

Scholars Day Program

Wesley College
Dover, Delaware



April 16, 2015

Schedule of Events

Wells Auditorium (Slaybaugh Hall 107)

1:00 – 1:05

Welcome & Opening Remarks

Dr. Patricia Dwyer

Vice President for Academic Affairs of Wesley College

Wells Auditorium (Slaybaugh Hall 107)

1:05 – 1:25

Keynote Address: Kristopher Roeske

Adjunct Professor of Science

Session I

1:35-2:15

Musical Performances

Oral Presentations

Session II

2:25-3:05

Musical Performances

Oral Presentations

Poster Presentations

Session III

3:15-3:55

Musical Performances

Oral Presentations

Session IV

4:05-4:45

Oral Presentations

Poster Presentations

The student photography exhibit will remain throughout the day in the DuPont Gallery

5:00-6:00

Reception & Ceremony College Center 206

Poster Presentations around the outside of the College Center

(In the event of rain, the presentations will be held at the College Center lobby)

Musical Performances in the Chapel,

Oral Presentations in Wells Auditorium (Slaybaugh Hall 107),

Slaybaugh Hall 104, Cannon Hall 7,

Cannon Hall 109 and Cannon Hall 110

Musical Performances: Session I
1:35 – 2:15

Chapel

Ensemble Performances: Wesley College Symphonic and Jazz Bands
Basin St. Blues, Louis Armstrong
Take Five, Desmond & Brubeck
David Laganella and Brian Cass, Conductors

Ensemble Performances: College Choir and Gospel Choir
James Wilson, Conductor

Oral Presentations: Session I
1:35-2:15

Panel 1: Cannon Hall 109
Moderator: Dr. Jeffrey Gibson
Assessor: Professor Susan Bobby

An Analysis of the Legalization of Gray Fox, Weasel, and Skunk Trapping in Delaware
Alex Niezgoda

The Mental Health Benefits of Animal Assisted Interventions in Long Term Care
Ashten Bodofsky

Panel 2: Cannon Hall 7
Moderator: Professor Paul Olsen
Assessor: Dr. Angela D'Antonio

The Crawford Treatment Wetland, a Pioneering Vertical Flow Treatment System
Samantha Weber

Using SAS to Analyze Water Quality
Rebecca Miller, Zachary Scholl, Jason Berry

Panel 3: Slaybaugh Hall 104
Moderator: Dr. Yu Tian
Assessor: Dr. Elaine Guertler

Time of Death, Differential Equations, and Newton's Law
Riza Bautista

Solvolysis of Diallylcarbamyl Chloride
Kyle Gillespie

Panel 4: Cannon Hall 110
Moderator: Professor Victor Greto
Assessor: Dr. Jill Cole

Understanding Reaction Pathways of an Agrochemical Precursor
Tabitha Lambert

*Alternative Pedagogies and Outcomes for African American Students in Higher
Education*
Morgan Williams

Musical Performances: Session II
2:25 – 3:05

Chapel

Solo Performances:

Still I Rise

Emily Benz

Clarinet Solo

Esmeralda Elsakhawy

Hannah's Waltz

Eugene Nelson

Wesley College Chamber Ensemble
Brian Cass, Conductor

Oral Presentations: Session II
2:25-3:05

Panel 1: Cannon Hall 7
Moderator: Ms. Karen House
Assessor: Dr. Saharat Pongsree

Comparison of Two Methods of Classifying Body Type
Christina Verzi

Comparison of Zoo Environments on Animal Behavior
Katelynn Russomanno

Panel 2: Wells Theater (Slaybaugh Hall 107)
Moderator: Dr. Jessica James
Assessor: Dr. Jack Barnhardt

The 5 Program: A Marketing Analysis for the Writing and Tutoring Center
Sean Hopkins

Burnout in Oncology Nursing
Chelsea Michaels

Panel 3: Slaybaugh Hall 104
Moderator: Ms. Shari Tenner
Assessor: Dr. Cynthia Newton

SIR Modeling of Ebola Outbreak in West Africa
Rebecca Miller

Delaware's Executive Order 41 and Emissions in the Transportation Sector
Kevin Hickman

Poster Presentations Session II

2:25-3:05 p.m.

