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.
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October 1, 2009

Dear Colleagues:

Since 2006, the State of Alabama has invested more than $4 million in support of the Graduate Research Scholars Program (GRSP), a program offering research opportunities to over one-hundred graduate students under the guidance of Alabama’s finest scientists and researchers. The GRSP announced its fifth round of awardees in August 2009.

The stories of recipients are told in the pages that follow: Who they are, where they are conducting their research, areas of study, current status, and career plans. Their work foretells the future of nanotechnology, biomedicine, chemistry, and environmental management. They are engaged in the development of new materials for industry and the military, the discovery of new energy resources, and the serious business of pharmacological research.

Former GRSP scholars are employed as scientists and engineers for private industry, academia, and government in the United States and around the world including Canada, Germany, Japan, and Columbia. Some are pursuing doctoral and postdoctoral studies in Europe and throughout the United States at prestigious institutions. A number are in the military, and others remain to work, teach, and continue their studies in Alabama.

Our GRSP scholars set a standard of high expectation for the future of Alabama and will continue to be major contributors to national and international efforts in building a sound global economy.

Respectfully,

Richard B. Marchase, Ph.D.
Chair, Alabama EPSCoR Steering Committee
Vice President for Research
University of Alabama at Birmingham
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. 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 brightest and best of our 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). Subsequently (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 NSF, Department of Energy (DOE), National Aeronautics Space Administration (NASA), U. S. Department of Agriculture (USDA), Environmental Protection Agency (EPA), and Department of Defense (DOD).

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 $4 million in support of the GRSP.\(^2\) An estimated one-hundred eight (108) students have been recipients of one-hundred ninety (190) awards, with a number of students benefitting from multi-year awards.

The highly competitive process includes the circulation of a Request for Proposal, rigorous internal institutional review and ranking of applications, and selection by members of a peer review team which makes recommendations for final awards. The fifth round of competition was conducted in August for FY 2009-10 awards. Of the ninety-one (91) applications submitted, forty-one (41) awards were granted.

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\(^1\)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.

\(^2\) Due to proration in FY 2008-09, the actual amount available for distribution was reduced by 9%.
## Round 4 Scholars

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## Round 5 Scholars

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**Degrees Granted**

As of October 2009, the GRSP Program had supported twelve M.S. graduates and nineteen doctoral students. An additional three M.S. and three Ph.D. graduates are expected to finish in December 2009. In 2010, the GRSP is expecting its largest number of graduates: four M.S. degrees and thirty-one Ph.D. graduates.

**Gender**

During the first three rounds of funding, males received 58% of the awards while females received 42%. In Round Four, thirty-four males and eighteen females were funded. Currently in Round Five, twenty-seven males and twelve females are funded.

**Research Areas**

The table below shows general areas of study. However, many scholars have multi-faceted research encompassing more than one discipline. General areas of study include: 1) Biological Sciences (protein studies, structural biology, bioengineering, cellular and molecular biology, genetics, and microbiology); 2) BioMed Sciences (food science, antimicrobial systems, basic medical sciences, and biochemistry); 3) Chemistry (inorganic chemistry, molecular motors, sensor protection, energy, and fuel cells); 4) Engineering (chemical and biological engineering, materials science and engineering, mechanical engineering, environmental engineering, electrical, and computer engineering); 5) Environmental Sciences (agricultural practices, air quality, land use, and soils); and 6) Physics (lasers, optics, material sciences, and nanotechnology).

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Miranda Byrne-Steele, an EPSCoR Graduate Research Scholar pursuing a Ph.D. in the Biotechnology Science and Engineering program at the University of Alabama in Huntsville presented highlights of her research entitled, Living Life in the Extreme to the Alabama Commission on Higher Education on March 13, 2009.

The research lab to which Miranda belongs studies the three-dimensional structure of proteins derived from microorganisms that thrive in diverse environments, such as high heat and extreme cold (extremophiles), by a very powerful technique called X-ray crystallography. This technique allows for visualization of a protein at the atomic scale. The insight provided by such detailed information has implications for many disciplines including drug design and molecular bioengineering.

The primary protein targets Miranda described were derived from a heat loving marine microorganism Thermococcus thioreducens, which was obtained from a deep-sea hydrothermal vent in the Mid-Atlantic Ridge and isolated in her lab. As part of a mini mid-throughput structural genomics pipeline implemented in the Laboratory for Structural Biology at the University of Alabama in Huntsville, she described how their lab successfully cloned, overproduced, purified, crystallized, and determined the structure of many selected protein targets from the genome of this organism. In addition, she described some of the various industrial applications of these proteins ranging from the food industry to molecular diagnostics. For instance, Miranda solved the structure for an enzyme from this organism responsible for making DNA produced and sold commercially as Rainbow™ polymerase. This protein structure provides not only insight into the molecular basis of thermal stability but also acts as a starting point for assessing mutational variations, which may be important for additional industrial applications of this enzyme. Miranda expects to graduate in December 2009.
Objective
Characterization of changes in electrical and mechanical properties of glassy polymeric carbon and silicon carbide following ion irradiation, with potential applications in the TRISO fuel for the next generation of nuclear reactors.

Research Abstract
• The TRISO fuel is planned to be used in some of the Generation IV nuclear reactor designs.
• TRISO design consists of a fuel kernel of UOx coated in several layers of materials with different functions, Pyrolytic Carbon (PyC) is one of them.
• To investigate the possibility of using glassy polymeric carbon (GPC) as an alternative to PyC.
• To compare the defects that appear in the structures of GPC and PyC after similar irradiation doses.
• To understand the fundamental mechanisms and defect creation in sp2-bonded carbons by particle irradiation.
• To investigate changes in the physical and mechanical properties of Silicon Carbide ceramics under various irradiation doses.

Future Plans: To continue towards a successful career in education and research.

Recent Presentations and Publications

Supervisor/Mentor
Dr. Daryush Ila
Physics
Alabama A&M University
4900 Meridian Street
Normal, AL 35762
256-372-8703
ila@cim.aamu.edu
Objective
To develop a cost saving, economic method to repair railhead defects.

Research Abstract
- This research focuses on producing defect-free, slot-welded rails that have similar properties as the parent rail.
- Slots will be milled in a one foot rail which will be filled using gas metal arc welding.
- Samples will then be prepared for testing.
- The properties of the welded rail steel will be evaluated using hardness, static tensile, fracture toughness and fatigue tests.
- X-ray photoelectron spectroscopy and optical microscopy will be used to evaluate the weld’s composition and microstructure.
- The effectiveness of the proposed slot weld repair will be assessed for potential field applications.

Future Plans: After finishing the Ph.D. program, I would like to work in research and development.

Recent Presentations and Publications

Supervisor/Mentor
Dr. Heshmat Aglan
Material Science and Engineering
Tuskegee University
218 Foster Hall
Tuskegee, AL 36088
334-727-8979
334-727-8857
aglanh@tuskegee.edu
Objective
To investigate the molecular mechanisms and functional significance of the recruitment of host organelles by *Toxoplasma gondii*.

Research Abstract
- My research addresses methods used by the parasite *Toxoplasma gondii* to control host functions.
- Toxoplasma causes the clinically significant disease toxoplasmosis.
- Toxoplasma is able to manipulate human cells to its own benefit, using the machinery of the host cell.
- A combination of biochemistry, advanced imaging, and nanotechnology is used to investigate this process.
- Findings from this research may lead to new medical treatments for a range of diseases beyond toxoplasmosis.

Future Plans: I intend to graduate with a Ph.D. in Spring of 2010, and will pursue a research/teaching position within the Alabama higher education system.

Recent Presentations and Publications
- Joel Andrews, Original Research performed at the Lion’s Center for Eye Research, USA College of Medicine, Lion’s Club Annual Meeting, 2008.
- Joel Andrews, Original Research, Research in Progress Seminar, Center for Lung Biology, USA College of Medicine, 2005-2008.
- Joel Andrews, Original Research, Research in Progress Seminar, Department of Biochemistry and Molecular Biology, USA College of Medicine, 2005-2008.

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Microfluid Synthesis and Rheological Characterization on Non-Spherical Nanostructures

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*Expected Graduation in 2011, Ph.D., Materials Science and Engineering*
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**Objective**
To use microfluidics to synthesize non-spherical organic and inorganic particles and to characterize flow properties in particle-oligomer suspensions.

**Research Abstract**
The ability to synthesize large quantities of highly uniform nano- or micro-sized particles with diverse customizable morphologies and physicochemical properties is an asset to many advanced applications. However, the synthesis of such highly monodispersed particles with tunable functionalities has been a great challenge. Various heterophase polymerization methods including microemulsion and suspension polymerization have been developed and used to synthesize both polymeric particles and their composites. This polymerization approach does not offer control over the size and morphology, and has been primarily used to synthesize spherical particles. Microfluidics technology, however, presents an alternative approach to synthesizing non-spherical particles with tunable functionalities. Using this approach, it is possible to synthesize colloidal based nano/microparticles and their composites with predetermined shapes usable in sensors, optical devices, microelectromechanical systems (MEMS) and field-responsive rheological fluids. The method is dependent on the use of a UV-curable prepolymer with an appropriate photo-initiator. In this study, a photo mask patterned with pores defining the shape of the particles will be used to block the UV light while the pores allow the passage of light thereby cross linking the liquid prepolymer in the light path and creating the particle.

**Future Plans:** After graduation, I plan to work in industry as a researcher with a special interest in product development and quality control. I believe that my graduate training has equipped me with the relevant skills to perform these functions.

**Recent Presentations and Publications**

**Supervisor/Mentor**
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Searching for Good Genes in the House Finch

Susan Balenger
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Objective
To test the good genes hypothesis for female choice and male immune quality.

Research Abstract
- Female house finches prefer to mate with the reddest males.
- Red males recover faster than yellow males from a respiratory disease caused by the bacterium Mycoplasma gallisepticum.
- My research investigates whether females prefer red mates because these males have better genes for dealing with infection, which are then passed to their offspring.
- I am testing this good genes hypothesis using transcriptome-scale sequencing and microarray analysis of gene expression.
- This study addresses a basic question in evolutionary biology, and contributes to our knowledge of the avian immune system and our general understanding of the evolution of disease resistance.

Future Plans
Ultimately, my goal is to obtain a university faculty position as an evolutionary biologist.

Recent Presentations and Publications

Supervisor/Mentor
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Processing and Characterization of Epoxy Composites Reinforced with Carbon Nanotubes and Carbon Nanopearls

Sandrea Brundidge-Young
Tuskegee University
Round 5 Recipient
Alabama Center for Nanostructured Materials
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Objective
To fabricate carbon nanotubes and carbon nanopearls epoxy-based nanocomposites via the calendaring method in order to access their thermal, mechanical, thermomechanical, and morphological properties.

Research Abstract
- Carbon nanotubes have been used as high strength nano-reinforcements for composites.
- The scope of applications involving carbon nanotubes have been hindered due to their poor dispersion and weak interfacial bonding with polymer matrices.
- Chemical functionalization of carbon nanotubes has been proven to improve dispersion, processing, and compatibility.
- Carbon nanopearls have different chemical and physical properties than carbon nanotubes. To date, there have been no reported results of the addition of carbon nanopearls to an epoxy resin.

Future Plans: Upon graduation, I plan to pursue a career in an industrial or government setting as well as a position as an adjunct professor.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
The main objectives of my research are to compare the phytochemistry of four *Lonchocarpus* species, screen the extracts against protein targets, and perform crystal trials.

Research Abstract
- I will be determining what compounds make up four plants found in the *Lonchocarpus* species.
- Once I get separate compounds I will determine their structures.
- The crude plant extracts and separated compounds will be tested against proteins for activities.
- I will then use the compounds found to have activities for crystal trials where I will try to crystallize the protein with the compound.

Future Plans: Once I obtain my Ph.D., I plan to look for a job related to my interest in drug discovery.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
I will be working with epitaxial graphene and studying the electrical, mechanical, and optical properties of graphene before and after it has been bombarded with ions.

