RISE
Research Initiative for Scientific Enhancement at The University of North Carolina at Pembroke

FELLOW PROFILE

Academic Year 2016-2017

Cora L. Bright

Department: Biology

Year of Study: Sophomore (1st Year RISE Student)

Mentor: Dr. Maria S. Santisteban

Major(s): Biology
Source(s) of Training Support: RISE Program

Current Research Activities (brief description):

- **UNCP Genetics in Yeast (2016)**

Other Research Experiences:

- NCSSM Developmental Biology Research on Planarian Negative Phototaxis (2014)
- UNCP Bahr Lab BIO 4990 Student (2015)

Honors:

- Presidential Volunteer Award Bronze, Silver, and Gold – 2012, Silver – 2013
- Outstanding Sophomore Award – 2013
- AP Scholar – 2013, 2014
- Chancellor's Commendation – Fall 2015, Spring 2016

Career Aspirations and Goals:

- I plan to get a doctorate in genetics and genomics from UNC Chapel Hill and to work helping grow better food for people.

Conference(s) Attended or will attend:

- Will attend ABCRMS in November 2016

Clubs and Organizations:

- Cross Country Team East Rutherford High school (2012)
- Winter Guard North Carolina School of Science and Mathematics (2013 – 2014)
- Ester G. Maynor Honors College Council Freshman Representative (2015)
- Ester G. Maynor Honors College Council Secretary (2016)

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FELLOW PROFILE

Academic Year 2016-2017

Ayanna Edwards

Department: Biotechnology

Year of Study: 1st year Research Student

Mentor: Dr. Ben Bahr

Major(s): Biotechnology

Current Research Activities (brief description):

I am currently working in Dr. Bahr's lab, which predominately focuses on Alzheimer's. Currently, lysosomal markets in skin and brain tissues are being testing with the hopes of a better understanding of how to help people with Alzheimer's.

Other Research Experiences:

SPIRE Research Program (May 2016-July 2016)

I worked with Dr. Lindsey Costantini working with Kaposi's Sarcoma Herpesvirus replication process. We worked with specific viral replication proteins with the hope of being able to fully characterize them in order to look at the replication process as a whole to find inhibitors and hopefully drug targets that could be used for the virus.

Honors:

- Brave Inaugural Scholar (September 2016)
- COMPASS Scholarship Recipient (August 2016 – Present)
- RISE Research Student (August 2016 – Present)

Career Aspirations and Goals:

For my career I would to eventually do research on cancer or disease in general. I am very fascinated with their ability to manipulate and take over the cells in the human body. I would like to further investigate their abilities and hopefully find inhibitors to the manipulation of cells all together.

Conference(s) Attended or will attend:

UNC SUP Symposium – July 2016
ABRCMS – November 2016

Clubs and Organizations:

National Association for the Advancement of Colored People – Secretary

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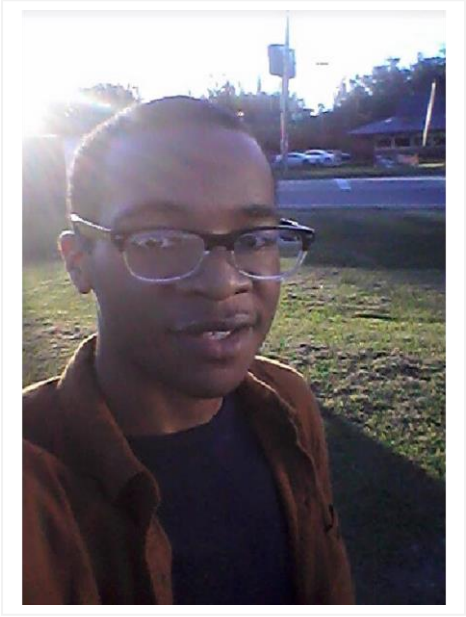

Frederick Feely II

Department: Biology

Year of Study: Senior-1st Year RISE Fellow

Mentor: Dr. Conner Sandefur

Major: Biology (Molecular)

Research experiences
University of North Carolina Pembroke (Summer 2016):
I worked in Sandefur Lab for the summer researching purine metabolism of *Liquidambar styraciflua*, a plant used as a traditional medicine in some Native American communities.

Research Interests:
My research interests are in virology and enzymatic chemistry. I'm particularly fascinated with the methods viruses propagate by using replication mechanisms of host cells, as well as the chemical structures that bypass cellular defenses.