The Outside of the College Center

(In the event of rain, the presentations will be held at the College Center Lobby)

Nursing... A Drug Free Zone: Recognizing Colleague Chemical Dependency

Karin Cooney-Newton, Lori Palmer-Davis, Janice Evans, Ayasha McGhee,
Sarah Rueda, Claudia Tilley

Improving Website Marketability

Brittany Blacksten

Which Tree Species in Delaware Exhibit Prominent Tree Rings?

Brooke Thompson

Trends Observed in Solvent Studies of 2-ethylhexyl Chloroformate

Alora Wilson, Katelyn Null

Increasing Interest and Awareness in STEM Programs

Alora Wilson, Ariel Bilbrough, Matthew Love

Can Nursing Interventions Impact Cesarean Delivery Rates?

Teresita Raymundo, Angelo Delario, Katherine Echem, Paige Green,
Kaitlyn Steinfeldt, Susan Hagelman, Teresia Kisesewa, Rebecca Lind

Water Level Salinity Correlations along the Saint Jones River

Tabitha Lambert, Brittany Kowalewski, Kert Lewis, Weilai Xiang

Animal Behavior Research Project: Avian Foraging: Place and Preference

Dinh Ngo, Ashley Hudson, David Payne, Katelynn Russomanno

BMI, Impedance and Caliper Test for Comparison of Body Fat

Catherine Gross

Determining the Mechanism of Octyl Chloroformate Using Acid-Base Titrations

Megan Durrant

The Effects of Science on the Religiosity of Students

Rachel Hausler

Territoriality Behavior in the Siamese Fighting Fish

Emily Overlander, Angela Clemmons, Samantha Corbett, Alex Niezgoda

A Study on the Infectious Rates of Lyme Disease among Deer Ticks in Delaware

James Welsh

Human Pheromones

Christina Verzi, Terrance Wingate, Katelyn Null, Molly Johnson

Advance Care Planning in the Primary Care Setting

Robin Maracle

Tree Ring Analysis of Eastern Red Cedars from the St. Jones Reserve, Dover De

Lihoshimar Gonzalez

*Assessing the Spatial Distribution of Red Knots within the Delaware Bay at Low
Tide*

Joshua Barth

Musical Performances: Session III

3:15 – 3:55

Chapel

Moderator: Dr. James Wilson

Assessor: Dr. David Laganella

Art Song of the World Wars

Marissa Richardson

Western Classical Music and East Asia

Julianne Morris

Oral Presentations: Session III
3:15-3:55

Panel 1: Cannon Hall 7
Moderator: Professor Paul Olsen
Assessor: Dr. Angela D'Antonio

Dover Urban Beekeeping
David Payne

Solvolysis of Cyclohexyl Chloroformate in HFIP and TFE
Laura Malinowski

Panel 2: Wells Theater (Slaybaugh Hall 107)
Moderator: Professor Victor Greto
Assessor: Dr. Jill Cole

Nursing Interventions to Alleviate Suffering in Patients Undergoing Cancer Treatment
Ruth Ann Elston

Solvent Reactions of Electron-Donating Chloroformates and Carbonyl Tosylates
Dionne Williams

Panel 3: Slaybaugh Hall 104
Moderator: Dr. Jessica James
Assessor: Dr. Elaine Guertler

Salmonella and Campylobacter Presence in Meats
Kirsten Ward

Promo MGMT
William Crockett

Oral Presentations: Session IV
4:05-4:45

Panel 1: Cannon Hall 7

Moderator: Professor Paul Olsen

Assessor: Dr. Angela D'Antonio

SPEAK Presents: The New Slam Poetry

Kevin Johnson, Dominic McAnulty, Patrick Schlosser, Austin Kind

Senior Media Project: The Ben Knapp Story

Brian Baker

Panel 2: Cannon Hall 110

Moderator: Ms. Karen House

Assessor: Dr. Jeffrey Gibson

Reservoir Analysis of Lyme Disease

Devin Price

Trends in the Polar Ice Caps

Brittany Kowalewski

Panel 3: Wells Theater (Slaybaugh Hall 107)

