



Volume 1, Issue 6-1  
Summer 2014

## Special Edition Newsletter

# Summer Research 2014

### Special points of interest:

- Summer Research 2014 Poster Session  
- pages 6-7

### INSIDE THIS ISSUE:

My Summer Research Experience	
Kendra Bufkin	1
Ashley Williams	2
Adaeze Aninweze	2
Leigha Stahl	3
Briana Murray	3
Kristin Ramirez	3
Michala Tesney	4
McNair Program Awards	4
Esse Etim	5
Arlene Haskins	5
Ian Deas	5
Poster Session	6-7
Jordan Lewis	8

STEM students enhance their understanding of learned concepts through research and become more competitive in the selection process for graduate programs. More than half of the 42 Eagle STEM Scholars participated in 2014 Summer Research projects. This special edition newsletter includes summaries from many of the scholars about their summer research experience. Dr. Robin Lammi, Director of Undergraduate Research, led the Summer Undergraduate Research Experience (SURE) Program at Winthrop. The research projects were directed by faculty from the Chemistry, Biology and Math Departments at Winthrop University. Students who were WISE or McNair Scholars were in programs directed by Ms. Cassie Bell and Dr. Cheryl Fortner-Wood, respectively. Some scholars also participated in research at Notre Dame University arranged by Dr. Cliff Harris, Eagle STEM Scholars Program Assistant Director, and at St Jude Children's Hospital arranged by Dr. Jason Hurlbert. Winthrop professors who dedicated their time to allow selected students to assist and learn in their research laboratories included Dr. Kristen Abernathy, Dr. Eric Birgbauer, Dr. Cliff Calloway, Dr. Janice Chism, Dr. Heather Evans-Anderson, Dr. Victoria Frost, Dr. Maria Gelabert, Dr. Nick Grossoehme, Dr. James Hanna, Dr. Cliff Harris, Dr. Aaron Hartel, Dr. Matt Heard, Dr. Jason Hurlbert, Dr. Trent Kull, Dr. William Rogers, Dr. Julian Smith, Dr. Takita Sumter, Interim Chair, Department of Nutrition and Dr. Janet Wojcik. 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. Beth Costner, Dr. Karen Kedrowski, Dr. Joe Rusinko, Dr. Kathie Snyder, and Dr. Kristi Westover ■

Winthrop Eagle STEM Scholars Program Director, Rachel Law

## My Experience at the University of Notre Dame

by Kendra Bufkin

This summer I had the honor of participating in the University of Notre Dame Graduate School Summer Research Program. I was under the mentorship of Dr. Matthew Leevy in the Galvin Life Science Department. The purpose of my experiment was to see if Zebra fish were compatible for preclinical

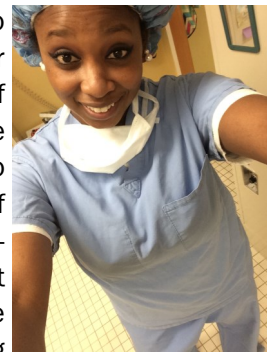
experiments. In this project, I worked with two-dimensional and three dimensional modalities. The modalities included Position Emission Tomography, Computed Tomography, Fluorescence and Planar X-ray. In this experiment, I wanted to investigate which modalities and probes worked best. The

by Ashley Williams

During the summer of 2014, I had the pleasure of working as a Pediatric Oncology Education (POE) student in the POE program at St. Jude Children's Research Hospital in Memphis, Tennessee for a course of 11 consecutive weeks. This academic program, fully funded by St. Jude, allowed for 50 students from across the nation to participate for a course of either nine, ten or eleven weeks based on one's academic title of either medical or graduate student, returning POE student, or undergraduate student respectively. Students were accepted to the program based on their ability to maintain a 3.5 GPA or higher, classification as either a rising junior undergraduate student or above, previous experience in research, and outstanding letters of recommendation. Those accepted to the POE program received a stipend of \$4,000 over the course of the summer, fully furnished housing in walking distance of St. Jude provided that the student lives a significant distance from the hospital, and daily lunch. These amenities were given on the condition that the student maintain integrity throughout the course of their research and abide by the rules set by St. Jude, complete a paper on their summer research equivalent to that which could be published in a scientific journal, present their work to their peers, lab mates, and the POE coordinators, and attend daily Lunch and Learns, where students learned about pediatric cancers and had opportunities to get to know principal investigators and doctors that either work at or are affiliated with St. Jude.

