurable antenna with full hemispherical null steering," Poster presentation in CPU2AL Science and Technology Open House, Mobile, AL, April-2019.
- Z. Iqbal and M. Pour "Addressing grating lobes in wide-angle scanning phased array antennas," Poster presentation in CPU2AL Science and Technology Open House, Montgomery, AL, Sept-2018.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
My strength in quantitative and analytical abilities instilled in me a special attention towards Mathematics and Physics which actually driven me to pursue graduate studies in the field of Electrical Engineering, particularly in Applied Electromagnetics, which is the direct implication of mathematical modelling, numerical analysis, fabrication and testing.

Future Plans
Upon completion of my doctoral program, I plan to pursue a career as an antenna/applied electromagnetics researcher either in an industry or an educational institute.

Faculty Advisor
Dr. Maria Pour
Department of Electrical and Computer Engineering
The University of Alabama in Huntsville
301 Sparkman Drive, Engineering Building, Room 217C
Huntsville, AL 35899
256.824.5431
maria.pour@uah.edu

Study of Low Temperature Plasma on Nanocrystalline Carbon Derived From Spent Coffee Grounds by Pyrolysis

Shardai Johnson
Tuskegee University
Round 14 Recipient
NSF EPSCoR RII Track 1, # 1655280
Expected M.S. in 2019; Ph.D. in 2022, Materials Science and Engineering
sjohnson7582@tuskegee.edu; shardaisjohnson@yahoo.com

Objective
The purpose of this research is to study the tunability of carbon nanoparticles derived from spent espresso grounds with metal oxides and low temperature plasma (LTP).

Research Abstract

- Reclamation of environmentally detrimental biomass spent coffee grounds, into filler for commercially feasible plastic composites.
- Recovery of common waste plastics for reinforced filaments.
- Utilization of Low Temperature Plasma to improve interfacial bonding between carbon filler and recycled thermoplastics.

List of Recent Publications/Presentations/ Honors
Alliances for Graduate Education and the Professoriate-Transformation (AGEP)/ Tuskegee Alliance to Forge Pathways to STEM Academic Careers (TPAC) Scholar

What inspired you to continue graduate education and/ or pursue research? Why this particular research topic? I wanted to become an expert in my field as well as a professor in my discipline. I was inspired by my high school Honors Organic Chemistry teacher who also had her Master's. She was able to effortlessly facilitate concepts about materials and make it an entertaining experience.

Future Plans
From my experience and knowledge in nanoscale biomaterials, I would like to participate in R&D for military or environmental applications in Alabama. I would also like to pursue a role in academia focusing on mentorship.

Faculty Advisor
Dr. Vijaya K. Rangari
Dept. of Materials Science and Engineering
Tuskegee University
105 Chappie James Center
Tuskegee, AL 36088
(334) 724-4875
vrangari@tuskegee.edu

High-Resolution Fiber-Optic Sensing under Extreme Conditions

Nabil Md Rakinul Hoque
University of Alabama in Huntsville
Round 14 Recipient
NASA EPSCoR grant # 80NSSC19M0033
Expected graduation in 2021, Ph.D., Optical Science and Engineering
nh0014@uah.edu; rakin66@gmail.com

Objective
The purpose of this research is to develop novel sensing concepts and techniques that can lead to high-resolution fiber-optic sensing up to 1000 °C.

Research Abstract

- Sensing under a harsh environment (high temperature, high pressure, corrosive conditions, etc.) has become one of the prime research interests in scientific and industrial fields.
- Fiber-optic sensors have proved to be a promising sensing device under extreme conditions due to the unique properties of optical fibers. But at the same time, while operating at high temperatures, the sensing resolution of fiber-optic sensors (e.g., fiber Bragg gratings) degrades. This restriction limits the use of such fiber-optic sensors in such extreme temperature conditions.
- The main objective of this research is to develop new fiber optic sensing concepts and scheme to address this problem and to demonstrate high-resolution fiber-optic sensing at up to 1000 °C.
- Federal agencies like NASA, The Department of Defense (DOD), The Department of Energy (DOE) are currently calling for next generation high resolution sensors for use in extreme conditions for their different projects such as NASA's potential landing missions to Mars and Venus, precise temperature measurements of jet engine exhaust required by DOD etc. These clearly indicate the importance of extreme-condition sensor development, which serves as the context for the proposed research.

List of Recent Publications/Presentations/ Honors

- N. M. R. Hoque and L. Duan, "Direct Frequency Locking of a Diode Laser to a Meter-Long High-Finesse Fiber Fabry-Perot Cavity," in Conference on Lasers and Electro-Optics (2019), paper SM1L.4, 2019, p. SM1L.4.
- Nabil. M. R. Hoque, T. Baruah, J. Ulises Reveles, and R. R. Zope, "Magnetic Anisotropy Energy of Transition Metal Alloy Clusters," in Clusters: Structure, Bonding and Reactivity, M. T. Nguyen and B. Kiran, Eds. Cham: Springer International Publishing, 2017, pp. 269–288.
- M. Wahadoszamen, A. Rahaman, Nabil. M. R. Hoque, A. I Talukder, K. M. Abedin, and A. F. M. Y. Haider, "Laser Raman Spectroscopy with Different Excitation Sources and Extension to Surface Enhanced Raman Spectroscopy," Journal of Spectroscopy, 2015. [Online]. Available: https://www.hindawi.com/journals/jspec/2015/895317/.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
The field of optical science mainly deals with the fascinating behavior of light which is one of the world's most exciting phenomenon with many research applications for the betterment of human life. Considering these aspects and to learn more deeply I have decided to continue my graduate education and perform PhD research in the field of optics.

Future Plans
I strongly believe that after completion of my PhD I will be able to get the opportunity to perform significant research in the field of optics in the future as a researcher with a university or company in Alabama.

Faculty Advisor
Dr Lingze Duan
Physics Department
The University of Alabama in Huntsville
301 Sparkman DR NW
Huntsville, Alabama 35899
256-975-0914
lingze.duan@uah.edu

Recapitulating the brain microenvironment in vitro to study its impact on the behavior of Glioblastoma stem cells (GSCs)

Pinaki Nakod
University of Alabama
Round 14 Recipient
NSF EPSCoR Co-funding, # 1604677
Expected graduation in 2021, Ph.D., Chemical and Biological Engineering
pnakod@crimson.ua.edu

Objective

To understand the impact of microenvironmental cues provided by the brain tumor on glioblastoma stem cells (GSCs) and associated drug resistance using in vitro biomimetic materials platform.

Research Abstract

- We engineer a three-dimensional hydrogel (Jell-O-like substance) which allows the incorporation of key features of the brain microenvironment. Integrating different microenvironment cues with biomimetic hydrogels can recapitulate the influence of these cues on GSC behaviors and can provide a realistic in vitro representation of the complex 3D in vivo tumor environment.
- Improved understanding of GSC behaviors using physiologically relevant hydrogel platform can be employed as a tool for anticancer drug screening prior to animal/clinical studies.

List of Recent Publications/Presentations

1. Nakod, P.S., Kim, Y., and Rao, S. S. (2019). Three-dimensional biomimetic hyaluronic acid hydrogels to investigate glioblastoma cell behaviors. Manuscript submitted for publication.
2. Nakod, P.S., Kim, Y., and Rao, S. S. (2018). Biomimetic models to examine microenvironmental regulation of glioblastoma stem cells. Cancer Letters, 429, 41-53. doi:10.1016/j.canlet.2018.05.007
3. Nakod, P.S., Kim, Y., and Rao, S. S., 'Three-dimensional biomimetic hyaluronic acid hydrogels to investigate glioblastoma cell behaviors', accepted for presentation at AICHE 2019 Annual Meeting.
4. Nakod, P.S., Kim, Y., and Rao, S. S., 'Three-dimensional biomimetic hyaluronic acid hydrogels to investigate glioblastoma cell behaviors', presented at BMES 2018 Annual Meeting.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?

I feel that the application of knowledge is highly important for scientific progress and graduate research allows me to apply my academic skills to answer scientific questions. My current research topic intrigues me as it lies at the interface of biology and engineering, which will revolutionize the way we understand modern medicine.

Future Plans

My long-term career goals are to involve myself in biomedical research in academia or in industrial R&D.

Faculty Advisor

Dr. Shreyas S. Rao
Department of Chemical & Biological Engineering
The University of Alabama
Box 870203
Tuscaloosa, AL 35487
(205) 348-6564
srao3@eng.ua.edu

Investigation on Reducing the Bandgap in Nanocomposite Polymers by Doping for Applications in Biosensor Technologies

Sharnae Palwai
Alabama A&M University
Round 14 Recipient
NSF EPSCoR Co-funding, # 1828729
Expected graduation in 2020; M.S., Applied Physics
psharvare@gmail.com; spalwai@bulldogs.aamu.edu

Objective
To foresee the potential of polymer based materials and their applications in the area of bio-sensing devices.

Research Abstract
The objective of my research is to develop nanoparticle based polymer composites for advanced sensor systems. Nanocomposite films with the best set of properties will be designed and tested for their performance under laboratory conditions. By characterizing the materials for their optical properties and investigating the effects of doping on the bandgap energies; next generation biosensor technologies can be advanced.

List of Recent Publications/Presentations/ Honors
S. Palwai, A.K. Batra and P. Guggilla "Effects of doping nanoparticle fillers in PVDF based thin films for Advanced Sensors" Poster Presentation at Alabama A&M University Stem Day 2019.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
My inspiration to pursue graduate studies comes from the current research at AAMU and the fascinating materials around us. Enhancing material properties with fine tuning in specific extents motivated me to investigate polymers and their applications in the biosensors field.

Future Plans
To conduct meaningful research that helps advance the scientific field and obtain a Doctorate Degree in Materials Science. Certainly, this degree empowers my appetite for research and a professional teaching career.

Faculty Advisor
Dr. Padmaja Guggilla
Professor and Interim Chair
Department of Physics, Chemistry and Mathematics
Alabama A&M University
(256) 372-8142
padmaja.guggilla@aamu.edu

Visualizing the conformation of Titin in body muscles of live Caenorhabditis elegans roundworms

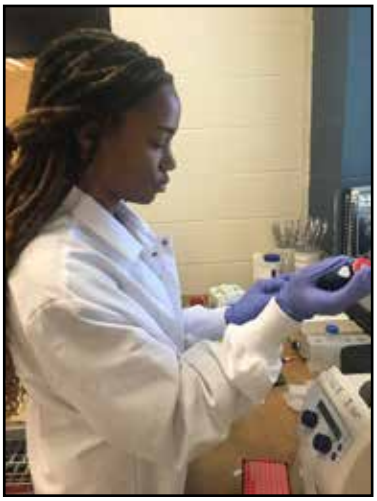
Gabrielle Prince
University of South Alabama
Round 14 Recipient
Expected graduation in 2021; M.S., Biological Sciences
gsp1222@jagmail.southalabama.edu

Objective
The purpose of this project is to understand how the structural properties of muscle contribute to its contractile and force producing properties.

Research Abstract

- Titin is a giant protein critical for muscle assembly as well as contraction and relaxation.
- If Titin in humans and animals is longer than in invertebrates, how long does this Titin protein extend during muscle contractions as well as when the muscle relaxes? What is the structure of Titin like, springy and stretchy, or is it straight and firm when the muscle contracts and relaxes?
- Examining how single muscle proteins impact properties of muscle contraction will contribute to the understanding of disease processes such as cardiomyopathy in humans.
- This work will broadly impact the field through the contribution of an innovative use of the CRISPR/Cas 9 system in C. elegans and by educating students regarding what occurs inside of their cells in a laboratory setting as well as in a classroom.

List of Recent Publications/Presentations/ Honors
Russell, M.R., Prince, G.S., Ward, T.M., McKinney, A.L., Walroth, J.F., Walroth, J.F., and Littlefield, R.S. Bicistronic tagging and severing (BiTS): a new gene editing tool in C. elegans using endogenous trans-splicing pathways. Poster presentation delivered at South Alabama Graduate Symposium, Mobile, AL March 2019



Russell, M.R., Prince, G.S., Ward, T.M., McKinney, A.L., Walroth, J.F., Walroth, J.F., and Littlefield, R.S. Bicistronic tagging and severing (BiTS): a new gene editing tool in C. elegans using endogenous trans-splicing pathways. Poster presentation delivered at ASCB Annual Meeting, San Diego, CA. December 2018.

What inspired you to continue graduate education and/ or pursue research? Why this particular research topic? I have always had a passion to study anatomy and physiology because of an interest in medical research. When I came to the University of South Alabama I began as a chemistry major. I discovered being a chemistry major was not the right fit for me and I changed my major to biology. In 2017, I enrolled in a cell biology class taught by my current mentor, Dr. Ryan Littlefield, and immediately had an interest in learning more about proteins involved in muscular structures as well as what happens in neuronal cells within the brain. I learned that Dr. Littlefield studied muscular structure and physiology in Caenorhabditis elegans worms, so I knew immediately that I wanted to work in his research lab. Throughout the time I've worked in his lab, I have been introduced to viewing live muscle cells in these worms underneath various microscopes as well as molecular biology techniques.

Future Plans
After graduating with my M.S. in biological sciences, I plan on pursuing my Ph.D. in Cellular Biology.

Faculty Advisor
Dr. Ryan Littlefield
Biology
University of South Alabama
Mobile, Alabama 36688
251-460-6331
ryanlittlefield@southalabama.edu

Visualizing Muscle Assembly and Function

Michael Russell
University of South Alabama
Round 14 Recipient
NSF EPSCoR Co-funding, # 1738564
Expected graduation in 2021, M.S., Cell Biology
mbr1221@jagmail.southalabama.edu

Objective
Determine how sarcomere components are assembled and organized from early embryo stage of vertebrates to the mature stage. We want to know which components in the sarcomere are necessary for normal function for locomotion and muscle contraction during the animal's lifecycle.

Research Abstract
- Determine which proteins are required for the development and function of the muscle cell in vertebrates.
- To also determine turnover of muscle components and the roll of force production in muscle assembly.
- Understanding how components regulate in the muscle fiber can give us evidence on which proteins are necessary for the muscle cell to function normal.
- The evidence can also tell us which muscle protein can cause abnormalities in function and development.

List of Recent Publications/Presentations/ Honors
Russell, M., Skipper, K., and Littlefield, R.S. GFP-tagging interferes with myosin function and sarcomere assembly in C. elegans. Poster presentation delivered at ASCB Annual Meeting, San Diego, CA. December 2018

Russell, M., Prince, G., and Littlefield, R. Using CRISPR-Cas9 gene editing to fluorescently-tag myosins in C. elegans and characterize their assembly. Poster presentation delivered at NanoBio Summit, Atmore, AL. November 2017
Michael Russell. Visualization of Muscle Assembly Dynamics in live Caenorhabditis elegans roundworms. Invited Lecture at St. Francis College. March 2019

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
For most of my life I've been a curious person, trying to solve difficult questions or understand certain concepts. When I took a microbiology class my sophomore year in college, I knew I wanted to do research with bacteria, viruses and human cells. I joined Dr. Ryan Littlefield's lab because he offered me the best chance to work with human cells and bacterial cultures. He showed me more about gene editing and the benefits of using CRISPR cas9 to help treat certain diseases.

Future Plans
I would like to get my PhD in Cell Biology and continue my contribution to muscle studies and genetics.

Faculty Advisorr
Dr. Ryan Littlefield
Biology
University of South Alabama
5871 USA Dr. N., Room 124
Mobile, Alabama 36693
251-391-4338
ryanlittlefield@gmail.com

Freshwater Mussel community and trait variation and their Influence in ecosystem function

Irene Sanchez-Gonzalez
University of Alabama
Round 14 Recipient
NSF EPSCoR Co-funding, Award # 1831512
Expected graduation, 2023; Ph.D. Biology
isanchezgonzalez@crimson.ua.edu

Objective

The objective of my research is to understand how individual-level species traits of mussels vary across space and how community assembly of mussels impact other components of the stream food web.