Moderator: Dr. Julie Fisher

Assessor: Dr. Jack Barnhardt

Comparison of Two Methods of Estimating Body Fat

Brynae Goodley

Panel 4: Slaybaugh Hall 104

Moderator: Ms. Shari Tenner

Assessor: Professor Dianitza Runser

*Upland Forest Buffer Losses Due to Inundation Caused by Sea Level Rise in the
Upper and Lower Sub-Watersheds of the Broadkill River*

Kyle Frame

Decoding Gender Identities in Commercial Advertisements
Marlon McNeill

Poster Presentations Session IV

4:05-4:45 p.m.

The Outside of the College Center

(In the event of rain, Presentations will be held in the College Center Lobby

The Impact of Title VII Funding on the Nursing Shortage

Sharon Yeager-Bilbrough, Jennifer Zimmerman, Aja Terry, Marjorie Berna,
Brandi Patterson, Christine Mogire

Integrative Undergraduate Biological Chemistry Program Includes the use of Informatics Tools, GIS and SAS Software Applications. Project-Based American Obesity Case Study Using GIS Maps and SAS

Alora Wilson, Malcolm D'Souza, Richard Kashmar, Kent Hurst, Frank Fiedler,
Catherine Gross, Jasbir Deol

Studying Reactivity and Leaving Group Effects in Aryl Chloroformate Esters

Ariel Bilbrough, Dionne Williams

Implementation of the SAS Program in Analyzing Water Quality Data

Laura Malinowski, Kyle Gillespie, Victor DeBarros

First Generation Students and Their Success at Wesley College through the Writing and Tutoring Center

Elizabeth Ostermann

Kinetics and Mechanism of Cyclohexyl Chloroformate

Catherine Gross, Laura Malinowski

Using SAS to Analyze Water Data

Catherine Gross, Jasbir Deol, Tyler Dominiak

'Frere Jaques', a New Perspective

Emily Overlander, Sharnice Wallace

Selecting a Methodology to Estimate the Missing Values from a Times Series Data Set that Measures the Extant of the Northern Polar Ice Cap

Riza Bautista

Egg Color, Size and Spacing

Salma Biatee, Jessica Collins, Rachel Kery, Samantha Weber, Karri Wallas

The Effect of Riparian Buffers on Water Quality

David Payne

Confirming the Use of Phenyl Chloroformates as an Appropriate Addition-Elimination Standard in LFER Analysis

Jasbir Deol

The Burden of Hypertension and Heart Disease among African-Americans

Anumeet Cheema

Kinetic Study of Alcohol Dehydrogenase

Maryeah Pavey

Wetland Values of the Restored Wetlands in the Blackiston Wildlife Area

John Dougherty

Horseshoe Crabs and Climate Change

Erin Wilson

Re-establishing St. Jones River Riparian Zones on Dover Air Force Base

Alex Niezgoda

Concurrent Malaria and Dengue Infections

Rachel Hausler, Kirsten Ward

Reception in honor of all Scholars Day student participants

5:00 – 6:00

College Center 206

Abstracts

An Analysis of the Legalization of Gray Fox, Weasel, and Skunk Trapping in Delaware

Alex Niezgoda

Mentor: Dr. Kathleen Curran

The gray fox, weasel, and skunk were recently added to Delaware's list of legal game species by the Department of Natural Resources and Environmental Control. There has been resistance to this move, primarily because of the status of the gray fox as our state animal. In this project the impact of trapping on gray fox, skunk and weasel was assessed using state records; including the number of trapping licenses sold, trapping activity, and numbers of animals taken. Similar measures in adjacent states were also examined. A critique of the legalization was then compiled, considering both sides of the argument.