Research Abstract
Graphene is a one atom thick planar sheet of sp2-bonded carbon atoms, and has great potential as an electronic material. It is an atomic sheet of the same material that comprises carbon nanotubes and graphite. There are three types of graphene: theoretical, exfoliated, and epitaxial. Epitaxial graphene is the form studied in our lab. Epitaxial graphene is grown by starting with silicon carbide (SiC). When SiC is heated under certain conditions, silicon evaporates leaving behind carbon that reorganizes into layers of graphene. Graphene will be bombarded with 5 MeV gold, 1 MeV hydrogen, and 5 MeV silicon ions and the electronic properties will be characterized using Hall and Van der Pauw measurements. Atomic force microscopy and Raman spectroscopy will also be used for surface and chemical characterization in order to correlate with the changes in the electrical properties. Nano-Indentation will be used to evaluate the mechanical properties.

Future Plans
After graduation, I would like to obtain a professional position that will utilize and strengthen my areas of study and experience in Mechanical Engineering or any related field with a government agency in the state of Alabama, preferably in the Huntsville area. While working, I will pursue a Master’s of Business Administration (MBA) and a Ph.D. in Engineering.

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Objective
Improve signal detection for Laser Induced Breakdown Spectroscopy (LIBS) and Laser Induced Incandescence (LII) measurements.

Research Abstract
LIBS determines the elemental composition of solids, liquids and gases by analyzing spectra emitted from a laser-induced plasma. LII is a similar technique used to determine soot particle size and concentration in combustion applications. This effort examined several experimental and data processing factors to improve the results of both techniques. The major findings of this work were:

- Measurement signal to-noise ratio was improved by optimizing ICCD chip utilization, camera gating, and spectrometer slit width.
- Improved SNR through above optimization reduced coefficient of variation (COV) up to 66%.
- Using hydrogen spectral lines to qualify the data decreased data COV an additional 10 to 60%.

Future Plans: Apply these study results for sensitivity increase in fiber-delivered LIBS and LII. I am currently employed as a Research Associate with the National Research Council of Canada.

Recent Presentations and Publications

Supervisor/Mentor
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Understanding the Molecular Mechanisms of Aluminum Tolerance in the Soybean Plant

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Center for Environmental Cellular Signal Transduction
Graduation in 2009, Ph.D., Plant Molecular Biology
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Objective
Understanding the molecular mechanisms of aluminum tolerance in soybeans.

Research Abstract
Aluminum (Al) toxicity is a major soybean production constraint in acidic soils. Genetic adaptation of germplasm to Al toxicity is an effective and economical strategy to overcome this problem. But, the lack of standard germplasm screening techniques and the complex nature of Al tolerance mechanisms have undermined the breeding effort. Discovering soybean DNA sequences underlying the tolerance mechanisms will facilitate the development of Al tolerance cultivars. One of my research goals is to discover these candidate sequences using DNA microarray technology. A related and interesting phenomenon is Magnesium (Mg) amelioration of Al toxicity. Understanding the molecular basis of this process is another goal of my research. Exploring the Al complexing potential of flavonoid type phenolics and phytic-acid is a third dimension of the project. Aluminum up-regulated genes will be determined by statistical test of fluorescence data generated by hybridization of mRNA samples to sequences on DNA chip and will be confirmed using real time PCR. The physiological function of up-regulated genes will be deduced using stored DNA and protein data bases. This research will contribute to my understanding of the mechanisms of Al tolerance in soybeans and eventually to the economic welfare of soybean growers cultivating in acidic soils worldwide.

Future Plans:
Pursuing a research/teaching career in the United States of America.

Supervisor/Mentor
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Objective
Development of nanoparticle-enhanced phase change materials (NEPCM) and their improved performance based on controlled solidification/melting experiments and theoretical analyses are investigated. A detailed understanding of the transport phenomena during phase change of this new class of materials is of great potential for thermal energy storage/thermal management applications.

Research Abstract
• Develop and characterize new combinations of nanoparticles and base PCM.
• Develop a 1-D Stefan formulation to model the transient freezing process of NEPCM.
• Design a controlled phase change experimental setup to investigate the freezing process of NEPCM.
• Employ the commercial CFD code FLUENT to simulate the phase change processes, both melting and freezing, of NEPCM.

Future Plans: Upon graduation, I look forward to finding a job in Alabama dedicated to addressing thermal energy storage and thermal management issues.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
Manipulate the orientation of nano-particles in the nanocomposites using an induced electric field. The proposed nanofiber alignment is expected to produce stronger materials that could be used for structural and other practical uses.

Research Abstract
- Develop an innovative manufacturing process to effectively align nanofibers in the direction of an external electric field (E-field).
- Apply the developed process to cellulosic nanofiber based composites.
- Apply the developed process to aerospace-grade composites.
- Test and characterize the nanomaterials.
- Several mechanical and electrical properties measurements will be used as indicators for the alignment of the fibers.

Future Plans: To work in the field of materials, composites, and aerospace research.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
Synthesize and characterize organophosphorus optical power limiting materials for sensor protection against laser threats.

Research Abstract
- Optical systems such as night vision systems and gunsights are used for a variety of consumer and military applications.
- These optical systems have an intensity threshold for which damage can occur rendering the device ineffective.
- The increase in availability of lower cost, high energy lasers to terrorist organizations presents a serious threat to optical sensors.
- We have developed a class of phosphorus containing conjugated organic materials capable of power limiting in the blue spectral region making these materials excellent candidates for sensor protectors.

Future Plans
Upon completion of my Ph.D., I plan to pursue a management or research and development position in an industrial setting.

Recent Presentations and Publications
Stephanie Freeman  
Alabama A&M University  
Rounds 4 and 5 Recipient  
*Expected Graduation in 2011, Ph.D., Air Quality and Land Use Change*  
sefreeman27@gmail.com  

**Objective**  
My research goal is to predict future changes in air quality and land use change for the state of Alabama from 1980 to present.

**Research Abstract**  
- Air quality has serious implications for health, economic and other aspects of life in the state of Alabama. Air quality is defined as a measurement of air pollutants that affect human health and the environment. Currently, Alabama has seen a sharp deterioration in air quality due to an increase in population and economic demands for forests and agriculture areas around urban centers. As a result, understanding the relationship of air quality and land use change in the state of Alabama may improve communities and air quality policies.

**Future Plans**  
I plan to undertake a theory-driven multidisciplinary research approach that integrates climate change, environmental science, technology, economics, and education. My objective is to work at a research institute that has a multifaceted interaction with the industry, government and business enterprise.

**Supervisor/Mentor**  
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**Objective**
This research involves gradation of magnetocrystalline anisotropy at the nanoscale. The results of this research will further the growth of magnetic area storage capacity while using available write-head field technology.

**Research Abstract**
A consequence of larger magnetic area storage capacity (e.g., hard disc drive capacity) is that smaller magnetic bit sizes are required. If the bit size of current magnetic materials’ are further decreased, the magnetization direction, which stores the binary information, will become unstable and result in random fluctuations and loss of information. To overcome this size limitation, magnetically harder materials are required. Unfortunately, magnetic harder materials make writing the bit more difficult, if not impossible, with current write head technologies. To overcome this problem, (i.e., the need for harder magnetic materials to be thermally stable but able to be written), this research proposes to grade the strength of the magnetic bit through the thickness of the bit volume. By making one-end of the bit magnetically soft, current write fields can be used to switch the magnetization and propagate the switch into the harder end of the material. The hard end will then act as an anchor to prevent the soft end from switching because of thermal effects. This will be accomplished by compositionally grading the material, which results in a gradient of magnetocrystalline anisotropy or magnetic hardness. The research will determine the stability of these gradients and quantify the compositional dependence on the magnetic properties using a variety of techniques, including the Anomalous Hall Effect, atom probe tomography and transmission electron microscopy.

**Future Plans:** After graduation, I will seek a post-doctoral fellowship then full time employment in academia or industry.

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Development and Evaluation of Nanostructured Gelatin Films for Biomedical Applications

Hannah Harding
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Round 4 Recipient
Alabama Center for Nanostructured Materials
Expected Graduation in 2013, Ph.D., Materials Science and Engineering
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Objective
Formulate and manufacture fish skin gelatin films with various dosages of silver nanoparticles for biomedical applications.

Research Abstract
- Biodegradable gelatin films were manufactured with silver nanoparticles at loadings of 0.1%, 0.3%, and 0.5% by volume.
- The tensile strength increased with silver loading.
- In vitro studies revealed excellent antibacterial properties against Staphylococcus aureus as the silver loading of these nanostructured films increased.

Future Plans
Work in research industries such as space applications and nanotechnology.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
Determine the level of 5-methyl tetrahydrofolate (5-MTHF) in human skin and its role in protection against UV-induced DNA damage.

Research Abstract
- Exposure to UV (ultraviolet) radiation is one of the leading causes of skin cancer in the United States, especially when over-exposure results in sunburn and blistering of light-colored skin.
- UV irradiation causes DNA damage mostly through excitation of cellular photosensitizers, such as flavins, that generate singlet oxygen (1O\(_2\)) which reacts with a variety of biomolecules, including DNA. Our laboratory has shown that 5-MTHF, the most abundant form of folate in the blood, is a quencher of photosensitization reactions and, at physiological concentrations, removes 1O\(_2\) before it can react with DNA.
- The goal of my research is to determine whether (1) Increased skin folates help to protect against UV-induced DNA damage, and (2) dark skin color protects against endogenous folate degradation during UV exposure.

Future Plans: I plan to continue research in academia or industry.

Recent Presentations and Publications
- Huai Hasoun, “Protection by Folates Against UV-induced DNA Damage,” Biochemistry Department, USA, Mobile, Alabama, March 10, 2009.

Supervisor/Mentor
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Extended Alabama Structural Biology Consortium
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Objective
Integration of the Liquid Crystal (LC) sensor with the interface CMOS circuit to increase sensitivity and accuracy of LC based chemical and biological detectors.

Research Abstract
- LC has proven to be excellent candidate for reliable sensing of chemical and biological agents.
- LC molecules can amplify small changes at the interface with chemical or bio agents.
- LC molecule orientation change can be detected electronically.
- Capacitive sensing of LC molecules can be fabricated on the same chip with the integrated CMOS circuit.
- Integrated sensing will increase sensitivity and accuracy of the LC sensor.

Future Plans: After graduation I plan to work in high-tech companies in North Alabama.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
To develop an innovative and effective method to manufacture, characterize and model nano-structured components in thermoplastic composites.

Research Abstract
In this research, effort will be directed toward finding fundamental answers to the reasons for significant changes in mechanical properties of nanoparticle-reinforced thermoplastic composites, and using this knowledge to optimize processing variables to further enhance the targeted properties of the composite. In conjunction with materials processing, a concurrent simulations technique known as the embedded statistical coupling method (ESCM), is used to simulate the response of the nanocomposite to applied external loads. The proposed research will contribute towards the understanding of advanced nanocomposite materials, which should subsequently benefit the manufacturing industry by making nanoparticle reinforced composites stronger and more affordable.

Future Plans: To pursue a career in academics with an interest in composites research.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
Identify mechanisms for estrogen regulation of Leydig cell mitosis and steroidogenesis using the xenoestrogen, bisphenol A (used in polycarbonate plastics) as a model agent.

Research Abstract
- Leydig cells in the testis produce the male sex steroid hormone testosterone, which maintains male fertility.
- BPA is a widely used industrial plasticizer with known estrogenic properties and is used in the manufacture of polycarbonate plastics and epoxy resins.
- Although the subject of ongoing debate, there is substantial evidence that environmental levels of BPA have the ability to impact Leydig cell function.
- The proposed research will investigate the mechanisms by which BPA regulates Leydig cell development and function. Results from this project will also allow me to characterize estrogen signaling pathways in Leydig cells. This information will be useful for risk assessment of the population.

Future Plans: To pursue a research career in male reproductive biology and toxicology.

Recent Presentations and Publications
Objective
My research goal is to establish an ecological monitoring program in the Citronelle, Alabama area to compare environmental and ecological features prior to and post CO$_2$ injection activities associated with CO$_2$ mediated enhanced oil recovery (EOR).

Research Abstract
• Establish a baseline for air quality in the Citronelle, Alabama area for future comparison.
• Establish a baseline for the health of vegetation in the Citronelle, Alabama area using satellite imagery.
• Establish a baseline for vegetative growth rates in the Citronelle, Alabama area.
• Compare air quality parameters, satellite imagery of vegetation and vegetative growth rates post CO$_2$ injection in the reservoir.

Future Plans: After graduation I plan to work towards pragmatic solutions in land management issues in the Mobile, Alabama area.

