



Volume 1, Issue 10-2  
Summer 2016

## Special Edition Newsletter

# Summer Research 2016

### Special points of Interest

- Summer Research 2016 Poster Session - pages 6-7

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STEM students enhance their understanding of learned concepts through practical research and become more competitive in the selection process for graduate programs. Twenty-five, more than 50% of the non-graduating Eagle STEM Scholars, participated in 2016 Summer Research projects. Sixteen of the scholars participated in research at Winthrop and nine scholars participated in research at other locations including Northeastern University, Notre Dame, St. Jude Children's Hospital, UMBC, University of Minnesota, USC Center for Colon Cancer Research, University of Wisconsin, VIMS, and Wake Forest. This special edition newsletter includes summaries from many of the scholars about their summer research experience. Dr. Robin Lammi, Director of Undergraduate Research, and Dr. James Hanna led the Summer Undergraduate Research Experience (SURE) Program at Winthrop. The research projects were directed by faculty from the Chemistry and Biology Departments at Winthrop University. Students who were McNair Scholars were also in programs directed by Dr. Cheryl Fortner-Wood. The research experience at Wake Forest was arranged by Dr. Cliff Calloway and at St. Jude Children's Hospital by Dr. Jason Hurlbert. Winthrop professors who dedicated their time to allow selected students to assist and learn in their research laboratories included Dr. Eric Birgbauer, Dr. Victoria Frost, Dr. Maria Gelabert,

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## My Experience at Notre Dame

by Jordan Lewis

This past summer I worked in the population biology lab of Dr. Hope Hollocher at University of Notre Dame in South Bend, Indiana as a part of the Summer Research Opportunities Program. The program is dedicated to increasing the diversity of PhD applicants who matriculate into the University. My project looked at the effects of Multiparasitism on the presence of Plasmodium Knowlesi in Macaque Monkeys in Bali, Indonesia. Plasmodium Knowlesi has recently been identified as the 5th



See **LEWIS** page 4

## My Summer Research at Northeastern

Michelle Corley

This summer I had the opportunity to go to Northeastern University in Boston, MA. I was a part of the Catalysis Summer Research Experience for Undergraduates in the Chemical Biology Department. I worked with Dr. Ke Zhang who is a polymer chemist and works to use polymers as a delivery vehicle for medical agents. My project this summer focused on reducing the unwanted immune response of nucleic acids by brush-polymer assisted compaction. I would encourage anyone who is interested in going into drug discovery/delivery or biotechnology to do their research at Northeastern University because it is located in the heart of Boston and is surrounded by major drug companies like Merck and Pfizer. I really enjoyed my time in Boston and at Northeastern and would highly recommend people to apply.■



Corley

## A Summer Well Spent

by Douglas Johnson

I worked with Dr. Frost and Dr. Heard in their labs on determining the diversity and origin of bacteria on South Carolina Oceanic Beaches. We searched for four bacteria including *Staphylococcus aureus*, *E. Coli*, *Enterococcus*, and *Fecal Coliform*. The beaches we went to were Folly Beach, Pawley's Island, and Myrtle Beach. At these beaches, we took sand and water samples to determine fecal indicator bacteria levels and the presence of *Staph aureus*. The second portion of the project was to determine where the *E. Coli* was originating from using a Multiplex PCR.

I thoroughly enjoyed my research experience. It allowed me to do some traveling to different beaches

and it gave me the opportunity to get to know some of the professors in my department. It also allowed me to branch out to other research students and make new friends. I learned important lab skills through firsthand experience and about specific biological areas such as conservation biology and microbiology which will better my learning process in the future. I would most definitely recommend research to other students if they are given the opportunity.■



Johnson



Di Falco

## My WISE Summer Research Experience

by Ashley Di Falco

I had the opportunity to be a part of the WISE (Winthrop Initiative for STEM Educators) program. The program was three weeks long. I participated in research dealing with diversity and abundance of microorganisms in Winthrop's water resources such as the Winthrop lake and wetlands. I also taught and led a frog dissection in a middle school and also taught a review for high school students end of course exams. Being involved in this program made me realize there was more to teaching than I realized!■

## My McNair Summer Research Experience

by Camerun Washington

This summer I was selected to participate in the McNair Scholars Program, a federally funded initiative seeking to promote the matriculation of underrepresented groups into PhD programs. I conducted genetics research under Dr. Kathryn Kohl, (my previous research mentor), where we investigated the role of heterochromatin deficiency on the frequency of X chromosome non-disjunction. This work is really important to me because it has allowed me to delve deeply into the mechanisms of aberrant meiotic recombination which is the leading cause of aneuploidy in humans. Since I want to be a genetic counselor, doing basic bench research, I feel, has been a great foundation for my future in graduate school. In addition to research, my cohort and I also underwent an intensive summer course which emphasized scientific writing skills, research methodology, professional development, and GRE preparation. At the end of the experience, we attended the