The Crawford Treatment Wetland, a Pioneering Vertical Flow Treatment System

Samantha Weber

Mentor: Dr. Stephanie Stotts

Elevated nutrient levels are common downstream of concentrated feeding operations. The Crawford Treatment Wetland is a vertical flow treatment system for both surface and ground water installed in an attempt to reduce elevated nutrient levels associated with an egg laying facility. The staff at the Sassafra River Association has been collecting hourly water samples since July 2014 and sending the samples to a lab for nutrient analysis. However, they are in need of someone to help them sort through the data and interpret the results. In this proposal, I will outline my plans to interpret and analyzing the nutrient data obtained by the SRA. The results of this study will determine the effectiveness of this system in reducing the nutrient levels during the first year of operation.

Using SAS to Analyze Water Quality

Rebecca Miller, Jason Berry, Zachary Scholl

Mentor: Dr. Frank Fiedler

In this expository presentation, we will show how SAS can be an integral part of undergraduate research at Wesley College. We use water quality data from the Delaware National Estuarine Research Reserve's (DNERR) Lebanon Landing side on the St. Jones River to explain the steps necessary to manage, analyze, and present data using SAS. In particular, we display the correlation between conductivity and salinity over the course of a year and a side-by-side comparison of salinity for two seasonally distinct months. The resulting analysis may be the starting point for a hypothesis test in undergraduate research.

Time of Death, Differential Equations, and Newton's Law

Riza Bautista

Mentor: Dr. Agashi Nwogbaga

When someone dies, determining the time of death is usually important especially if foul play is suspected. Knowing the time of death helps in verifying alibi, thus narrowing the list of potential suspects. Many factors can affect a dead body and hence influence the calculation of the time of death. Data about the environment where the person died are gathered and analyzed. The main result is that, under suitable stated conditions, the time of death is calculated using mathematical modeling involving first-order differential equations together with one of Sir Isaac Newton's laws.

Solvolysis of Diallylcarbamyl Chloride

Kyle Gillespie

Mentor: Dr. Malcolm J. D'Souza

Diallylcarbamyl chloride has found use in patented herbicidal applications of novel tetrazolinones and as a useful precursor in the formation of many pharmaceutically useful compounds. The specific rates of solvolysis of diallylcarbamyl chloride were determined at 25.0°C, 35.0°C and 45.0°C in solvents of varying nucleophilicity and ionizing power. The pseudo first order rates obtained for diallylcarbamyl chloride when compared to the rates previously obtained from various alkyl and aryl carbamoyl chlorides help provide a better understanding of the reaction mechanisms. This helps to support that the mesomeric effect of the allyl groups in R₂NCOCI tend to dominate the rates of this reaction.

Understanding Reaction Pathways of an Agrochemical Precursor

Tabitha Lambert

Mentor: Dr. Malcolm J. D'Souza

Chloroformate esters are synthetically useful precursors in the commercial agrochemical industry as potential inhibitors of insect and plant growth. With prior analysis of solvolytic rate data for a variety of these esters showed the occurrence of side-by-side addition-elimination and unimolecular S_N1 mechanisms that were dependent on the structure of the reacting substrate. This undergraduate project focuses on the study of the specific rates of solvolysis of 1-chloro-2-methyl propyl chloroformate in a variety of solvents with different nucleophilicity and ionizing power values. The solvolysis reaction of 1-chloro-2-methyl propyl chloroformate in 21 solvents including the highly ionizing aqueous HFIP and TFE mixtures were studied. The recorded times and titration values were evaluated by calculation using the Guggenheim method to obtain the rate at which the compound reacted in each solvent. Analyses are completed using the Guggenheim method and the Grunwald-Winstein equation in a variety of mixed aqueous organic solvents at 25.0°C.