Research Abstract

- Freshwater mussels (Bivalvia: Unionidae) are a species-rich group (~300 North American species) of long-lived (6-100+ years) filter feeding mollusks that live and burrow in river sediments in large multi-species groups (up to 200 individuals per m2).
- Freshwater Mussels are North America's most imperiled group of organisms and their biodiversity continuous to decline
- As filter feeders they remove nutrients and particulates from the water column.
- We are currently determining how mussels vary in morphology and other traits such as nutrient storage across environmental gradients and how mussels' impact and alter the abundance of other riverine organisms.
- My research goal is to connect the diversity of mussels to their role in ecosystem processes.

List of Recent Publications/Presentations/ Honors

Irene Sanchez Gonzalez. 2018. Water Quality and Freshwater Mussel Assemblages in the Strawberry River Watershed, Arkansas. Thesis. Arkansas State University.

Irene Sanchez Gonzalez, John L. Harris and Jennifer L. Bouldin, "Quantitative Freshwater Mussel Surveys in the lower Strawberry, River, AR and its Tributaries, Poster presented at 1st Freshwater Mollusk Conservation Society International Meeting, Verbania, Italy, September 2018.

Irene Sanchez Gonzalez, John L. Harris and Jennifer L. Bouldin, "Quantitative Freshwater Mussel Surveys in the lower Strawberry, River, AR and its Tributaries. Oral Presentation at Society for Freshwater Science, Detroit, MI, May 2018.

Arkansas Soil and Water Meeting, January 2018, 1st place Graduate Student Poster.

Mid-South SETAC, June 2017, 1st place Graduate Student Poster.

Arkansas Water Works and Water Environment Association, 1st place Student Presentation.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?

I started working with freshwater mussels for my master's project. During that time, I had the chance to see their diversity and learn more about their unique life cycle. I decided to pursue a PhD to learn more about these organisms and to actually know what their impact in river ecosystems can be.

Future Plans

My future right now is focused in my PhD project. I will be immersed in it for at least the next four years. Although It is hard to think where you will be five years from now, I see myself following an aquatic ecology career path.

Faculty Advisor

Dr. Carla L. Atkinson
Biological Sciences
University of Alabama
Science and Engineering Complex, 1325 Hackberry Ln
Tuscaloosa, AL 35401
(205) 348-6805
carla.l.atkinson@ua.edu

Functions of the Heterochromatin Protein 1 family in transcription and genome stability

John Schoelz
University of Alabama at Birmingham
Round 14 Recipient
NSF EPSCoR Co-funding, # 1552586
Expected graduation in 2021, Ph.D., Biology
schoelzj@uab.edu

Objective
My research goal is to elucidate the individual and combined contributions of Heterochromatin Protein 1 family members to both gene expression and genome stability. To do this, I use a combination of bioinformatic and molecular approaches.

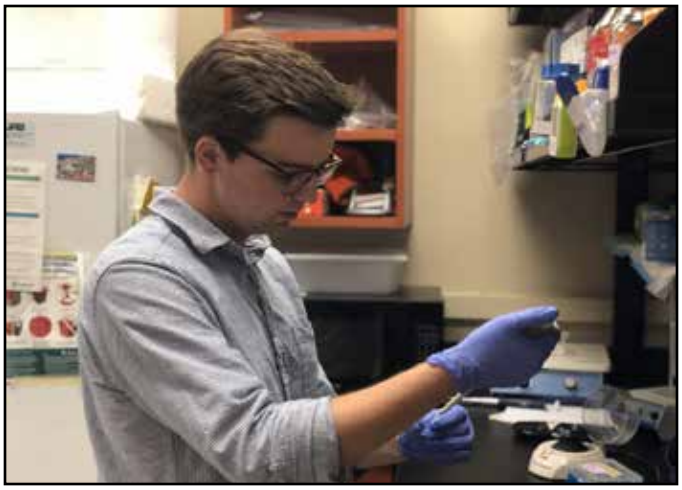
Research Abstract
- Biological information is encoded in DNA, which is packaged along with various proteins into chromatin when stored in living cells.
- Cells must unpackage DNA from chromatin to read biological information from DNA molecules (transcription), which can leave DNA vulnerable to damage if it isn't packaged properly.
- Accumulated DNA damage contributes to aging and cancer.
- A better understanding of how chromatin prevents DNA damage during transcription will broaden understanding of how to prevent negative outcomes.
- An especially important group of chromatin proteins is the Heterochromatin Protein 1 (HP1) family
- HP1 family members are located at DNA that is highly active in transcription and may be vulnerable to damage, but the individual roles of HP1 proteins is not clear.
- My goal is to use a combination of bioinformatics and dCas9 epigenome engineering to identify the function of each HP1 family member at these sites.

List of Recent Publications/Presentations/ Honors
- Finalist, 2018 UAB Three Minute Thesis Competition
- UAB Blazer Graduate Research Fellow
- Schoelz, J.M. "The Genome and The Blob" UAB Graduate School 'Discoveries in the Making' Seminar Series; Birmingham, AL
- Schoelz, J.M. and Riddle, N.C. ,"Regulation of gene expression by Drosophila Heterochromatin Protein 1" UAB Comprehensive Cancer Center Trainee Seminar Series; Birmingham, AL
- Schoelz, J.M. and Riddle, N.C. "Promoter proximal pausing as a possible mechanism of gene regulation by HP1 paralogs" 59th Annual Drosophila Research Conference; Philadelphia, PA
- Schoelz, J.M. and Riddle, N.C. "CRISPR/Cas9 Technologies in epigenetics research" Epigenetics Methods, First Edition (In Press)
- Schoelz, J.M. and Riddle, N.C. "Heritable Generational effects through RNA" Transgenerational Epigenetics, Second Edition (In Press)

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
In my undergraduate research I worked on identifying copy number variations in the African 'Killer' Bee genome that may underlie aggressive behavior. I loved the sense of discovery and creativity that came from doing laboratory research as well as the concept of studying complex traits through the lens of the genome. In my graduate research I wanted to explore epigenetics and chromatin to better appreciate how dynamic these processes can be.

Future Plans
Continue research in epigenetics and chromatin biology through either a post-doctoral or industry research position.

Faculty Advisor
Dr. Nicole Riddle
Department of Biology
University of Alabama-Birmingham
Birmingham, AL 35203
riddlenc@uab.edu
(205) 975-4049



Millimeter wave arrays on metasurface for future 5G wireless systems

M M Reazul Haque Tanmoy
University of South Alabama
Round 14 Recipient
NSF EPSCoR Track 4, grant # 18330161
Expected graduation, 2020; M.S., Electrical Engineering
mt1823@jagmail.southalabama.edu

Objective
Simulation and modeling of 3-D dispersed smart array antennas for dual operation in 28 GHz and 39 GHz bands and investigation of dispersed array elements on metasurfaces with sharp beams for wide-angle coverage.

Research Abstract

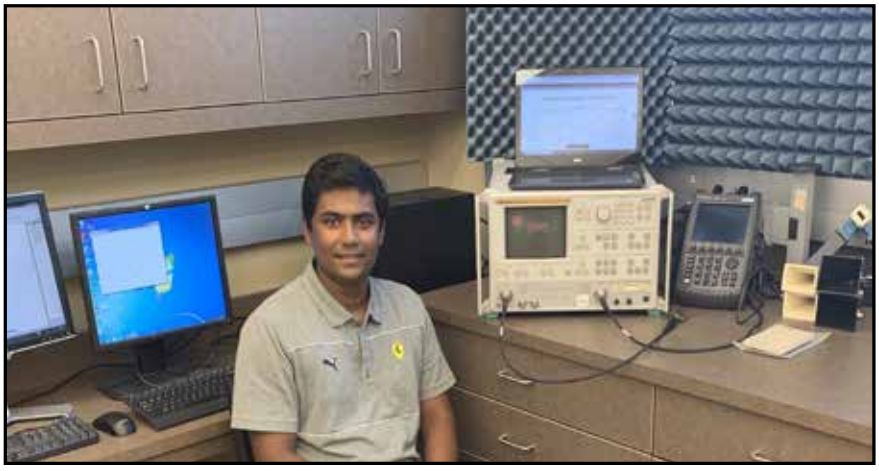
- The demand for high speed data transfer by handheld devices, e.g. mobile phones, has increased drastically, and 5G communication systems are being implemented to tackle this challenge.
- Mobile terminals have space limitations. Therefore, innovative antenna design is required to accommodate large scale antenna arrays to provide various services. Very thin metasurface-based antenna arrays have the advantage of light weight volume, and can potentially offer full spherical beam scanning.
- I will investigate the integration and impact of metasurface on millimeter wave antenna arrays to be incorporated in mobile devices for use in future 5G wireless systems.

List of Recent Publications/Presentations/ Honors
Conducted 3-month long research at the University of California, Irvine (UCI), as part of the NSF EPSCoR-funded project titled: 'RII-Track 4: Investigating 3-D Dispersed Smart Antenna Arrays for Nearly Full Spherical Scanning by New Radios (NRs).

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
I believe the knowledge we are learning needs to be translated in our daily life which would shape our society and have an impact on our economy. Graduate education provides the opportunity to conduct research that can impact a technology directly. The antenna studies, especially the incorporation of metasurface in millimeter wave antenna arrays has the potential to develop a special class of antenna which will solve many challenges that the implementation of 5G is facing. This has inspired me the most to conduct this kind of research.

Future Plans
I have plans for my own startup company with an efficient research and development department in Alabama where the students across the state studying antenna design and metamaterials would get immediate access to the research infrastructure and provide solutions to complex wireless technology-related problems.

Faculty Advisor
Dr. Saeed I. Latif
Department of Electrical and Computer Engineering
University of South Alabama
150 Jaguar Drive, SHBC 4122 Mobile, AL USA 36688
slatif@southalabama.edu
251-460-6998



Sex-dependent regulation of behaviors and receptor function by NPY

Taylor Davis
University of Alabama at Birmingham
Round 14 Recipient
NSF EPSCoR Track 2 Award, # 1632881
Expected graduation in 2023, Ph.D., Behavioral Neuroscience
trdavis2@uab.edu

Objective
This study looks at sex differences in behaviors as a result of neuropeptide y expression in mice using behavioral tests, electrophysiology, and optogenetics.

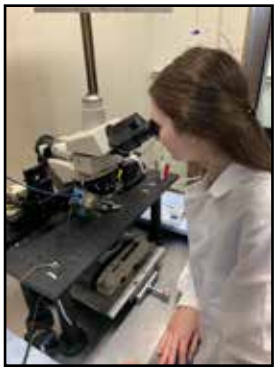
Research Abstract
- Women have a 60% higher lifetime prevalence for depression and anxiety disorders compared to men.
- The reason for this discrepancy is unknown but one possible source could be due to differences in neuropeptide Y (NPY) expression.
- NPY is a molecule found throughout the brain and is involved in cognition, anxiety, and stress responses.
- Previous studies found that female rats have a lower expression of NPY compared to male rats, and that estrogen regulates NPY levels.
- Our brain is made of specialized cells, one of which being neurons that enable communication from one area to another.
- These cells communicate via electrical signals that create connections from one neuron to another.
- Receptors, which can be selectively activated by a particular molecule, can act on these connections to alter their electrical activity
- NPY can act through its receptors to affect these connections but it is unknown how expression differences of NPY would modify circuit changes in females compared to males.
- We can genetically alter mice to express NPY more than a normal mouse.
- Using these genetically altered mice, we will study behavioral differences between males and females along with changes in their receptor function that may be affected by NPY expression.

List of Recent Publications/Presentations/ Honors
- Corder KM, Li Q, Cortes MA, Bartley AF, Davis TR, and Dobrunz LE. (2019) Overexpression of Neuropeptide Y induces hypoactivity and decreases responsiveness to Neuropeptide Y. Neuropeptides in Revision.
- Davis TR, Cortes MA, Bahabry R, Sekar P, Dobrunz LE. Sex-dependent regulation of behaviors and receptor function by NPY. Poster presented at: UAB Graduate Biomedical Sciences/Joint Health Sciences Symposium; 2019 August 16; Birmingham, AL.
- Davis TR. (2019) "'Y' are women more anxious?". Oral presentation given at: UAB's Discoveries in the Making; 2019 November 12; Birmingham, AL.
- Davis TR, Cortes MA, Bahabry R, Sekar P, Dobrunz LE. Sex-dependent regulation of behaviors and receptor function by NPY. Poster presented at: UAB Comprehensive Neuroscience Center Retreat; 2019 October 3rd; Birmingham, AL.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
I have wanted to study the brain since I was young and a graduate education allows me to do research along with taking more advanced classes, which will help me advance my career so I can continue doing research. I became interested in this topic upon rotating in Dr. Dobrunz's lab where I did some preliminary work that excited me and made me realize female animal models/women were understudied in neuroscience.

Future Plans
I am interested in becoming a lobbyist for government research institutes and science policy/communication. There are also many research opportunities in Alabama from continuing work in academia via UAB or at another institution such as University of South Alabama to working in the non-profit sector at Southern Research, here in Birmingham, or Hudson Alpha in Huntsville.

Faculty Advisor
Dr. Lynn Dobrunz
Neurobiology
University of Alabama at Birmingham
1825 University Blvd., SHEL 902
Birmingham, AL 35294
205-934-7923
dobrunz@uab.edu



The Effect of Polymer Coating on Adsorption Capability of 13X-Zeolite

Carson Graves
University of South Alabama
Round 14 Recipient
NASA EPSCoR, Award # NNX16AT47A
Expected graduation, 2020; M.S., Chemical Engineering
Cag1222@jagmail.southalabama.edu

Objective

The objective of my research is to improve the mechanical stability of 13X-zeolite adsorbent, which is the current adsorbent used for CO2 air revitalization aboard the International Space Station, by coating the adsorbent using a polymer.

Research Abstract

- One necessity for space travel is the maintenance of a suitable environment to support human life, part of which is the removal of metabolic CO2 and water from the air, which is termed closed environment air revitalization.
- In the closed environment on the International Space Station (ISS) the removal of metabolic CO2 is accomplished by the Carbon Dioxide Removal Assembly (CDRA) which utilizes pressure swing adsorption.
- The CDRA uses a solid adsorbent materials to remove CO2 from the breathing air.
- The current adsorbents on the ISS are fragile and after being subjected to a number of pressure swings produce dust.
- The dust interferes with normal operation of the life support systems by interfering with sensors.
- Coating the adsorbent material with a polymer coating could reduce the amount of dust produced due to normal operation while having a minimal effect on the adsorption capacity.

List of Recent Publications/Presentations/ Honors

Carson Graves, T. Grant Glover. The Effect of Polymer Coating on Adsorption Capability of 13X-Zeolite. Poster session presented at: NSF EPSCoR CPU2AL Annual Meeting; 2019 Apr 3; Mobile, AL.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?

I decided to attend graduate school because I enjoyed the undergraduate chemical engineering curriculum and wanted to gain a more comprehensive understanding of the material utilized in a research setting.

Future Plans

After graduation, I intend to pursue a career as a chemical engineer and will seek a process engineering or research and development position.

Faculty Advisorr

Prof. T. Grant Glover
Department of Chemical Engineering
University of South Alabama
307 N University Blvd.
Mobile, Alabama 36688
251-460-7462
glover@southalabama.edu

Evaluation of a Chlamydia Nanovaccine Formulated by Encapsulation of Recombinant MOMP in Poly (Lactic acid)-Poly (Ethylene) Glycol Nanoparticles Administered with a Mucosal Adjuvant

Ayodeji Oludare Ipinmoroti
Alabama State University
Round 14 Recipient
NSF EPSCoR Co-funding, # 1241701
Expected graduation in 2023, Ph.D., Microbiology
ayodejimoroti@gmail.com

Objective

Aim to contribute positively towards new cutting-edge scientific discoveries in eradication of infectious diseases and drug discoveries with strong enthusiasm to join a team of professionals and build a career on a successful platform.