Recent Presentations and Publications

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Sandra Sadat
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Rounds 4 and 5 Recipient
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**Objective**
Use Surface Enhanced Raman Scattering (SERS) to detect residues of harmful organic and inorganic substances in the air and water.

**Research Abstract**
- Commercial SERS substrates fabricated with e-beam lithography will be investigated together with those fabricated by depositing nanospheres of gold and silver.
- The effect of chemical nature of substrates will be tested by investigating SERS with gold and silver nanospheres. Commonly available laser wavelengths like 633 and 780 nm will be used.
- Chemical and electromagnetic enhancements will be investigated by varying the concentration of surface porosity as well as the morphology (surface toughness) of the substrate.
- The effect of geometry of substrate will be investigated by using gold nanospheres as well as nanorods.

**Future Plans**
I plan to pursue a Ph.D.

**Supervisor/Mentor**
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Objective
Finite element analysis will be used as the technique to analyze and design multilayer composites under impact loading conditions. The primary objective is to improve impact resistance of multilayered composites by optimizing volume fraction of fibers and matrix, the fiber orientation, layer thickness, etc.

Research Abstract
- Increasing interest of composites.
- Composites are strong under constant (static) loads.
- Impact loading is not well taken by composite laminates.
- Finite element analysis can help analyze and design laminates.
- Project will seek to improve impact loading resistance on the laminates.
- Analyze results and optimize laminates with their material properties.

Future Plans
Pursue a career at Northrop Grumman based on fracture/structural mechanics in composite materials either for shipbuilding or space technology.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
The objective of my research is to better understand the molecular pathogenesis of different types of cancer in dogs. Comprehensive knowledge of these factors will help to design better therapeutic protocols.

Research Abstract
- Melanoma differentiation associated gene-7 (mda-7) when expressed ectopically, results in irreversible growth arrest, cancer reversion and terminal differentiation of various cancer cells.
- To understand the molecular pathogenesis of different type of cancer in the dog.
- These studies are designed to elucidate the role and expression pattern of canine mda-7 and its receptors.
- Comprehensive knowledge of these molecular pathways involving mda-7 will help to design better therapeutic protocols for canine cancers and ultimately improve the knowledge and ability to treat human cancers.

Future Plans: Following graduation, my goal is to serve in an industry position where I will be able to continue to pursue genetic and cellular approaches to cancer therapy.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
Application of ferrite and ferromagnetic materials in micro-coax devices to develop phase shifters, isolators, and circulators.

Research Abstract
- Design, simulation, and fabrication of micro size radio frequency passive devices for applications up to 60GHz.
- Micro-fabrication of radio frequency devices to down size the microwave systems.
- Applying ferromagnetic materials to the micro-coax transmission lines to fabricate phase shifters, isolators, and circulators.
- Simulation and modeling of ferrite based micro-coax transmission lines.

Future Plans
After graduation I will pursue a faculty position to teach or conduct research at a university.

Recent Presentations and Publications
- R. Sarvestani, “Application of Pulse Frequency to Control the Nano Grain Size of Gold Plated Thin Films,” Seventeenth International Conference on Composites or Nano Engineering (ICCE/17), July (2009), Honolulu, Hawaii USA.

Supervisor/Mentor
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Hunter Sims
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Objective
I seek to use analytical and first-principles numerical methods to study the electronic and magnetic properties of transition metal oxides, particularly as they pertain to aspects of information storage and computer logic.

Research Abstract
- Perform calculations to determine the physical properties of materials that exhibit novel effects.
- By studying these materials, discover properties that may have applications to computer storage, memory, or logic.
- Discover materials that can filter electrons of certain polarizations, as these can be used to detect or store information.
- Studying these materials to strengthen and deepen the current understanding of the physics that gives rise to the varied phenomena encountered in condensed matter.

Future Plans: After earning my Ph.D., I intend to pursue post-doctoral study at a research institution and seek a professorship.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
To progressively form thick section composite panels with the combined application of pressure and heat by investigating the manufacturing process and physics. Progressively formed thick section composite panels have application in mass transit, military, aerospace, and marine parts.

Research Abstract
- Advanced composite structures will require integrated features for assembly, sensor placement, and enhanced protection.
- Lightweight efficient composite panels can benefit by geometrical stiffening with localized material deformation.
- Research approach is taken in three steps: 1) form panels with a single, hemispherical cup for multiple material combinations, 2) analytically validate results by means of a processing prediction scheme, and 3) expand knowledge base from prior topics to address multiple formations within one panel.

Future Plans: I will continue developing an in-depth finite element model alongside manufacturing tests, while producing multiple journal articles.

Recent Presentations and Publications

Supervisor/Mentor
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Objective
To computationally design the appropriate green molecular functional groups for improved dispersion and alignment of single walled carbon nanotubes using the reverse problem formulation.

Research Abstract
- Through the careful design and formulation of chemical products, green chemistry principles can be incorporated in molecular nanostructure assemblies that exhibit significant improvements in desired product attributes while reducing waste.
- To execute the design, systems methods such as the reverse problem formulation are used to simultaneously match product attributes from each of the length scales under high efficiency.
- Characterization data provided by Dr. Virginia Davis will be used to validate the method.

Future Plans: I plan to pursue a position as an Assistant Professor of chemical engineering.

Recent Publications

Supervisor/Mentor
Dr. Mario Eden
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Objective
To produce artificial cell membranes supported on porous silicon with high yield. This structure is then used to demonstrate biological batteries and integrate biological complexes with electronic circuits.

Research Abstract
- An artificial cellular membrane is produced.
- The core structure of this membrane is composed of a thin silicon layer with holes in it (porous silicon). The hole size and porosity are suitably chosen.
- A lipid membrane similar to the one present in living cells is then developed on top of the porous silicon structure.
- Protein is then incorporated in the lipid bilayer membrane to form controllable channels.
- This will allow for interfacing of both sides of the structure in a controlled manner.

Future Plans: To work as nanotechnology research engineer in Alabama.

Recent Presentations and Publications

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Objective
To develop an ultra-compact trace gas optical sensor platform capable of analyzing hydrocarbon molecules with a full chemical specificity, with high sensitivity, and real time speed. It will be realized by applying quartz-enhanced photo-acoustic spectroscopy (QEPAS) and new rapidly tunable fiber-bulk Cr:CdSe laser.

Research Abstract
- All chemicals absorb light differently. However, the strongest absorption lines of organic molecules are located in the so-called “molecular fingerprint” middle-infrared (IR) spectral range.
- The goal of this research is to develop a portable ultrasensitive “optical nose” based on IR lasers for hydrocarbon monitoring.
- Such a device could be used for remote atmosphere monitoring for harmful pollutions as well as for real-time identification of explosive, biological, and chemical agents.

Future Plans: To optimize a system developed for analyzing of exhaust breath of patients. This potentially opens a path for real-time identification of cancer and other diseases at early stages.

Recent Presentations and Publications

Supervisor/Mentor
Dr. Sergey Mirov
Department of Physics
University of Alabama at Birmingham
1300 University Boulevard
Birmingham, AL 35294
(205) 934-8088/ (205) 934-8042
mirov@uab.edu
Objective
Developing novel landscape phage libraries with increased size, diversity and distinct repertoire; establishing a rapid detection system for *Staphylococcus aureus* by phage derived probes and polymerase chain reaction (PCR).

Research Abstract
- Landscape phage libraries serve as a rich source of novel ligands for various receptors. I am constructing new libraries by changing the conformation and format of the inserts in the major coat protein of phage, with increased size, diversity and distinct repertoire.
- The selected phage probes from landscape libraries will be coupled to magnetic beads to capture and separate the target pathogen from contaminated sources. Further identification of the pathogen will be accomplished using a specifically designed real time polymerase chain reaction (PCR) procedure.

Future Plans: After this project, I would like pursue a career in Alabama to help people stay healthy by working in either the food safety or clinical microbiology area.

Recent Presentations and Publications

Supervisor/Mentor
Dr. Valery A. Petrenko
Department of Pathobiology
College of Veterinary Medicine
Auburn University
Auburn, AL 36849
334-844-2897
petreva@vetmed.auburn.edu
Using Channel Diversity to Increase Communication Capacity of Vehicular Ad Hoc Networks

Qing Yang
Auburn University
Round 4 Recipient
Expected Graduation in 2010, Ph.D., Computer Science and Software Engineering
yangqin@auburn.edu

Objective
A multi-hop multi-channel communication (unicast and broadcast) system in vehicular ad hoc network (VANET) is proposed.

Research Abstract
- A joint design of channel allocation and routing protocol for multi-channel VANET to improve the network communication capacity.
- Cell and cluster based connectivity models.
- Localized and dynamic channel allocation algorithm.
- Connectivity aware routing (CAR) protocol for VANETs.
- Carry-and-forward scheme to solve network partition issue.
- Distributed algorithm.
- Minimizing both intra-flow and inter-flow interferences.

Future Plans: Obtain a tenure track faculty position at a U.S. institution or conduct research at a national laboratory.

Recent Presentations and Publications

Supervisor/Mentor
Dr. Alvin Lim
Computer Science and Software Engineering
Auburn University
345 W. Magnolia Avenue
Auburn, Alabama 36849
334-844-4330 / 334-844-6326
lim@eng.auburn.edu
Objective
Study the role of receptor-like kinases in plant-pathogen interactions.

Research Abstract
- Create transgenic plants that over express the receptor-like kinases RLK7 and RLK8.
- Determine the defense responses in transgenic plants.
- Create mutant plants that contain mutations in both RLK7 and RLK8 genes and test their susceptibility to powdery mildew.
- Search the genes that share similar structures with RLK7 and RLK8 in soybean.
- Create transgenic soybean that has the RLK7 and RLK8 counterparts knocked down.

Future Plans: Purify RLK7 protein and study its kinase activity and interaction with other proteins.

Recent Presentations and Publications

Supervisor/Mentor
Dr. Katrina M. Ramonell
Department of Biological Sciences
The University of Alabama
300 Hackberry Lane
Tuscaloosa, AL 35401
205-348-9512
kramonel@as.ua.edu

Xin Yang
The University of Alabama
Round 5 Recipient
Expected Graduation in December 2011, Ph.D., Molecular and Cellular Biology
yangxin1983224@gmail.com
Alabama EPSCoR
Graduate Research Scholars Program

GRSP and Beyond
A follow-up on previously featured scholars and alumni
Chathan Acharya
The University of Alabama
Round 3 Recipient
Ph.D., Chemical and Biological Engineering, May 2008
archar002@gmail.com

I received my Ph.D. in May 2008 and am currently a Postdoctoral Scholar at the University of California at San Diego.

Special Recognitions
- College of Engineering Outstanding Dissertation Award.
- 2007 Computational Molecular Science and Engineering Forum (CoMSEF) graduate student award, at the 2007 annual AIChE conference, Salt Lake City, Utah.
- 2007 Catalysis and Reaction Engineering Division Graduate Student Award, at the 2007 Annual AIChE Conference, Salt Lake City, Utah.
- Chemical and Biological Engineering Graduate Student of the Year 2008, chosen by the Alabama Society of Professional Engineers (ASPE).
- Graduate Student Research and Travel Support Award, Spring 2008.

Sudhir Aluwalia
Auburn University
Rounds 3, 4 and 5 Recipient
Expected Graduation in December 2009, Ph.D., Veterinary Biomedical Sciences
ahluwsk@auburn.edu

My proposed study will give a clear picture of the impact of chronic asymptomatic Chlamydyophila spp. infection on the health of the bovine mammary gland and on milk production by dairy cows. Particularly important results will be the influence on the quantity of milk produced, the increase in Somatic Cell Counts (SCC) associated with chlamydial infection, and the influence on the chemical milk composition. Further data can be expected on the pathogenic events and cellular infiltrates and mechanism associated with chronic Chlamydyophila spp. infection of the mammary gland. Another important component in my understanding of this infection will be data on the kinetics of lesion development, and potential temporary clearance and recurrence of the infection. The comparative observation of infected and non-infected mammary gland quarters of the same animal with identical immune response may be of particular interest. Thus, the findings from this study will have a major impact on potential countermeasures against these subtle, but economically important infections, and will aid in the rational design of future observational and intervention studies thus encouraging more interdisciplinary studies and attracting more researchers in this field and in Alabama’s higher research institutions.