Course Work, Presentations, Posters, or About you Section:
"Purine Metabolism in Sweet Gum and its Application in Traditional Medicine", RISE End-of-Summer Research Presentations

Career Aspirations and Goals:
I am aspiring toward a PhD in Virology and research within a government facility once that is completed.

Conference(s) Attended or will attend:
Duke BioCORE Symposium, July 2016
ABRCMS Research Symposium, October 2016

Internship:
RISE Fellowship Summer-2016

Clubs and Organizations:
Journal Club

FELLOW PROFILE

Academic Year 2016-2017

Name: Ereny Gerges

Department: Chemistry and Biology

Year of study: Junior, 2nd Year RISE Fellow

Research Mentor: Dr. Maria Santisteban, Ph.D.

Major(s): Chemistry and Biology

Current Research Activities (brief description):

- I am working with Dr. Santisteban to test if *SET2* in the yeast genome, which appeared to complement a suppressor of the *htz1 RPB2-2^{SL} is* synthetic lethal, can also suppress the cryptic initiation phenotype of this strain as well as that of *htz1/ RPB2-2^{SL}/sup* strain. The goal of the project is to understand the mechanism by which rpb2-2 alone or in combination with htz1 promotes cryptic initiation.

Other Research Experiences:

- I worked with Dr. Paul Flowers on a project whose goal was to develop a new clinical assay for bilirubin, a biological compound, and acetaminophen, a pharmaceutical compound, which are both found in blood plasma and urine. The assay is based on measurements of a sample's visible spectrum while it is being electrolyzed, which is called spectroelectrochemistry. The goal of the project was to create an assay to quantify the amount of Bilirubin or Acetaminophen in patient's blood or urine.

- I worked with Dr. A.B Carter to investigate the mechanism by which cadmium from cigarette smoke downregulates the immune response of the lung's alveolar macrophages. Cadmium does so by the deactivation and the prevention of membrane localization of a small GTPase binding protein, Rac2. Rac2 activation and membrane localizations in phagocytic cells, such as alveolar macrophages, is crucial in the process of phagocytosis and the release of reactive oxygen species (ROS) from the NADPH oxidase complex. The mechanism of which cadmium inhibits Rac2 happens by impairing the lipidation of the C-terminal cysteine of Rac2. Which explains the reason why smokers have a higher risk of having Lower Respiratory Tract Infection (LRTI) compared to nonsmokers.

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FELLOW PROFILE

Academic Year 2016-2017

Lonzie Hedgepeth

Department: Chemistry and Biology

Year of Study: Senior (1st Year RISE Fellow)

Mentor: Dr. Conner Sandefur

Major(s): Chemistry and Biotechnology

Source(s) of Training Support: RISE (Fall 2016)

Current Research Activities:

The University of North Carolina at Pembroke (Fall 2016-Present): Currently, I am working on a project exploring the use of medicinal plants by Southeastern American Indians with Dr. Sandefur, in the Sandefur lab. The objective of this project is to investigate the cellular mechanisms of the efficacy of medicinal plants. In doing so, we wish to answer two questions: (1) does the decline in the use of traditional medicines correlates with declining positive health benefits, and (2) do interactions between currently used traditional medicines and western therapies contribute to health disparities in American Indian communities?

Other Research Experiences:

The University of North Carolina at Chapel Hill (Summer 2016-Present): During the summer, I worked with Patrick McCarter on a project which aimed to investigate Mitogen-Activated Protein Kinases (MAPKs) in budding yeast (*Saccharomyces cerevisiae*). The objective was to define the dynamic interactions between the two branches (Sln1, Sho1) in the HOG pathways that both respond to hyper-osmotic stress and activate the same stress adaption mechanism through the Hog1 MAPK.

Honors: RISE Fellow (Fall 2016)

Career Aspirations and Goals: My aspirations in life has been to become a pharmacologist emphasizing molecular biology, genetics, and the effects of drug interactions.

Publications: Co-author in a preparation of publication investigating dynamics of the High-Osmolarity Glycerol (HOG) pathway in Baker's yeast (*S. cerevisiae*). First author: Patrick McCarter; PI: Timothy Elston, Ph.D.