Research Abstract

- Chlamydia is a pathogen that infects the mucus membrane of the human reproductive tract. All effort to come up with a competent vaccine against Chlamydia infection has so far proven abortive.
- The use of nano-particles as substances to deliver vaccine has been employed in recent vaccine studies; it has demonstrated the potential to stimulate immune response against infections.
- The use of nanoparticles and even more immunogenic substances such as mucosal adjuvants as co-stimulant has so far revealed enhanced immune response against Chlamydia infection.
- In the present study, we choose to formulate a vaccine made up of the Chlamydia outer membrane protein enclosed within diblock of nanoparticles.
- Morphological characterization will be performed to assess physical properties and stability of the nano-vaccine.
- Groups of mice will receive 3 immunizations with nano-vaccine in the presence of a mucosal adjuvant.
- After immunization, spleens and blood samples of mice will be collected for immunological responses such as specific T cells and antibody stimulations.
- Subsequently, immunized mice will be infected with Chlamydia to determine the protection level offered in mice after vaccination.
- We assume that high immunogenic response will be achieved when nano-vaccine is co-delivered with mucosal adjuvant.
- We also expect there will be enhanced protection against genital infection.

Presentations and Publications

Apr. 2017 Appalachian Student Research Forum (ASRF)
Apr. 2017 Experimental Biology Conference, (EB)
Apr. 2019 Chlamydia Basic Research Society (CBRS)
Apr. 2019 Research and Creative Activity Symposium (RCA)
Sept. 2019 Nano-Bio Summit

A.O Ipinmoroti and E.M Onyango (2018), Effect of Lactobacillus rhamnosus on uptake and lipid accumulation in Caco2 cells. http://m.fasebj.org/content/31/1_Supplement/lb757.short.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?

My passion and love for curative science were born out of my desire and curiosity to contribute to the growing field of infectious diseases and hopefully be a faculty member in one of the leading universities in Alabama. My plan is to continue my research in the field of immunology. I believe that aside the research experience, this research project will expose me to several research techniques and improve my critical thinking abilities which are the core requirement for securing position in renown and respectable research institutes. I also believe this would improve the quality of life for individuals at risk of infectious diseases and disorders in the state of Alabama and the country at large.

Future Plans

My plan is to continue my research in the field of immunology/ infectious diseases which I believe I can secure here in the state of Alabama. After doing some research, I have an interest in a possible post doctoral position at UAB School of Medicine and/or possibly a position at HudsonAlpha Institution for Biotechnology working towards research in cancer and neurological immonotherapy. I also believe this would improve the quality of life for individuals at risk for infectious diseases and disorders in the state of Alabama and the country at large. I love to translate and utilize my practical and theoretical knowledge of molecular genetics, microbiology and cell biology for diagnostic or therapeutic decision-making and health outcomes including policy implications.

Faculty Advisor

Dr. Vida Dennis
Biological Sciences
Alabama State University
vidadenis@myasu.alasu.edu
334-229-8447

A Functional Genomics Approach to Explain the Evolution of Large Bodies and Long Life Spans

Stephanie Bulls
University of South Alabama
Round 14 Recipient
NSF EPSCoR Track 4 Grant # 1833065
Expected graduation, 2020; M.S., Biology
Seb1621@jagmail.southalabama.edu

Objective
To examine the function of key genes related to longevity and cancer resistance in giant tortoises as compared to their smaller, shorter-lived relatives.

Research Abstract

- Mammals are typically used to study aging and tumor suppression for the obvious applications to human health, but it is becoming clear that all kinds of animals have evolved unique mechanisms of delaying aging and avoiding cancer.
- By examining non-mammalian organisms, we hope to increase our understanding of aging and tumor biology to help overcome challenges in human health and to shed light on the diversity of animal life spans and body sizes in nature.
- We will use cells from long-lived, giant tortoises and their small tortoise relatives to test whether certain genes related to aging and cancer behave differently in these two types of tortoises.
- Cells will be treated with chemicals that cause cell stress then evaluated on their responses such as DNA repair or signaling for cell death.
- We hypothesize that larger, long-lived, tortoises have unique genetic mechanisms to control damaged cells compared to their smaller, shorter lived relatives.

List of Recent Publications/Presentations/ Honors
-Bulls, S. and J. L. Mata. (Poster Abstract 2017) Phylogenetic insights into Amanita mushrooms found southern Alabama. Program: Undergraduate Symposium 2017: p57
-Student Organization for Academic Research (SOAR) Best Poster Award for University of South Alabama 19th Undergraduate Research Symposium (2017)
-Hosted student presenter to Gulf States Mycological Society Winter Foray (2017): Phylogenetic insights into Amanita mushrooms found southern Alabama
-Conference scholarship and Poster Presentation: Native Plant Conference at Birmingham Botanical Gardens (2017)

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
As a young adult I obtained an Associates of Science in veterinary technology and worked as a veterinary technician for several years. While I enjoyed working directly with animals in a medical capacity, I discovered a desire for higher education and a more research-oriented career. I wanted to help others by answering questions about diseases and how they interact with organisms on an evolutionary scale. This research project appealed to me because it examines an important medical topic, aging and cancer, using the comparative physiology of animals and humans.

Future Plans
I would like to continue my academic studies to achieve a PhD in biology concentrating in evolutionary biology, molecular genomics, and disease pathology. My current project looking into longevity and cancer genetics is complex with many opportunities for future with which that I hope to continue.

Faculty Advisor
Dr. Ryan Littlefield
Biology Department
University of South Alabama
5871 USA Dr. North, LSCB Room 124
Mobile, AL 36688
(251) 460-7533
ryanlittlefield@southalabama.edu

Evaluation of the production of Vietnamese Turmeric (Curcuma spp) varieties in Alabama

Lam Duong
Alabama A&M University
Round 14 Recipient
NSF EPSCoR Track 1 grant # 1655280
Expected graduation in 2022, Ph.D., Plant Science
lduong@bulldogs.aamu.edu

Objective:
Screen several turmeric accessions for growth, development, yield and curcumin level, develop best agriculture practices for varieties selected for desirable traits, conduct production economics and market analysis and provide marketing strategies for fresh and dry turmeric products.

Research Abstract
Turmeric, a medicinal crop, is known as an anti-inflammatory as well as a preventative for cancer and Alzheimer's. Imported turmeric is often met with quality concerns. The goal is to establish turmeric as a medicinal crop in the southeastern US, particularly Alabama. The objectives are to: i) screen the 52 genotypes for growth, yield, rhizome curcuminoid and elemental content; ii) develop agronomic practices using varieties selected for desirable traits; iii) develop enterprise budgets and marketing strategies for fresh and dry turmeric products; and iv) educate farmers and extension service providers on the best production practices, post-harvest handling, and marketing of turmeric.

List of Recent Publications/Presentations/ Honors
- Dennis A. Shannon, Edzard van Santen, Saeid Zehtab Salmasi, Timothy J. Murray, Lam T. Duong, Jackie T. Greenfield, Tia Gonzales and Wheeler Foshee, 2019. "Shade, Establishment Method and Varietal Effects on Rhizome Yield and Curcumin Content in Turmeric in Alabama". Journal of Crop Science. (Article in Press).
- Ly Nguyen, Lam T. Duong, Rao S. Mentreddy. 2019. The U.S. import demand for spices and herbs by differentiated sources. Journal of Applied Research on Medicinal and Aromatic Plants 12 (2019) 13-20.
- L. Duong, S. Kumar, L. Nyochembeng, E. Cebert, and S. R. Mentreddy. 2018. Cold Plasma: A Potential Non-chemical Tool for Enhancing Turmeric Rhizome Sprouting and Plant Growth. 2019 Biennial Research Symposium of the Association of Research Directors. April 2-6, 2019. Jacksonville, FL (Abstract accepted for oral presentation)
- L. Duong, S. Kumar, L. Nyochembeng, E. Cebert, and S. R. Mentreddy. 2018. The effects of Low Temperature Plasma on Turmeric Rhizome Sprouting and Basil Seed Germination. 2018 Science and Technology Open House, Tuskegee University, Montgomery, AL. April 6-8, 2018. Third Place Winner in the Doctoral Students Category.

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
I have been a faculty member at Nong Lam Uiversity, Ho Chi Minh City, Viet Nam, a tropical area with abundant agriculture products. I came to Alabama in 2012 and recognized that the state has much potential for growing crops. In 2017, I brought 52 varieties of turmeric from Viet Nam to Alabama A&M University for study and development for medical purposes and as a potential crop for small Alabama farmers. I chose turmeric for it's health benefits.

Future Plans
Develop high yield varieties of tumeric and study how curcumin might work to treat diseases.

Faculty Advisor
Dr. Srinivasa Rao Mentreddy
Biological and Environmental Sciences
Alabama A&M University, Normal, AL
256-372-4250
srinivasa.mentreddy@aamu.edu

Novel Synthesis of Spinel Metal Oxides for ORR Catalysis

Alexandria Bredar
Auburn University
Round 14 Recipient
NSF EPSCoR Co-funding grant #1809847
Expected graduation, 2021; Ph.D., Chemistry
arc0072@auburn.edu

Objective
This research project will focus on the synthesis of ferrite-based spinel metal oxide nanoparticles using a continuous-injection synthetic methodology. The resulting nanoparticles will be studied for their catalytic properties towards the oxygen reduction reaction.

Research Abstract

- Efficiently performing water splitting is an important reaction towards realizing renewable fuels
- The oxygen reduction reaction (ORR) is the most difficult catalytic reaction for performing water splitting, catalysts are typically expensive or inefficient
- Spinel metal oxides have shown promising reactivity towards ORR catalysis
- The continuous-injection nanoparticle synthesis has been under-utilized for spinel metal oxides
- This synthesis will allow for control of particle morphology, which will affect catalytic properties of the particles

- This research will help us further understand the processes towards making renewable fuels a reality

List of Recent Publications/Presentations/ Honors
Bredar, A. R. C.; Blanchet, M. D.; Comes, R. B. Farnum, B. H.* "Evidence and Influence of Copper Vacancies in p-Type CuGaO2 Mesoporous Films" ACS Appl. Energy Mater. 2019, 2, 19-28.

"Evidence and Influence of Copper Vacancies in p-type CuGaO2". This Is Research, April 2019 (Oral Presentation)

What inspired you to continue graduate education and/or pursue research? Why this particular research topic?
After being introduced to research as an undergraduate, I knew that spending time to solve unique problems and understand complex chemistry was what I wanted to pursue. Research related to renewable energy is of vital importance to society, and I hope to be able to have a small impact on the field.

Future Plans
After finishing my degree, I plan to pursue an academic career in chemistry. I would love to have the opportunity to teach and train students in chemistry in a classroom and laboratory setting.

Faculty Advisor
Dr. Byron H. Farnum
Department of Chemistry and Biochemistry
Auburn University
179 Chemistry Building
Auburn, AL 36849
farnum@auburn.edu
334-844-3744

Renewing GRSP Round 14 Awardees				
Name	Inst	Target degree	EPSCoR funding	Subject Area
Patrick Donnan	AU	PhD	NSF 1555138	Chemistry
Keshab Baskyal	UA	PhD	NSF 1727875	Materials Science
Ryan Gott	UAH	PhD	NSF 1655280	Mechanical & Aerospace Engineering
Amir Ahmadi	UAH	PhD	NSF 1606117	Civil and Environmental Engineering
Zaheerudding Mohammed	TU	PhD	NSF 1655280	Materials Science & Engineering
Zhuoran Gan	UAH	PhD	NSF 1606117	Chemical Engineering
Seung Jo Park	UA	PhD	NSF 1604677	Chemical and Biological Eng
Christopher Phillips	UAH	PhD	NSF 1352046	Atmospheric Science
Thanh Chi Vu	UAH	PhD	NSF 1606117	Civil and Environmental Engineering
Jafar Orangi	AU	PhD	NASA NNX15AK29A	Materials Engineering
Ellyn Harges	AU	PhD	NSF 1604084	Mechanical Engineering
Bryan Cronin	AU	PhD	DOE SC0018011	Chemistry
Thomas Koenig	UA	PhD	NASA FY 18 CAN	Materials Science
Ross Totsch	UAB	PhD	NSF 1632881	Chemistry
David French	UAB	PhD	NSF 1632881	Chemistry
Sangeeta Nair	UAB	PhD	NSF 1632891	Neurology
Sattik Basu	UAH	PhD	NASA NNX15AK29A	Mechanical & Aerospace Engineering

Alabama EPSCoR
Graduate Research Scholars Program

GRSP and Beyond

A follow-up on previously featured scholars and alumni

Patrick Donnan

Auburn University
Recipient, Rounds 13 and 14
NSF EPSCoR Co-funding, Award # 1555138
Expected graduation in 2021, Ph.D., Chemisty
phd0003@auburn.edu; phdonnan@gmail.com

Our primary research efforts during the past year have focused on understanding dinoflagellate luciferase, the enzyme responsible for catalyzing bioluminescence in marine microorganisms called dinoflagellates, via utilization of computational techniques. We have focused on using molecular dynamics methods to characterize the binding of different stereoisomers of its substrate, dinoflagellate luciferin, and quantum chemical methods to understand the non-productive reaction of the substrate with oxygen to produce a non-bioluminescent air-oxidation product. Extension of our calculations to quantum mechanical/molecular mechanical (QM/MM) investigations of the bioluminescent reaction are underway. We are currently working with experimental efforts in our laboratory and collaborating with researchers at the University of South Florida in order to experimentally characterize the enzyme. Secondary research efforts have focused on understanding a newly identified organometallic intermediate present in the radical S-adenosyl-L-methionine superfamily of enzymes.

Presentations:
"Oxidation Studies of Dinoflagellate Luciferin: A Combined Computational and Experimental Approach" Patrick H. Donnan, Thomas Brown, Xingchen Huang, Kirsta G. Channell, and Steven O. Mansoorabadi, Science & Technology Open House and NSF EPSCoR CPU2AL Annual Meeting hosted by University of Alabama-Huntsville, Mobile, Alabama, 3-5 April 2019

"Computational Studies of a Novel Organometallic Intermediate in Radical SAM Enzymes" Patrick H. Donnan and Steven O. Mansoorabadi, 10th Southeast Enzyme Conference, Georgia State University, Atlanta, Georgia, 13 April 2019

"Computational Studies of a Novel Organometallic Intermediate in Radical SAM Enzymes" Patrick H. Donnan and Steven O. Mansoorabadi, This is Research: Student Symposium, Auburn University, Auburn, Alabama, 9 April 2019

Keshab Bashyal

University of Alabama
Recipient, Rounds 13 and 14
NSF EPSCoR Co-funding, # 1727875
Expected graduation in 2020, Ph.D., Metallurgical and Materials Engineering
jkbashyal@crimson.ua.edu

Grain boundary (GB) is the interface separating two crystalline grains in a polycrystalline material. It is a planar defect that separates regions of different crystalline orientation within a polycrystalline material. Grain boundaries can strongly affect many materials properties such as strength, ductility, corrosion resistance, electrical conductivity, fatigue properties, creep performance and thermal coarsening. The properties of GB strongly depend upon its crystallography, which is characterized by five independent parameters of GB crystallographic space: three microscopic degrees of freedom for the misorientation between the intersecting grains and two macroscopic degrees of freedom to define the boundary plane of

intersection. Despite the complex GB crystallographic space, GB motion is widely believed to occur through thermally activated events. These stochastic processes take place on an extended time scale that makes them very difficult to reproduce using molecular dynamics simulation. Grain boundary can have different complexions and structure depending upon different factors like misorientation, chemical compositions and atomic density in the boundaries. This make it more complex to study the kinetics of the boundaries. For some complex system like biomolecules and glassy materials, the kinetics of such system is explained by exploring the potential energy landscape of those systems which is the graph of the energy function across the configuration space of the system. To investigate the kinetics and dynamic evolution of grain boundaries under thermal activation we are implementing Activation and Relaxation technique (ARTn). To explore the change in potential energy landscape of grain boundary with change in misorientation, two special type of grain boundaries, ∑5 (310) and ∑5(210) in Copper, is studied by implementing ARTn technique. To explore the change in the potential energy landscape and properties of the materials based on the grain boundary phases, different percentage of Zr is doped in those grain boundaries at different temperature. Different phases of CuZr is prepared at the boundary by applying hybrid MD/MC technique and ARTn simulations is implemented.