Needless to say, I learned a lot about cancer this summer. As it turns out, there is a lot that St. Jude

does for children that I had no idea about, including never making patients pay out of pocket, providing long-term care and follow-up with patients to better evaluate the effects of drugs and therapies, giving patients the care and comfort that they deserve when they are away from home, and reaching



out to pediatric cancer centers all over the world to ensure that all children receive the quality of care that they need. Danny Thomas, the founder of St. Jude Children's Research Hospital had a vision in the 1960's that "bench to bedside" could be reality. He proposed that scientists and doctors could collaborate under one roof in an effort to improve the efficiency of finding cures or alleviating disease by going directly from drug development to patient trials. Today, St. Jude Children's Research Hospital has made this proposal a reality by encouraging the collaboration of scientists from various backgrounds, such as structural biology, chemical biology and therapeutics, and genetics, with doctors that directly treat patients. In many cases, St. Jude employees are MD/PhDs, who are able to conduct research and see such research make differences in their own patients. St. Jude MDs, PhDs, and MD/PhDs have so graciously allowed for students like me to gain first-hand experience of what it would be like to work at St. Jude. POEs have learned that patients are the number one priority in every aspect of research and care at St. Jude, which is why there are

See **DANNY** page 8

## My Summer Research

by Adaeze Aninweze

This summer, I had the opportunity to work for Dr. Jason Hurlbert under the Winthrop Summer Undergraduate Research Experience. I studied the "Expression, Purification, and Crystallization of Novel Glycosyl Hydrolase Family 30 Xylanases." My research focused on learning more about a group of enzymes that have an important role in biofuel production. The research opportunity was very rewarding because it introduced me to some new skills that are taught in a biochemistry lab class and microbiology class. I would recommend this program to other students because the skills learned with the two month period equals a semester course in a biochemistry lab class or a microbiology class ■



by Leigha Stahl

**F**or my summer research, I participated in the Summer Undergraduate Research Experience (SURE). My mentors were Dr. Heard and Dr. Frost from Winthrop's Biology Department. While our lab is largely investigating *Escherichia coli* levels in relation to several aspects on Folly Beach, S. C., my mentors and I specifically studied how salinity influences *E. coli* survival and growth. *E. coli* can be found in a variety of environments including beaches and can also be used as a fecal indicator to assess contamination and water quality. Although the beach environment is not thought to be ideal for *E. coli* survival, studies are showing that it is still able to persist. To assess salinity tolerance, we exposed laboratory and field *E. coli* strains to varying levels of salt concentrations. Our data indicated that the amount of colony forming units (CFUs) showed a

significant decrease as well as a reduction in the diameter of the colony size. We also observed that after exposing our laboratory and wild *E. coli* strains to salt concentrations greater than 5% after a period of 24 hours at 37° C, the *E. coli* experienced a cut-off for salinity tolerance. I am so grateful for this opportunity to learn from my mentors and work in an actual lab. During this experience, I learned more about microbiology, techniques, and equipment. I enjoyed learning about new concepts and terms such as gram-negative, inoculate, and agar. Most importantly, I value my interactions with my mentors and lab partner as well as the ability to familiarize myself with the lab setting. Before my experience, I felt uncomfortable in the laboratory. Now that I've conducted research, I feel more confident. ■

## My Summer Research Experience

by Briana Murray

**T**his summer I was able to work with Dr. Hurlbert on a new project. My project goal was to crystallize and determine the structure of a Xyn10C protein. This project allowed me to travel to the Medical University of South Carolina (MUSC), where I was able to network with faculty as well as use the X-ray Diffractor there. I was also able to present my research at the EPSCoR/IDeA Confer-

ence in Columbia, S. C. While I was at MUSC, I learned about graduate school opportunities, and met faculty and students that do research at other institutions. I would recommend the opportunity to do research to others because it allows the students to network and experience new things. ■

**Ashley Williams**, Fall 2012 Cohort, was a first place award winner for Best Paper for her work at St. Jude Children's Research Hospital.

