



## Special Edition Newsletter

# Summer Research 2013

### Special points of interest:

- Summer Research 2013 Poster Session

Ten Eagle STEM Scholars participated in 2013 Summer Research projects. This special edition newsletter includes summaries from most of the scholars about their summer research experience. The research projects were directed by faculty from the Chemistry, Biology and Math Departments at Winthrop University and one scholar participated in Research at Notre Dame University arranged by Dr. Cliff Harris, Assistant Eagle STEM Program Director and steering committee member. Dr. Takita Sumter, steering committee member and Co-PI for the INBRE grant, Dr. Jason Hurlbert, Dr. Eric Birgbauer, Dr. Cliff Calloway, Dr. James Hanna, Dr. Robin Lammi, Dr. Nick Grosseohme, Dr. Abernathy and Dr. Harris all dedicated their time to allow selected students to assist and learn in their research laboratories. Research experience is a key element in the selection process for graduate programs so this experience gives students an advantage.

Winthrop Eagle STEM Scholars Program Director, Rachel Law

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## My Summer Research Experience

by Justin Waller

This past summer, my research experience was gained through an opportunity to spend 10 weeks as a participant in the University of Notre Dame's REU program. The University of Notre Dame provided an excellent learning experience with a wide array of high quality research facilities and instruments. At the institution, I received the chance to be a participant in Dr. Prashant Kamat's research lab group. In the Kamat research group, the focus of my research primarily related to the synthetic process of colloidal gold nano-sphere (GN) and gold

nano-rod (GR) particles for applications to solar cells. Nano-particles exhibit Plasmon resonance and if utilized efficiently with sensitizing materials of solar cells, the conversion factor of solar light to electricity can be increased substantially.

I greatly enjoyed my time spent in the labs of Notre Dame. I believe that the research opportunity ultimately enabled me to mold my skills as a researcher as well as assisted me in acquiring a sense of independency in laboratories. Since that time spent there this summer, I have incorporated many of ideas and techniques attained from that

by Katja Hall

This summer I worked with Dr. Calloway on instrumental development for chromium emission with a tungsten atomizer. The title was very intimidating when I started working for him last semester. I remember seeing the project outline and thinking that I'd better transfer into the regular lab class while I still had the chance. Since I made it through last semester I thought I had a fairly decent idea about what to expect but I was definitely wrong! Working three hours a week is much different from working nine hours a day, five days a week. The developments I've made are much more tangible this summer than they were last semester but the problems and failures were amplified as well. During the research, I ran out of materials, ideas, motivation, and patience more than once this summer.

My summer would have been much more relaxing had I not decided to do summer research. It would've been more peaceful, but definitely less interesting than research has turned out to be. While I've made more progress than seems possible for eight weeks, there were definitely times where I wanted to pack up and go home. Research can definitely be more disappointing than quickly gratifying, something I was not prepared for as a newbie. This experience has however, affirmed my decision to be a chemistry major and even made me realize that I want to work with system development.

It seems crazy to my family that I want to stay in this field because of all the whining they had to deal with. I feel like every time I called home there was a different problem or annoyance to complain about. Things were moving too slowly; I ran out of gas; I didn't know what I was doing; I lost the emission signal. If it could go wrong it did, and my family heard about it. Everyone I know has told me

*"It's an obsession, and even after all of the disappointing and annoying things that hindered my progress, I can't think of anything else that would've made for a more interesting summer."*

**Katja Hall**



that I complained so much I couldn't possibly have enjoyed my summer; but I did. I'm a very competitive person and my experience this summer has taught me that research is basically a competition. Nature, is taunting us, making something happen that we must understand and science is helping us

find the comprehension we need. It's an obsession, and even after all of the disappointing and annoying things that hindered my progress, I can't think of anything else that would've made for a more interesting summer.