List of Publications/Presentations/Honors

Presented a Poster on 2018 Science and Technology Open House Student Poster Competition hosted by Tuskegee University and Sponsored by Alabama EPSCoR.

Presented "Study of the Potential Energy Landscape of the different Grain Boundary phases of Cu-Zr Nanocrystalline Alloy" at 2019 Material Science Graduate Student Symposium at University of Alabama.

Presented a Poster on 2019 Science and Technology Open House sponsored by NSF EPSCoR in Mobile.

Presenting about "Exploring the Potential Energy Landscape of ∑5(310) Cu Grain Boundary" on MS&T 2019 at Oregon Convention Center, Portland, Oregon.

Zaheeruddin Mohammed

Tuskegee University
Recipient, Rounds 11 and 14
NSF EPSCoR Track 1, Award # 1655280
Expected graduation 2021, Ph.D., Materials Science and Engineering
zmohammed0176@tuskegee.edu; zaheer855@gmail.com

Plasma, due to its ability to interact with matter at nano and meso scales can be used as a tool to alter surface properties of high surface to volume ratio materials. These treatments can not only achieve desired surface properties by changing the functional group densities but also alter the crystallinity of material. In this work plasma treatment is incorporated to investigate its efficiency in altering the surface interactions of nanomaterials with other materials which would be otherwise achieved through rigorous chemical and physical modifications often having detrimental effects on the desirable properties of the materials. Eventually the effect plasma treatment will have on dispersion of surface treated nanoparticles and the overall effect of such nanoparticles on mechanical, thermal, electrical properties will be investigated. Advanced manufacturing techniques like those that fused deposition method (FDM) and selective laser sintering (SLS) will be incorporated to make samples for various applications like storage, separation, sensing, barrier and electronics.

Ryan Gott

University of Alabama in Huntsville
Recipient, Rounds 13 and 14
NSF EPSCoR Track 1, # 1655280
Expected graduation in 2021; Ph.D. in Aerospace Engineering
Ryan.Gott@uah.edu

In the last year, much progress has been made with our atmospheric plasma treatment of plants, water, and biological materials. We studied and characterized our existing plasma source and developed new plasma sources to improve our treatments. These studies allowed us to determine the best operating conditions and geometries for our devices. We have treated basil seeds, turmeric, pumpkin seeds, poultry skin, raw beef, fungus, and cabbage with great success. We have observed improved growth in the seeds and plants and a reduction in bacteria and fungus on the other materials. Most notably for my work, we have successfully treated small samples of water contaminated with methyl blue dye. This is an important milestone that will be used as a springboard to improve and expand plasma-based water purification.

Publications in the last year:
[1]Volkov, A. G., Hairston, J. S., Patel, D., Gott, R. P., and Xu, K. G., "Cold plasma poration and corrugation of pumpkin seed coats," Bioelectrochemistry, vol. 128, pp. 175–185, 2019.
[2]Gott, R. P. and Xu, K. G. "OH Production and Jet Length of an Atmospheric Pressure Plasma Jet for Soft and Biomaterial Treatment," IEEE Transactions on Plasma Sciences, 2019. (Under Review)

Oral Presentations:
Gott, R. P., Xu, K. G., "Diagnostics of Atmospheric Pressure Plasmas," NSF EPSCoR CPU2AL Annual Meeting, Huntsville, AL, June 2018.
Gott, R. P., Xu, K. G. "Optical Measurements of an Atmospheric Plasma Jet for Plasma Treatments", 71st Annual Gaseous Electronics Conference, Portland, OR, Nov 2018.
Gott, R. P., Xu, K. G., "Characterization of an Atmospheric Microplasma Jet for Water Purification," CPU2AL Science and Technology Open House, Mobile, AL, April 2019.

Amir Ahmadi

University of Alabama in Huntsville
Recipient, Rounds 13 and 14
NSF EPSCoR Co-funding, Award # 1606117
Expected graduation in 2020; Ph.D., Civil and Environmental Engineering
amir.ahmadi@uah.edu; amirahmadi4229@gmail.com

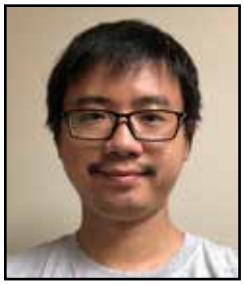
My Ph.D. research focuses on developing and applying novel TiO2 nanotube (TiO2 NTA) electrodes for water and wastewater treatment. In the previous GRSP funding period two research objectives were pursued. The first objective was employing TiO2 NTA as the cathode material for electrochemical reduction of water pollutants with nitrobenzene as the model compound. In the second objective, the electrochemical oxidation of emerging contaminants (antibiotics: meropenem) in environmental matrices was investigated. The success of this project will help advance electrochemical treatment as a cost-effective tool to decontaminate water, which was not possible without financial support from the Alabama EPSCoR.

Achievements:
Journal paper:
Amir Ahmadi, Tingting Wu "Electrocatalytic Reduction of Nitrobenzene using TiO2 nanotube Electrodes with Different Morphologies: Kinetics, Mechanism, and Degradation Pathways" Chemical Eng., 2019, Volume 374, 1241-1252.

Conference presentations:
Oral presentations:
Amir Ahmadi, Tingting Wu "Removal of Meropenem from Environmental Matrices by Electrochemical Oxidation" 258th ACS National meeting. Aug 2019, San Diego, California.
Amir Ahmadi, Tingting Wu "Cathodic reduction of Nitrobenzene using TiO2 nanotube electrodes with different morphologies" 257th ACS National meeting. Mar & Apr 2019, Orlando, Florida.
Poster Presentation:
Amir Ahmadi, Tingting Wu "Electrocatalytic reduction of Nitrobenzene using TiO2 nanotube electrodes with different morphologies" Science & Technology Open House. Sep 2018, Montgomery, Alabama.

Award:
Outstanding Graduate Student for academic year 2019; Department of Civil and Environmental Engineering, University of Alabama in Huntsville.

Accomplishment:
Qualifying exam



Zhuoran Gan

University of Alabama in Huntsville
Recipient, Rounds 13 and 14
NSF Co-funding, Award # 1606117
Expected graduation in 2020, Ph.D., Chemical Engineering
zhuorangan@foxmail.com

Last year, we combined the precise synthesis technique – atomic layer deposition (ALD) with conventional technique such as incipient wetness impregnation (IWI) to synthesize Pt-Zn nanoparticles. we successfully studied the synthesis and structures of Pt-Zn intermetallic alloy under controlled environment in the Advanced Photon Source in Argonne National Lab. We have proposed a series of surface intermediates and reaction mechanisms for the catalytic ozonation using Pt-Zn catalysts.

Recent presentations

Tri-Campus Materials Science Graduate Student Symposium 2019, oral presentation, Tuscaloosa AL, United States, Jan. 24, 2019

Southeastern Catalysis Society 18th Annual Fall Symposium, oral presentation, Knoxville TN, United States, Sep 23, 2019

Recent Awards

Chemical Engineering Program Outstanding Graduate Student, 2019

Materials Science Symposium Presentation Award, Runner-Up, 2019

Sattik Basu
University of Alabama in Huntsville
Recipient, Rounds 13 and 14
NASA EPSCoR NNX15AK29A
Expected graduation in 2022, Ph.D., Aerospace Engineering
sb0144@uah.edu

Objective

To compare the pressure and density fluctuations obtained from the linearized fluctuating conservation equations to that of the Helmholtz equation to determine the consistency of the boundary conditions.

Research Abstract

- Sound wave propagates through any medium following the generalized conservation equations. Solving these equations for fluctuating properties determine whether they make the duct unstable.
- The conservation equations are often used together to derive a single Wave Equation (and then to the Helmholtz Equation) which can be solved with lesser input data.
- This research has two objectives. First was to develop the exact Neumann boundary condition at the inlet to a quasi 1-D duct needed to solve the Helmholtz equation. The second principal objective was to determine the exact relationship between the density and pressure fluctuations

Importance of the Research Topic

Throughout time, vibrations originating from sound has caused fatal destructions. It can affect any form of duct (from a gas burner to a rocket engine). Understanding the acoustics help in controlling the frequencies so that it does not resonates with the ducts causing them to fail. These failures often leads to great losses. Thus deeper understanding of this invisible mode of destruction is the only way to prevent unrepairable damages.

Bryan Cronin
Auburn University
Recipient, Rounds 13 and 14
DOE EPSCoR, Award # SC0018011
Expected graduation in 2020, Ph.D., Chemistry
bmc0018@auburn.edu; b.mat.cro@gmail.com

Our research this past year has revealed a cluster of uncharacterized genes that are found in all methanogens, in a cell extract fraction shown to activate Mcr (methyl coenzyme M reductase. So far we do not know if these genes are involved in folding, or activation of the enzyme. These genes could be possibly what has been missing in our hypothesized A3a (activation complex) models. When we tested the proteins originally thought to make up the A3a complex little to no activation was observed. We did experiments to reconstitute cofactors but these experiments showed no improvement. It is possible E.coli is not a suitable host for overexpressing these genes. Now we are in the process of characterizing and overexpressing these genes in methanococci maripaludis. By doing this we can compare native protein to recombinant E.coli protein to show E. coli is not a suitable system to study these complexes due to the lack of necessary genes involved in folding, cofactor insertions, as well as other environmental factors.

Suengjo (Joe) Park

University of Alabama
Recipient, Rounds 12, 13 and 14
NSF EPSCoR Co funding Award # 1604677
Expected graduation in 2020, Ph.D.,Chemical and Biological Engineering
spark60@crimson.ua.edu

Recent achievements

Previously, we modeled stage IV brain tumor and studied effects of the brain tumor environment on brain tumor cells. Currently, we are studying how brain tumor cells behave when they grow in different brain tumor environments over the time. Understanding brain tumor cell behavior over time can help to predict brain tumor prognosis. With our previous findings of brain tumor environment specific cell behavior, we can develop a brain tumor prognosis model. Moreover, we can ideally predict and stop the prognosis by targeting cues that we found.

Presentations

1. Oral presentation at 2019 American Chemical Society (ACS) National Meeting, March 2019
2. Oral presentation at 2019 American Institute of Chemical Engineers (AIChE), Nov 2019

Research achievement

Previously, we found that U87MG cells behave differently depending on stiffness of hyaluronic acid (HA) hydrogel that we developed. Cells on 0.4 kPa of the hydrogels showed delayed attachment to the hydrogel and slow proliferation on the hydrogel compared to cells on 4.5 kPa of the hydrogels. We further verified translocation of four transcription factors depending on the substrate stiffness, SALL2, POU3f2, Olig2, and Sox2, which are involved in glioblastoma stem cell reprogramming. We have studied long-term effects of the hydrogel stiffness on stemness with U87MG as well as with a patient-derived glioblastoma stem cell line, JX6. JX6 also showed the same morphology as U87MG showed on the different stiffness of the hydrogel. After 3 days culture on 4.5 kPa of the hydrogel, gene expression of CD133, Nestin, Olig2, POU3f2, and SALL2 was significantly upregulated compared to gene expression from 0.4 kPa of the hydrogel. We are working on verifying protein expression level after long-term culture as well as knock out of the four transcription factors to verify inhibition of glioblastoma multiforme prognosis.

Christopher Phillips

University of Alabama in Huntsville
Recipient, Rounds 13 and 14
NSF EPSCoR Co-funding, award 1352046
Expected graduation in 2020 Ph.D., Atmospheric Science
cep0013@uah.edu

My research to date has found that North African mineral dust transported over the Atlantic Ocean does cool sea surface temperatures on a regional scale. Additionally, the presence of dust modifies regional surface pressure, potentially impacting the timing and location of the African monsoon. These preliminary results strongly suggest that human activities that increase African dust emission, will impact the larger climate, particularly rainfall. These impacts, however, are not limited to the African continent. We have linked presence of African dust to the formation of a tropical cyclone that impacted the Caribbean during 2017. The study of dust and cyclone interactions is ongoing in the field, and case studies such as this are not common in the literature. The results of this analysis are submitted for presentation at the American Meteorological Society's annual meeting in January 2020.

David French

University of Alabama at Birmingham
Recipient, Rounds 13 and 14
NSF EPSCoR Track 2 Award # 1632881
Expected graduation 2020, Ph.D., Chemistry
dnfrench@uab.edu

In the past award year, I have made good progress toward completion of my dissertation and the research that supports it. I have finished writing one paper with plans to submit to Applied Polymer Science within the month. This work focuses on characterizing down-converting materials for optogenetic applications. In a novel proof-of-concept experiment, we determined that down-conversion of UV-light carries enough energy to activate ion channels found in engineered neurons to drive an observable synaptic response. The next focus of my work aims to improve the overall x-ray down-converting (i.e. scintillating) output of anthracene based materials through phosphorus modification. Experimental results show phosphorus-modification of anthracene enhances visible fluorescence upon x-ray and UV excitation. This improvement is advantageous for non-invasive optogenetics. I am currently in the process of writing this paper. Finally, I have begun synthesis of new water-soluble phosphorus-modified anthracenes. These biocompatible scintillators will provide enhanced fluorescence and can be directly applied to biological tissue, and may increase the synaptic response of tissue. At this current pace, I plan to defend and graduate in the Spring of 2020.

Ellen Harges

Auburn University
Recipient, Rounds 13 and 14
NSF EPSCoR Co-funding, # 1604084
Expected graduation in 2020, Ph.D., Mechanical Engineering
enh0015@tigermail.auburn.edu

Over the past year, my colleagues and I have collected and analyzed frost data for flat plates on bare aluminum, hydrophobic, and hydrophilic surfaces, as well as three different biphilic surfaces. I also improved the droplet growth portion of the frost model by including the effects of droplet coalescence for droplets with radii larger than 125 microns. We have written several papers about the data and model, and have presented our results at multiple conferences. I will begin the next step of the research shortly, which involves using the data we collected to finalize the flat plate frost model. After this, I will adapt the flat plate model to be applicable for louvered fins as can be found on microchannel heat exchangers.

Recent Publications:

1) Harges, E., Cremaschi, L., Adanur, B., 2019. A new model for droplets growth during their onset of freezing on flat surfaces under air forced convection. Proceedings of the 25th International Congress of Refrigeration, Montreal, Quebec, Canada, Aug 24-30.
2) Adanur, B., Cremaschi, L., Harges, E., 2019. Effect of mixed hydrophilic and hydrophobic surface coatings on droplets freezing and subsequent frost growth during air forced convection channel flows. Science and Technology for the Built Environment: 1-11.
3) Cremaschi, L., Adanur, B., Harges, E., 2019. Effect of humidity and airflow velocity on droplets elapsed time and radius at the onset of freezing and frost nucleation for super-hydrophilic and super-hydrophobic surfaces. ASTFE Digital Library, Begel House Inc.
4) Cremaschi, L., Harges, E., Adanur, B., and Strong, A., 2019. Effect of mixed super-hydrophilic and

super-hydrophobic surface coatings on droplets freezing and subsequent frost growth during air forced convection channel flows. ASHRAE Transactions, ASHRAE Conference Paper, ASHRAE Winter Conference, Atlanta, GA, USA, Jan 12-16.
5) Cremaschi, L., Harges, E., Adanur, B., and Strong, A., 2018. Frost nucleation and frost growth on hydrophobic and hydrophilic surfaces for heat exchangers fin structures. Proceedings of the 17th International Refrigeration and Air Conditioning Conference at Purdue University, West Lafayette, IN (USA), July 9-12. Paper No. 2508, Pages 1-10.

In addition, I presented papers 1 and 4 listed above at their conferences in Montreal and Atlanta, respectively. I will also be submitting a paper to the 5th Thermal and Fluids Engineering Conference on October 7th, followed by a paper to the International Journal of Refrigeration in about a month.