"Purification and Structural Studies of Bone Morphogenetic Protein Receptor Type IA (BMPRI-IA)"

Faculty Mentor: Jie Zheng, PhD Structural Biology

## McNair Summer Research Experience 2014

Kristin Ramirez

**O**ver the summer of 2014, I did research with an exercise science professor, Dr. Wojcik. We researched the physical fitness components and posture screening of pre-professional dancers between the ages of 15 and 18. I spent time going to two different competition dance studios in the Charlotte area. We did multiple physical tests on the dancers. Then, we analyzed our data through statistical analysis. I learned so much more than I expected to learn. I learned how to do physical tests such as body mass index, height and weight measurements, muscular endurance, cardiovascular endurance, and flexibility tests. I also learned much more about pre-professional

dancers than I knew prior to this research. It was a very eye-opening experience.

I thought this research opportunity was phenomenal. I was able to spend part of my summer learning about two of my favorite subjects: fitness/training and dance. I enjoyed looking at dance in a scientific aspect. I would definitely recommend others to experience the McNair program. It is an eye-opening experience and allows scholars to work one-on-one with a professor. McNair allowed me to not only research my own topic, but also gain experience in presenting my project to professionals. ■

## My WISE and Summer Research Opportunities

by Michala Tesney

During May, I participated in the Winthrop Initiative for STEM Educators program (WISE). We learned different teaching techniques like teaching English as a Second Language (ESL) students. They also showed us how to gear our teaching towards the three types of learners, visual, auditory, and kinesthetic. We took field trips to the zoo and to the White Water Center. We spent four days in the classroom actually teaching middle school and high school students. This opportunity teaches you a lot about yourself, because learning information is one thing, but actually teaching it in a way that others understand is another. Although teaching is fun, this experience showed me that it is not the path I want to take with my life.

During June and July, I did research in the Winthrop Chemistry Department with Dr. Jason Hurlbert as my mentor. I worked on two proteins that interact with each other. I was able to crystallize one of my proteins, so hopefully in the near future I will be able to build the structure of that protein. My overall research experience was amazing. My lab mates truly made the summer upbeat and entertaining. I have grown so much academically and mentally from this opportunity. I will continue my research into the fall and spring semesters. Hopefully, next summer, I will be able to do research at a different location ■

---

### BUFKIN continued from front

probes included FDG, NaF and OsteoSense 750X and ProSense 750X. I really enjoyed this experience. I learned the expectations required for a graduate student in the lab. I also learned how to image and analyzed data using different software's such as Volview and Image J. My research opportunity has given me insight into different biomedical research areas. It also has helped me in writing scientific articles about my research for application notes or publication. I really liked the fact that this program had weekly seminars with speakers of different backgrounds and research areas and hearing how they got to the position they are in now. Another thing I liked is that we took the time to focus on the GRE and looked at different fellowships or assistantships available to help fund graduate school. I am glad we had to complete a draft of the requirements needed for the NSF-GRFP applications and we received feedback which was very beneficial. I would definitely recommend this program to another student especially if they think they want to do research or if they do not know if graduate school is right for them. This opportunity has definitely confirmed for me that I want to do research and attend graduate school ■

---

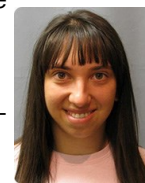
## Six Eagle STEM Scholars Participates in the McNair Program