National McNair Research Conference in Atlanta, GA where I won 1st place (\$500) in the Life Sciences Research Presentation. After McNair ended, I was most grateful for the opportunity to travel to Virginia Commonwealth University, Johns Hopkins University, and the University of Cincinnati Children's Medical Center to tour genetic counseling programs and to interact with future faculty all through McNair funding. The opportunities that McNair has afforded me are inexplicably life-changing. With the support of Eagle STEM and McNair, I feel like I have been entrusted with the expectation to achieve great things and thanks to these programs, I believe I am well on my way. ■

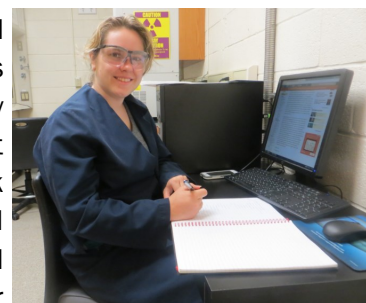


Washington

## A New Experience

by Emily Watson

This summer I worked in the geology lab with Dr. Werts researching clay chemistry. It was a privilege to work in the geology lab because it unified my interest in chemistry and geology. In our research, clay chemistry was used as a tool to investigate fire intensity along with the changing morphology of clay minerals. This summer was a new experience as I got to do a great deal of field work. For data collection, we set small camp fires on land in York County, South Carolina. I learned new skills about data collection in the field and the sources of error as well as hardships with collecting soil samples. I am excited to continue this research into the semester and present a poster at the American Geophysical Union in San Francisco this December. ■



Watson

## My Research Experience

by Autumn Leggins



Leggins

This summer, I did research with Dr. Grosseohme and Dr. Stern. The project I worked on this summer revolved around incorporating the Oct4 gene into Adipose Derived Stem Cells (ADSCs) through the use of plasmids. This was done in order to see if Oct4 expression alone could ultimately control pluripotency in stem cells and was completed through the use of Invitrogen's GeneSwitch™. I enjoyed working on this project and I would recommend summer research. ■

## Seven Eagle STEM Scholars Participated in the McNair Program

Seven Eagle STEM Scholars, Jordon Lewis, Theresa Melendez, Jesslyn Park, and Leigha Stahl, Camerun Washington, Autumn Leggins, and Madeline Diaz are part of the McNair program.

This summer, three of the scholars, Camerun Washington, Autumn Leggins, and Madeline Diaz, presented their research in June 2016 at the S.C. McNair Research Symposium at USC and at the Southeastern Association for Equal Opportunity Programs and Personnel (SAEOPP) National McNair/SSS Research Conference (in Atlanta). Students from 27 institutions competed in these highly competitive categories.

*Madeline Diaz's* presentation was "Investigation of the HMGA1/EF24 Nexus in Human Colon Cancer." Her mentor was Dr. Takita Sumter.

The title of *Autumn Leggins'* presentation was "Controlling the Expression Levels of Oct4 in Murine Adipose Derived Stem Cells Using Invitrogen's Gene Switch™ System." Her mentor was Dr. Nick Grosseohme.■

Lewis, Melendez, Park, and Stahl participated in REU's at other institutions.

### Camerun Washington

*Fall 2013 Cohort, was the first place award winner in Life Science orals. The title of his presentation was "Investigating X Chromosome Non-disjunction in Drosophila melanogaster su(var)3-9 mutants."*



*His faculty mentor was Dr. Kathryn Kohl.*

## Another Summer Research Experience at St. Jude

by Michala Tesney

This summer, I returned to St. Jude Children's Research Hospital to participate in the Pediatric Oncology Education (POE) program. I worked in the structural biology department in Dr. Tudor Moldoveanu's lab. I studied the structure and function of an effector protein, BAK, involved in the apoptotic pathway. I really enjoyed returning to St. Jude because I was able to finish the project I started the summer before. I

also really enjoy St. Jude as a hospital because it reminds me why I want to be a doctor every day I walk into their doors. I would highly recommend the POE program to anyone who is interested in health or biomedical research. Side note: St. Jude is starting a graduate school in 2017!■