Thanh Chi Vu

University of Alabama at Huntsville
Recipient, Rounds 13 and 14
NSF EPSCoR Award #1606117
Expected graduation in 2021; Ph.D., Civil and Environmenal Engineering
tv0009@uah.edu

I am continuing to work on research for water/wastewater treatment. My current research is on synthesizing a new and novel LDO (layered double hydroxide) adsorbent to address nutrient and pathogen contaminants in secondary effluent. The adsorbent should also carry magnetic separation ability for its practical application in the field. The adsorbent will be tested under different solution chemistry conditions (e.g. pH, ionic strength, coexisting species, etc.). Besides, real secondary effluent will be collected from wastewater treatment plant and employed for the experiment.

Publication

Vu, C.T., Wu, T.*, 2019. “Engineered multifunctional sand for enhanced removal of stormwater runoff contaminants in fixed-bed column systems.” Chemosphere, Vol. 224, pp. 852-861.

Jafar Orangi

Auburn University
Recipient, Rounds 12, 13 and 14
NASA EPSCoR Award NNX15AK29A
Expected graduation in 2020, Ph.D., Materials Engineering
Jzo0018@auburn.edu

My research is focused on 3D printing of conductive ceramic-based inks, specifically a family of materials called MXenes which has 2D strucuter. In our lab, I am trying to develop functional inks based on MXene with application in energy storage and conversion, sensor, and electromagnetic field shielding. We developed a water-based additive-free MXene based ink with favorable viscoelastic properties for extrusion-based 3D printing. We can print energy storage devices with improved electrochemical performances. This process allows rapid fabrication of supercapacitors on a variety of substrates, while we have control on design and load of active material per area. Our study suggests that due to its high electrical conductivity and electrochemical properties, MXene is an excellent choice as the building block for the fabrication of 3D energy storage devices. Thus, we expanded our research to study the application of the fabricated ink to print micro-batteries. In parallel research, I am trying to evaluate the effects of synthesis parameters on the quality of 2D V2CTx flakes and synthesis porous V2CTx flakes as a conductive additive to improve dielectric properties of different polymers.

Thomas Koenig

University of Alabama
Recipient, Rounds 12, 13 and 14
NASA EPSCoR FY 18 CAN Award
Expected graduation in 2021, Ph.D., Materials Science
trkoenig@crimson.ua.edu; tom_koenig@comcast.net

Several novel systems have been developed at the University of Alabama with the aid of the EPSCoR Fellowship Funding. First devised in 2018, a high temperature mechanical testing apparatus (HT-MANTA) has been built, allowing for ex situ thermomechanical testing of truly freestanding thin films at a macroscopic length scale. Development into the optimization of specimen geometry has been pursued over the course of this year, culminating in the fabrication of a photolithographic mask for specimen preparation. Additionally, an in situ thermomechanical testing microelectromechanical system (MEMS) device has been fabricated through collaboration with Sandia National Laboratories' Integration Lab at the Center for Integrated Nanotechnology. Recently, the potential for this device to provide thermomechanical loading within a transmission electron microscope has been demonstrated at a preliminary level. The work seeks to ultimately employ both nanobeam electron diffraction (NBED, commercially 4D-STEM) and electron energy loss spectroscopy (EELS) to produce temperature, strain, and thickness maps of specimens loaded in situ. While all of this work has only just begun to come to fruition, a manuscript on the DC magnetron sputter deposition of Ni thin films has been completed and is under internal review.

Ross Totsch

University of Alabama at Birmingham
Recipient, Rounds 12, 13 and 14
NSF EPSCoR Track 2 # 1632881
Expected graduation in 2020, Ph.D., Chemistry
rosst@uab.edu

Over the past year, I have successfully characterized a large number of new homo- and copolymer polyphosphonates and tested the ability of some of these as ion-conducting materials. The homopolymers synthesized show a range of backbone structures derived from more fluid tetraethylene glycol to more rigid benzenedimethanol. Copolymers have been made as both random statistical polymers of different unit composition and as more controlled alternating block copolymers that show unique properties through distributing the backbone differently. In addition to these new polymers, the previously synthesized tetraethylene glycol-based polyphosphonates have been doped with Li+ salt and tested for conductivity. This was done with both the S and the Se derivatives of these polymers and a noticeable increase in conductivity was seen in Se over S, suggesting the Lewis acid group on the phosphorus center can affect the functionality of the polymer. 31P{1H} NMR titration experiments were also run with these polymers to elucidate a binding behavior. It was found that the binding in these materials fits well to a cooperative binding profile. Even more, it was found that S and Se had much different degrees of cooperativity with the Se polymers showing much stronger cooperativity. It is being hypothesized that this difference in binding behavior may explain the difference in conductivities, and may also offer a new way of analyzing ionic conductivity in the future.

There are two publications that are planned for submission before the end of the year. The first is a large manuscript describing the synthesis and characterization of multiple new homo- and copolymer polyphosphonates. The second is a smaller applications paper detailing the ionic-interaction studies done on the tetraethylene glycol polymers.

Sangeeta Nair

University of Alabama at Birmingham
Recipient, Rounds 12, 13 and 14
NSF EPSCoR Track 2 # 1632891
Expected graduation in 2020, Ph.D., Neurology
snair1@uab.edu; sangeetanair.012@gmail.com

FMRI and MEG data collection on 24 healthy controls were completed in February of this year, and the FMRI data processing pipeline has been built. MEG data analysis is now underway with the intent to submit an abstract this December to Human Brain Mapping with the results from the co-processing pipeline. There is one manuscript being prepared for submission using the fMRI data collected as a comparison group for an epilepsy study. The fMRI pipeline that will be implemented in the present study was built and tested on existing data and recently published in Frontiers in Neuroscience: Auditory Cognitive Neuroscience (Nair et al., 2019).

Nair S, Nenert R, Allendorfer JB, Vannest J, Mirman D, Szaflarski JP. (2019). Sex, age, and handedness modulate the neural correlates of active learning. Frontiers in Neuroscience: Auditory Cognitive Neuroscience.

THE FOLLOWING ARE SHORT UPDATES FROM PREVIOUSLY FUNDED GRSP STUDENTS

Jean Michel Taguenang

Alabama A&M University
Recipient, Rounds 1, 2, and 3
Ph.D., 2008; Applied Physics
taguenang@gmail.com

I am currently a senior medical physicist at Banner Health in Phoenix, Arizona. I am certified by the American Board of Radiology in Diagnostic Medical Physics.

William (Jeff) Horne

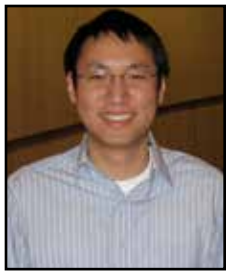
University of Alabama
Recipient, Round 8
Ph.D., 2015, Chemical and Biological Engineering
wjeffreyhorne@yahoo.com

I'm starting my 4th year this fall at Auburn University. I'm running the Senior Unit Operations Laboratory as well as teaching the Chem E Economics and Safety course. This past summer, I was lucky enough to teach my elective course, Chemical Engineering Aspects of Pollution Prevention and Sustainability for the 2nd time. I was also honored with the Faculty Member of the Year award for 2018-2019 for the department. Needless to say, things are going great down here on the plains, and I look forward to many happy years here.

Justin Havird

Auburn University
Recipient, Rounds 6, 6S and 7
Ph.D., 2014, Biological Sciences
jchavird@gmail.com

I am an assistant professor at the University of Texas at Austin in the Department of Integrative Biology. My research generally focuses on investigating questions involving genomics, evolution, physiology, and ecology. Much of my work involves cytonuclear interactions - the interactions between nuclear-encoded gene products and gene products encoded by the cytoplasmic genomes found in mitochondria, chloroplasts, and other endosymbionts. These interactions are thought to drive coevolution and conflict between genomes and have implications for diverse fields in biology - from speciation and environmental adaptation to the evolution of aging and sex. We have folks in the lab working on thermal adaptation in crustaceans, mitochondrial inheritance in mollusks, mitochondrial physiology in plants, and sexual reproduction in sea anemones.



Ke Jiang

Auburn University

Recipient, Rounds1, 2, and 4
Ph.D., 2010 Biological Sciences
biojiangke@gmail.com

With support from Alabama EPSCoR, Ke Jiang graduated from Auburn University with a PhD. in Botany in 2010. He joined Dr. Zach Lippman, a 2019 MacArthur Fellow, at Cold Spring Harbor Lab and continued studying plant genetics, genomics and domestication. During the time at CSHL, he made several key contributions to our understanding of plant inflorescence development and diversity, which could highly impact yield if applied to crops. After four years working with tomatoes and maize, he joined Dow AgroSciences in Indianapolis (now Corteva Agrisciences) to work on maize and soybean breeding and bio-engineering in 2014. During his time at Dow, he worked extensively on the emerging gene editing technologies and their applications to improve crops, and made several publications on various gene editing approaches in maize and soybean. In 2018, following the merger between Dow and DuPont, he joined Genus PLC in Madison, WI, an animal breeding and biotechnology company, to continue working on gene editing and genomics in animal systems.

Narendra Sadwani

Auburn University

Recipient, Rounds 8, 9 and 10
Ph.D., 2016; Chemical Engineering
nss0006@tigermail.auburn.edu

I was awarded AL EPSCoR GRSP awards during rounds 8, 9 and 10 for my research on Biomass gasification using carbon dioxide under Dr. Mario Eden and Dr. Sushil Adhikari at Auburn University. After completing graduation in May 2017, I worked as a postdoctoral fellow for Dr. Eden at Auburn for a period of 5 months. Post that, I have worked as a Sr. Process Engineer with Baxter Healthcare In Opelika, Alabama where my responsibilities include validations, process improvements, design and implementation, and production support. In August 2018, I received the CEO award for contribution to the plant from the CEO of Baxter Healthcare. I would like to thank AL EPSCoR as the GRSP awards were a major motivating factor for me to push my boundaries and explore various opportunities.

Rabih Al Ghossein

Auburn University

Recipient, Round 9
M.S., 2015, Mechanical Engineering
rabihgh8@gmail.com

I have been working at Hubbell Power Systems for 3 years now as a product engineer. I have been mainly responsible for the design and maintenance of products for the communication products. Then last year, I have taken on more responsibilities by developing new products for the electric utility as well, and supporting our VIP customers like Alabama Power, Florida Light, Duke Energy, etc. Also, I have recently earned my professional engineering (P.E) license after taking the exam in April and meeting the experience requirements in June. I will be utilizing my license in the development and approval of safe products that meets our industry standards and codes, therefore ensuring the safety of our customers and the public.

Rohit Dhariwal

University of Alabama in Huntsville
Recipient, Rounds 9 and 10
Ph.D. 2016; Mechanical Engineering
d.rohit6@gmail.com

After completing my Ph.D. in Mechanical Engineering from the University of Alabama in Huntsville in December 2016, I joined Prof. Andrew Bragg's research group at Duke University as a postdoctoral fellow. The goal of my postdoctoral research work was to computationally investigate the relative motion of unequal sized inertial particles in isotropic turbulent flows. In September 2018, I joined the Center for Institutional Research Computing at Washington State University as a computational scientist.

Tae Kim

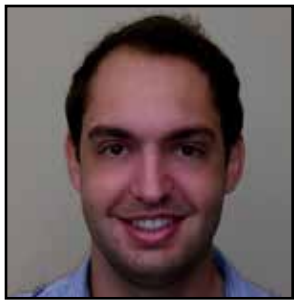
University of Alabama in Huntsville
Recipient, Rounds 7 and 8
Ph.D., 2014, Physics
tkk0023@uah.edu

In January 2019, I was promoted to a Research Scientist position at the Center for Space Plasma and Aeronomic Research, where I currently work as a PI on a couple of projects funded by NASA and the Air Force to develop advanced numerical models of the solar wind and the coronal mass ejections. I am also partly funded by the Parker Solar Probe mission to provide modeling support for the analysis of the exciting new data from unprecedented distances just above the solar corona. All these activities are in the early phase, so hopefully there will be some exciting discoveries to report in the coming years.

Zeyu Pan

University of Alabama in Huntsville
Recipient, Round 7
Ph.D., 2013, Electrical and Computer Engineering
panzeyu@gmail.com

I'm currently working as a Test Engineer at IPG Photonics Corp. My job is to purchase the testing equipment and build the on-wafer testing setup for the silicon-based photonic integrated circuit. The testing includes passive optical components, electrical to optical modulators, optical to electrical photodiodes, electrical devices (such as junction capacitors and resistances) and high-speed radio frequency measurement, using laser source, power meter, and 12-axis wafer probe station, etc., and requires heavily coding in order to automatize the measurements and improve the testing speed and efficiency.



Sebastian Kirmse

University of South Alabama
Recipient, Rounds 11 and 12
M.S., 2018, Mechanical Engineering
sk1111@jagmail.southalabama.edu

I am currently finishing my Doctor of Science degree in Systems Engineering from the University of South Alabama with an expected graduation date in December 2019. The collected research results and experience from my GRSP fellowship laid the foundation for my dissertation topic, called *Towards the Commercialization of a Carbon Fiber Composite Reinforced with Carbon Nanofiber Z-Threads Utilizing a Hybrid Lean LaunchPad / Model-Based Systems Engineering Approach.*
During the GRSP Round 12 award period, I received a grant titled "I-Corps: Z-Threaded Carbon Fiber Composite Technology" together with Alexander M. Scruggs (co-Entrepreneurial Lead), Dr. Kuang-Ting Hsiao (PI/Technical Lead), and Dr. Michael Chambers (Mentor) to participate as the entrepreneurial lead for the NSF Innovation Corps (I-Corps) National Team. Our team was the first national I-Corps team from the University of South Alabama. We investigated the commercialization capabilities of a carbon fiber reinforced plastic (CFRP) laminate reinforced with z-threaded carbon nanofibers developed in our lab. Acting as the entrepreneurial leader, I was responsible for, e.g., interview scheduling, travel organization and weekly update presentations through WebEx. Our team developed a potential commercialization plan and business model using the Business Model Canvas by interviewing 100+ experts at various companies in Europe (Germany and France) and across the United States over a period of seven weeks.

My time during my graduate program funded by the EPSCoR Graduate Research Scholar Program (GRSP) equipped me with the necessary skills needed for my doctoral research and for a successful career in the industry.

Jonathan Mills

Alabama A&M University
Recipient, Round 12
M.S., 2018, Physics
jmills11@bulldogs.aamu.edu

During the Fall of 2018 I graduated with a Master's in Physics and immediately entered the Ph.D. program for Applied Physics at Alabama A&M University. Research performed under GRSP during my Master's program, which examined the enhanced detection of adulterants in honey using Raman spectroscopy, was published as part of my thesis. Additional results are currently being prepared for publication. Lessons learned from this research have improved computational analysis in additional projects that I am currently involved with as well, such as the detection of stabilizers in rocket propellants.
During the summer of 2019 I accepted an internship at Pacific Northwest National Laboratories (PNNL) where I performed research as part of the Applied Statistics and Computational Modeling group (ASCM). While at PNNL I explored A.I. and Machine learning techniques to solve problems relating to image processing, data fusion, risk assessment, and cancer detection. Part of my research explored the Julia programming language for optimizing image fusion techniques. Additionally, I co-authored a publication while at PNNL which should be cleared for release by Spring 2020.

I am currently back at Alabama A&M University, continuing to apply computational and data science techniques to projects as I work towards completing my Ph.D.

Alabama EPSCoR
Graduate Research Scholars Program

Campus Coordinators / Staff

Each of the eight Alabama EPSCoR member institutions has an appointed campus coordinator. Campus Coordinators, in collaboration with the Alabama EPSCoR State Office and each GRSP faculty advisor, manage the GRSP awards. Campus Coordinators serve as the main point of contact for their respective institution.