Six Eagle STEM Scholars, Ian Deas, Olivia Manley, Diamond Melendez, Denise Peppers, Kristin Ramirez and Sarah Wicks, participated in the McNair program during the summer. These Scholars, along with ten other McNair Scholars from Winthrop, presented their research at the 20<sup>th</sup> Annual SAEOPP National McNair Research Symposium in Atlanta. They competed against fellow Scholars from universities including, but not limited to, USC, UNC Chapel Hill, U of Florida, UC Berkeley, Morehouse, U of Illinois at Urbana-Champaign, Xavier of Louisiana, Rider, and Cal State Sacramento. Three Eagle STEM Scholars listed below received awards for their presentations and outstanding work.

- \* Denise Peppers (Mentor: Dr. Nick Grossoehme) 1<sup>st</sup> Place, Physical Science, Purification and Characterization of Nickel Uptake Regulator (NUR) and Single NUR Mutants (Physical Sciences, oral)
- \* Sarah Wicks (Mentor: Dr. Robin Lammi) 2<sup>nd</sup> Place, Life Science, Synthesis and evaluation of symmetric biphenyltetrols as aggregation inhibitors for Alzheimer's amyloid-beta peptide (Physical Sciences, oral)
- \* Diamond Melendez (Mentor: Dr. Aaron Hartel) 3<sup>rd</sup> Place, Posters, The Reaction of O-Silylated Cyanohydrin Anions with Epoxides as an Alternative for the Enantio- and Diastereoselective Preparation of Aldols (Physical Sciences, oral) ■



Peppers



Wicks



Melendez

by Esse Etim

**M**y research group tackled the difficult problem of innovating drug analysis. We explored a technique of analyzing pharmaceuticals, a technique that is cheaper which is especially useful for lower income countries, like African countries. I was interested in the project because I am a native of an African country, Nigeria. The technique proposed was a marriage of Chemistry and Computer Vision. From this marriage came Paper Analytical Devices (PADs). In the proposed technique, the lab would prepare and sell these paper devices to any consumer at an affordable rate, less than \$1.00. The consumer would deposit the pharmaceutical they wish to analyze by grinding it first and swiping it on the PAD. Next, they would put the PAD in water, run the reaction, take a picture of the test, then send the picture to the online service, where we would use computer vision



to analyze the test. For the analysis of the test PAD, a repository of possible outcomes needs to be available for reference. Essentially, for the computer to make sense of these test PADs, we need to teach it what to look for. My project was to create and populate a database with the reference data that the computer will use for the PAD analysis. Therefore, I spent most of the days preparing test cards, running the tests, taking the images and uploading them to a database. I loved it so much, because I had to problem solve most of the problems that we

came across and the group, the Lieberman Group, was the perfect group to work in, in my opinion.

The program leaders, Dr. McDonald and Linda Chism, went out of their way to make us feel comfortable so that we could enjoy the campus and South Bend. They exposed us to numerous great people and organized workshops, getting us prepared for the GRE and applying for Grad schools. I think as a whole, the program was phenomenal. The students in the program made an effort to socialize and be friendly with each other. One Saturday, we went to the lake and kayaked one of the Saturdays. On another Saturday morning, there was an "Old to Gold Sale." I bought a bicycle at the sale and rode it around campus. This is how I explored the beautiful campus of Notre Dame. ■

## My Summer in Peru

by Arlene Haskins

**T**his summer, I spent 10 days in the Peruvian Amazon Rainforest, close to the Peru-Brazil border, just outside Iquitos. I went with the Biology 552A class called Tropical Conservation and Ecology in the Amazon. While I was there, I learned so much about the rainforest and the life within it. I saw many animals including the famous pink dolphins of the amazon, some Titi monkeys, and two- and three-toed sloths, one of which was close enough to touch if I wanted to.