Tesney

**Lewis** continued from front

human malaria parasite and its prevalence in south east Asia is being evaluated and studied. My project evaluated the parasite interactions within the macaques, treating them as individual ecosystems with the parasite coexisting and competing in the individuals. I enjoyed my time at Notre Dame and will be applying this December for my PhD in Biological Sciences.■



## Life-changing Research at Virginia Institute of Marine Science

by Leigha Stahl

I was selected as a Research Experience for Undergraduates (REU) intern at the Virginia Institute of Marine Science associated with the College of William & Mary. My research mentors were Dr. Kimberly Reece and Dr. Wolfgang Vogelbein. My research focused on a toxin-producing harmful algal bloom species called *Alexandrium monilatum*. This algae re-emerged in the York River around 2007 and has since expanded its range into the mainstream of the Chesapeake Bay. One reason why my research mentors and I studied this organism is because it can produce toxins and has been associated with fish and invertebrate mortalities including



Stahl

the Eastern oyster, which is an important shellfish consumed by people. While previous laboratory studies suggest this algae is being ingested in the oyster based on histological preparation of oyster tissue, we needed to confirm the

algae's presence using a molecular genetic approach. Based on my research, I was able to confirm the algae's presence in oyster tissue, but more research is needed to ensure that the fluorescent DNA probes bind only to the genes on the algae of interest. My summer research was a wonderful experience where I gained new skills, knowledge, and friends while working in a beautiful setting along the York River. I feel honored to have been selected as an REU Intern and given the opportunity to explore my interest in marine science and aquatic health.■

## My Summer at University of South Carolina

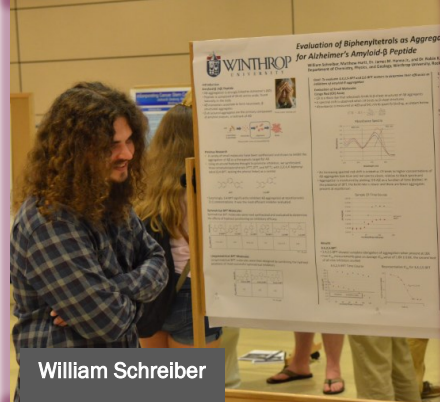
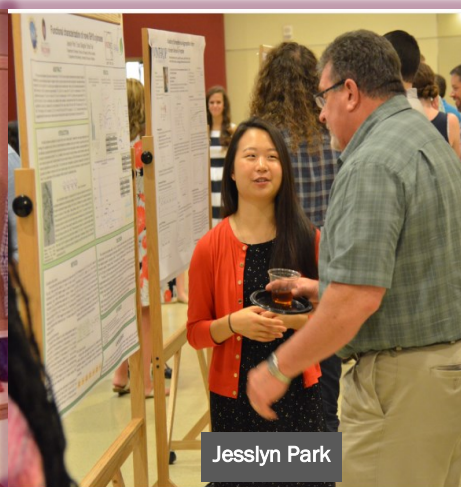
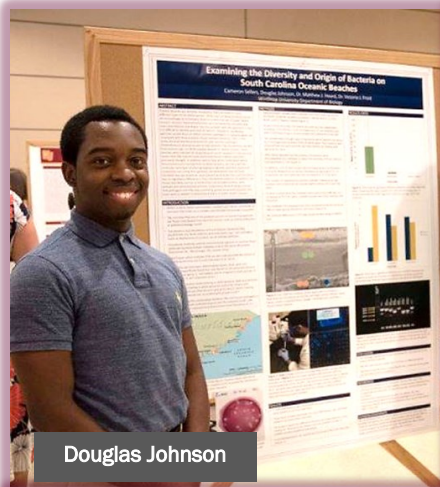
by Theresa Melendez

This past summer, I was a part of the Center for Colon Cancer Research's Minority Undergraduate Research Program. I had the opportunity to work for Dr. Eugenia Broude at USC in the Translational Cancer Therapeutics laboratory. Over the course of the 10-week program, I worked with a postgraduate and another undergraduate student on CDK7 inhibition in breast cancer cells. The object of the research project was to determine the effects of the drug THZ1 on breast cancer cells by measuring CDK7 protein expression levels, using 2D and 3D assays to determine the growth inhibitory effects of THZ1 in multiple breast cancer cell lines, and to analyze the effects of THZ1 on RNA polymerase II activity in breast cancer. At the end of the summer, the research was presented at the USC Undergraduate Research Symposium.■