Dr. David Berkowitz

University of Alabama in Huntsville (UAH)

Dr. David Berkowitz is the Dean of the Graduate School and International Services at UAH. Prior to his appointment, he was the Associate Dean of the College of Business Administration, the Director of the Innovation, Commercialization and Entrepreneurship Lab (ICE Lab), and the Director of the Integrated Enterprise Lab. David is also a Professor of Marketing and continues to educate students in conjunction with his administrative roles. He has experience as a product developer, small business owner and academic. His current research focuses on the intersection between Product Development and Supply Chain for Complex Long Lifecycle products. His research has appeared in leading academic journals such as the Journal of Retailing, Journal of Advertising Research, Journal of Advertising, European Journal of Marketing, European Journal of Innovation Management, Defense Acquisition Review Journal and the Journal of Product Innovation Management. At UAH, Dr. Berkowitz teaches Marketing High Technology Products, Managing Technology, Development, and Marketing Management. He is the past Director of the Center for the Management of Technology at UAH. Dr. Berkowitz was a founding board member of Alabama Launchpad.

Dr. Berkowitz earned his Ph.D. in Marketing and Applied Statistics from the University of Alabama, a MBA from the University Texas at Austin and a B.A. in Accounting from Rutgers University at Camden. Dr. Berkowitz worked for 12 years with Hallmark Cards. Dr. Berkowitz developed and implemented several analytical models and managed new product introductions while working with Hallmark Cards. He was involved with site selection, retail acquisition, international licensing and franchising. Dr. Berkowitz also co-owned and operated a small retail business with his wife for 6 years. Dr. Berkowitz has consulted with numerous organizations on performance based logistics, customer satisfaction, strategic planning, brand loyalty and product development issues. For more information contact Dr. Berkowitz at berkowd@uah.edu or 256-824-6952.

Dr. Shaik Zainuddin

Tuskegee University

Dr. Shaik Zainuddin is an Associate Professor of Materials Science and Engineering at Tuskegee University (TU). He received his B.E. in Mechanical Engineering from India, and M.S. and Ph.D. in Mechanical and Materials Science Engineering from TU. He has served in different positions and is also a Director of Research Experience for Undergraduates (REU), Research Initiation Award (RIA) and Target Infusion Project (TIP) programs at TU. His research interests are in the areas of processing and characterization of polymer and fiber reinforced composite materials, biomaterials and sandwich composites; durability, life prediction, computational simulations, nanomechanical and tribological properties of nanocomposites and polymer coated metals. For more information, contact Dr. Zainuddin at 334.724.4222 or szainuddin@tuskegee.edu.

Dr. Frank "Skip" Bartol

Auburn University

Dr. Frank F. (Skip) Bartol is Alumni Professor of Reproductive Biology in the Department of Anatomy, Physiology and Pharmacology, Associate Dean for Research and Graduate Studies, and Interim Director of the Scott-Ritchey Research Center in the College of Veterinary Medicine at Auburn University (AU). Additionally, since its establishment in September, 2014, Dr. Bartol serves with Dr. Greg Barsh of the HudsonAlpha Institute for Biotechnology, as co-Director of the HudsonAlpha/Auburn University Center for Comparative Genomics and Translational Research. A member of the AU faculty since 1983, Bartol obtained the BS degree from Virginia Tech and both MS and Ph.D. degrees through the Interdisciplinary Reproductive Biology Program from the University of Florida. Additionally, he obtained advanced training in molecular biology as a Visiting Scientist and Scholar in the Center for Animal Biotechnology at Texas A&M University. In 2005, Bartol was honored by his doctoral alma mater when he was named a Donald Henry Barron Lecturer at the University of Florida in recognition of "outstanding research and scholarly activities in the field of reproductive biology." In 2017 he was named a "Distinguished Alumnus" by the College of Agriculture and Life Sciences at Virginia Tech. His research, which focuses on identification of mechanisms regulating development and function of female reproductive tract tissues in domestic ungulates, has been supported by competitive grants from the USDA National Research Initiative, the National Institute of Food and Agriculture (NIFA), the National Science Foundation, and private organizations in the U.S. and abroad, as well as by the Alabama Agricultural Experiment Station. Dr. Bartol served as Panel Manager for the U.S. NIFA Animal Reproduction program in 2014 & 2015. He is an active member of the Society for the Study of Reproduction (SSR), the American Society of Reproductive Immunology (ASRI), and the Society for Theriogenology (SFT), and was elected as an Honorary Member of the Society of Phi Zeta, the honor society of veterinary medicine, for "distinguished service in the advancement of science relating to the animal industry." An advocate of the responsible use of animals in research and education, Dr. Bartol has served as chair of the Auburn University Institutional Animal Care and Use Committee, and both Animal Care and Experimentation and Animal Ethics sub-committees for the SSR. In addition to teaching the graduate course in reproductive biology at AU, Bartol lectures in bioethics and animal law in the AU veterinary curriculum and has spoken nationally and internationally on these topics. For more information, contact Dr. Bartol at 334.844.3700 or bartoff@auburn.edu.

Dr. John M. Wiest

The University of Alabama

Dr. John M. Wiest is a Professor of Chemical and Biological Engineering and Associate Dean for the College of Engineering, and has been at the University of Alabama since 1995. He received his Ph.D. in 1986 from the University of Wisconsin and has held positions at Sydney University, the University of Wisconsin, and Purdue University. His research interests are in the areas of rheology and non-Newtonian fluid mechanics and include structural and molecular theories for rheologically complex materials, and thermoviscoelasticity. For more information, contact Dr. Wiest at 205.348.1727 or jwiest@eng.ua.edu.

Dr. Chris Lawson

University of Alabama at Birmingham

Dr. Christopher Lawson is a Professor of Physics at the University of Alabama at Birmingham. His research specialty is optical sensing and nonlinear optics and he has published over 70 journal articles and 10 books or book chapters in these areas. At UAB, Dr. Lawson has been Principal Investigator (PI) for numerous research grants awarded from the National Science Foundation, the Army Research Office, Army Research Labs, the Air Force Office of Scientific Research, and NASA. He received his Ph.D. in Physics at Oklahoma State University and his M.S. Degree in Physics at the University of Colorado.

Dr. Lawson has served as Executive Director of Alabama EPSCoR since 2010. The Executive Director is the chief administrative officer of ALEPSCoR, and is elected by the ALEPSCoR Steering Committee. The ALEPSCoR Executive Director has overall responsibility and authority for the day-to-day operation, management and coordination of the Alabama EPSCoR program, as well as, supervising and administrating the state funded Graduate Research Scholars Program (GRSP) which is funded by the Alabama Commission for Higher Education. In October 2016, Dr. Lawson was elected Chair of the EPSCoR/IDEA Coalition which provides a leadership role in coordinating national EPSCoR activities.

For more information, contact Dr. Lawson at 205.975.5059 or lawson@uab.edu.

Dr. Zhengtao (Z.T.) Deng

Alabama A&M University

Dr. ZT Deng is the Interim Dean for the College of Engineering, Technology and Physical Sciences and Professor of Mechanical Engineering at Alabama A&M University (AAMU). Dr. Deng has been actively involved in research of aerodynamic and rocket propulsion system/component design and performance analysis. His recent research areas include Non-Newtonian fluid dynamics and fluid property characterization, electromagnetic/plasma propulsion, and additive manufacturing technique for electronics. Dr. Deng helped developed the Mach 4 supersonic wind tunnel facility at AAMU. He also developed the first high performance computing research lab at AAMU. For more information, contact Dr. Deng at 256-372-5560 or zhengtao.deng@aamu.edu.

Dr. John W. Steadman

University of South Alabama

John W. Steadman, P.E, serves as the Alabama Department of Energy (DOE) EPSCoR State Agency Director, Professor of Engineering at the University of South Alabama, and is a licensed professional engineer. Dr. Steadman previously served as Dead of Engineering at the University of South Alabama, Associate Dean and Head of the Department of Electrical Engineering at the University of Wyoming. He earned his B.S. and M.S. degrees in electrical engineering from the University of Wyoming and the Ph.D. degree from Colorado State University. Dr. Steadman was a research engineer for General Dynamics, Convair Division in San Diego, California before joining the faculty at the University of Wyoming and served as a Distinguished Visiting Professor at the United States Air Force Academy.

Dr. Steadman has received several awards, including the IEEE United States Activities Board Citation of Honor, the NCEES Distinguished Service Award with Special Commenation, the Wyoming Engineering Society Outstanding Engineer Award, and the AT&T Foundation Award for Excellence in Teaching. Professor Steadman was appointed to the Board of Registration for Professional Engineers and Professional Land Surveyors in Wyoming by three different governors serving on that board for more than sixteen years. He has also been active in the National Council of Examiners for Engineering and Surveying (NCEES), serving on several of the national committees, as treasurer, and as the national president in 1993-94.

In addition to his engineering education responsibilities, Dr. Steadman was 2004 President of IEEE-USA, Past Chair of the Board of Governors of the Order of the Engineer, and participates in accreditation of engineering programs for ABET. Dr. Steadman is the author of more than 60 journal publications, book chapters and patents. He has been honored with election to Fellow grade in the National Society of Professional Engineers and the American Society for Engineering Education. For more information, contact Dr. Steadman at 251.460.6140 or jsteadman@southalabama.edu.

Dr. Audrey Napier Matthews

Alabama State University

Dr. Audrey Napier is a Professor of Biology in the Department of Biological Sciences. She also serves as the department chairperson. In addition to her departmental duties, she is the interim Associate Dean for the College of Science, Technology, Engineering and Mathematics. Her service began at Alabama State University in 2001. She earned her Ph.D. in Molecular Genetics from The Ohio State University. Her two year postdoctoral fellow was at the Medical College of Georgia in Augusta, Georgia. Her research interests are in the molecular mechanisms involved in organ development, molecular switches involved in disease progression, and differential gene expression during age progression. For more information, contact Dr. Napier at 334.604.8192 or anapier@alasu.edu.

Charlotte Nix is a graduate of the University of Alabama and has been a member of EPSCoR staff since 2006. She serves as the Program Administrator at The University of Alabama. She can be contacted at cnix@ua.edu or 205-348-7079.

Ms. Perryman graduated from the University of Alabama at Birmingham in 2017 with a degree in Marketing Management and plans to return for her MBA fall 2019. As of October 2017, she diligently serves as the Program Coordinator II for Alabama EPSCoR at the University of Alabama in Birmingham, briaunap@uab.edu or 205-996-7168.

Alabama EPSCoR
Graduate Research Scholars Program

Appendices

Index

GRSP Student **Page**

Adhikari, Kiran 11
Afrin, Taiaba 12
Ahmadi, Amir 40
Ahmed, Sajid 13
Ahmed, Syed Salman 14
Al Ghossein, R. 49
Bashyal, Keshab 38
Basu, Sattik 42
Blanchet, Miles 15
Boudreaux, Chance 16
Bredar, Alexandria 35
Bulls, Stephanie 33
Burch, Ashlyn Damaris 17
Cronin, Bryan 42
Davis, Taylor 30
Dhariwal, Rohit 50
Donnan, Patrick 38
Duong, Lam 34
French, David 44
Gan, Zhuoran 41
Glasaway, Katherine 18
Gott, Ryan 8, 40
Graves, Carson 31
Hall, Joshua 19
Harges, Ellen 44
Havird, Justin 48
Hoque, Nabil 22
Horne, Jeff 48
Ipinmoroti, A. O. 32
Iqbal, Zabed 20
Jiang, Ke 49
Johnson, Shardai 21
Kim, Tae 50
Kirmse, Sebastian 51
Koenig, Thomas 46
Mills, Jonathan 51
Mohammed, Z. 39
Nair, Sangeeta 47
Nakod, Pinaki 23
Orangi, Jafar 46
Palwai, Sharnae 24
Pan, Zeyu 50
Park, Suengjo 43
Phillips, Christopher 43
Prince, Gabrielle 25
Russell, Michael 26
Sadwani, Narendra 49
Sanchez-Gonzalez, Irene 27
Schoelz, John 28
Taguenang, J. M. 48
Tanmoy, MM Reazul 29
Totsch, Ross 47
Vu, Thanh Chi 45

GRSP Campus Coordinators **Page**

Bartol, Frank 54
Berkowitz, David 53
Deng, ZT 55
Lawson, Chris 55
Napier, Audrey 56
Steadman, John 56
Wiest, John 54
Zainuddin, Shaik 53

Staff

Perryman, Briauna 57
Nix, Charlotte 57

Joshua Hall (page 19) is studying brown anole lizards (Anolis sagrei) to assess how urban environments enhance reproduction in an urban-exploiting invasive species.

Front cover:
Alexandria Bredar (p. 35) is studying nanoparticles for their catalytic properties.

Back cover:
Ajodeji Oludare Ipinmoroti (p. 32) is studying Chlamydia, a pathogen that infects the human reproductive tract.

GRSP Alumni

2007
Hunter Hyche, MS
Andrew Gallian, PhD

2008
Redahagn Sileshi, MS
Sai Santosh Bangalore, MS
Fernando Calzzani, MS
Renato A. Minamisawa,MS
Vijay Eppakayala, MS
Deepak V. Kini, MS
Bopha Chhay, PhD
Chethan Acharya, PhD
Jejal Reddy Bathi, PhD
Cosmin Dumitrescu, PhD
Jean M. Taguenang, PhD
Wanda Denise Jones, PhD
Merlin Theodore, PhD
Sergio Fabi, PhD
Humberto Rangel, PhD

2009
Matt Dodson, MS
Ivy Kystal Jones, MS
Tiffany Frazier, MS
Yu Xiang, MS
Ester Haugabrooks, MS
Shantel King, MS
David Johnson, MS
Amicia Elliott, MS
Dechassa Duressa , PhD
Sudhir Aluwalia, PhD
Miranda Byrne-Steele, PhD
Erin Imsand, PhD
Min Zhong, PhD
Shaik Zainuddin, PhD
GiHan Kwon, PhD
Huizhen Zhu, PhD
Changsu Kim, PhD
Samuel Owens, Jr., PhD

2010
Bethany Crean-Harris, MS
Hannah Harding, MS
Shoieb Shaik, MS
Ines Sampayo, MS
Erin Donovan, PhD
Chengdong Huang, PhD
Ke Jiang, PhD
Larissa Parsley, PhD
Chuanling Xu, PhD
Qing Yang, PhD
Tarig Hassan, PhD
Jessie Mayo, Jr., PhD
Tiffany N. Williams, PhD
Nydeia W. Bolden, PhD
Celina Bochis, PhD
Yahao Lu, PhD
Abilash Nair, PhD
Alan Martinez, PhD
NoSoung Myoung, PhD
Jonathan Williams, PhD
Joel Andrews, PhD
Samer Swedan, PhD
Mary E. R. Moore, PhD
Wei Li, PhD
Ronny Hughes, PhD

2011
Andrew Cantrell, MS
Tomeka Colon, MS
Paul Robertson, MS
Farhana Afroz, MS
Danalea Skarra, MS
Bradford Wilson, MS
Emily Gordon, MS
Malek Abunaemeh, PhD
Stephanie Freeman, PhD
Susan Balenger, PhD
Yanli (Joyce) Chen, PhD
Liwu Fan, PhD
Maninder Sandey, PhD
Christina B. Schmidt, PhD
Charles Solvason, PhD
Aldington Allie, PhD
Gregory Strawder, PhD
Bianzhu Fu, PhD
Xin Yang, PhD
Parimal Bapat, PhD
Jason Freeman, PhD
Justin Sheff, PhD
John Smith, PhD
Yuri Terkhov, PhD
P. Keith Veronese, PhD
Yi Chen, PhD
Alireza Hassenzadeh, PhD
Li Qiu, PhD
Reza Sarvestani, PhD
Yang Zou, PhD
Noboru Togawa, PhD
Randall Wilson, PhD

2012
Mallory Messersmith, MA
Basil Farah, MS
Mohammad Hossain, PhD
Jianguo Lu, PhD
Manju Nanjappa, PhD
Jingyuan Xiong, PhD
Sandrea B. Young, PhD
Rezwanur Rahman, PhD
Dheeraj Raju , PhD
Po Sun, PhD
Khalid Tantawi, PhD
K.P. Venkataramanan, PhD
Luai Hasoun, PhD

