

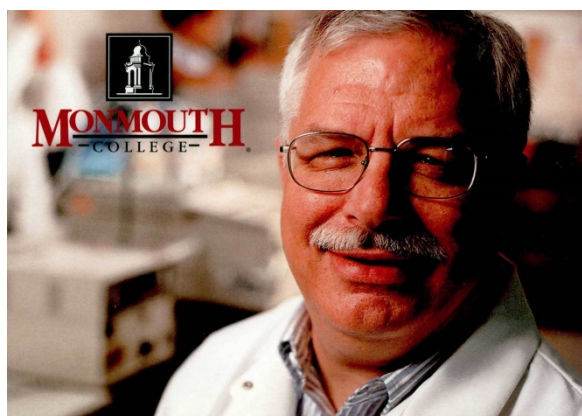
Doc Kieft Summer 2016 Research Program
Undergraduate Research Talks

July 18, 2016

Pattee Auditorium

Monmouth College

9:45am-2:30pm



Nadia Ayala (MC '17) – Biochemistry Major – Sturgeon Lab

Brittany Book (MC '18) – Biochemistry Major – Sostarecz Lab

Bridgette Davey (MC '19) – Physics Major – Kumar Lab

Broddie Davis (MC '18) – Chemistry Major – Prinsell Lab

Khdr Eskander (MC '17) – Biochemistry Major – Kumar/Moore Lab

Ian Salveson (MC '17) – Chemistry/Classics Double Major – Sturgeon Lab

Kate Sauley (MC '19) – Biochemistry Major – Sostarecz Lab

Ben Stillwell (MC '18) – Chemistry Major – Sturgeon Lab

Amy Wollenburg (MC '18) – Biochemistry Major – Prinsell Lab

Schedule of Events

9:45am-10:00am – Talk Setup - Refreshments

10:00am-12:00pm – Morning Session of Talks *There will be 10 minutes between talks for questions

10:05am-10:25am – **Kate Sauley**

“Insulin: Its Structure, Function, and Interaction in Model Cell Membranes”

Working under the guidance of Dr. Audra Sostarecz and with the funding of the Doc Kieft Summer Research Program, I have been investigating the effects of insulin, both human and bovine, on various lipids that are common components of biological membranes. I am also working to determine the structure of insulin while altering specific variables: concentration, temperature, and the presence of various metal cations (zinc, copper, etc.). I am using a model membrane system known as a Langmuir monolayer to determine the interactions of these substances as though they were in living systems. I will also be using the Atomic Force Microscope to image the various conformations that the insulin molecule may take upon exposure to the metals and other variables previously mentioned.

10:35am-11:05am – **Broddie Davis and Amy Wollenburg**

“Formation of N-N Bonds as a Tool for Synthesis and Drug Development”

Molecules with nitrogen-nitrogen (N-N) bonds have exhibited promising biological activity, but are often synthesized by substituting a preformed hydrazine derivative. This research program focuses on developing a method for creating N-N bonds, using a nucleophilic nitrogen and an electrophilic nitrogen attached to a leaving group. This method would be used to synthesize natural products, and derivatives with potential biological activity.

11:15am-11:30am – **Bridgette Davey**

“Astrometry using Astrophotography at Adolphson Observatory”

Object at large distance (e.g. stars) does not appear to change their relative position with respect to other distant objects and thus can be used as a fixed background to study the motion of the nearby object such as asteroid and comet. These objects are commonly known as minor planet. Their trajectory can be influenced by other nearby object due to collisions, radiation pressure, as well as the relative configuration of the planets and sun in our solar system. To ensure that they are not on the collision course with Earth it is very important to track these minor planets. Over this summer we used the Trubeck 20 inch CCDK Telescope located in the Adolphson Observatory to study the trajectories of the minor planets and imaging Deep Space objects.

11:40am-11:55am – **Brittney Book**

“Examining the Effects of Propolis on Cancer Cell Membranes and Bacterial Cell Membranes”

The Langmuir Monolayer Technique is used to simulate a model cell membrane. Using the Langmuir Monolayer Technique, the interactions between a variety of lipids and propolis can be investigated to determine the mechanism of how propolis interacts with cell and bacterial membranes.

12:05pm-1:00pm – Lunch in the Nutrition Lab

1:05pm – Group Picture in front of CSB

1:15pm-2:30pm – Afternoon Session of Talks

1:15pm-1:45pm – Nadia Ayala, Ian Salveson, and Ben Stillwell

“Oxidation of Biophenols”

The enzymatic oxidation of phenols that have a biological significance was investigated. These phenols include acetaminophen, the top prescribed pain reliever over the past 5 years, N-acetyl L-tyrosine which has a crucial role in signal transduction, and 4-hydroxyphenylacetic acid, a known antioxidant derived naturally from beer and olive oil. The formation of radicals is similar in all the phenols; and, because of this, we have an idea of what to expect from the products as made from the reactions through the use of HPLC, Flash Chromatography, and NMR to identify said products.

1:55pm-2:25pm – Khdr Eskander

“Measuring the Binding Force Between CRP and DNA promoter Region Using AFM”

Atomic Force Microscope opens doors to the nano-scale world. It allows us to take images of nanoparticles and molecules such as DNA and proteins, and thus allows one to visualize and analyze their topographic features. Furthermore, Force Spectroscopy mode in AFM allows us to measure adhesion forces of surfaces and binding forces of two molecules. In this study, we investigate the binding force between DNA and CRP transcription factor with the presence and absence of cAMP using Force Spectroscopy.