



Special Edition Newsletter

Summer Research 2017

Special points of Interest

- Summer Research 2017 Poster Session - pages 6-7

STEM students enhance their understanding of learned concepts through practical research and become more competitive in the selection process for graduate programs. Twelve, more than 32% of the non-graduating Eagle STEM Scholars, participated in 2017 Summer Research projects. Seven of the scholars participated in research at Winthrop and five scholars participated in research at other locations including St. Jude Children’s Hospital, UMBC, UC-Berkley, UC-San Diego 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 Dr. Jason Hurlbert recommended the student at St. Jude Children’s Hospital. Winthrop professors who dedicated their time to allow selected students to assist and learn in their research laboratories included Dr. Kristen Abernathy, Dr., Zach Abernathy, Dr. Eric Birgbauer, Dr. Nick Grossoehme, Dr. Robin Lammi, Dr. Julian Smith, Dr. Takita Sumter.

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Summer Research Experience

by Douglas Johnson

This summer, I conducted undergraduate research for my mentor Dr. Julian Smith, III at Winthrop in the summer Undergraduate Research Experience Program. The focus of the study was to understand the marine meiofaunal community composition using a developed metabarcoding method. Meiofauna have been studied for years due to their influence on aquatic ecosystems but we specifically studied beaches around Morehead City, NC and utilized the



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My Summer Research Experience

by Augustine Vinson

The opportunity I had to do research over the past summer with Dr. Lammi and Dr. Hanna as part of the SURE program was wonderful. Before this summer, I never really realized just how exciting research can be. The experience caused me to consider career paths that I had not previously. I learned new laboratory techniques, gained more confidence in the lab, and learned more about chemistry. I also became friends with other students in the department because of the SURE program. As a result of having done research this summer at Winthrop, my career path changed, I made new friends, I learned a lot, and I had a ton of fun!■



Vinson

My Summer Research Experience

by Sydney McCall

This summer I worked with Drs. Abernathy in the math department. We used a system of five ordinary differential equations to model immunotherapy as a treatment for cervical cancer caused by Human Papilloma Virus. Using mathematical techniques, we were able to find conditions for both local and global stability that rely on the treatment term. It was a great experience to see math outside of the classroom. This summer provided me with a chance to get to know a great group of people and to interact with other students in and outside of my major.■



McCall

My Summer Research Experience

by Ashley Di Falco



Di Falco

I worked with Dr. Birgbauer studying the development of the nervous system. My individual project was studying the effect of semaphoring 3A of retinal growth cones in vitro. I studied the visual system on embryonic chicks simply because their eyes are so enlarged it was easy to target the cells I needed in the retina. I learned so much, and applied my lab experience from my core classes. I think the SCINBRE is one of the best things colleges can offer, it really allows you to get creative in the lab.■

My Summer Research Experience at the University of California, Berkeley

by Jesslyn Park

This summer I was privileged to have the unique opportunity to conduct research at the University of California, Berkeley in the Laboratory of Professor Jennifer Doudna as part of the Howard Hughes Medical Institute Exceptional Research Opportunities Program (HHMI ExROP) in partnership with the Amgen Scholars Program. Under the impassioned mentorship by Postdoctoral researchers Dr. Gavin Knott and Dr. Alexandra Amen, the goal of my project was to characterize a transcription factor involved in the development of brain cancer. The experimental challenges I faced allowed me to learn and improve upon my skillset and confidence towards graduate study. As I have ventured into new research environments, including UW Madison last summer mentored by Evan Glasgow in the laboratory of Professor Brian Fox, I have been very mindful of those from Winthrop who initially and continue to empower me with the skills and resources to succeed. I am very grateful to have received my early training since freshman year from Dr. Jason Hurlbert, who has generously gifted me with enduring encouragement and mentorship that has facilitated my independence. I am thankful to the Department of Chemistry, Physics and Geology led by Dr. Pat Owens, the Winthrop Eagle STEM Scholars Program directed by Mrs. Rachel Law and Dr. Clifton Harris, and the Ronald E. McNair Scholars Program for professional support, and especially to Dr. Fortner-Wood and Dr. Victoria Frost who introduced and nominated me to HHMI ExROP. With indebted reflection towards my experiences, I hope that the possibilities of research that originate at Winthrop will continue to grow. ■