The Mental Health Benefits of Animal Assisted Interventions in Long Term Care

Ashten Bodofsky

Mentor: Dr. Julie Fisher

Animal-assisted intervention [AAI] offers a way to improve the mental health and well-being of elderly residents who are confined to long term care facilities. When researching this topic, I identified fifteen articles and studies which describe the effects of AAI, especially on residents of long-term care facilities. Often people newly admitted to long-term care suffer from feelings of loneliness, sadness, and loss. The research I reviewed supported the positive effects of AAI on these residents, such as decreased apathy and increased communication with nursing staff. Based on the results of these studies, I developed a survey which could be given to long-term care facilities that are utilizing AAI to gain a better insight into the perceived benefits for those facilities. My presentation will discuss the research that has been reviewed and the benefits of this type of therapy to patients and nursing staff of long-term care facilities.

Comparison of Two Methods of Classifying Body Type

Christina Verzi

Mentor: Dr. Lynn M. Everett

A number of studies have shown a positive correlation between high body mass index (BMI) and increased risk of diseases like cancer, cardiovascular disease, diabetes, and high blood pressure. However, this method relies solely on height and weight measurements and does not take into account fat distribution or how muscular a person is. Alternative measurements are being proposed to relate abdominal adiposity and disease risk. Waist circumference to hip circumference ratios are believed to be superior to BMI in assessing disease risk. The purpose of this study is to compare waist-hip ratios to BMI in Wesley College students. Data will be collected from consensual students in A&P labs and then analyzed using a paired t-test.

Comparison of Zoo Environments on Animal Behavior

Katelynn Russomanno

Mentor: Dr. Kathleen Curran

Research has shown that creating enriched, immersive environments that simulate a natural habitat are important in providing the best possible life for a zoo animal. There have been studies to suggest that the environment in which the animal is expected to live is just as important as providing the animal with proper nutrition. Some zoos take this into consideration, giving their animals plenty of interesting landscape features, complete with obstacles to challenge them, while others provide only the bare basic cement enclosures for each animal. We hypothesize that the animals housed in a more enriched environment will be more active. Two species of animals at Space Farms Zoo in Sussex, NJ and the same two at Turtle Back Zoo in West Orange, NJ will be observed, and their activity patterns compared.

The 5 Program: A Marketing Analysis for the Writing & Tutoring Center's New Promotion

Sean Hopkins

Mentors: Jessica Pilewski, Christine McDermott

The Department of Academic Success is marketing a new program in conjunction with the Writing & Tutoring Center. Studies have shown that students who attended an average of 5 tutoring sessions are more likely to be academically successful. The 5 Program's mission is to find better ways to motivate the students at Wesley College to take advantage of tutoring services. Based on data collected from student surveys, in comparison to past and present visit histories, the department will utilize the results to initiate more innovative strategies of encouragement. The Department will also revisit the marketing tactics used over the last year to determine new tactics that will be beneficial for the program's future development.

Burnout in Oncology Nursing

Chelsea Michael

Mentor: Dr. Julie Fisher

There has been an abundant amount of research conducted on burnout rates in oncology nurses. Burnout is best described as, "A prolonged response to chronic physical or emotional stressors resulting in exhaustion and ineffectiveness" (Maslach et al., 2001). Nurses who are single, without children, and newly graduated experience burnout more often than others. The research also shows that when using various intervention programs, burnout is greatly decreased. This presentation will describe the synthesis of research that supports intervention program implementation on oncology units. It will also include an example of a survey to evaluate burnout and a teaching tool that can be used for educating nurses in these units.

S.I.R. Modeling of Ebola in West Africa

Rebecca Miller

Mentor: Dr. Agashi Nwogbaga

This study examines the 2014 West Africa Ebola tsunamic outbreak using fundamental quantitative reasoning. Also discussed in the study are the implications for the United States (USA) and other European nations if the current outbreak is not contained, and a vaccine/cure is not found. Lessons learned from how Nigeria (a country in West Africa) contained the Ebola outbreak will also be examined. Ultimately, we intend to analyze the Ebola outbreak using the calculus of differential equations together with applicable statistical analysis in an SIR epidemic model (Susceptible, Infected, and Recovered model) to simulate an Ebola outbreak.