Along with learning about wildlife, I learned about the people in the nearby Chino village and how they live with the forest. I also had the opportunity to play soccer with the guides at the travel lodge and all of them told me I was a great goalie. I also learned how to do field research and even did a mini research project on the calls of the Tinamou bird. While I was there, I made friends with the students and professors and some of the guides from the lodge.

Studying abroad is a great opportunity. Not only do you see things you would never see at home, you realize that no place is so far or different that you have nothing in common with the people there. No matter where you go, what you learn can be applied anywhere. ■

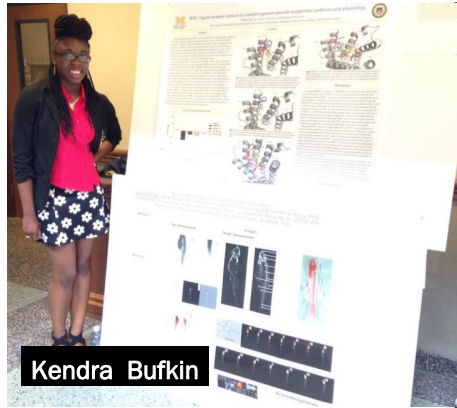


## Research Reflection

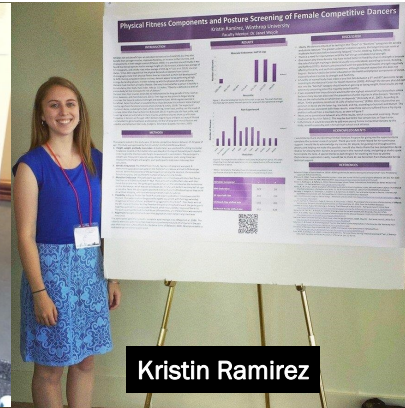
by Ian Deas

**T**his summer I was given the opportunity to research *The Circadian Fluctuation of Melatonin in Stenostomum virginianum* under the guidance of Dr. Julian Smith III and the Winthrop University McNair Scholar's Program. Being able to conduct research under an experienced mentor helped me grow both personally and academically. The discipline and patience required to follow experimental protocol has translated into other extracurricular activities, benefitting me in more than one way. The critical thinking skills necessary to analyze a problem in results and work towards a solution has also assisted tremendously outside of the laboratory. Alongside the immense personal growth came a depth of knowledge in regards to the subject matter related to my research project, and the unmatched camaraderie between my mentor, lab mates, and myself. I am undoubtedly a better student as a result of such work, and am grateful for every minute of it. ■

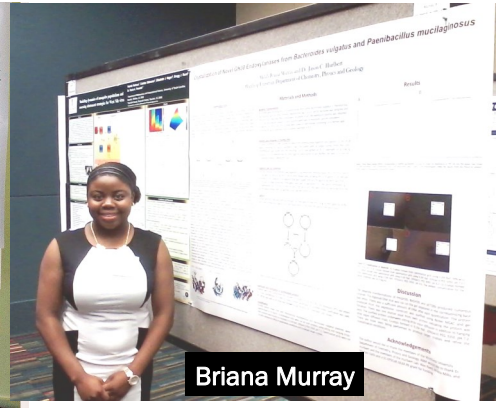
# Eagle STEM Scholars Presenting Posters of their Summer Research