2013
Arefin Tauhid, MS
Nathan Brock, MS
Sayna Ebrahimi, MS
Sungmin Kim, MS
Kathleen Ann Roberts, PhD
Johanna Cannon, PhD
Kailash Jajam, PhD
Padma Sundaram, PhD
Christopher Ward, PhD
David Baah, PhD
Alfred Tcherbi-Narteh, PhD
Gang Shen, PhD
Hunter Sims, PhD
Ross Ptacek, PhD
Yuanli Zhang, PhD
Caitlin Cassidy, PhD
Talitha Caudle, PhD
Brian Fayock, PhD
Zeyu Pan, PhD

2014
Padraic T. Conner, MS
Sandra Sadat, MS
Brandie Stringer, MS
Hunter Rogers, MS
Md. Ariful Ahsan, MS
Erin McDonald, MS
Syed Misbahuddin, MS
Ashwith Chilvery, PhD
Hasan Babaei, PhD
Hamed Ghaednia, PhD
Justin Havird, PhD
Shikai Liu, PhD
Selcuk Poyraz, PhD
Vitus Apalangya, PhD
Diane Render, PhD
Anne Coppa, PhD
Xibing Gong, PhD
Caleb Hill, PhD
Yaolin Xu, PhD
Peter Barfknecht, PhD
Samantha D. Hastings, PhD
Tae Kim, PhD

2015
Rabih Al Ghossein, MS
Austin Branch, MS
Morgan Davis, Jr., MS
Maria Poupard, MS
K. Neil Ruckart, MS
Ghanem Sabeeh, MS
Shartori Meadows, MS
Carlton W. Farley III, PhD
Santosh K. Ojha, PhD
Raja Suradhi, PhD
Delicia Peoples, PhD
Sharooz Amidi, PhD
Daniel Clayton, PhD
William Horne, PhD
Shoieb Shaik, PhD
Ninfa Constante, PhD
Melike Dizbay-Onat, PhD
Patrick Hwang, PhD
Rongwen Lu, PhD
William Willouhby, PhD
Laxman Adhikari, PhD
Dan Ke, PhD
Wonkyu Kim, PhD

2016
Mercedes Bartkovich, MS
Justin Roberts, MS
Kevin Messenger, PhD
Sherita Moses, PhD
Wesley Sims, PhD
Alexander Hodge, PhD
Petra Kercher, PhD
Richard Mariita, PhD
Shantanu Pradhan, PhD
Narendra Sadhwani, PhD
Kristy Crews, PhD
Vertonica P. Rose, PhD
Kaushal Prayakarao, PhD
Boniface Tiimob, PhD
Dereca W. Hubbard, PhD
Todd Butler, PhD
Bo Cheng, PhD
Nabil Dawahre, PhD
Zhichao Shan, PhD
Justin Martin, PhD
Jeremy Peppers, PhD
Rohit Dhariwal, PhD
Semih Dinc, PhD
William Gaillard, PhD
Lin Yang, PhD

2017
Janine Antalffy, MS
Iwo Gross, MS
Mohammad Zaheeruddin, MS
Jackson Cunningham, MS
Chukwuma Nweke, PhD
Lisui Bao, PhD
Alan Hanley, PhD
Pengcheng Li, PhD
Rajdeep Shakya, PhD
Yuan Zeng, PhD
Chemar Huntley, PhD
Shartori Meadows, PhD
Tyler Kaub, PhD
Kristine Marson, PhD
Jennifer Sherwood, PhD
Xioqing Wang, PhD
Grant Alexander, PhD
Dominique Everett, PhD
Sarthak Dasadia, PhD
Hong Guo, PhD
Vijaya Rani, PhD

2018
Jonathan Mills, MS
Mohammad Bhaktiar Uddin, MS
Mohanad Idrees, MS
Fariborz Bayat, MS
Valeria King, MS
Sebastian Kirmse, MS
Yi Zeng, PhD
Daniel Depperschmidt, PhD
Sharniece Holland, PhD
Lei Hu, PhD
Nelly Kaneza, PhD
Karim Budhwani, PhD
Ethan Cagle, PhD
Zachary Lindsey, PhD
Yuxi Sun, PhD
Dipenkumar K. Barot, PhD
Zhitong Li, PhD
Sayed Mirshafieyan, PhD
Abubaker Tareki, PhD

2019
Kavitha Abiraman, PhD
Shofolaw Bakare, MS
Tareq Hossain, MS
Timothy Howton, PhD
Wei Li, PhD
Yanxiao Ma, PhD
Sushan Nakarmi, PhD
Ekwuazi Onyekachi, MS
Easir Papon, PhD
Suengjo Park, PhD
Farooq Syed, PhD
Yuan Tian, PhD
Armin VahidMohammadi, PhD
Delroy Watson, MS
Chistina Young, MS

GRSP Quick Reference Guide

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
12, 13	Abiraman	Kavitha	UAB	PhD	2019	Neuroscience
4, 5, 6	Abunaemeh	Malek	AAMU	PhD	2011	Physics
3	Acharya	Chethan	UA	PhD	2008	Chemical and Biological Engineering
1	Adams	Brian	USA			
14	Adhikari	Kiran	UAB	PhD	2020	Physics
9	Adhikari	Laxman	UAH	PhD	2015	Space Science
14	Afrin	Taiaba	UAB	PhD	2022	Plant Biology
6	Afroz	Farhana	UA	MS	2011	Aerospace Engineering
13, 14	Ahmadi	Amir	UAH	PhD	2020	Civil and Environmental Eng
14	Ahmed	Sajid	UA	PhD	2022	Aerospace Engineering and Mechanics
14	Ahmed	Syed Salman	TU	MS	2021	Materials Science and Engineering
8	Ahsan	Md. Ariful	TU	MS	2014	Chemistry
9	Al Ghossein	Rabih	AU	MS	2015	Mechanical Engineering
10, 11	Alexander	Grant	UAB	PhD	2017	Biomedical Engineering
4, 5, 6	Allie	Aldington	TU	PhD	2011	Materials Science and Engineering
3, 4, 5	Aluwalia	Sudhir	AU	PhD	2009	Veterinary Biological Sciences
7, 8	Amidi	Sharooz	UA	PhD	2015	Civil, Constr and Envir Eng
4, 5	Andrews	Joel	USA	PhD	2010	Biochemistry and Molecular Biology
11	Antalffy	Janine	AAMU	MS	2017	Biology
6, 6S, 7	Apalangya	Vitus	TU	PhD	2014	Material Sciences
4, 5, 6	Baah	David	TU	PhD	2013	Materials Science and Engineering
6, 7, 8	Babaei	Hasan	AU	PhD	2014	Mechanical Engineering
13	Bakare	Shofolawe	TU	MS	2019	Materials Science and Engineering
4, 5, 6	Balenger	Susan	AU	PhD	2011	Biological Science
2	Bangalore	Sai Santosh	UAB	MS	2008	Electrical and Computer Engineering
11	Bao	Lisui	AU	PhD	2017	Molecular Genetics and Biotechnology
3, 4	Bapat	Parimal	UAB	PhD	2011	Physics
7, 8	Barfknecht	Peter	UAB	PhD	2014	Materials Science and Engineering
10, 11	Barot	Dipenkumar K.	UAH	PhD	2018	Physics
9, 10	Bartkovich	Mercedes	AAMU	MS	2016	Wildlife

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
13, 14	Bashyal	Keshab	UA	PhD	2020	Metallurgical and Materials Engineering
13, 14	Basu	Sattik	UAH	PhD	2022	Aerospace Eng
1, 2	Bathi	Jejal Reddy	UA	PhD	2008	Civil and Environmental Engineering
11, 12	Bayat	Fariborz	USA	MS	2018	Mechanical Engineering
12	Bhaktiar Uddin	Mohammad	TU	MS	2018	Materials Science and Engineering
14	Blanchet	Miles	AU	PhD	2020	Physics
2	Bochis	Celina	UA	PhD	2010	Civil Engineering
14	Boudreaux	Chance	UA	PhD	2021	Chemistry
9	Branch	Austin	AU	MS	2015	Mechanical Engineering
14	Bredar	Alex	AU	PhD	2021	Chemistry
7	Brock	Nathan	USA	MS	2013	Mechanical Engineering
5, 6	Brundidge-Young	Sandrea	TU	PhD	2012	Materials Science and Engineering
10, 11	Budhwani	Karim	UAB	PhD	2018	Materials Science and Engineering
14	Bulls	Stephanie	USA	MS	2020	Biology
14	Burch	Ashlyn	UAB	PhD	2020	Physics
7, 8, 9	Butler	Todd	UA	PhD	2016	Metallurgical and Materials Engineering
1, 2, 4, 5	Byrne-Steele	Miranda	UAH	PhD	2009	Bioengineering, Biology, Chemistry
9, 10, 11	Cagle	Ethan	UAB	PhD	2018	Chemistry
3	Calzzani	Fernando	AAMU	MS	2008	Surfance Enhanced Raman Scattering
3, 4, 5	Cannon	Johanna	AU	PhD	2013	Biological Science
6	Cantrell	Andrew	AAMU	MS	2011	Natural Resources, Environmental Studies
4, 5	Cassidy	Caitlin	UAH	PhD	2013	Biotechnology
3, 4	Caudle	Talitha	UAH	PhD	2013	Biomedical/ Biotechnology
11, 12, 13	Chen	Jinnan	UAH	PhD	2019	Electrical and Computer Engineering
3	Chen	Yanli (Joyce)	AU	PhD	2011	Chemical Engineering, Bioengineering
6	Chen	Yi	UAH	PhD	2011	Computer Science
9	Cheng	Bo	UA	PhD	2016	Mechanical Engineering/Manufacturing
1, 2	Chhay	Bopha	AAMU	PhD	2008	Materials Science, Physics
13, 14	Chi Vu	Thanh	UAH	PhD	2021	Civil and Environmental Engineering
8	Chilvery	Ashwith	AAMU	PhD	2014	Materials Science and Engineering
7	Clayton	Daniel	UA	PhD	2015	Metallurgical and Materials Engineering

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
14	Clohan	Katherine	AU	PhD	2021	Chemistry and Biochemistry
5, 6	Colon	Tomeka	AAMU	MS	2011	Materials Engineering
7, 8	Conner	Padraic T.	AAMU	MS	2014	Forestry
7, 9, 10	Constante	Ninfa	UAB	PhD	2015	Materials Science and Engineering
7, 8	Coppa	Anne	UA	PhD	2014	Metallurgical and Materials Engineering
1, 2	Crean-Harris	Bethany	AU	MS	2010	Animal Science
9, 10	Crews	Kristy	TU	PhD	2016	Materials Science and Engineering
13, 14	Cronin	Bryan	AU	PhD	2020	Chemistry
11, 12	Cunningham	Jackson	USA	MS	2017	Chemical Engineering
11	Dasadia	Sarthak	UAH	PhD	2017	Physics
14	Davis	Taylor	UAB	PhD	2023	Behavioral Neuroscience
7, 8	Davis, Jr.	Morgan	TU	MS	2015	Materials Science
8, 9	Dawahre	Nabil	UA	PhD	2016	Material Science
11	Depperschmidt	Daniel	UA	PhD	2018	Mechanical Engineering
9, 10	Dhariwal	Rohit	UAH	PhD	2016	Mechanical Engineering
10	Dinc	Semih	UAH	PhD	2016	Mechanical and Aerospace Engineering
13	Dinuke	Sashi	UA	PhD	2020	Geography
7, 8, 9	Dizbay-Onat	Melike	UAB	PhD	2015	Interdisciplinary Engineering/ Materials Science and Engineering
2	Dodson	Matt	AU	MS	2009	Cellular and Molecular Biology
13, 14	Donnan	Patrick	AU	PhD	2021	Chemistry
1	Donovan	Erin	AU	PhD	2010	Cellular and Molecular Biology
4	Dumitrescu	Cosmin	UA	PhD	2008	Mechanical Engineering
14	Duong	Lam	AAMU	PhD	2022	Plant Science
4	Duressa	Dechassa	AAMU	PhD	2009	Molecular Biology
7	Ebrahimi	Sayna	USA	MS	2013	Mechanical Engineering
3	Elliott	Amicia	UAH	MS	2009	Structural Biology
3	Eppakayala	Vijay	UA	MS	2008	Environmental Engineering
12	Everett	Dominique	UAB	PhD	2017	Materials Science and Engineering
1,2	Fabi	Sergio	UA	PhD	2008	Physics
5, 6	Fan	Liwu	AU	PhD	2011	Mechanical Engineering

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
5, 6, 6S	Farah	Basil	USA	MS	2012	Mechanical Engineering
7, 8, 9	Farley III	Carlton W.	AAMU	PhD	2015	Physics
6	Fayock	Brian	UAH	PhD	2013	Physics
11	Finklea	Ferdous	AU	PhD	2020	Chemical Engineering
1	Floyd	Melissa	UAB			
3	Frazier	Tiffany	AAMU	MS	2009	Surfance Enhanced Raman Scattering
5, 6	Freeman	Jason	UAB	PhD	2011	Chemistry
4, 5	Freeman	Stephanie	AAMU	PhD	2011	Air Quality and Land Use Change
13, 14	French	David	UAB	PhD	2020	Chemistry
4, 5, 6	Fu	Bianzhu	UA	PhD	2011	Metallurgical and Materials Engineering
7, 8, 9	Gaillard	William	UAH	PhD	2016	Electrical and Computer Engineering
1	Gallian	Andrew	UAB	PhD	2007	Physics
13, 14	Gan	Zhuoran	UAH	PhD	2020	Chemical Engineering
7	Ghaednia	Hamed	AU	PhD	2014	Mechanical Engineering
8	Gong	Xibing	UA	PhD	2014	Mechanical Engineering
2	Goodson	Kenya	UA			Civil Engineering
3, 4	Gordon	Emily	UAH	MS	2011	Structural Biology
13, 14	Gott	Ryan	UAH	PhD	2021	Aerospace Engineering
14	Graves	Carson	USA	MS	2020	Chemical Engineering
11	Gross	Iwo	AAMU	MS	2017	Biology
7, 8, 9	Guo	Hong	UAH	PhD	2017	Electrical and Computer Engineering
14	Hall	Joshua	AU	PhD	2020	Chemistry
10, 11, 12	Hanley	Alan	AU	PhD	2017	Chemical Engineering
4	Harding	Hannah	TU	MS	2010	Materials Science and Engineering
13, 14	Harges	Ellyn	AU	PhD	2020	Mechanical Engineering
4,5,6	Hasoun	Luai	USA	PhD	2012	Basic Medical Sciences
3, 4, 5	Hassan	Tarig	TU	PhD	2010	Bio-Nanocomposite Materials
4, 5, 6	Hassenzadeh	Alireza	UAH	PhD	2011	Electrical Engineering
3, 4, 6, 7	Hastings	Samantha Delmont	UAB	PhD	2014	Inorganic Chemistry