## My Summer Research Experience

by Kenisha Barber

For the summer of 2013, I spent eight weeks conducting undergraduate research with Dr. Cliff Harris. Dr. Harris's lab focuses on finding alternative fuel sources to combat the energy crisis, and to do so in an efficient and effective manner by using solar energy as the driving force. My research this summer focused on tungsten oxide, a semiconductor that can oxidize water and also absorb visible light. My goal was to synthesize a form of tungsten oxide nanoparticles that can be applied to an FTO or piece of conductive glass so

the oxidation step of water can be photocatalytically carried out. However, I did not have very good results this summer, but I still learned so much and had a lot of fun doing so. I expanded my knowledge by learning new lab techniques such as doctor-blading, and even synthesized a new product the lab calls, "Barbersol." This summer research experience also gave me the opportunity to make new friends and to also form stronger bonds with students and faculty alike. I could not see a better way of spending my summer break. I really enjoyed it.

By Ashley Williams

When first invited to participate in the summer research experience, I imagined it to be a school-away-from-school experience that I would be giving up a summer filled with friends, fun, and relaxation for. However, this was not the case. While I may have been hesitant to fully commit myself to waking up at 7:30 AM every day of the week for two months, the time that I have spent in the lab this summer did not take away from my having an enjoyable summer, but rather added to it. Over the course of two months, I was fortunate enough to become engaged in a project concerning an iron-sensory mechanism in bacteria. Along with my research partner, I took steps to isolate the proteins involved in the uncharacterized mechanism for iron homeostasis in *Streptococcus pneumoniae*. These proteins were cloned into expression vectors so that they could be overexpressed in *Escherichia coli* cells, grown, harvested, induced, lysed, and purified so that we could have an abundance of protein to work with throughout our experiments. Such experiments included fluorescent anisotropy, which determines the binding affinity that exists between proteins and DNA. I was even fortunate enough to work in the glove box, as well as with the NanoDrop, the spectrophotometer, Fast Protein Liquid Chromatography (FPLC) and many other pieces of equipment that I had no idea about prior to my working in the lab this summer.

Through many incidents of trial and error as well as plenty moments of confusion, I have learned regarding my project, chemistry in general, as well as myself. While learning about the many ways to purify proteins and the equipment that they include, I also gained more insight about public speaking due to my having to present my research in front of a classroom full of faculty and students from the Chemistry Department. In relation to public speaking, I was also fortunate enough to be interviewed for the local news concerning the research that I have been participating in. During the interview, I was asked how I felt about having a hand in research that could potentially affect someone's life for the better in the future. Though this question first surprised me, because I had never thought of my research in that manner, I can say that it makes me feel like I am a part of something beyond just me, which makes me feel good about both myself and the research

that I have been a part of, and it makes me even more passionate about the work that I do in the lab. Research has touched my life in more ways than one. Things that I once considered to be outside of my comfort zone, such as public speaking, working with dangerous lab equipment, and meeting new people, have become things that I now look forward to because of the opportunity I was given this summer. I have learned that I absolutely love working in the lab, not only because of the work that I do, but because of the people that I work with. There is never a dull moment when working with my lab mates and mentor, who I am especially grateful for. Working, or rather learning to do something that I have come to love, in the lab this summer under the supervision of Dr. Nicholas Grosseohme has been the best way for me to spend my summer. I am thankful for the opportunity he gave me and I hope to continue my research so that I may continue to expand my learning about what working in the lab truly means.

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## My Summer Research Experience