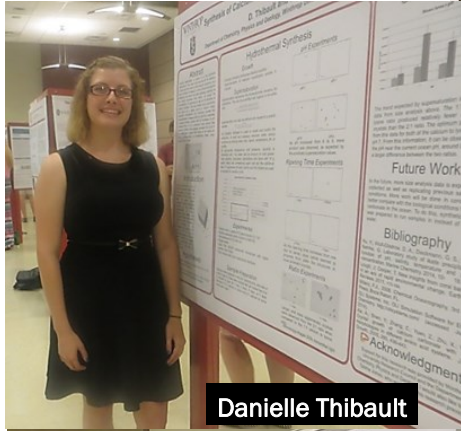
**Kendra Bufkin**



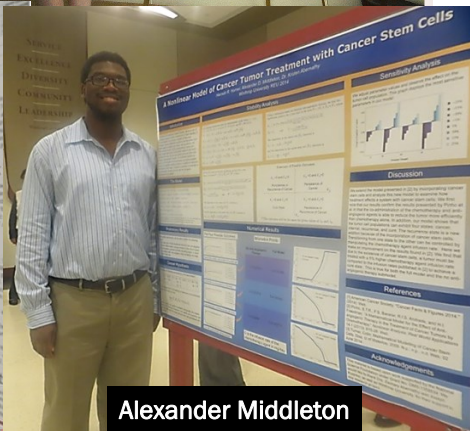
**Kristin Ramirez**



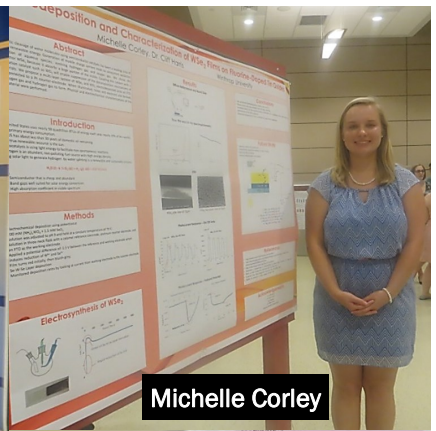
**Briana Murray**



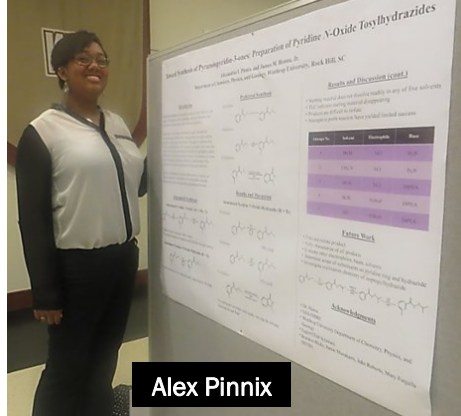
**Danielle Thibault**



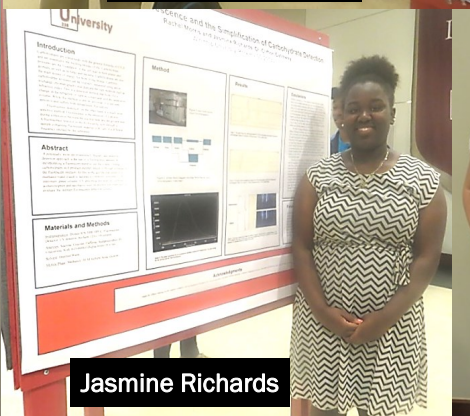
**Alexander Middleton**



**Michelle Corley**



**Alex Pinnix**



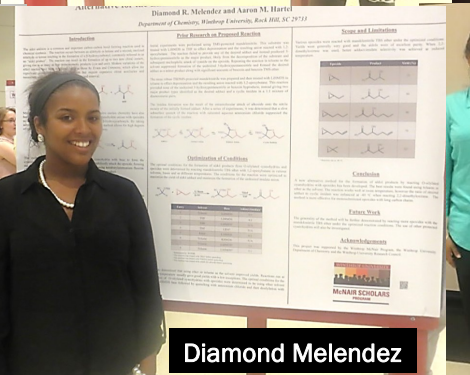
**Jasmine Richards**



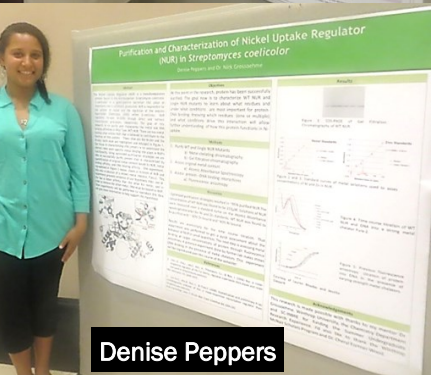
**Leigha Stahl**



**Sarah Wicks**

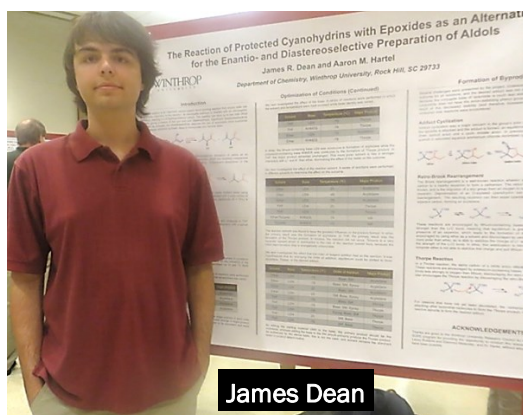


**Diamond Melendez**

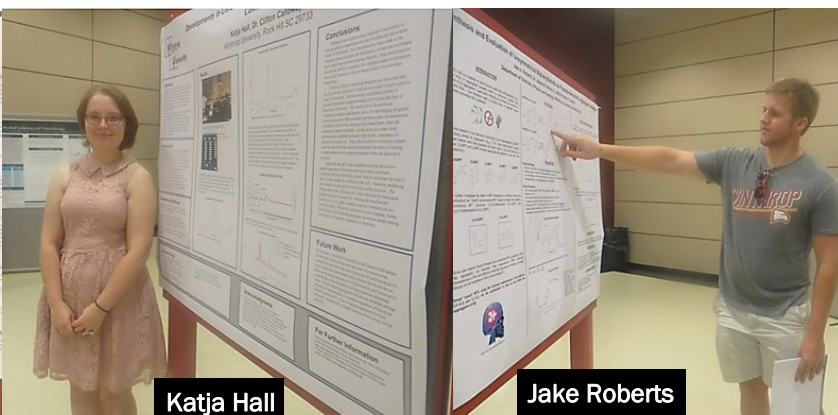


**Denise Peppers**

## POSTERS continued from page 6

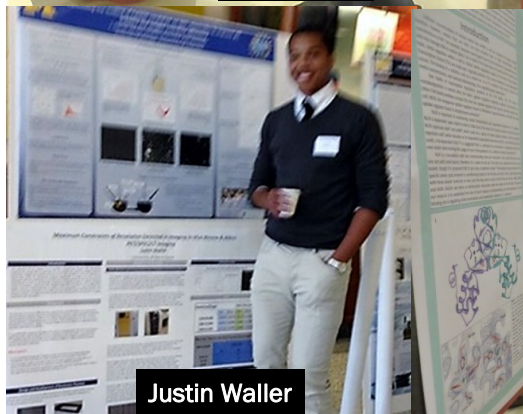


James Dean

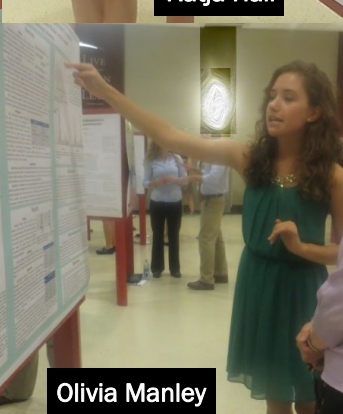


Katja Hall

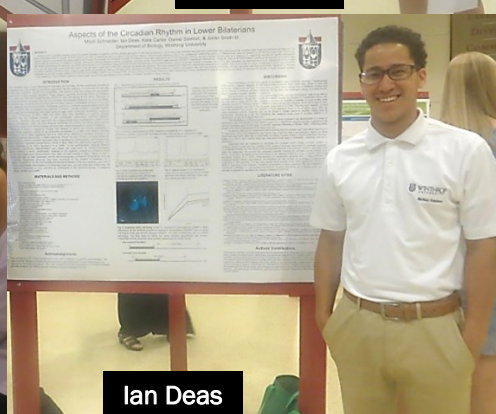
Jake Roberts



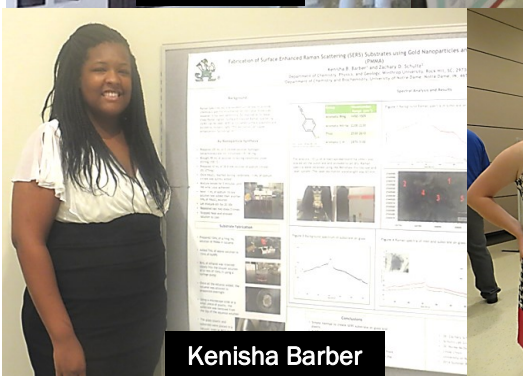
Justin Waller



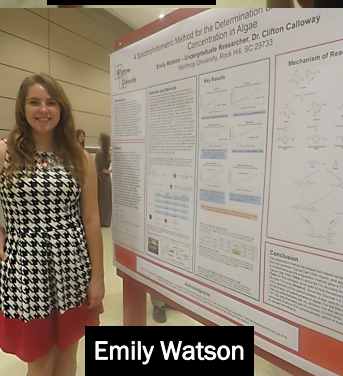
Olivia Manley



Ian Deas



Kenisha Barber



Emily Watson



Adaeze Aninweze



## My Research Experience

by Jordan Lewis

This summer I conducted field research in Folly Beach, S. C., with Dr. Matthew Heard and Dr. Victoria Frost. My research attempted to find what areas of the beach E.coli was persisting in and if there were any differences found in the abundance in different sections of the beach. It was a great opportunity and



I look forward to conducting research every summer while I attend Winthrop University. I would definitely