Graduate School Awards and Honors
- Auburn University Presidential Fellowship, Auburn, Alabama.
- Outstanding Graduate Student Presentation Award at the Conference of Research Workers in Animal Disease, Chicago, Illinois, 2007.
- Outstanding Doctoral Graduate Student Award, Auburn University, Alabama, 2008-2009.
Sai Santosh Bangalore  
University of Alabama at Birmingham  
Round 2 Recipient  
M.S. in Electrical and Computer Engineering, May 2008  
sbangalore@soph.uab.edu

I am currently employed in the Section of Statistical Genetics in the UAB Department of Bio-Statistics. My thesis was, *How accurate are the extremely small p-values used in genomic research: An evaluation of numerical libraries.* This work has been accepted and published in the journal, *Computational Statistics and Data Analysis*, see [http://dx.doi.org/10.1016/j.csda.2008.11.028](http://dx.doi.org/10.1016/j.csda.2008.11.028). Statisticians and programmers in the field of genomics, often use numerical values from software tools to elucidate scientific truths about an observed phenomenon. The paper educates researchers and programmers on the best practices for developing scientific software with respect to numerical accuracy, thus uniquely contributing to the field of numerical accuracy.

Parimal Bapat  
University of Alabama at Birmingham  
Round 3 Recipient, Department of Physics  
*Expected Graduation Summer 2011, Ph.D., Physics (Nanomaterials)*  
parimal3@uab.edu

Calcium phosphates and especially Hydroxyapatite (HA) are found in abundant proportions in bones and in tooth enamel. Synthetically grown calcium phosphates showing chemical and structural resemblance with naturally occurring biological materials have proven to be very useful in biological applications ranging from cements, coatings for prosthetic implants and more recently substrates and scaffolds for bone tissue engineering. This newly developed method allows one to synthesize crystalline HA nanoparticles. Commercially available crystalline HA target is ablated inside a furnace at about 800°C in the presence of Argon/H₂O gas flow to form a calcium phosphate nanoparticulate aerosol. A 248 nm KrF excimer laser is used at a laser fluence of 5 J/cm² for target ablation. Particles formed in this process are deposited on a silicon wafer and further annealed at about 800°C in presence of Argon H₂O gas flow. X-ray scans of these samples show strong HA peaks indicating presence of crystalline HA.

My future goal is to size select these particles using a Differential Mobility Analyzer (DMA) and deposit them on a bio-inert surface like silicon wafer. Such 2-D substrates could be very useful in studying cell-biomaterial interactions. During this research I also developed the capability of suspending these crystalline HA nanoparticles in water.
Jejal Reddy Bathi  
**The University of Alabama**  
Rounds 1 and 2  
Center for Optical Sensors and Spectroscopies  
*Ph.D., Environmental Engineering, December 2008*  
jejalb@gmail.com  

I graduated with Ph.D. in Civil Engineering with a major in Environmental Engineering in December 2008. I am currently working as a Senior Staff Engineer with Geosyntec Consultants in Santa Barbara, California. As part of my job, I deal with stormwater pollution monitoring and it’s control. During my stay at the University of Alabama, I developed a rapid analytical procedure for analysis of organic pollutants in stormwater and creek sediments. Recently, I presented my research work at Environmental Water Resources Congress 2009 held in Kansas City, Missouri.

**Recent Presentations and Publications**


Celina Bochis  
**The University of Alabama**  
Round 2 Recipient  
Center for Optical Sensors and Spectroscopies  
*Expected Graduation in May 2010, Ph.D. in Civil Engineering*  
cbochis@bama.ua.edu  

I am continuing my research at The University of Alabama’s NSF Center for Optical Sensors and Spectroscopies. I presented part of my research work at: 1) the 81st Annual Water Environment Federation Technical Exhibition and Conference (WEFTEC) in Chicago, Illinois, October 2008; 2) the International Stormwater and Urban Water Systems Conference in Toronto, Canada, February 2009; and 3) the World Environmental and Water Resources Congress in Kansas City, Missouri, May 2009 hosted by the American Society of Civil Engineers’ Environmental and Water Resources Institute. The work presented was also published in the conference proceedings.
Christina Booher  
Auburn University  
Round 3 Recipient  
Center for Environmental Cellular Signal Transduction  
*Expected Graduation in Fall 2011, Ph.D., Biological Sciences*

cmb0011@auburn.edu

My research focuses on how mammalian mothers allocate calcium from both their diet and from their skeleton to offspring production, and preliminary results suggest that bone loss during gestation and lactation can influence reproductive performance in mice when dietary calcium is limited. Understanding the trade-off between a mother maintaining her own skeleton and providing enough calcium to support development of her offspring’s skeleton will affect how we view nutritional requirements for humans and other vertebrate species, and will provide another component to our comprehension of bone loss in women. Over the past year, I have attended several meetings, presented my research, received a honorable mention for a poster presentation at the Society for Integrative and Comparative Biology Meeting in January, was accepted to participate in an ecological stoichiometry workshop in Kawatabi, Japan, and received a Grant-In-Aid of Research from the American Society of Mammalogists.

Miranda L. Byrne-Steele  
University of Alabama in Huntsville  
Rounds 1, 2, 4, and 5  
Extended Alabama Structural Biology Consortium  
*Expected Graduation in December 2009, Ph.D., Biotechnology Science and Engineering*

MIRANDA@IOKIE.COM

I was fortunate to represent the GRSP Program at the Alabama Commission of Higher Education during their March 2009 meeting and was given the opportunity to present some highlights of my research, see page 8. To-date, four manuscripts have been submitted for publication, two have been published. The remaining manuscripts are currently under review. Overall, I am the first author on two of these publications. Also, two additional first author publications are pending. The first will include a description of a structural comparison of the *hot* and *cold* PCNA structures, the other, the structure of the ‘hot’ DNA polymerase.

During my time as a graduate student, I have presented my results at both national and international conferences. Over the past year, I have attended three scientific meetings and had the opportunity to act as a student delegate for the Alabama EPSCoR program while attending the 2009 Coalition of EPSCoR/IDEA States Annual Meeting in Washington, D.C., February 2009. Two awards were received from meeting presentations: 1) A first place award for my oral presentation was received at the 10th Annual Biological Sciences and PBR Retreat held at the Hudson Alpha Institute for Biotechnology in Huntsville, Alabama in September 2008; and 2) a first place award was received for outstanding poster presentation at the 2009 SER-CAT Symposium meeting held in April 2008 in Huntsville, Alabama. In addition, a poster presentation was also made at the American Crystallographic Association meeting in Knoxville, Tennessee in May 2008.
Johanna T. Cannon  
Auburn University  
Rounds 3, 4 and 5 Recipient  
Center for Environmental Cellular Signal Transduction  
*Expected Graduation in May 2011, Ph.D., Biological Sciences*  
cannojt@auburn.edu; johanna.cannon@alumnae.brynmawr.edu

I continue to work towards my Ph.D. studying evolutionary relationships in the marine invertebrate phylum *Hemichordata*. Because hemichordates share important morphological features with chordates, this research has implications for the study of chordate and vertebrate origins and evolution. Results of my research were published in 2009 in the journal *Molecular Phylogenetics and Evolution*, suggesting that the current classification of hemichordates, particularly deep-sea groups, is in need of revision. I am currently working on a genomic-scale project involving the sequencing of hundreds of gene fragments from several hemichordate species that will be used to reconstruct evolutionary relationships. I have received several individual grants and fellowships funding my travel to study hemichordates, including travel to the Bermuda Institute of Ocean Sciences, funded by the Lerner-Gray Fund for Marine Research, and a visit to the Smithsonian Institution’s National Museum of Natural History, funded by the United States Antarctic Program. In addition to research activities, I have been involved in a number of outreach programs promoting science education for Alabama k-12 students, including Auburn’s AU-Explore Science and Math Open House, and a program called LADIES (Leading Auburn in Developing Interest in Experimental Science) for middle school girls sponsored by Auburn University’s chapter of the Association for Women in Science.

Talitha Holmes Caudle  
University of Alabama in Huntsville  
Rounds 3 and 4 Recipient  
Extended Alabama Structural Biology Consortium  
*Expected Graduation in Dec. 2010, Ph.D., Biotechnology*  
holmest@email.uah.edu

Optineurin is a protein that has been implicated in many cellular processes, and mutations of its gene lead to hereditary primary open angle glaucoma. Recent discoveries have also suggested roles in Huntington’s disease and cancer. To date, the structure of optineurin has not been solved, and a detailed molecular description of its function is lacking. The focus of my investigation is to define the structure and functional relationships in optineurin using crystallographic, nuclear magnetic resonance (NMR), and other techniques.

Full-length human optineurin was cloned, expressed, and purified. I have also created truncations beginning at amino acid residue 396 and 550 which correspond to a putative coiled-coil domain and the C-terminal zinc finger of optineurin, respectively. All constructs have been subjected to crystallization trials, and crystals have been obtained for the coiled-coil region and the zinc finger. Protein crystals will be used to obtain the 3D structures through X-ray crystallography. NMR experiments are used to look at structure and will provide detail regarding optineurin’s interaction with other proteins. These data will provide crucial information for this protein’s role in cellular processes, as well as its contribution to glaucoma, cancer, and Huntington’s disease.
Yanli Chen
Auburn University
Round 3 Recipient
*Expected Graduation in May 2011, Ph.D. in Chemical Engineering*
Chenyan@auburn.edu

In 2008, my research work focused on the research project “elucidation of metabolic networks of mixed culture for bioethanol production.” Bioethanol production from lignocellulosic biomass has drawn tremendous attention, not only because bioethanol has a number of advantages as an alternative to fossil fuel, but also due to attractive characteristics of lignocellulosic biomass as a feedstock. However, there is lack of a cost-competitive bioethanol production process since significant challenges exist, such as pretreatment of biomass feedstock, optimization of hydrolysis process, xylose fermentation and so on. In this work, I concentrate on the issue of xylose fermentation. Xylose is the second most abundant fermentable sugar followed by glucose in biomass hydrolysate, so its fermentation is essential for economic conversion of lignocellulose to bioethanol. A complex biological system which consists of two different microorganisms, *Saccharomyces cerevisiae* and *Pichia stipitis* has been confirmed as a model system to ferment glucose and xylose simultaneously and effectively. A novel bioreactor designed for this model system has been tested. In addition, a basic metabolic network for *P. stipitis* has been reconstructed based on the gained knowledge of reconstructing genome-scale metabolic network for *S. cerevisiae*. The preliminary simulation result was presented in the 2008 Alabama EPSCoR Annual Conference. This research project will support the Auburn University’s efforts on bioethanol initiative and the successful completion of the study could be beneficial to Alabama’s development of renewable energy.

The research project of the Ph.D. program I am currently working on is novel packaging designs for improvements in air filter performance. The major benefit is to provide a significant HVAC cost savings with cleaner indoor air as an added bonus.

Bopha Chhay
Alabama A&M University
Rounds 1 and 2
Ph.D., Physics, August 2008
bopha@cim.aamu.edu

I am a research physicist in the Center for Irradiation of Materials at Alabama A&M University, where I obtained my Ph.D. in 2008. My research involves the fabrication and characterization of glassy polymeric carbon (GPC) nanocomposites. GPC is a unique biocompatible material that has also found applications in aerospace technologies. I am currently developing GPC heat exchange tubes to answer NASA needs.

Bethany Crean Harris
Auburn University
Rounds 1 and 2, Center for Environmental and Cellular Signal Transduction
*Expected graduation in December 2009, M.S., Animal Science*
bharris@cbse.uab.edu

I began working at the Center of Biophysical Sciences and Engineering at UAB in January 2009.
Matt Dodson  
Auburn University  
Round 2  
Center for Environmental and Cellular Signal Transduction  
*Expected Graduation in Dec. 2009, M.S., Cellular and Molecular Biology*  
dodsonb@auburn.edu

I plan to graduate in December 2009 with my Masters of Science from Auburn University then pursue my Ph.D. at another institution. I recently received a National Sigma XI Grants in Aid of Research Award to help fund my thesis research investigating the mechanisms involved in a rapid wound healing response that occurs in the comb jelly *Mnemiopsis leidyi*. I also presented my research in December 2008 at the annual meeting of the American Society for Cell Biology in San Francisco, California. I am in the process of writing two publications, one describing wound repair in the comb jelly, and the other a review article on wound repair in invertebrates. Comb jellies are able to heal wounds to their skin in as little as 30 minutes with no formation of a scar. The processes involved in healing a wound are very similar across organisms, despite the complexity of the animal undergoing the healing response. Therefore, understanding the basis for how comb jellies heal so quickly and efficiently will help develop possible avenues of biomedical research in humans.