Conference/Symposium Attended or will attend:

Annual Biomedical Research Conference for Minority Students (Fall 2016)
Summer Undergraduate Pipeline Research Symposium (SUPRS) (Summer 2015)

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FELLOW PROFILE

Academic Year 2016-2017

Cheyenne Lee

Department: Biotechnology Major **(Biology)**

Year of Study: Sophomore, 2016-2017

Mentor: Dr. Conner Sandefur, Ph.D.

Research Experiences or Research Interests:

So far, the only research experience I have had is with Dr. Sandefur; we are currently researching the antimicrobial effects of certain plants to bacteria. The main objective is to see if herbal treatments, such as teas utilized by Native American tribes, may actually be used as alternatives to some antibiotics that are nowadays becoming useless with the onset of antibiotic resistant bacteria.

I am generally most interested in researching methods to treat bacterial and viral illnesses, as well as the practical and industrial application of microbiology to society.

Conferences:

I will be attending ABRCMS conference during the fall of 2016.

Clubs and Organizations:

- R.I.S.E Fellow (2016-2017)
- COMPASS Program
- Maynor Honors College

Honors:

Chancellors List: fall 2015, spring 2016

Career Aspirations and Goals:

I plan to attend graduate school in order to continue my budding research career. I love to teach others about how microbes may be utilized in industry, as well as how they generally function, so I would not mind becoming a professor one day or even working in industry. I feel that it is not only important to heal people, but also to help them understand how illnesses work so that they may be better prepared to face a world where illness and microorganisms are everywhere, whether you want them there or not. However, I primarily wish to be in a lab one day, researching for better ways to combat illnesses caused by bacterial and viral diseases.

FELLOW PROFILE

Academic Year 2016-2017

Dakota Lee

Department: **UNCP Biology**

Year of Study: 1st year Research Student

Mentor: **Dr. Conner Sandefur**

Major(s): Biology, Biomed Emphasis

Current Research Activities (brief description):
Researching and testing the interactions of certain microbes and herbal teas to justify whether or not Traditional Native American remedies can provide natural aid in modern day illnesses.

Other Research Experiences:
This is my first research experience and I feel like it is a good square one for me to begin my future in a scientific career.

Honors: Chancellor's list

Career Aspirations and Goals:
I someday hope to make the world a better place by supplying easily accessible and high-tech bionics to amputees. I am looking into a career with emerging companies that are topping the bionic industries such as Ekso Bionics.

Publications:
I have had no publications at this time.

Conference(s) Attended or will attend:
I plan to attend ABRCAMS with my other RISE colleagues.

Clubs and Organizations:
I am also a member of the Compass program.

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FELLOW PROFILE

Academic Year 2016-2017

Cary Mundell

Department: Biology

Year of Study: Senior

Mentor: Dr. Ben Bahr

Major(s): Molecular Biology

Source(s) of Training Support: RISE

Current Research Activities:
Analysis of Exploratory Habituation data from the summer experiment cycle. Ongoing research into the effects of PADK on transgenically induced Alzheimer's Disease.

Other Research Experiences:
Investigating regulatory mechanisms for the m^6A methylation reader protein YTHDF2 (CSU)

Honors: Rise Fellowship (3 years)

Career Aspirations and Goals:
PhD in Virology, PI of my very own lab.

Publications and Presentations:

1. SFN, Paraoxon effects in hippocampal explants and adult rats: synaptotoxicity and protection through an endocannabinoid enhancement avenue. November 2016
2. Front Range CSBS, Investigating a regulatory mechanism for the m6A-methylated RNA reader protein YTHDF2, July 2016.
3. PURC, Testing New PADK Derivatives for Positive Lysosomal Modulation: Early Drug Discovery of a Unique Therapeutic Avenue for Alzheimer's Disease April 2016
4. NCAS, Testing New PADK Derivatives for Positive Lysosomal Modulation: Early Drug Discovery of a Unique Therapeutic Avenue for Alzheimer's Disease March 2016.
5. ABRCMS, Testing New PADK Derivatives for Positive Lysosomal Modulation: Early Drug Discovery of a Unique Therapeutic Avenue for Alzheimer's Disease, November 2015

Conference(s) Attended or will attend:
Annual Biomedical Research Conference for Minority Students (presenter)
Front Range Computational and Systems Biology Symposium (Presenter)
North Carolina Academy of Sciences (Presenter)
Pembroke Undergraduate Research and Creativity (Presenter)

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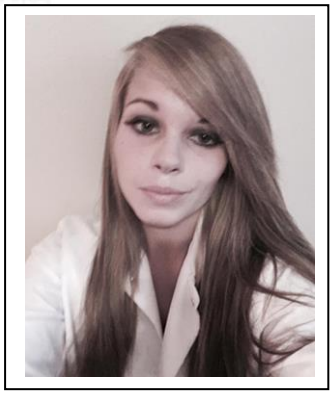

Katherine Rentschler

Department: Biology (Environmental)

Year of Study: Senior, 1st year student researcher

Mentor: Dr. Ben Bahr, Ph.D.