Park

My Research Experience at the University of California, San Diego

by Autumn Leggins

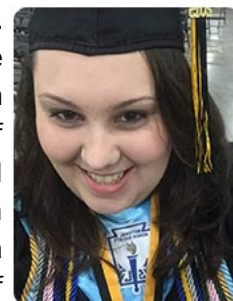


Leggins

Over the summer, I was working in Dr. Joseph Gleeson's Neurobiology lab at University of California San Diego. I was part of the Howard Hughes Medical Institute Exceptional Research Opportunities Program (HHMI ExROP) in partnership with the Amgen Scholars Program. I was able to work on two projects: one focus on determining the effectiveness of a potential drug to reduce the neurological defects seen in Zika-Virus infected embryos and the second project focused on determining the gene causing neurological defects in children with consanguineous parents. I also got the chance to help out with another project for a week that is in the process of being published and if everything goes well I will be listed as an author on that publication! ■

My McNair Summer Research

The Ronald E. McNair Scholars program is a federally funded initiative to promote the enrollment of underrepresented students to PhD programs. This program gave me the opportunity to work with Dr. Zachary Abernathy and Dr. Kristen Abernathy on mathematical modeling this summer. My project was focused on virotherapy as a treatment for cancer using a combination of differential equations to model the population changes in infected tumor cells, uninfected tumor cells effector T-cells, and virions. It was incredible to work alongside two great professors and learn from them firsthand, outside of the classroom. The wealth of knowledge and personality of these two mentors created a truly unique environment where I got to be hands on with mathematical modeling, a topic that I'm interested in pursuing. I worked with a total of four other students under the direction of Dr. Zachary, and Dr. Kristen Abernathy and through this group, even though we worked on different projects, I feel as if I gained a valuable insight into other ways to approach problems. Through the McNair program, my cohort and I attended and presented at a national McNair conference in Atlanta, Georgia. After Learning from the McNair staff and my two mentors (and lot of elbow grease), I have a presentation that earned me 2nd place in the Life Sciences oral presentation category. On top of the research aspect of this summer, the McNair cohort took a summer course that taught us about scientific writing, GRE preparation, research methods, professional developments, and what to look for in graduate schools. This program gave me more opportunities that I could have ever dreamed of having access to and with the support from both staff and students alike, I feel like I have truly learned a lot about what I can accomplish as well as a better grasp on the type of things that I want to do in the future. The McNair program, not unlike the Eagle STEM program, has given me a push to reach for even my largest goals and the expectation of success that I hope to fulfill. ■



Stevens

My Summer at Wake Forest

by Dakota Hawkins



Hawkins

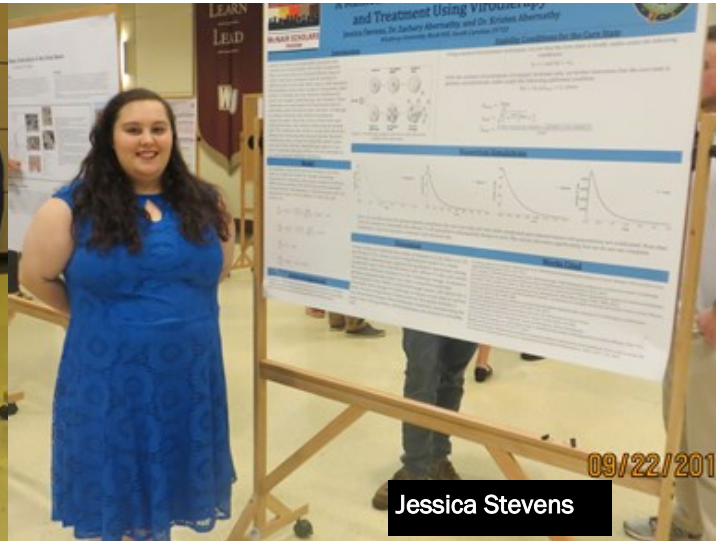
This summer I worked with Dr. Calloway, at Wake Forest on a Phytoremediation project. Phytoremediation is a method using green plants to help remove contaminants that lie within the soil. We utilized the Microwave digestion system and the ICP-MS that Wake Forest had for this project. Our goal was to 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, often 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. ■