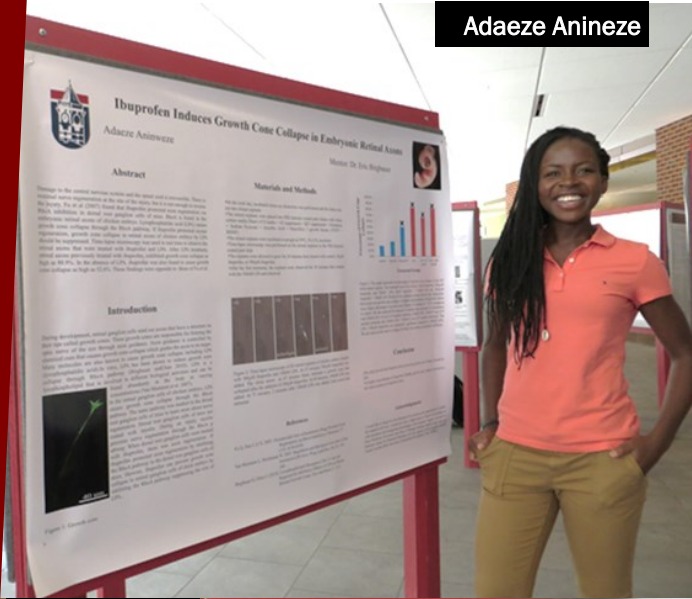
by Briana Murray

This summer I was given the opportunity to do research for the Winthrop University Chemistry Department. I worked on a biofuel project with Dr. Hurlbert that required me to identify and clone a novel endoxylanase from the 30th Glycosyl Hydrolase family. The summer research program allowed me to participate in the lab without having the stress of doing research during a regular semester. I was able to develop a mentoring relationship with Dr. Hurlbert and the many professors within the Chemistry Department. The Summer Research Program allowed me to be academically engaged during the summer and this set me apart from many of my colleagues. I would tell anyone who is given this opportunity to participate, because it can only be beneficial.