Melendez

## Eagle STEM Scholars Presenting Posters of their Summer Research



## Eagle STEM Scholars Learning about Summer Research



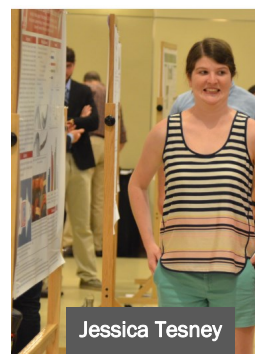
Joycelyn Price



Juliana Quay



Hunter Seller



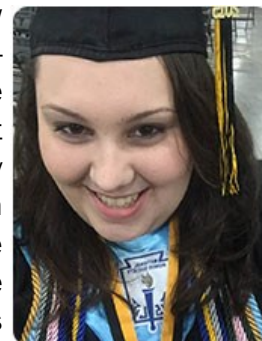
Jessica Tesney

### My Research Opportunity

by Jessica Stevens

This summer I found myself fortunate enough to have an undergraduate research experience here at Winthrop. I worked with Dr. Gelabert, known for her physical chemistry class, and Aaron, a rising Eagle STEM senior. We continued on a project that had been worked on by previous students (such as Jessica Zinna). The research we worked on was the crystallization of zinc oxide nanoparticles in water for the purpose of bacterial remediation. In simple terms, we worked on making super small particles that can be used to purify water in the long run. The reason this is so important is because these particles are currently being made in ethanol, which is much less environmentally safe than water. By building off of the past experiments, Aaron and I got to further explore the project; in other words, we did exploratory research. It was really awesome to work on this project because I got to make decisions and educated guesses. It was

something that I highly value, not only for the fun but also for the training that I received throughout the summer. I am now trained on X-ray powder diffraction and particle size analysis as well as different software that the chemistry department has. Along with this, I was lucky enough to be mentored by one of the greatest professors at this university *on a personal basis*; Dr. Gelabert is incredible and I have learned, as well as continue to learn, more than I ever imagined from her. This research and mentoring continues even now into the fall semester. Getting to partake in an REU is an experience that I wouldn't trade for anything. ■



Stevens



## My Summer at Wake Forest

by Dakota Hawkins

This summer I worked with Dr. Calloway, at Wake Forest on a Phytoremediation project.

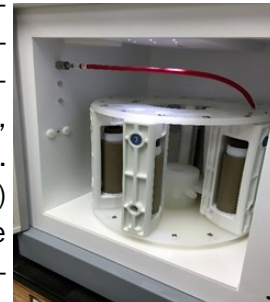
Phytoremediation is a method using green plants to help remove contaminants that lie within the soil. We utilized the Microwave digestion system and the ICP-MS that Wake Forest had for this project. Our goal was to evaluate three plants native to this area to see how good they were at drawing up metals. The metals that we tested were copper, zinc, chromium, and nickel. To measure the amount of the metals, we used inductively coupled plasma-mass spectrometry (ICP-MS). The plants that we would be using were Bluestem Grass, Twisted Arrow Rush, and Lemongrass, of-



Hawkins

ten recommended to reduce erosion.

We ended the summer having made an effective method for plant and soil materials dissolution developed, along with ICP-MS method. Twisted Arrows Rush (TAR) was the best plant to be used for the phytoremediation of all four metals, zinc, chromium, copper, and nickel. With a shoot to root ratio higher than 1, it shows that this grass is effectively taking up the metals from the soil, through its roots and into the shoots of the plants. All one would need to do is simply cut this grass and let the shoots start to grow all over again. ■



### RESEARCH continued from front

Dr. Nick Grossoehme, Dr. James Hanna, Dr. Aaron Hartel, Dr. Matt Heard, Dr. Jason Hurlbert, Dr. Kathryn Kohl, Dr. Robin Lammi, Dr. Julian Smith, Dr. Matt Stern, Dr. Takita Sumter and Dr. Scott Werts. Thanks to the department chairs, Dr. Dwight Dimaculangan, Dr. Pat Owens, and Dr. Thomas Polaski and steering committee members and others not formerly mentioned who supported the summer research efforts for Eagle STEM Scholars in various capacities including Dr. Karen Kedrowski, Dr. Kathie Snyder, and Dr. Kristi Westover.

Winthrop Eagle STEM Scholars Program Director, Rachel Law

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The Eagle STEM Scholars Program was formed as a result of the INBRE II diversity initiative to effectively matriculate more students from diverse groups into biomedical science Ph.D. programs. Winthrop, because of its diverse population of students, is uniquely poised to increase the number of under-represented minority, low income and first generation undergraduates in South Carolina who matriculate into Ph.D. biomedical science, bioengineering, biochemistry, biology and chemistry programs. It is taking steps to move over the next two decades towards national leadership in this area.