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
2	Haugabrooks	Ester	TU	MS	2009	Environmental Science
6, 6S, 7	Havird	Justin	AU	PhD	2014	Biological Science
11, 12, 13	Hembrick-Holloman	Vincent	TU	PhD	2020	Material Science and Engineering
8	Hill	Caleb	UA	PhD	2014	Chemistry
7	Hodge	Alexander	AU	PhD	2016	Chemical Engineering
11	Holland	Sharniece	UA	PhD	2018	Materials Science
8	Horne	William	UA	PhD	2015	Chemical and Biological Engineering
6, 6S	Hossain	Mohammad	AU	PhD	2012	Microbiology
13	Hossain	Tareq	TU	MS	2019	Materials Science and Engineering
12, 13	Houserova	Dominika	USA	PhD	2020	Medical Sciences
12, 13	Howton	Timothy	UAB	PhD	2019	Biology
11	Hu	Lei	UA	PhD	2018	Electrical Engineering
3, 4, 5	Huang	Chengdong	AU	PhD	2010	Biochemistry
1, 2, 4, 5	Hughes	Ronny	UAH	PhD	2010	Bioengineering, Chemistry, Life Sciences
11	Huntley	Chemar	TU	PhD	2017	Materials Science and Engineering
8, 9	Hwang	Patrick	UAB	PhD	2015	Biomedical Engineering
1	Hyche	Hunter	UA	MS	2007	Environmental Engineering
12	Idrees	Mohanad	TU	MS	2018	Materials Science and Engineering
3	Imsand	Erin	AU	PhD	2009	Biochemistry
14	Iqbal	Zabed	UAH	PhD	2021	Electrical Engineering
7	Jajam	Kailash	Au	PhD	2013	Mechanical Engineering
1,2,4	Jiang	Ke	AU	PhD	2010	Biological Science
2, 4	Johnson	David	UAB	MS	2009	Bioengineering, Computer Science
14	Johnson	Shardai	TU	PhD	2022	Materials Science and Engineering
1, 2	Jones	Ivy Kystal	TU	MS	2009	Materials Science and Engineering
1, 2	Jones	Wanda Denise	TU	PhD	2008	Materials Science and Engineering
12	Kaneza	Nelly	UA	PhD	2018	Analytical Chemistry
9, 10, 11	Kaub	Tyler	UA	PhD	2017	Metallurgical and Materials Engineering
7, 8	Ke	Dan	UAH	PhD	2015	Optical Science and Engineering
10	Kercher	Petra	AU	PhD	2016	Chemical Engineering

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
1, 2, 4	Kim	Changsu	UAB	PhD	2009	Physics
7	Kim	Sungmin	USA	MS	2013	Mechanical Engineering
7, 8	Kim	Tae	UAH	PhD	2014	Physics
7, 8, 9	Kim	Wonkyu	UAH	PhD	2015	Electrical and Computer Engineering
2	King	Shantel	TU	MS	2009	Materials Science and Engineering
11, 12	King	Valeria	USA	MS	2018	Biology
1	Kini	Deepak V.	UAB	MS	2008	Mechanical Engineering
11, 12	Kirmse	Sebastian	USA	MS	2018	Mechanical Engineering
1	Knowles	Kaye	AAMU			
12, 13, 14	Koenig	Thomas	UA	PhD	2021	Materials Science and Engineering
3	Kwon	GiHan	UA	PhD	2009	Energy, Fuel Cells
10	Li	Pengcheng	AU	PhD	2017	Chemical Engineering
13	Li	Wei	AU	PhD	2019	Computer Science and Software Engineering
3,4	Li	Wei	UA	PhD	2010	Chemical Engineering
10	Li	Zhitong	UAH	PhD	2018	Electrical and Computer Engineering
12	Liggins	Kristopher	AAMU	PhD	2021	Physics
10, 11, 12	Lindsey	Zachary	UAB	PhD	2018	Physics
8	Liu	Shikai	AU	PhD	2014	Fish Genomics
6, 6S	Lu	Jianguo	AU	PhD	2012	Catfish Genomics
8	Lu	Rongwen	UAB	PhD	2015	Biomedical Engineering
3,4, 5	Lu	Yahao	UA	PhD	2010	Electrochemical Engineering
11	Ma	Yanxiao	UA	PhD	2019	Chemistry
9, 10	Mariita	Richard	AU	PhD	2016	Biological Science
8, 9, 10	Marson	Kristine	UA	PhD	2017	Integrative Animal Behavior
8, 9, 10	Martin	Justin	UAB	PhD	2016	Inorganic Chemistry
3, 4	Martinez	Alan	UAB	PhD	2010	Physics
3	Mayo, Jr.	Jessie	TU	PhD	2010	Materials Science and Engineering
8	McDonald	Erin	USA	MS	2014	Mechanical Engineering
9, 10, 11	Meadows	Shartori	TU	MS/Phd	2017	Materials Science and Engineering
8, 9, 10	Messenger	Kevin	AAMU	PhD	2016	Wildlife

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
6, 6S	Messersmith	Mallory	UAB	MA	2012	Anthropology
1	Michael	Kimberly	UA			
12	Mills	Jonathan	AAMU	MS	2018	Applied Physics
3	Minamisawa	Renato A.	AAMU	MS	2008	Ion Beam, Nanolithography, Physics
10, 11, 12	Mirshafieyan	Sayed	UAH	PhD	2018	Mechanical and Aerospace Engineering
8	Misbahuddin	Syed	USA	MS	2014	Chemical Engineering
9, 10	Moses	Sherita	AAMU	PhD	2016	physics/optics
1, 2, 4, 5	Myoung	NoSoung	UAB	PhD	2010	Physics
14	Nabil	Hogue	UAH	PhD	2021	Optical Science and Engineering
4, 5	Nair	Abilash	UA	PhD	2010	Engineering Science and Mechanics
12, 13, 14	Nair	Sangeeta	UAB	PhD	2020	Neurology
12, 13	Nakarmi	Sushan	UA	PhD	2019	Aero Space Eng and Mechanics
14	Nakod	Pinaki	UA	PhD	2022	Chemical Engineering
4	Nanjappa	Manju	AU	PhD	2012	Veterinary Biological Sciences
12, 13	Narkhede	Akshay	UA	PhD	2021	Chemical Biological Engineering
1	Ndeqwa	Eunice	TU	MS		
3	Nelson-Williams	Tiffany	TU	PhD	2010	Materials Science and Engineering
10	Nweke	Chukwuma	TU	MS/PhD	2017	Materials Science and Engineering
7, 8, 9	Ojha	Santosh K.	AAMU	PhD	2015	Forestry
14	Oledare Ipinmoroti	Ayodeji	ASU	PhD	2023	Microbiology
13	Onyekachi	Ekwuazi	TU	MS	2019	Materials Science and Engineering
12, 13, 14	Orangi	Jafar	AU	PhD	2020	Materials Science and Engineering
1,2	Owens, Jr.	Samuel	UAB	PhD	2009	Chemistry
14	Palwai	Sharvare	AAMU	PhD	2020	Electronics and Communication Engineering
7	Pan	Zeyu	UAH	PhD	2013	Electrical and Computer Engineering
11	Papon	Easir	UA	PhD	2019	Aerospace Engineering and Mechanics
12, 13, 14	Park	Suengjo	UA	PhD	2019	Chemical Biological Engineering
1, 2	Parsley	Larissa	AU	PhD	2010	Microbiology
8	Peoples	Delicia	TU	PhD	2015	Materials Science and Engineering
7, 8, 9	Peppers	Jeremy	UAB	PhD	2016	Physics

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
13, 14	Phillips	Christopher	UAH	PhD	2020	Atmospheric Science
9	Poupard	Maria	TU	MS	2015	Materials Science and Engineering
10	Powell-Rose	Vertonica	TU	PhD	2016	Materials Science and Engineering
8	Poyraz	Selcuk	AU	PhD	2014	Polymer and Fiber Engineering
8	Pradhan	Shantanu	AU	PhD	2016	Chemical Engineering
8, 9, 10	Prayakarao	Kaushal	TU	PhD	2016	Materials Science and Engineering
14	Prince	Gabrielle	USA	MS	2021	Biology
6	Ptacek	Ross	UAB	PhD	2013	Mathematics
3, 4	Qiu	Li	UAH	PhD	2011	Structural Biology
6, 6S	Rahman	Rezwanur	UA	PhD	2012	Mechanical Engineering
2	Raju	Dheeraj	UA	PhD	2012	Educational Research
1	Rangel	Humberto	UA	PhD	2008	Civil Engineering
11, 12	Rani	Vijaya	UAH	PhD	2017	Mechanical Engineering
7, 8	Render	Diane	TU	PhD	2014	Materials Science
13	Rich	Megan	UAB	PhD	2020	Radiology
10	Roberts	Justin	USA	MS	2016	Biological Sciences
4, 5, 6	Roberts	Kathleen Ann	AAMU	PhD	2013	Agriculture and Environmental Sciences
6	Robertson	Paul	AAMU	MS	2011	Optics and Lasers
8	Rogers	Hunter	AU	MS	2014	Chemical Engineering
2, 4, 5	Rogers-Moore	Mary Ellen	TU	PhD	2010	Material Sciences
8, 9	Ruckart	K. Neil	USA	MS	2015	Chemical Engineering
14	Russell	Michael	USA	MS	2021	Biology
9	Sabeeh	Ghanem	USA	MS	2015	Chemical Engineering
4, 5, 7	Sadat	Sandra	AAMU	MS	2014	Optics/Physics
8, 9, 10	Sadhwani	Narendra	AU	PhD	2016	Chemical Enginering
4, 5	Sampayo	Ines	USA	MS	2010	Mechanical Engineering
14	Sanchez-Gonzalez	Irene	AU	PhD	2023	Biology
4	Sandey	Maninder	AU	PhD	2011	Veterinary Medicine
4, 5, 6	Sarvestani	Reza	UAH	PhD	2011	Electrical Engineering
3, 4	Booher	Christina	AU	PhD	2011	Biological Sciences

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
14	Schoelz	John	UAB	PhD	2022	Biology
3, 4, 5	Shaik*	Shoieb	TU	MS	2010	Electrical Engineering
6	Shaik*	Shoieb	UA	PhD	2015	Electrical and Computer Engineering
11, 12	Shakya	Rajdeep	AU	PhD	2017	Biosystems Engineering
10	Shan	Zhichao	UA	PhD	2016	Chemistry
3, 4, 5, 6	Sheff	Justin	UAB	PhD	2011	Inorganic Chemistry
6, 6S, 7	Shen	Gang	UA	PhD	2013	Materials Science
10	Sherwood	Jennifer	UA	PhD	2017	Chemical and Biological Engineering
3	Sileshi	Redahagn	AAMU	MS	2008	UV Nanolithography
4	Sims	Hunter	UA	PhD	2013	Physics
10, 11	Sims	Wesley	AAMU	PhD	2016	Applied Physics
13	Singh	Talwinder	UAH	PhD	2020	Space Science
1, 2, 4	Skarra	Danalea	USA	MS	2011	Basic Medical Sciences
4, 5, 6	Smith	John	UAB	PhD	2011	Materials Science and Engineering
5	Solvason	Charles	AU	PhD	2011	Chemical Engineering
6	Strawder	Gregory	TU	PhD	2011	Materials Science and Engineering
7, 8	Stringer	Brandie	AAMU	MS	2014	Plant and Soil Science
6. 6S	Sun	Po	UAH	PhD	2012	Optical Science and Engineering
10, 11	Sun	Yuxi	UAB	PhD	2018	Biomedical Engineering
6, 6S, 7	Sundaram	Padma	AU	PhD	2013	Drug Delivery
7, 8, 9	Suradhi	Raja	AAMU	PhD	2015	Physics
3, 4, 5	Swedan	Samer	USA	PhD	2010	Basic Medical Sciences
11, 12, 13	Syed	Farooq	TU	PhD	2019	Materials Science
1,2,3	Taguenang	Jean Michel	AAMU	PhD	2008	Physics
14	Tanmoy	Md	USA	MD	2020	Electrical Engineering
5,6, 6S	Tantawi	Khalid	UAH	PhD	2012	Electrical Engineering
10, 11, 12	Tareki	Abubaker	UAH	PhD	2018	Electrical and Computer Engineering
7	Tauhid	Arefin	TU	MS	2013	Materials Science
6, 6S	Tcherbi-Narteh	Alfred	TU	PhD	2013	Materials Science and Engineering
4	Terkhov	Yuri	UAB	PhD	2011	Laser Physics

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
1	Theodore	Merlin	TU	PhD	2008	Materials Science and Engineering
13	Tian	Yuan	AU	PhD	2019	Chemical Engineering
7, 8, 9	Tiimob	Boniface	TU	MS/PhD	2016	Materials Science and Engineering
1, 2, 4, 5, 6	Togawa	Noboru	UA	PhD	2011	Environmental and Civil Engineering
12, 13, 14	Totsch	Timothy	UAB	PhD	2020	Chemistry
11, 12, 13	VahidMohammadi	Armin	AU	PhD	2019	Materials Engineering
6, 6S	Venkataramanan	K.P.	UAH	PhD	2012	Biotechnology Science and Engineering
3, 4	Veronese	Phillip Keith	UAB	PhD	2011	Chemistry
10	Wang	Xioqing	UA	PhD	2017	Mechanical Engineering/Materials Processing
7	Ward	Christopher	AU	PhD	2013	Material Sciences
2	Watkins	Renita	AAMU			
7	Watkins Hubbard	Dereca	TU	PhD	2016	Material Sciences
13	Watson	Delroy	TU	MS	2019	Materials Science and Engineering
13	White	Rebecca	UAB	PhD	2020	Physical and Occupational Therapy
1, 2, 4, 5	Williams	Jonathan	UAB	PhD	2010	Physics
7, 8	Willouhby	William	UAB	PhD	2015	Physics
2, 6	Wilson	Bradford	UA	MS	2011	Environmental and Civil Engineering
1, 2, 4	Wilson	Randall	UAH	PhD	2011	Structural Biology
4	Wong	Yong K.	USA	PhD	2011	
3, 4	Wright-Bolden	Nydeia	TU	PhD	2010	Bio-Nanotechnology, Materials Science
1	Xiang	Yu	AU	MS	2009	Biological Science
6, 6S	Xiong	Jingyuan	AU	PhD	2012	Biochemistry
4	Xu	Chuanling	AU	PhD	2010	Food Science
7	Xu	Yaolin	UA	PhD	2014	Chem/Bio Engineering
7, 8, 9	Yang	Lin	UAH	PhD	2016	Physics
4	Yang	Qing	AU	PhD	2010	Computer Science
5, 6	Yang	Xin	UA	PhD	2011	Biological Science
12, 13	Young	Christina	TU	MS	2019	Materials Science and Engineering
11, 14	Zaheeruddin	Mohammad	TU	MS 2017; PhD 2021	2021	Materials Science and Engineering
3	Zainuddin	Shaik	TU	PhD	2009	Materials Science and Engineering
10, 11, 12	Zeng	Yi	AU	PhD	2018	Mechanical Engineering
9	Zeng	Yuan	AU	PhD	2017	Entolomology/Microbiology

FUNDING ROUNDS	LAST NAME	FIRST NAME	INST.	GOAL	DATE	RESEARCH FIELD
6, 6S, 7	Zhang	Yuanli	UAB	PhD	2013	Physics
1, 2	Zhong	Min	AU	PhD	2009	Biological Science
3, 4, 5	Zhu	Huizhen	UA	PhD	2009	Energy, Fuel Cells
6, 6S	Zou	Yang	UAH	PhD	2011	Optical Science and Engineering

Alabama EPSCoR Steering Committee

Dr. Christopher S. Brown
Chair, Alabama EPSCoR Steering Committee (3/2018)
Vice President for Research
University of Alabama at Birmingham

Dr. Paul B. Mohr, Sr.
Proxy for Dr. James Purcell
Director of Special Programs
Alabama Commission on Higher Education

Dr. Shaik Jeelani
Vice-Chair, Alabama EPSCoR Steering Committee (3/2018)
Vice President for Research and Sponsored Programs
Dean of Graduate Studies
Tuskegee University

Dr. Robert (Bob) Lindquist
Interim Vice President for Research and Economic Development
The University of Alabama in Huntsville

Ms. Lynne U. Chronister
Vice President for Research and Economic Development
University of South Alabama

Mr. Steve R. Spencer
President, Economic Development Partnership of Alabama

Dr. Daniel Wims
Provost and Vice-President for Academic Affairs
Vice-President for Research
Alabama A&M University

Dr. Jim Weyhenmeyer
Vice President for Research
Auburn University

Dr. Russell Mumper
Vice President for Research and Economic Development
The University of Alabama

Dr. Christine Thomas
Associate Vice President for Institutional Effectiveness
Alabama State University

GRADUATE RESEARCH SCHOLARS PROGRAM

Alabama EPSCoR
University of Alabama at Birmingham
1720 2nd Avenue South, AB 770P
Birmingham, AL 35294-0107