Erin W. Donovan  
Auburn University  
Round 1  
Center for Environmental and Cellular Signal Transduction  
*Expected Graduation in Fall 2010, Ph.D., Cell and Molecular Biology*  
donovew@auburn.edu

The focus of my research is the comb jelly *Mnemopsis leidyi* and observing the bacteria associated with the animal. The main objectives are to determine if the bacteria are consistently associated with the animal and if the bacteria population differs or stays the same between locations. Current data has revealed wart bodies on the surface of the animal, which may be a mechanism for the animals to clean the surface of their body from environmental bacteria.

*Mnemopsis* is a native of the eastern shores of the United States from the coast of Texas all the way to the Northeast coast. In recent years *Mnemopsis leidyi* has spread to new bodies of water. The recent invasion of *Mnemopsis leidyi* to new environments has caused a decreased fish populations creating ecological and economical problems. Studies to observe microorganisms involved with *Mnemopsis leidyi* could lead to better understanding of why these animals are invading new waters and how to control this invasive species.

**Recent Presentations and Honors**

- Received the Department of Biological Science Service Award, May 2009.
Amicia D. Elliott
University of Alabama in Huntsville
Round 3 Recipient
Extended Alabama Structural Biology Consortium
M.S., Genetics and Molecular Biology, May 2009
adelloitt@gmail.com

My M.S. research was related to Huntington’s disease and the characterization of an aggregating huntingtin-interacting protein, PQBP1. I was able to establish an amyloid-like aggregation, which may contribute to pathogenesis in several polyglutamine diseases. Upon graduation in May 2009 with a M.S. in Biological Sciences, I began a summer lab rotation at Vanderbilt University with Dr. Robert Macdonald studying mutations related to epilepsy. I am now pursuing a Ph.D. at Vanderbilt University related to biophysics and...

Vijay Jumar Eppakayala
The University of Alabama
Round 3 Recipient
M.S., Environmental Engineering, Dec. 2008
vijaykumar.cbit@gmail.com

I graduated with my Master’s degree in Environmental Engineering in December 2008 from The University of Alabama. I am currently working as a Civil Engineer E.I.T. at Southern Consultants Inc., and my work is related to projects involving water distribution, sewer and drainage design.

Sergio Fabi
The University of Alabama
Round 1 Recipient
Center for Optical Sensors and Spectroscopies
Engineering Math Advancement Program
Ph.D., Physics, May 2008
fabi001@bama.ua.edu

I am an Adjunct Professor in the Physics Department at The University of Alabama. I am teaching Introductory Physics and serving as the Laboratory Coordinator.

Recent Presentations and Publications
Due to the high cost and environmental hazard of petroleum and mineral derived products, a growing effort has emerged in recent years on the research, development and application of bio-nanocomposite materials for structural applications. In this research, I will explore the synthesis and characterization of various types of materials obtained from renewable resources such as eggshells and seashells. These natural biomaterials will be processed to reduce their sizes to nanometer scale, and used as the reinforcing fillers in bio based thermoplastic and thermoset polymers. The bio-nanocomposite materials synthesized by this technique can be used for structural composite applications in biomedical, electronic, automotive, aerospace and other military applications.

Recent Presentations and Publications

Samantha Delmont Hastings
University of Alabama at Birmingham
Rounds 3 and 4 Recipient
Expected Graduation in May 2013, Ph.D., Inorganic Chemistry
sdelmont@uab.edu

I am continuing my graduate research project under Dr. Gary Gray. My goal is to synthesize transition metal complexes of functionalized phosphorus-donor ligands that serve as tunable molecular receptors, and therefore sensors, for toxic substances. Analytical techniques used to observe these binding events are also being developed and optimized. The properties of these phosphorus-donor ligands also make them suitable candidates for transition metal catalyzed reactions. The ligands have been used in environmentally friendly industrial processes.

Esther Haugabrooks
Tuskegee University
Round 2 Recipient, Center for Advanced Materials
M.S., Environmental Science, May 2009
ehaugabrooks@gmail.com

I completed my Master’s at Tuskegee University in May 2009. My thesis topic was the Evaluation of Soil Enzyme Activity and Microbial Diversity as Measures of Wetland Function Along a Forested Transect in Macon County, Alabama. In this study samples were taken in transects starting in wetland soils, through a transitional area, ending in upland soils. Phosphomonoesterase and phosphodiesterase activities, organic carbon, pH and microbial diversity were measured. The soils in the wetland transects were found to have the highest phosphatase activity and percent of organic carbon. A strong correlation was found between phosphatase enzyme activities and percent of carbon. Spatial differences in microbial diversity were also observed. This research was the inspiration for further evaluation of microbial communities and enzyme activity in wetland soils at Tuskegee University’s Water Quality Lab. In the fall of 2009, I started a doctorate program in Toxicology at Iowa State University.

Chengdong Huang
Auburn University
Rounds 3, 4 and 5 Recipient
Expected Graduation in Summer 2010, Ph.D., Biochemistry
huangc4@auburn.edu

N-glycosylation, the most ubiquitous protein modification in eukaryotic cells, is catalyzed by a remarkably complex multi-subunit integral membrane enzyme, oligosaccharyl transferase (OT). Due to their insolubility in water, the studies on integral membrane proteins are always notoriously difficult, and remain a frontier for biochemistry and structural biology. My research is focused on using NMR, one of the most powerful and versatile scientific techniques, to solve the three-dimensional structure of the C-terminal domain of Sttt3p, the catalytic subunit of OT. Another goal is to address the function of the C-terminal domain of Stt3p, and ultimately, elucidate enzymatic mechanism of OT. So far, this project has been progressing smoothly and close to completion. This project will have a profound impact on areas of both structural biology and biochemistry, since the C-terminal domain of Stt3p will be to date the biggest α-helical integral membrane proteins whose structure is determined by NMR.
Ronny C. Hughes  
University of Alabama in Huntsville  
Rounds 1, 2, 4 and 5 Recipient  
Extended Alabama Structural Biology Consortium  
*Expected Graduation in 2009, Ph.D., Biotechnology*  
hughesrc@email.uah.edu

I earned my Master’s degree and am now pursuing a Ph.D. in Biotechnology. My research has focused on the production and structural characterization of heat stable enzymes with applications in biotechnology. My work has been published in peer-reviewed journals and has been presented at many national and international conferences. I have fulfilled the course work and passed the written examinations needed to obtain my degree and plan to defend my dissertation by the end of 2010. At that time, I plan to start a company to offer services and products used for molecular based diagnostics in Huntsville, Alabama.

Hunter Hyche  
The University of Alabama  
Round 1  
M.S. Environmental Engineering, August 2007  
hunterhyche@hotmail.com

I am currently employed by CH2M HILL, in their New Orleans office. I finished my M.S. in Environmental Engineering at the University of Alabama, under the impeccable guidance and leadership of Dr. Bob Pitt. I have been involved in a variety of projects and assignments since my professional career began two years ago. I am involved in Bayou Lafourche Freshwater Diversion Project in a variety of assignments including; monitoring flow meters and data collection, HEC-RAS modeling, statistical modeling of mean high water/mean low water, utility coordination, among other responsibilities. This project will insure a quality drinking water source for 300,000 plus residents in southern Louisiana, limit saltwater intrusion, benefit Terrebonne and Baratara Basin marshes, enhance water quality and ensure long-term freshwater supplies for Bayou Lafourche stakeholders. I was responsible for the technical oversight of the Adele/Fulton St. Improvement project for New Orleans DPW. The project involves the replacement of the water infrastructure, including the installation of forty-eight inch subsurface drainage, catch basins, new sidewalks, and the replacement of streets and curbs for this $2.4-million project. For the last six months I have been involved in the Sewer System Evaluation and Rehabilitation Program (SSERP) for Sewerage and Water Board of New Orleans. I have been completing design plans and specifications on the Lower Ninth Ward Basin with a GIS based computer model called Rehabilitation Decision Analysis Software (RDSS).
Erin Imsand  
Auburn University  
Round 3 Recipient  
*Expected Graduation in December 2009, Ph.D., Biochemistry*  
imsanem@auburn.edu  

With the help of my advisor, I have developed a new method for measuring the activity of the metalloprotein cysteine dioxygenase. This has allowed me to discern the cause of several contradicting reports in the literature and to conclusively determine which isoform of the enzyme is the physiologically active form. Using this information, my current focus is determining the cause of inactivation in the inactive isoform in the hopes of elucidating aspects of the catalytic mechanism of cysteine dioxygenase.

In January 2010, I will be starting my post-doctoral research under Dr. Judith Klinman at the University of California, Berkeley. This research will focus not only on medically relevant metalloenzymes, but on an array of different enzymes. These enzymes make up an uncharacterized pathway that likely will become a target for a series of novel antibiotics thus helping ameliorate the ongoing problem of antibiotic resistance.

Ke Jiang  
Auburn University  
Rounds 1, 2, and 4  
Center for Environmental and Cellular Signal Transduction  
*Expected Graduation in May 2010, Ph.D., Biological Sciences*  
jiangke@auburn.edu  

My work on flowering time analysis of grapevine specimens was submitted for publication. I am also preparing two manuscripts for my work on genome-wide analysis of intron expansion associated with grapevine domestication, and comprehensive phylogenetic analysis of native North American grapevines using molecular markers, respectively. After graduation, I hope to continue my research on bioinformatics, genomics and evolution and stay in academia.

**Recent Presentations and Publications**

- Ke Jiang, “Extensive Intron Size Expansion Associated with Grapevine Domestication,” Annual Graduate Research Forum, Department of Biological Sciences, Auburn University, 2009.
Ivy Krystal Jones  
Tuskegee University  
Rounds 1 and 2  
Alabama Center for Nanostructured Materials  
M.S., Materials Science and Engineering, Summer 2009  
jj0088094@tuskegee.edu

My thesis was on the fabrication, observation, comparison, and evaluation of polyhedral oligomeric silsesquioxane epoxy derivative nanocomposite resin systems. I completed my research for my thesis in the summer of 2008 at the Air Force Research Laboratory located near Dayton, Ohio at Wright-Patterson Air Force Base in the Materials and Manufacturing Directorate under the Nonmetallic Materials Division within the Composite and Hybrid Materials Branch. I also completed an additional Master’s in Physics during the spring semester of 2009 at Hampton University in Virginia. My Master’s thesis was on the material preparation and infrared spectroscopy of chromium (II) doped II-VI semiconductor windows and crystals for mid-infrared laser applications. I spent the summer of 2009 at the Howard Nanoscale Science and Engineering Facility located in the College of Engineering at Howard University in Washington, D.C. studying secondary ion mass spectroscopy, molecular beam epitaxy techniques, and nanotechnology application of integrated circuits. In the fall of 2009, I returned to Hampton University to pursue a Ph.D. in Physics.

Recent Presentations and Publications
GiHan Kwon

My post-doc research at the Technical University Munich is to understand the size-dependent chemical and catalytic properties of model catalysts consisting of size-selected metal clusters supported on planar substrates. The investigated metal clusters are prepared in the gas phase by utilizing a laser evaporation source, are then size-selected in a quadrupole mass spectrometer, and softlanded onto different substrates. This method allows investigations of particle size effects in the non-scalable size regime, i.e., the size regime where the electronic, and thus catalytic, properties of the particles are not scalable from bulk properties. Ultimately, the research team tries to determine the different factors controlling the reactivity at the molecular level. That is, the evolution of the electronic spectra with size, cluster charging, the structural functionality of clusters, as well as the role of the oxide support and its defects. By combining experimental results with quantum mechanical ab-initio calculations a detailed picture of the reaction mechanism emerges and guiding principles for catalytic reactions can be established.