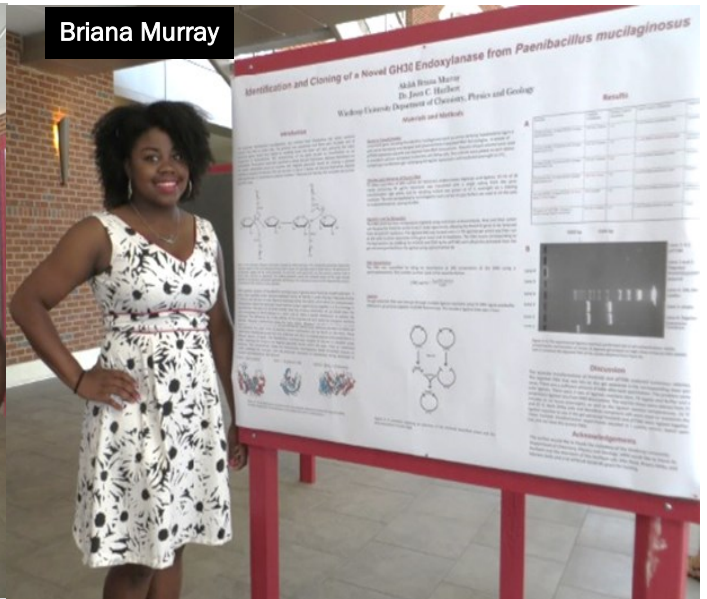


# Eagle STEM Scholars Presenting Posters of their Summer Research

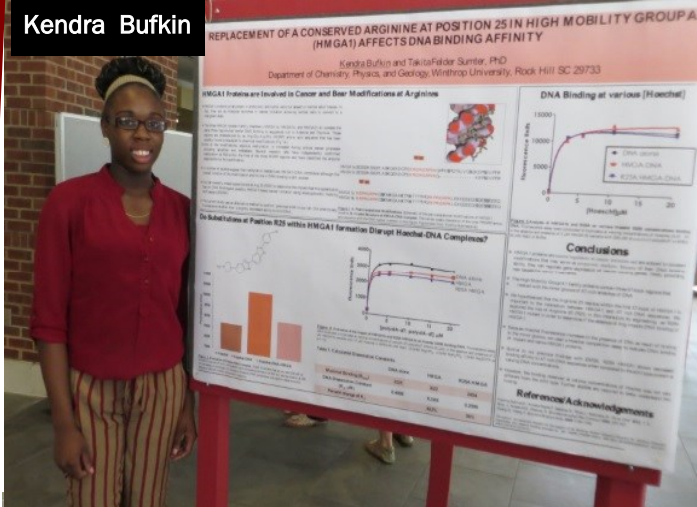
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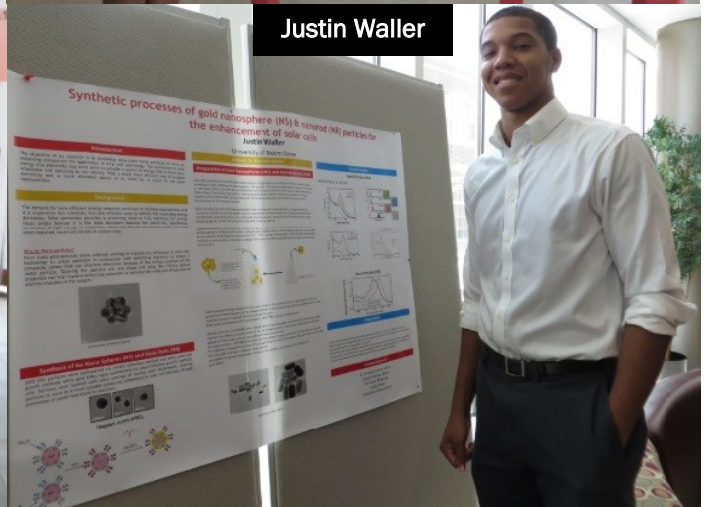
Briana Murray