recommend Research to any STEM major because it is a great experience and it allows you to apply what you have learned in the classroom to practical issues. I plan to apply for more funding to extend this research to other areas to attempt to find trends between different S. C. beaches. Eagle STEM has been a great help to me by

introducing the prospects of research early on and sparking my interest ■

DANNY continued from page 2

several studies being conducted to alleviate the pain and discomfort that some patients may experience from taking certain cancer-directed drugs or therapies.

This summer, I worked in a structural biology lab under Dr. Jie Zheng on a protein receptor that has been implicated in several cancers and ailments all over the human body. I was able to sharpen my skills in cell culture and protein purification to generate the target protein and become introduced to 2-D and 3-D Nuclear Magnetic Resonance Spectroscopy and Circular Dichroism Spectroscopy, which would allow me to gain a brief understanding of protein structure and activity. The laboratory techniques and programs, such as Pymol, that I became familiar with over the summer, have already proven to be useful in my courses this school semester, during which time I will be able to learn even more about protein structure and will be able to apply these skills to my future research endeavors. However, working in the laboratory is not the only experience that I gained this summer. Through the POE program, I was also able to shadow doctors that work in fields that interested me, tour the Univer-

sity of Tennessee Medical School, speak with medical school students, gain a better understanding of the process of applying to, interviewing at, and attending medical schools, as well as make connections with many people that either have the same aspirations as I do, or have achieved something that I hope to achieve in the future.

Without having been exposed to basic science research as a freshman, I would not have been given the opportunity to be a part of the POE 2014 cohort of student researchers. Being a part of Eagle STEM, working in the chemistry department at Winthrop University, getting to know my professors, and allowing my professors to get to know me has proven to be some of the most rewarding things that I have done. With the hopes of attending medical school after graduation in 2016, working at St. Jude Children's Research Hospital has given me the experience of a lifetime, and has reinforced my aspirations of one day becoming a medical doctor while keeping my eyes open to research ■

### Eagle STEM Scholars Program

101 Sims Science Building  
Rock Hill, SC 29733

Phone: 803/323-4932  
Fax: 803/323-2246  
E-mail: eaglestem@winthrop.edu

We're on the Web  
eaglestem.winthrop.edu

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.