Analytical tools are temperature programmed reaction spectroscopy, pulsed molecular beam reactive scattering, metastable impact electron spectroscopy, ultraviolet photoelectron spectroscopy and FT-infrared spectroscopy.
Wei Li
The University of Alabama
Round 3 Recipient
*Expected Graduation in May 2010, Ph.D., Chemical Engineering*
WLI15@crimson.ua.edu

Cathode catalyst degradation is a key barrier for proton exchange membrane fuel cell (PEMFC) commercialization, a key element of the hydrogen economy. Carbon support corrosion (CSC) is a major factor causing cathode catalyst (platinum nanoparticles on carbon black, Pt/C) degradation in PEMFC, i.e. aggregation of Pt nanoparticles over time, and changes in pore morphology and surface characteristics in the catalyst layer. My study objective is to understand and mitigate the CSC in-situ at the cathode of PEMFC. Electrochemical methods coupled with an online mass spectrometer were used to investigate the mechanism of CSC by analyzing the cathode exhaust gases, CO$_2$, H$_2$, and O$_2$. They were correlated in our laboratory for the first time to characterize most reactions that happen at the cathode in a real PEMFC. The CSC rate was measured by quantifying the CO$_2$. Moreover, the oxygen was isotope labeled using oxygen-18 to determine the oxygen source, verify mechanistic pathways, and classify surface oxides on the carbon for the Pt-catalyzed CSC. In-situ diffuse reflectance infrared Fourier transform spectroscopy (DRIFT or DRIFTS) will be employed to identify the surface oxides contributing to the CSC current at different potentials for better understanding the mechanisms. In-situ Raman is designed to measure over time the changes of order and disorder graphite of carbon support subjected to CSC. Pt is thought to catalyze CSC by supplying the OH or O. A hypothesis is proposed here that Au clusters can mitigate the Pt catalytic effect on CSC by accepting the OH, since it has stronger interaction with Au. Two conventional methods, colloid and deposition-precipitation, were utilized to prepare the PtAu/C catalyst to verify the hypothesis.

Yahao Lu
The University of Alabama
Rounds 3, 4 and 5 Recipient
*Expected Graduation in August 2010, Ph.D., Metallurgical and Materials Engineering*
lu002@crimson.ua.edu

I am finishing my project, Designing, Fabricating, Integrating, Testing and Optimizing of Micro-fuel Cells. So far, I have published eight papers about the topic and am preparing another two. I am also preparing my dissertation.
Alán Martinez  
University of Alabama at Birmingham  
Rounds 3 and 4 Recipient  
Center for Optical Sensors and Spectroscopies  
*Expected Graduation in Dec. 2010, Ph.D., Physics*  
AMartin7@uab.edu

My research has expanded to investigate new semiconductor nanopowders and micropowders as potential laser materials in powder form or as hot-pressed ceramics that may perform better over a broader spectrum than existing materials without the need for cooling. I am attempting to refine the preparation of these powders and characterize their optical properties with the end goal of producing working lasers based on these materials.

Jessie B. Mayo, Jr.  
Tuskegee University  
Round 3 Recipient  
Tuskegee Center for Advanced Materials  
*Expected Graduation in 2010, Ph.D., Materials Science*  
Jm0164729@tuskegee.edu

Being a student at Tuskegee University has allowed me to conduct research with novel advanced body armor technologies. This research has graduated into a study on the micro-level of cut resistance and fracture mechanics of the fibers that make up flexible and lightweight body armor solutions and materials that have substantial mechanical properties but are not used in body armor.

I am currently working in a research program at the Army Research Lab at the Aberdeen Proving Ground, Maryland. Within this program, the cut resistance of single filaments such as Kevlar, carbon, glass, and ultra high molecular weight polyethylene are being examined. The research involves cutting fibers at different angles and angling the cut mechanism to complete severance. Angle dependence on both levels are determined along with dependence on fiber type. Mixed modes such as tension-shear are also being examined on the micro-level.

**Recent Presentations and Publications:**

Renato Amaral Minamisawa  
Alabama A&M University  
Round 3 Recipient  
M.S., Applied Physics, June 2008  
radiarefm@yahoo.com

I am working on my Ph.D. in Physics at the Institute of Bio and Nanosystems, Jülich Research Center/RWTH Aachen University, Germany.
Tiffany Nelson Williams  
Tuskegee University 
Round 3 Recipient  
Alabama Center for Nanostructured Materials  
Expected Graduation in May 2010, Ph.D., Material Science  
Tiffany.Nelson@tuskegee.edu  

Currently, I am a doctoral candidate in the process of completing my last year in the Ph.D. program in Materials Science and Engineering at Tuskegee University. My dissertation project focuses on developing eco-friendly alternatives for automotive body panels. I am in the final stages of producing and characterizing the composites, which are comprised of natural cellulose-based fibers and soybean oil derived resins. After graduation, I would like the opportunity to work in education. This involves teaching and exposing high school students to the areas of chemistry and engineering.

Recent Presentations and Publications
- Tiffany Williams, “Physical and Mechanical Characterization of Alkali Treated Kenaf Fibers,” 17th International Conference on Composite Materials, (ICCM-17), Edinburgh, United Kingdom, July 2009.
Samuel B. Owens, Jr.
University of Alabama at Birmingham
Round 2 Recipient
Ph.D., Chemistry, August 2009
sb Bowen@ascendmaterials.com

I finished my Ph.D. work with Dr. Gary Gray at UAB in August of 2009. I live in Friendswood, Texas with my wife Lauren and two children, Britt and Paige. I work for Ascend Performance Materials (formerly Solutia) as a Senior Analytical Chemist with the AN Technology Group at the Chocolate Bayou Plant in Alvin. Our two main products at the Bayou are acrylonitrile and hydrogen cyanide. My work focuses primarily on plant operational support of our catalyst used in the acrylonitrile synthetic process as well a general analytical support for all the processes here at the plant.

Larissa C. Parsley
Auburn University
Rounds 1 and 2
Center for Environmental and Cellular Signal Transduction
Expected Graduation in 2010, Ph.D., Microbiology
parsllc@auburn.edu

My current research at Auburn University explores both antimicrobial resistance and synthesis genes found in diverse microbial environments. For example, I have identified several potentially novel antibiotic resistance genes in the municipal wastewater treatment plant in Auburn, Alabama. The emergence of antibiotic resistant bacteria is of great concern to the medical community, and identifying potential reservoirs of antibiotic resistance is an important step in tracking and limiting the spread of these bacteria. Because the wastewater treatment system disperses organic material into the environment (e.g., irrigation areas, ecosystems, food chains), it is an ideal model for studying the occurrence and spread of antibiotic resistance with both public and environmental health implications.

I am also using novel molecular microbiology techniques to discover new antibiotic compounds from bacteria in soil. From the beginning of the antibiotic era, soil microorganisms have proven to be a rich source of powerful antibiotics that are still in use today, such as streptomycin and tetracycline. In addition, soil environments harbor a very diverse group of microorganisms, many of which have never been cultivated in the laboratory. I have already had success in identifying several genetic pathways that may be responsible for producing novel antimicrobial compounds, which will be the focus of my research during this last year of my Ph.D. program.

Recent Presentations and Publications
Li Qui
University of Alabama in Huntsville
Rounds 3 and 4 Recipient
Expected Graduation in August 2011, Ph.D., Biotechnology Science and Engineering
lq0001@email.uah.edu

My research focuses on exploring the novel specific inhibitors of urokinase-type plasminogen activator (uPA) via implementing a small molecule fragment-based screening program using X-ray crystallography. Overexpression of uPA in the cell is the one of the main causes of the imbalance in the plasminogen activator system leading to serious disorders in tissue structure and function. My research approach is soaking high quality uPA crystals into more than 300 low molecular weight fragments and screening them by X-ray diffraction for compounds binding. The results of this study will be implemented towards the development of novel drug compounds.

Dheeraj Raju
The University of Alabama
Round 2 Recipient
Center for Optical Sensors and Spectroscopies
Expected Graduation in August 2010, Ph.D., Educational Research
seeth001@bama.ua.edu

My research involves providing statistical and research analysis to analyze and improve educational based programs. Some of the research projects I was involved this year were:

- Evaluation report on the Alabama Math and Science Technology Initiative program (AMSTI). AMSTI is a hands-on inquiry based training program for teachers to improve math and science classroom teaching for K-12. Evaluation of the teacher’s pre-test and post-test scores was reported to the Alabama State Department of Education.
- Provided qualitative analysis and helped develop and analyze a survey for E-MAP program leading to the retention of students in the University of Alabama College of Engineering.
- Worked on research projects involving construction safety and co-authored five conference publications including: On-site construction Productivity, The Challenges of Safety in the Construction Industry, and Efficacy of Warning Displays in Construction Sites.

Humberto Avila Rangel
The University of Alabama
Rounds 1 and 2
Center for Optical Sensors and Spectroscopies
Ph.D., Civil Engineering, December 2008
hfavilarangel@bama.ua.edu

I am currently teaching in Columbia.
Mary Ellen Rogers-Moore
Tuskegee University
Rounds 2, 4 and 5 Recipient
Alabama Center for Nanostructured Materials
Expected Graduation May 2010, Ph.D., Materials Science and Engineering
Mary.E.Rogers@hotmail.com
Currently, I am a doctoral student at Tuskegee University pursuing a degree in Material Science and Engineering. My research efforts are focused on enhancing the thermal, mechanical, and fire properties of resole phenolic resins through the infusion of silicate nanoparticles. If the infused silicate nanoparticles aid in the enhancement of properties, the resulting materials will be prime candidates for use in high temperature applications (ex., aerospace, electronics, and construction). Certain findings of this research have already been presented at several conferences and technical meetings and have won a couple of awards for presentation and technical content.

Emily Roth-Gordon
University of Alabama in Huntsville
Round 3 Recipient
Extended Alabama Structural Biology Consortium
Expected Graduation in September 2010, M.S., Biology; 2013 Ph.D., Biotechnology
emilyrothgordon@gmail.com
I currently work at the Laboratory for Structural Biology at the University of Alabama in Huntsville with the intent to make NMR backbone assignments of tRab9, a GTPase that aids the vesicular transport of mannose-6-phosphate receptors from the late endosome to the trans golgi network.
Although there has been a consistent quantity of tRab9 obtained during the purification process, there have been many obstacles to overcome in obtaining conditions in which tRab9 is stable enough without binding it to Tip47 in order to collect useful data with NMR spectroscopy. Past funded research has included optimization of the tRab9 purification process including pH, buffers, histadine cleavage, and salt concentration. It has also included several NMR experiments including a 15N-NOSEY HSQC. After a recent buffer trial using a tris/calcium chloride/citric acid buffer it was found that there is increased stability of the protein compared to previous buffer trials. With this new buffer, there is great hope that the final NMR experiment, CBCACO, can be done for the completion of the project. With structural analysis of proteins such as Rab9, scientists will have better understanding of the biochemical nature of transport proteins in hopes of designing anti-viral drugs against diseases such as HIV-1, Ebola, and Marburg.
GRSP support began in January 2008 while attending UAB graduate school for a doctorate in chemistry. The objective of my research was to continue developing molecular sensors for hazardous materials. As a starting point, considerable research has gone into determining the exact binding events of \( \alpha, \omega \)-bis(phosphorus) metallacrown ethers to \( \text{Li}^+ \), \( \text{Na}^+ \), and small molecules. Accurate binding constants have been determined for many complexes while some specific titrations are still in progress. Studies have shown metallacrown ethers are completely self-assembling allowing for strict synthetic control. Research is continuing in binding constant determination with the complete series of metallacrown ethers using \( \text{Li}^+ \) and \( \text{Na}^+ \) then subsequent publication of binding results, X-ray crystal structures, synthesis, and characterization. The project ending date is the summer of 2010 coinciding with the completion of my degree. Currently I am writing my original research proposal and continuing research for the final publication of this proposal. The first publication is written on synthetic characterization, X-ray structures, hard metal binding, and isomerization studies and will be submitted to Organometallics. The first publication to Organometallics will present all experimental work on my GRSP project with an expected publication date in the late fall of 2009.

During the 2008-2009 funding period, three presentations were given. I presented a poster at the EPSCoR conference in Montgomery, July 2008. The poster covered the results of several binding studies with these metallacrown ethers with alkali metal salt as well as their X-ray crystal structures. In November of 2008, I presented my research on behalf of Dr. Gray at the Southeast Regional American Chemical Society Conference (SERMACS) in Nashville, Tennessee. This talk focused on binding results to date. I also presented this talk to UAB Graduate Research Days in March 2009.
Redahegn Sileshi  
**Alabama A&M University**  
Round 3 Recipient, Alabama Center for Nanostructured Materials  
*M.S., Physics, December 2008*  
redahegnkas@yahoo.com

Currently I am working on my Ph.D. at The University of Alabama in the Department of Civil, Construction and Environmental Engineering under the supervision of Dr. Robert Pitt. My thesis topic is, “Dye Assisted Optical Lithography of Polymers from Aqueous-Phase.”