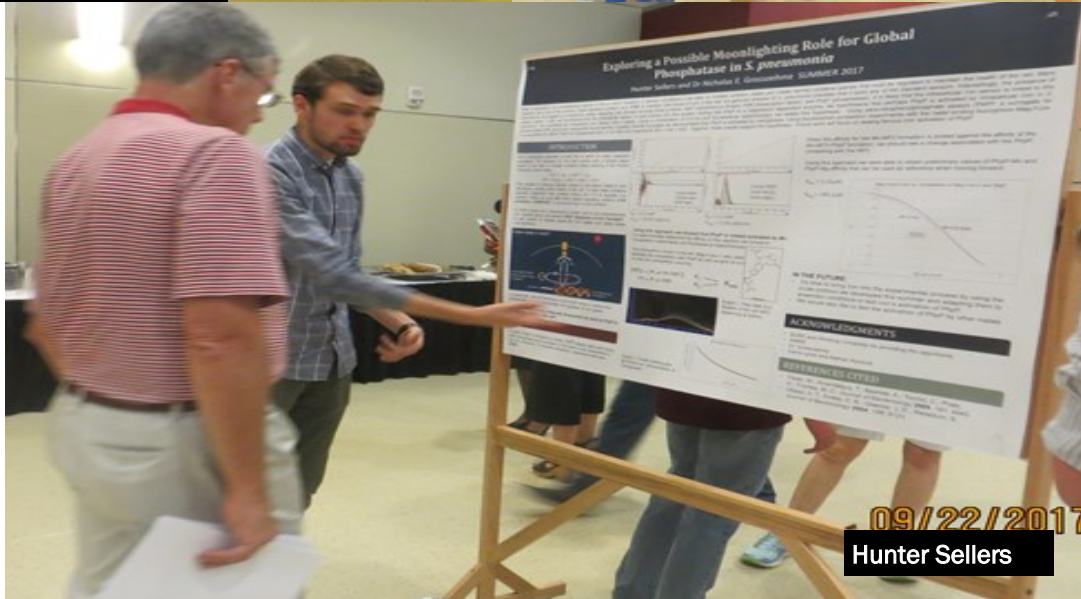
Eagle STEM Scholars Presenting Posters of their Summer Research



Douglas Johnson



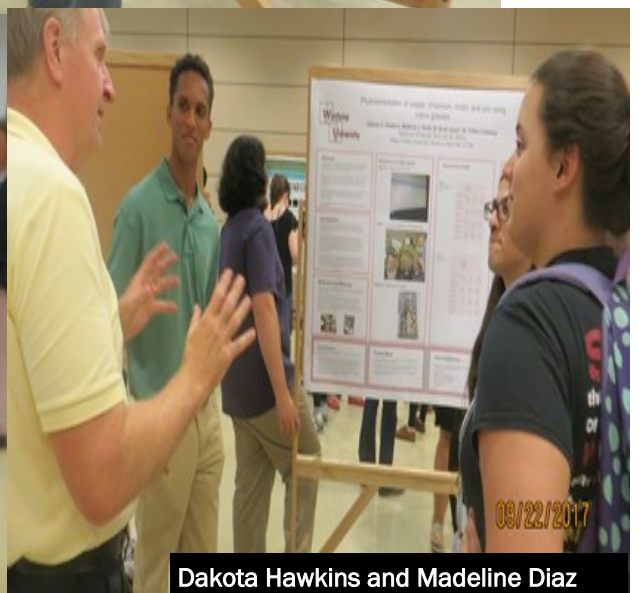
Jessica Stevens



Hunter Sellers



Jessica Stevens



Dakota Hawkins and Madeline Diaz

RESEARCH continued from front

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

Johnson continued from front

facilities at both Winthrop and the UNC Chapel Hill Marine Sciences building which introduced me to new skills in the lab. The research experience was very educational and rewarding by teaching concepts surrounding zoology and molecular biology. I would fully recommend for anyone interested in research to be apart of this program for educational and networking purposes. ■

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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.