Delaware's Executive Order 41 and Estimating Emissions in the Transportation Sector

Kevin Hickman

Mentor: Dr. William Kroen

Delaware's governor recently enacted Executive Order 41, requiring the State reduce its greenhouse gas emissions by 30% by year 2030. Currently, seven major sectors contribute to Delaware's greenhouse gas emissions: electrical power generation, transportation, industrial, commercial, residential, agricultural, and disposal and treatment of waste. In 2010, these sectors emitted 12.48 million metric tons of carbon dioxide equivalents. The two largest contributors to these emissions are transportation (approximately 34%) and electrical generation (approximately 31%). Delaware's greenhouse gas emissions have decreased 29.7% between 2000 to 2010. Recent investments to modernize our energy system and other efforts will result in significant additional reductions. With Executive Order 41, The Department of Transportation will look at long-term investment strategies and the most effective methods to accurately account for these reductions. This project will examine better formulas and methods to estimate the emissions from the vehicle transportation sector.

Nursing... A Drug Free Zone: Recognizing Colleague Chemical Dependency

**Karin Cooney-Newton BSN, RN, CCRN Claudia Tilley RN, Ayasha McGhee BSN, RN,
Sarah Rueda AND, RN, Lori Davis-Palmer AND, RN**

Mentor: Dr. Denise Morris

The National Council of State Boards of Nursing reports that 6-8% of nurses use alcohol or drugs sufficient to impair professional performance (ANA, as noted in NCSBN, 2011).

As a result, the Delaware Board of Nursing mandated that every nurse complete a minimum of 3 continuing education units. The Plan Do Check Act research method, including a gap analysis process and a systematic review of the literature was completed by Wesley College Graduate Student Nurses revealing that there were no "in seat" offerings within the state or surrounding areas.

The purpose of this study was to collaborate with a field expert and develop a comprehensive continuing education offering for regional area nurses.

At the completion of the offering, course evaluations showed a 98% satisfaction rating for the offering and obtaining the course objectives. In addition, the collegial interactions allowed networking relationships that can support the approaches from the offering.

Improving Website Marketability

Brittany Blacksten

Mentor: Professor Barbara Abbott

The investigation will examine how the improvement of the state interscholastic athletic association website will impact marketing, using the viewpoints of populations that are involved with the association at various levels. The data outcome will provide the association with assessment to determine if goals and objectives of the Department of Education are being met.

Which Tree Species in Delaware Exhibit Prominent Tree Rings?

Brooke Tamara Thompson

Mentor: Dr. Stephanie Stotts

Tree ring analysis is a valuable tool that can provide insight into a variety of climate and geomorphic histories. Recently, researchers have begun to use dramatic changes in tree ring width to investigate changes in salinity associated with sea-level rise. We are interested in using tree-ring analysis to gain information on flooding frequency and sea-level rise at the St. Jones Reserve near Dover, DE. Preliminary work has indicated that some species of trees are not appropriate for this type of analysis due to faint and unclear ring structure (e.g., Black Gum). In this study we collected tree cores from 19 different species of tree at the St. Jones Reserve to assess species usefulness in tree ring analysis. Black Oak, Shingle Oak, Laurel Oak, White Oak, Willow Oak, and Bur Oak were all found to produce clear rings, but we recommend the Eastern Red Cedar for further investigation because this species is wide spread, displays clear annual rings, and can survive increasing salinity levels.

Trends Observed in 2-Ethylhexyl Chloroformate

Alora Wilson and Katelyn Null

Mentor: Dr. Malcolm J. D'Souza

Primary alkyl chloroformates like 2-ethylhexyl chloroformate are precursors for alcohols, amines, esters and long carbon chains. This substrate is important in the Quantitative High Throughput Screening (qHTS) assay of hormone receptor inhibitors and activators since it identifies the hormones that catalyze multiple enzymatic pathways. We followed the specific rates of reaction of 2-ethylhexyl chloroformate in a constant temperature water-bath (kept at 25.0 °C). Using the acid-base titration method we studied its acetolysis and alcoholysis in a variety of pure and mixed aqueous alcohols. The indicator used was lacmoid (resorcinol blue) in acetone. Our preliminary results indicate that the two-step carbonyl-addition process is dominant.