In my M.S. research at AAMU, I focused on photopatterning on polymer thin films which can be used as a platform for fabricating high density biosensing chips as well as hydrophilic wells. These biosensing chips can be used for sensing several biomolecules. Various kinds of biomolecules such as nitrobenzo-2-oxa-1, 3-diazole-methacrylate dye; 1,2-dimyristoyl-sn-glycero-3-phosphocholine lipid; and Biotin (vitamin) with Oregon green (dye) were investigated. Polybutadiene is biologically benign synthetic rubber used as a platform for biomolecular applications.

Holographic gratings are investigated for their application in the field of information storage, waveguide coupling, and holographic recordings. Grating is fabricated using interference of two coherent beams derived from 488 nm Argon-ion laser on the surfaces of polybutadiene rubber. Aqueous solution of nitrobenzo-2-oxa-1, 3-diazole-methacrylate dye biomolecule was confined between two polybutadiene rubber coated substrate. Gratings were made using the interaction of laser excited nitrobenzo-2-oxa-1, 3-diazole-methacrylate dye with the polybutadiene coating. The two polybutadiene rubber coated substrates were separated by a spacer which provided enough space for the molecules to move and rearrange themselves.

**Recent Presentations and Publications**


Danalea Skarra  
**University of South Alabama**  
Rounds 1, 2 and 4 Recipient, Extended Alabama Structural Biology Consortium  
*Expected Graduation in May 2010, Ph.D., Basic Medical Sciences*  
dvs501@jaguar1.usouthal.edu

I am continuing my research into the role of protein phosphatase type 5 (PP5) in cellular stress and growth pathways. Cancer is the result of loss of control of these pathways. PP5 has been identified as a regulator of cellular stress, growth, and hormone response pathways. Also, PP5 is overexpressed in human breast cancers. The objective of my research is to identify proteins that interact with PP5 under stressed and non-stressed conditions. This distinguishes PP5’s function in select pathways under specific conditions. In 2008 I coauthored a paper investigating PP5 in breast cancer, and will defend my dissertation in 2010.
Samer Swedan
University of South Alabama
Rounds 3, 4 and 5 Recipient
Extended Alabama Structural Biology Consortium
*Expected Graduation in 2011, Ph.D. in Basic Medical Sciences*
sfs601@jaguar1.usouthal.edu

My research involves studying human Respiratory Syncytial Virus (RSV), one of the most common causes for respiratory disease in infants and children. This research could eventually provide the design of a RSV vaccine or novel antiviral drugs. I have presented my research findings in a variety of settings, from departmental presentations and university research forums, to national professional scientific meetings (FASEB). Furthermore, I have submitted some of my research findings to the Journal of Virology, and this paper was recently accepted for publication.

Jean Michael Taguenang
Alabama A&M University
Recipient, Rounds 1, 2 and 3
Alabama Center for Nanostructured Materials
Ph.D., Applied Physics, December 2008
Jean.taguenang@mailserver.aamu.edu

I am now a Postdoctoral Research Analyst at Alabama A&M University Research Institute. My job consists of developing computer based models for generating hyperspectral signatures to be used in the development and evaluation of various ATR (automated target recognition) algorithms, to design and model relevant optical systems and assist in the design, assembly and evaluation of a laboratory hyper-resolution breadboard sensors supporting software development for ATR algorithms. I will also assist two groups of electrical engineering students in the realization of their senior design projects.

Merlin Theodore
Tuskegee University
Round 1
Alabama Center for Nanostructured Materials
Ph.D., Material Science and Engineering, May 2008
cememerlin@yahoo.com

I am continuing my post-doc work at Universal Technology Corporation in Dayton, Ohio. I am a Materials Research Engineer in the Materials and Manufacturing Directorate, Nonmetallic Materials Division with the Air Force Research Laboratory.
The objective of my research is to determine the hydraulic capacity and the pollutant removal capabilities of a full-size upflow filtration device, the Up-FloTM Filter in a field installation. Stormwater requires treatment because it contains pollutants such as oil and grease, chemicals, nutrients, metals, and bacteria as it travels across land. Many types of devices have been manufactured to treat stormwater runoff, but most have been designed to treat one or more of the common pollutants. Treatment of runoff requires a device which can remove many types of pollutants at the same time as well as large amounts of debris and floatable materials. Upflow filtration methods are examined because traditional downflow practices have a problem in rapid clogging which reduces their treatment flow rate and overall treatment capacity. The Up-Flow Filter is designed to treat stormwater runoff from critical source areas.

I have worked with teachers and students for the development of a pilot-scale waste water treatment system. Performance of the device was tested after the model was built. At the same time, I performed a hydraulic demonstration for the future engineering students. I have explained many types of hydraulic devices used in the real world such as gates, culverts, and dams. Also, I have showed the water flow in the small open flow channel in the water resources lab to demonstrate the actual performance of those hydraulic devices.

Sarah Torgerson
University of Alabama in Huntsville
Round 3

I am currently serving on active duty out-of-state with the United States Military.
Phillip Keith Veronese
University of Alabama at Birmingham
Rounds 3 and 4 Recipient
*Expected Graduation in May 2010, Ph.D., Chemistry*
veronese@uab.edu

During 2008-09, my research centered on how the assembly of ClpA, an enzyme involved in regulation of proteins in the cell, changes as a function of temperature as well as how ClpA comes together in the presence of target peptide sequences that mimic proteins tagged by the cell for destruction. This work gives insight into how ClpA is assembled in the cell and how ClpA plays a role in reversing situations where there is a buildup of unwanted or misfolded proteins in the cell, a situation that arises in many P53-mediated cancers along with Alzheimer’s, Parkinson’s, and Huntington’s disease. My research is performed in the Lucius Lab, a biophysical chemistry lab located in the Chemistry Department at the University of Alabama at Birmingham. I have three first-author papers underway, these papers make up the bulk of my thesis.

Jonathan E. Williams
University of Alabama at Birmingham
Rounds 1, 2, 4 and 5 Recipient
Center for Optical Sensors and Spectroscopies
*Expected Graduation in May 2010, Ph.D., Physics*
jwill18@uab.edu

My research objective is the development of materials to be used to produce light in the middle infrared region. These materials are developed in thin film form so that compact, portable middle infrared laser sources can be fabricated for use in spectroscopic applications such as detection of organic compounds, biohazards, water contamination, etc. I have been working with the Center for Optical Sensors and Spectroscopies at the University of Alabama at Birmingham studying chromium doped zinc selenide material for middle infrared light emission. My project has shown that this material in thin film form can produce middle infrared light when excited by an alternate light source. This result was published in a peer review journal article. My next step is to show that light emission is feasible when the material is excited electrically. I am currently fabricating thin films of chromium doped zinc selenide by a growth technique called pulsed laser deposition to investigate if middle infrared light emissions can be obtained through electrical excitation. So far, successful light emissions from the thin films grown have not been obtained through electrical excitation due to some set backs in material development. However, after meeting with my Ph.D. committee for candidacy for degree, a plan for solving these problems was discussed and a completion date for degree in May 2010 was realized.

Recent Presentations and Publications
Bradford M. Wilson
The University of Alabama
Round 2 Recipient
Expected Graduation in Dec. 2011, M.S./Ph.D., Environmental Engineering
brad4d@hotmail.com

In ongoing studies of microbiological characterization of urban wet-weather flows, materials have been acquired for an experiment into factors affecting survival of non-sewage indicator microbes on impervious surfaces. The same equipment will also be used for later studies of survival factors on pervious surfaces. These survival studies should help untangle net survival rates from deposition rates in planned environmental sheetflow studies of the same organisms.

Randall Wilson
University of Alabama in Huntsville
Recipient, Rounds 1, 2 and 4
Laboratory for Structural Biology
Expected Graduation in 2009, Ph.D., Biotechnology Science/ Engineering
wilsonrc@uah.edu

I am studying a protein that functions as part of the cell’s ability to break down misfolded proteins. This system is one contributing factor to a number of neurodegenerative diseases, such as Alzheimer’s, Huntington’s, and Parkinson’s disease. Upon graduation, I plan to continue my research and exploration of the structure and function of disease-related proteins through corporate research and development opportunities, private equity agreements or academic partnerships.

Recent Presentations and Publications
- R. C. Wilson, R. C., Hughes, J. W. Flatt, E. J. Meehan, J. D. Ng and P. D. Twigg, "The Crystal Structure of Ubiquitin-Conjugating Enzyme E2-25 kDa (Huntington Interacting Protein 2) M172A Mutant Reveals Additional Key Residue Within the Active Site" Poster presented at the PBR/UAH Biosciences Retreat, Huntsville, Alabama September 2008. 3rd Place in Graduate Poster Competition.
Nydeia Wright-Bolden
Tuskegee University
Rounds 3 and 4 Recipient
Center for Advanced Materials
Expected Graduation in May 2010, Ph.D., Material Science and Engineering
Nydeia.wright@tuskegee.edu

I am currently working for the U.S. Air Force (Eglin Air Force Research Lab near Valparaiso, Florida) as a research engineer developing micro munitions.

This project includes the synthesis of iron oxide nanoparticles engineered for drug delivery applications. Drug delivery through magnetic carrying systems are of particular interest in areas such as cancer therapy where the side-effects are severe and the amount of drug that must be ingested is increased due to the minute amount that reaches the tumorous site with each dosage. Nano materials such as iron oxides and carbides have the magnetic capability to be used as drug carrier vehicles by interacting with an external magnet place near the desired location.

In this project, iron oxide nanoparticles have been successfully synthesized through ultrasonic irradiation of varying solutions of organometallic precursors in the presence of a polyol solvent. Precursors include iron II acetate, iron pentacarbonyl, EG, PEG and water. In addition to synthesizing iron oxide nanoparticles, the particles have been coated both in situ and post synthesis using PVA, dextran, oleic acid and pluronic-127. Besides increasing the biocompatibility of the particles, the coatings aid in providing a means for drug loading. Currently, drug loading procedures are being evaluated for optimum loading ability. Characterization of the nanoparticles includes XRD, TEM, magnetization studies and Massbauer spectroscopy. Coated particles have been additionally characterized using TGA, FTIR, TEM, and micro magnetometry. The final drug loaded particles will be evaluated primarily for drug loading ability, drug retention, magnet properties and toxicity.

Yu Xiang
Auburn University
Round 1 Recipient
Expected Graduation in May 2009, M.S, Biology
xiangyu@auburn.edu

My interests are in the specificity and flexibility in the mutualistic symbiosis between cnidarians and algal symbionts by comparing the population genetics and evolution of sea anemones in the genus Aiptasia and the Symbiodinium dinoflagellates they harbor. I’ve recently completed my M.S. in Biology and am now pursuing a M.S. in Statistics at Auburn University.
Shaik Zainuddin  
Tuskegee University  
Round 3 Recipient  
Alabama Center for Nanostructured Materials  
Ph.D., Materials Science and Engineering, May 2009  
szainuddin@tuskegee.edu  
I graduated in May 2009 with a Ph.D. and am currently looking for a faculty position in materials science and mechanical engineering.

Recent Presentations and Publications

Min Zhong  
Auburn University  
Rounds 1 and 2  
Center for Environmental and Cellular Signal Transduction  
Ph.D., Biology, August 2009  
zhongm@email.unc.edu  
I am working in the Lineberger Comprehensive Cancer Center at the University of North Carolina at Chapel Hill. My current research is to identify novel therapeutic targets and pathways in pancreatic and colorectal cancer. I am focusing on the BCAR3 gene in pancreatic and Ect2 gene in colorectal cancer to investigate their activation for the regulation of the RasGEF-Ral pathway. The work will provide the biological information for the use of potential pharmacologic therapeutic targets in this pathway, as well as future cancer therapies.
Huizhen Zhu

The University of Alabama
Rounds 3, 4 and 5 Recipient
*Expected Graduation in December 2009, Ph.D., Chemistry*
zhu001bama.ua.edu

This project (Dendrimer Encapsulated Platinum Nanoparticles (Pt DENs): Preparation, Characterization, and Potential Applications in Fuel Cells) involves the use of amine-terminated polyamidoamine (PAMAM) as both a template and a stabilizer to synthesize Pt nanoparticles by photoreduction and then self-assembly of Pt DENs on Nafion® to form a simplified membrane electrode assembly (MEA) by electrostatic association.