Research Interests:
I am interested in studying both neurobiology and pollution ecology. I wish to find out how environmental toxins affect the brain, specifically mycotoxins, such as species of *Stachybotrys* and *Aspergillus.* Many toxins in the environment can have psychoactive or neurodegenerative effects by causing neurotransmitter imbalances. I would like to study how these pollutants may play a role in the etiologies behind psychiatric and neurological disorders.

Research Experience:

William C. Friday Laboratory, Pembroke, NC (2014 to Present)

I have worked as a student volunteer since 2014 in the Alzheimer's Research facility under the mentorship of Dr. Ben Bahr, Ph.D. I was just recently accepted as a RISE fellow this summer. I focus mainly on the toxicological and behavioral side effects regarding the oral dosing of the compound PADK. This includes analyzing behavior, weight changes, and analyzing cognitive performance during behavioral testing. I also analyze data regarding kidney and liver function and serum Cathepsin B levels. In addition, I have tested samples for the expression of specific proteins, such as GIT-2 and Tau, which are commonly overexpressed in Alzheimer's patients.

SPIRE Summer Research Program: UNC Chapel Hill (Summer 2015)

I have worked in the Philpot lab under the mentorship of Dr. Alex Kloth, Ph.D., where I learned hippocampal electrophysiology. The experiments were designed to assess the role of TCF4 haploinsufficiency on synaptic plasticity in mouse models of Pitt-Hopkins Syndrome.

Presentations and Publications

- Investigating the role of TCF4 Haploinsufficiency on Synaptic Plasticity in area CA1 of the Hippocampus. (UNCP RISE Summer Research Symposium, Fall 2015; Distinguished SPIRE Scholar Seminar, UNC Chapel Hill, Fall 2015)

- Effects of the Lysosomal Modulator PADK on Exploratory Habituation and the Expression of Tau Isoforms in Aged Mice. (North Carolina Academy of Sciences Conference, Spring 2016)

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FELLOW PROFILE

Academic Year 2016-2017

Natasha Wells

Department: Chemistry and Physics

Year of Study: Senior, 3rd year Research Assistant

Mentor: **Paul Flowers, PhD**

Major(s): Chemistry: Molecular Biotechnology and Biology: Biomedical Emphasis

Source(s) of Training Support:

NIGMS RISE Program: Cohort 10 and 11
National Science Foundation: "New Devices and Methods for Microscale Spectroelectrochemistry"

Current Research Activities (brief description):

Dr. Paul Flowers SEC Urinalysis Project: Summer 2016- Present

Our group is utilizing a novel kinetic spectroelectrochemical (SEC) assay for determination of uric acid in human urine. We found that the kinetic SEC assay exhibited a sensitivity and precision comparable to standard clinical assays. Preliminary results of split urine samples analyzed by both the kinetic SEC assay and a standard, colorimetric, assay confirmed that concentrations within the clinical range were consistently detected. Recent research efforts investigated potential negative bias in results. The analysis method was modified via standard addition approach to prevent possible interference due to specimen matrix effect. Correlation results of novel kinetic SEC assay and standard assay, will confirm the suitability of our SEC approach for clinical applications.

Other Research Experiences:

Dr. Paul Flowers Microiontophoresis Project: Spring 2015- Spring 2016
Our research aims to develop an in-vitro microspectrometric protocol that will permit both the quantification of iontophoretic ejections and real-time imaging of the process, affording a strategy for quantitative delivery of compounds during the in-vivo use of probes.

Dr. Cornelia Tirla Organic Synthesis Project: Spring 2015- Fall 2015
Through classical organic chemistry methods, modification of Z-Phenyl-Alanine-Diazomethylketone (PADK) derivatives to determine functional group efficiency, a collaboration with the William C. Friday Laboratory.

Honors and Scholarships:

Chancellor's List Spring 2016
GlaxoSmithKline Women in Science Scholar 2015-16
Arrowhead 1887 Scholar 2015-16