Increasing Interest and Awareness in STEM Programs

Ariel Bilbrough, Alora Wilson, Matt Love

Mentor: Dr. Malcolm. J. D'Souza

To coincide with National Chemistry Week, the Delaware American Chemical Society (DE-ACS) Section hosts a Family Science Adventure program at the Independence School, in Newark, DE. The goal of this program is to build awareness of chemistry at the local level. Every year, Wesley College STEM students participate in this event. They conduct a series of "fun" hands-on experiments that explain various chemical principles. Activities, geared toward grades K-6 children, were open from noon to 3 p.m., on November 1, 2014. This year, we surveyed the participants (parents and children) before and after the event, to demonstrate any measurable increase in student interest observed after program participation. The children ranged from ages 5 to 11 years old and attended a Delaware school. Participants were given a survey containing three key questions to gauge interest in science. It was concluded that participating students gained more confidence.

Can Nursing Interventions Impact Cesarean Delivery Rates?

Teresita D. Raymundo, Angela Delario, Katherine Echem, Paige Green, Kaitlyn Steinfeldt, Susan Hagelmann, Teresia Kiseewa, Rebecca Lind

Mentor: Darla Davidson, MSN, RN

A healthy and safe birth for the mother and infant is the goal for labor and delivery. A recent and sustained upward trend in Cesarean deliveries has been noted across the United States. The aims of this root cause analysis research project are to identify factors contributing to cesarean deliveries and exploring nursing interventions to reduce their rates through a literature review organized in a "Plan, Do, Study, Act" conceptual framework.

Water Level and Salinity Correlations along the Saint Jones River

Tabitha Lambert, Brittany Kowalewski, Kert Lewis, Weilai Xiang

Mentor: Dr. Frank Fiedler

In this presentation, we will show how SAS can be a vital part of undergraduate research at Wesley College. We use water quality data from the Delaware National Estuarine Research Reserve's (DNERR) Division Street and Scotton Landing sites along the St. Jones River to manage, analyze, and present the data using SAS. We display the correlation between water level and salinity at these two sites. Since one site is fresh water whereas the other is brackish, the resulting analysis may be used for a hypothesis test in undergraduate research.

Animal Behavior Research Project: Avian Foraging: Place and Preference

Dinh Ngo, Ashley Hudson, David Payne, Katelynn Russomanno

Mentor: Dr. Kathleen L. Curran

No two species can occupy the same niche. Competition will lead to one of them becoming extinct. Research has shown that successful bird communities reduce competition by foraging at different heights, varying the nestling period, being active during different types of weather, and most importantly the geographic location between seasons. In this study we will examine how local bird species decrease competition for food. Our experimental design includes suspending bird feeders at different heights, and after allowing birds to become accustomed to them, providing different types of seeds in each feeder. We will evaluate the food preferences of different species of birds when given a choice between small and large seeds, at low and high elevations.

BMI, Impedance and Caliper Test for Comparison of Body Fat

Catherine Gross

Mentor: Dr. Lynn M. Everett

The Centers for Disease Control and Prevention report that over one-third of adults in the United States are obese. Obesity causes many health-related issues, such as Type 2 diabetes, hypertension, and heart disease. A previous study of the Wesley College student population indicated 29.5% of students are overweight and 19.8% are obese based on a Body Mass Index (BMI) of over 29, which is above the Delaware reported average of 26.9%. Visual observations at Wesley College indicate a 50% overweight population is unlikely. To verify this, we compared BMI using self-reported height and weight to two different body-fat composition tests (caliper test for skinfold thickness and bioelectric impedance). Measurements were taken during Anatomy and Physiology II labs. Results of the caliper tests were null due to high variation in measurements; a comparison of BMI to bioelectric impedance showed only a weak correlation.