The nanoparticles prepared by photoreduction are highly monodisperse, exhibit a high specific activity for the Oxygen Reduction Reaction (ORR), and are inert to Methanol Oxidation Reaction (MOR), showing great potential for application in Polymer Electrolyte Membrane Fuel Cell (PEMFC) and Direct Methanol Fuel Cell (DMFC). Furthermore, these nanoparticles are stabilized by encapsulation within the dendrimers, and therefore they do not agglomerate, which can maximize the active area and improve catalyst efficiency.

A simplified MEA has been fabricated by the electrostatic self-assembly between Nafion® and Pt DENs. Two methods were proposed to increase Pt loading: layer-by-layer self-assembly and immobilization of Pt DENs onto carbon paper. Approximately eighty layers are proposed to reach the required loading using a dipping machine. Immobilization of Pt DENs and carbon powder simultaneously on a carbon nanofiber can easily reach the required Pt loading for fuel cells, which makes this a very promising method with which to replace the conventional method of electrode fabrication.

No information was available on the following recipients:

- Brian Adams, Round 1
- Fernando Calzzani, Round 3
- Melissa Floyd, Round 1
- Deepak Kini, Round 1
- Kaye Knowles, Round 1
- Tiffany Frazier, Round 3
- Shantel King, Round 2
- Kimberly Michael, Round 1
- Eunice Ndeqwa, Round 1
- Renita Watkins, Round 2
Alabama EPSCoR
Graduate Research Scholars Program

Campus Coordinators
Each of the seven 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. Anup Sharma**  
**Alabama A&M University**

Dr. Anup Sharma is a professor of physics at Alabama A&M University. He has a Master’s degree from the Indian Institute of Technology and a Ph.D. from Columbia University. His research involved the first demonstration of continuous-wave mirrorless laser in an alkali vapor. Dr. Sharma continued his research in Optics and Spectroscopy at Max-Planck Institute, Texas A&M University and the Bhabha Atomic Research Center. For the last several years, he has fabricated fiber-Bragg gratings for applications in sensors. He has also used UV lithography for fabricating micro/nano arrays on substrates which show promise for biosensing applications. He has guided several Ph.D. students and developed graduate courses in Biophotonics and Nanophotonics. He is the Principal Investigator for a recently awarded RISE grant titled, “Research Infrastructure for Advanced Materials and Nanophotonics.” For more information, contact Dr. Sharma at 256.372.8102 or anup.sharma@aamu.edu.

**Dr. Frank “Skip” Bartol**  
**Auburn University**

Dr. Frank (Skip) F. Bartol is the Alabama USDA EPSCoR State Agency Director, Professor of Reproductive Biology, Director of the Cellular and Molecular Biosciences Program, the Associate Dean for Research and Graduate Studies in the College of Veterinary Medicine at Auburn University (AU), and a member of the AU faculty since 1983. Dr. Bartol holds academic appointments in the Department of Animal Sciences in the College of Agriculture and the Department of Anatomy, Physiology and Pharmacology in the College of Veterinary Medicine. He obtained his B.S. degree from Virginia Polytechnic Institute and State University (Virginia Tech) and both M.S. 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 Dr. 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.” His research, which focuses on identification of mechanisms regulating development and function of female reproductive tract tissues in domestic ungulates, has been supported by the USDA National Research Initiative Competitive Grants Program (USDA-NRICGP), the National Science Foundation, and private organizations in the U.S. and abroad, as well as by the Alabama Agricultural Experiment Station. He is an active member of the Society for the Study of Reproduction (SSR) 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, Dr. Bartol lectures in animal use and bioethics in the AU veterinary curriculum and has spoken nationally and internationally on these topics. For more information, contact Dr. Bartol at 334.844.1506 or bartoff@auburn.edu.
**Dr. Mahesh Hosur**  
**Tuskegee University**

Dr. Hosur is the Director of the Alabama NSF RII Grant’s Alabama Center for Nanostructured Materials (ACNM) headquartered at Tuskegee University. The ACNM team also consists of researchers at Alabama A&M University, Auburn University, University of Alabama at Birmingham, the University of Alabama, and the University of South Alabama. Together, they study a broad spectrum of areas connected to materials research and engineering including nanotechnology, carbon/epoxy composites, epoxy syntactic foams, and carbon nanofibers. The research has the potential to create a new generation of automobile, aircraft, spacecraft, locomotives and sporting goods materials. Further, the nanotechnology work could lead to new types of biosensors, drug delivery systems, and heat exchangers.

Dr. Hosur earned his B.S. in Civil Engineering, M. Tech in Aeronautical Engineering and Ph.D. in Aerospace Engineering from India. He is currently a Research Associate Professor in Materials Science Engineering at Tuskegee University. For more information, contact Dr. Hosur at 334.724.4220 or hosur@tuskegee.edu.

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**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.

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**Dr. Chris Lawson**  
**University of Alabama at Birmingham**

Dr. Christopher M. Lawson is a Professor of Physics at UAB, as well as, Director of the Center for Optical Sensors and Spectroscopies (COSS), and Associate Executive Director of Alabama EPSCoR. At UAB, Dr. Lawson has been Principal Investigator (PI) for numerous grants awarded from NSF, ARO, ARL, AFOSR, and NASA. Before coming to UAB in 1993, Dr. Lawson was Manager and then Director of Optical Sciences at BDM Corporation in McLean, Virginia. He received his Ph.D. in Physics at Oklahoma State University in 1981 under Dr. Richard C. Powell (former President, Optical Society of America) and he received his M.S. degree in Physics from the University of Colorado at Boulder in 1979.

Dr. Lawson’s personal research, currently funded by NSF and the Army, is directed toward the development of nonlinear optical materials for optical power limiting applications. Dr. Lawson is also involved in the COSS-related development of optical spectroscopic sensors for detection of toxic substances. Dr. Lawson has published over 60 research articles and two book chapters, and he has also edited or co-edited eight books published by the International Society for Optical Engineering. For more information, contact Dr. Lawson at 205.975.5059 or lawson@uab.edu.
Dr. Edward Meehan
University of Alabama in Huntsville

Dr. Edward J. Meehan is Professor of Chemistry and Director of the Laboratory for Structural Biology at the University of Alabama in Huntsville (UAH). He was the Principle Investigator for NSF/EPSCoR funded Alabama Structural Biology Consortium (ASBC). He received a B.S. degree in Chemistry in 1972 from Birmingham-Southern College and a Ph.D. in Biochemistry in 1978 from the University of Alabama in Birmingham. He was a visiting scientist in the Department of Crystallography at the University of Pittsburgh (1989) and a visiting research fellow at the Institute of Molecular Biology, Academia Sinica, Taiwan (1990-1992). He was selected as UAH’s Outstanding Young Educator (1981) and honored as the Outstanding Professor of the Year for the College of Science (1998). In 2004, he received both the Dean’s Service Award for the College of Science and the UAH Foundation Award for Research and Creative Achievement. Dr. Meehan uses X-ray crystallography to determine the three-dimensional shapes of important biological molecules. Private donations and funding from NASA, NIH, and NSF, and the Alpha foundation have funded his work. For more information, contact Dr. Meehan at 256.824.6533 or meehane@email.uah.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, the Dean of Engineering at the University of South Alabama, and is a licensed professional engineer. Dr. Steadman previously served as 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 Commemation, 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@usouthal.edu.
### Index of Scholars

Page numbers are referenced by volume and page number. Example: V3-10 denotes the scholar can be found in Volume 3, page 10. This publication, printed October 2009 is the third volume of the GRSP booklet. Volume Two was printed July 2008, Volume One was printed February 2008 and is denoted similarly.

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### Alumni Roster and Expected Graduation Dates

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<td>Andrew Gallian, Ph.D.</td>
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<td></td>
<td>Hunter Hyche, M.S.</td>
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<td></td>
<td>Merlin Theodore, Ph.D.</td>
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<tr>
<td>2007</td>
<td>Chethan Archarya, Ph.D.</td>
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<tr>
<td></td>
<td>Sai Santosh Bangalore, M.S</td>
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<td></td>
<td>Jejal Bathi, Ph.D.</td>
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<td>Bopha Chhay, Ph.D.</td>
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<td>Cosmin Dumitrescu, Ph.D.</td>
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<td>Kimberly Michael, M.S.</td>
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<td>Redahegn Sileshi, M.S.</td>
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<td>Jean M. Tanguenang, Ph.D.</td>
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**2009**

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<td>Shantel King, M.S.</td>
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**Expected Graduation Dates for Current GRSP Scholars**

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<td>2010</td>
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Joel Andrews
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Ines Sampayo
Danalea Skarra
Samer Swedan

Rep. Bobby Bright - 2nd District

Rep. Mike Rogers - 3rd District
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Sudhir Aluwalia
David Baah
Susan Balenger
Christina Booher
Sandrea Brundidge-Young
Johanna Cannon
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Larissa Parsley
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Maninder Sandey
Shoieb Shaik
Charles Solvason
Nydeia Wright
Chuanling Xu
Qing Yang

Rep. Robert Aderholdt - 4th District

Rep. Parker Griffith - 5th District
Malek Abunaemeh
Miranda Byrne-Steele
Caitlin Cassidy
Talitha Caudle
Tomeka Colon
Duchassa Duressa
Stephanie Freeman
Alireza Hassenzadeh
Ronny Hughes
Qiu Li
Emily Roth-Gordon

Rep. Spencer Bachus - 6th District
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Samantha Hastings
David Johnson
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Alán Martinez
Justin Sheff
John Smith
Philip Veronese

Rep. Arthur Davis - 7th District
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Jonathan Williams
Xin Yang
Huizhen Zhu

*Reported institutional residencies of students by Alabama Congressional District. There are no research institutions located in Districts 2 and 4.
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<td>Apply Cutting Edge Molecular Technology to Understanding Evolutionary Processes</td>
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<td>Basic Medical Sciences</td>
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<td>Protection by Folic Acid Against UV-Induced DNA Damage</td>
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<td>Integration of Liquid Crystal Sensors with Interface Circuitry for Bio-Sensing Applications</td>
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<td>Evaluation of Microbial Diversity and Enzyme Activities in Wetland Soils</td>
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<td>Biochemistry</td>
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<td>Structural and Functional Characterization of the C-Terminal Stt3p, a Subunit of Yeast Oligosaccharin Transferase</td>
<td>Aug. 2010</td>
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<td>Hughes</td>
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<td>Ph.D.</td>
<td>Biotechnology</td>
<td>Bioengineering, Chemistry, Life Sciences</td>
<td>Two Men and a Genome: A Small Lab Structural Genomics Project</td>
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<td>May 2010</td>
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<td>Optimizing Drug Targets and Improving Shelf Life of Pharmaceuticals</td>
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<td>New Portable Sensor Equipment to Detect Hazards</td>
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<td>Mechanical Engineering</td>
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<td>Ways Computers Can Solve Genetic Questions</td>
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<td>Applied Physics</td>
<td>Ion Beam Nanolithography, Physics</td>
<td>Fabrication of Nanopores using MeV Accelerators</td>
<td>2008</td>
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<td>Ph.D.</td>
<td>Engineering Science and Mechanics</td>
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<td>To Manufacture and Characterize Response of Nanocomposites and Stimulate and Understand the Governing Mechanisms Behind the Strengthening Polymer Matrix Composite</td>
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<td>Tartaric Acid-Derived Bis(phosphites) as Ligands for the Catalytic Asymmetric Hydroformylation of Styrene</td>
<td>Aug 2008</td>
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<td>Microbiology</td>
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<td>Silicate Nanocomposites and Polyamide Laminate Composite Sheets Based on Resole Phenolic Resins and Brominated Resole Phenolic Copolymer Resins</td>
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<td>Effects of Nonstructural (NS) Proteins of Human Respiratory Syncytial Virus on Host Inferferon Response</td>
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<td>2010</td>
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<td>Characterizing the Structures of Proteins Involved in Neurodegenerative Diseases</td>
<td>Aug-10</td>
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Alabama EPSCoR Steering Committee

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Alabama EPSCoR Steering Committee
Vice President for Research
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