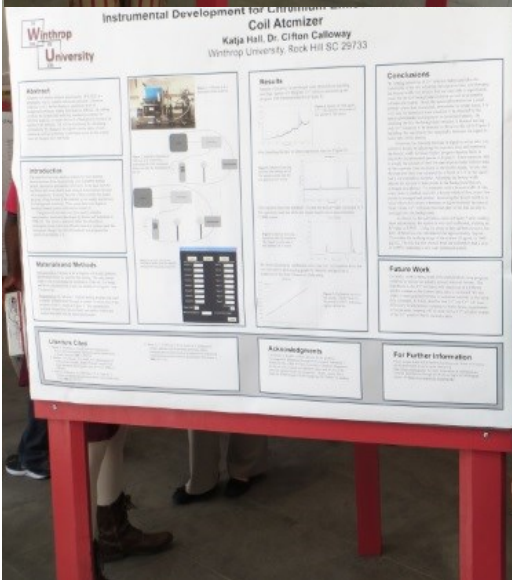
Kendra Bufkin



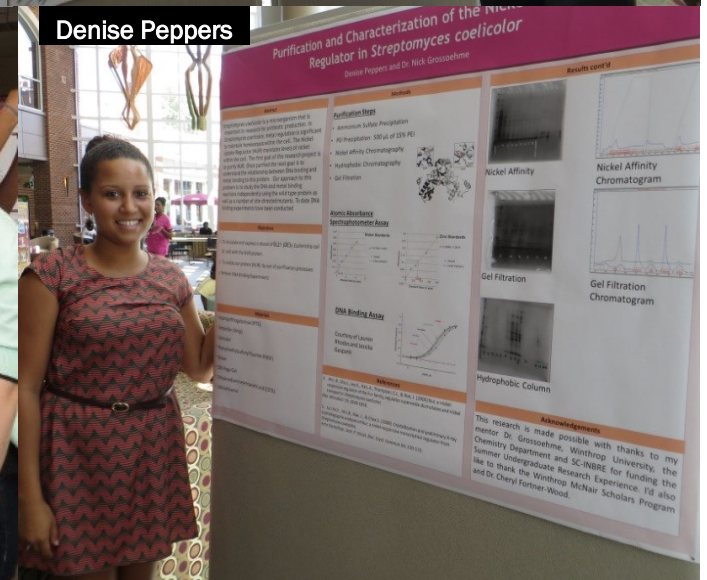
Justin Waller



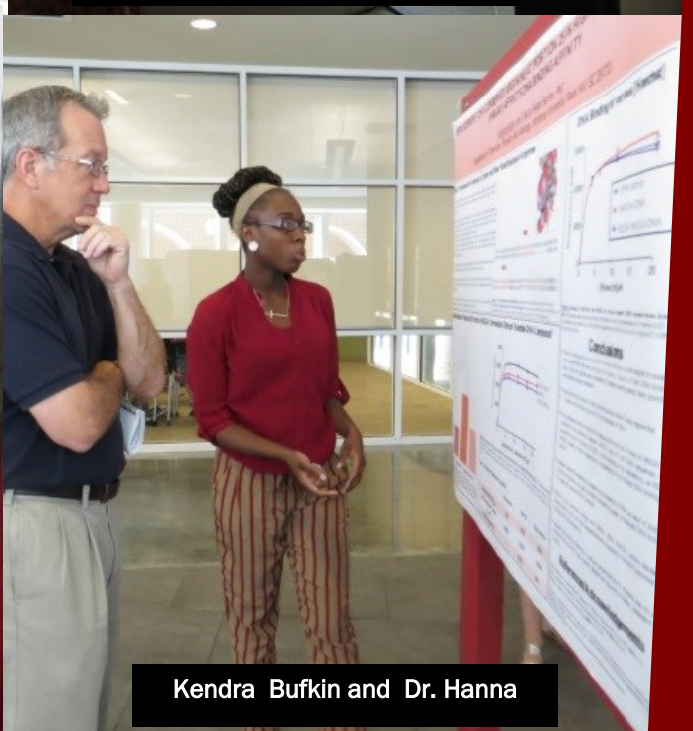
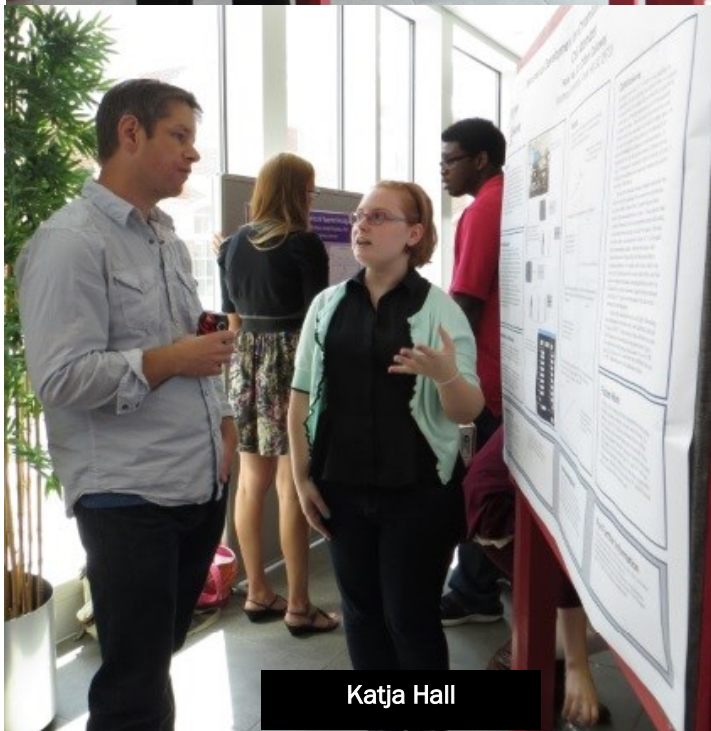
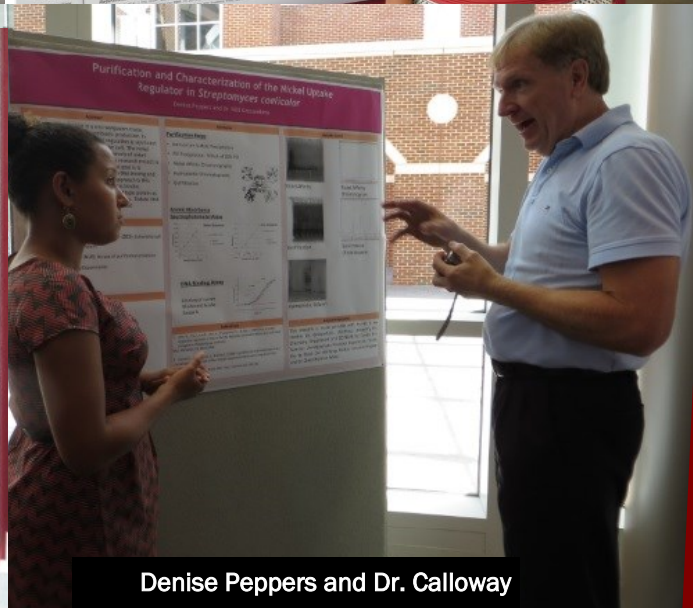
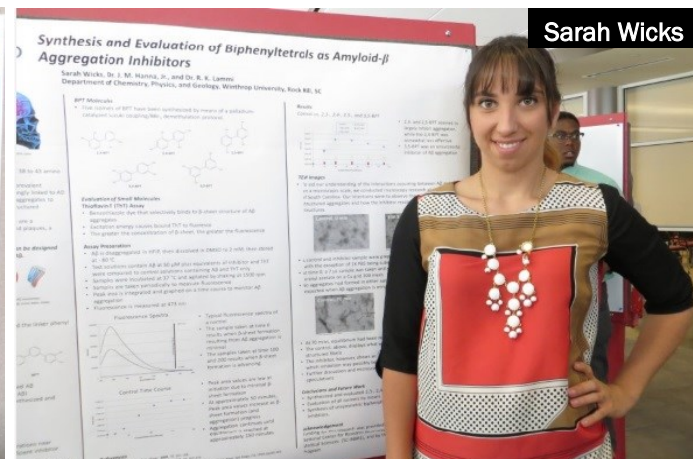
Katja Hall



Denise Peppers







## My Research Experience

by Aadaeze Aninweze

This summer, I had the opportunity to participate in Winthrop's Summer Undergraduate Research Experience (SURE) under the mentorship of Dr. Eric Birgbauer. I conducted my research on "The Role of Ibuprofen in Embryonic Growth Cone Collapse". Through the use of time-lapse microscopy, I observed in real time as the growth cones were treated with several concentrations of ibuprofen and LPA and how it affected growth cone collapse.

This experience was very rewarding for me. As a freshman student, I had not taken enough upper level science classes to prepare me for research. During that span of time, I learned a variety of lab skills and techniques usually taught in upper level science classes. Summer research also gave me knowledge of the several research opportunities provided at Winthrop. During the SURE symposium, students who participated in research presented their projects for other students to learn about the different areas of research at Winthrop and how much progress is being made in their research and the program. With the experience I gained this summer at SURE, I feel confident to venture out to other research programs in other colleges/universities and medical schools.

Aninweze was featured in The Herald during the summer. To see the article, click the link below:

[www.heraldonline.com/2013/07/11/5016116/winthrop-summer-research-digs.html](http://www.heraldonline.com/2013/07/11/5016116/winthrop-summer-research-digs.html)

## My McNair Research Experience

by Kendra Bufkin

I really enjoy the McNair Research experience and was glad that I had the opportunity to participate in it. One of the things I liked is that we had a writing and math coach to help us prepare for the GRE. The different writing sessions were very beneficial to me. My favorite part of the McNair experience was the research aspect of it. I enjoyed hearing about the other scholar's research. Another thing I liked

was that we had milestones due throughout the summer so that when it was time for us to prepare presentations I did not feel overwhelmed. I was glad that I had the opportunity of presenting my work at the McNair conference and was able to receive feedback on my presentation, so that the next time I can do better. I can't wait for the upcoming McNair Summer Research Experience.

### WALLER from front

institution into some of my own research and developments here at Winthrop University. The REU program has without a doubt provided me with a memorable experience and has indeed given me a deeper appreciation for the research aspect of science.

### Eagle STEM Scholars Program

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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 PhD 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.