Determining the Mechanism of Octyl Chloroformate Using Acid-Base Titrations

Megan Durrant

Mentor: Dr. Malcolm J. D'Souza

Octyl chloroformate (OctOCOC_l) is used as a precursor for drugs that inhibit multiple enzymatic pathways to control obesity. The drug inhibits lipase which stops your body from breaking down and absorbing fat. Determining the mechanism of reaction for such substrates is extensive and tedious work. Hence, this undergraduate research project is funded through the DE-INBRE program as it trains students in the basic biomedical methodologies used to develop more effective drugs.

In this project, the acid-base titration method has been used to study the specific rates of OctOCOC_l in different concentrations of aqueous acetone, aqueous ethanol (EtOH), aqueous methanol (MeOH), aqueous 1,1,1,3,3,3-Hexafluoroisopropanol (HFIP), aqueous 2,2,2,

trifluoroethanol (TFE), and in mixtures of TFE-EtOH at 25.0 °C. The initial trends observed are very similar in nature to those seen when shorter chain alkyl chloroformates were reacted in a similar set of solvents.

The Effects of Science on the Religiosity of Students

Rachel Hausler

Mentor: Dr. Lynn Everett

It is speculated that the religious belief of college students decreases as they gain scientific knowledge. In this study, data collected from Wesley College students was used to test the hypothesis that taking two or more college science courses has decreased their religiosity. A survey distributed to 263 students in science classes requested age, major, gender, and religious preference, as well as the number of science courses taken. Students were asked to rate the strength of their religious commitment before entering college and the current strength of their religious commitment. It was found that religiosity increased in the student surveyed. Speculations for the reason are discussed.

Territorial Behavior in the Siamese Fighting Fish

Emily Overlander, Angela Clemmons, Samantha Corbett, Alex Niezgoda

Mentor: Dr. Kathleen L. Curran

Male betta fish are extremely territorial. When another male betta fish is introduced into their habitat they become very aggressive, and exhibit agonistic behaviors, including flaring their fins and gills plates. This territorial display allows the fish to compete, without risking injury. However, it utilizes a great deal of energy to perform. In a series of experiments we are examining the behavior itself, and whether familiarity with another male can lead to a decrease in behavior. Finally, we will examine whether male dominance impacts female choice by allowing females to choose between dominant and subordinate males. We expect to find that if males become habituated to neighbors they won't respond to any fish. If they learn to recognize males, they will not display when presented with their neighbor but will when presented to a stranger. Finally, we predict that females will choose males that are able to intimidate other males.

Re-establishing St. Jones River Riparian Zones on Dover Air Force Base

Alex Niezgoda

Mentor: Dr. Kathleen Curran

Riparian buffer zones are vegetated areas along a stream, river, or other bodies of water. These areas play a key role in increasing the quality of adjacent water while partially protecting the aquatic system from the impact of neighboring land use. They, among other factors, provide shade, absorb excess nutrients and pollutants from runoff, and mitigate erosion and sediment

pollution. The St. Jones River watershed winds 10 miles through residential and commercially developed areas in Kent County, Delaware. The Dover Air Force Base is one of the major commercially developed areas contained within this watershed. Past development has eradicated large swaths of the buffer zone, and the base poses possible threats to the watershed via urban runoff, densely populated housing, frequent construction, and possible mishandling of toxic waste. This project, conducted during an internship, restored a section of effective riparian buffer using a variety of nursery stock plants.

A Study on the Infection Rates of Lyme Disease among Deer Ticks in Delaware

James Welsh

Mentor: Dr. Kathleen Curran

Ixodes scapularis, commonly known as the deer tick, is an important vector for *Borrelia burgdorferi*, the causative agent of Lyme disease. Lyme disease is very prevalent in Delaware, and can cause potentially debilitating arthritis, fever, and other health issues. In this study the infection rates for *B. burgdorferi* in the *I. scapularis* population in Delaware was examined in ticks collected in all three counties of Delaware using PCR analysis.

Human Pheromones

Christina Verzi, Terrance Wingate, Katelyn Null, Molly Johnson

Mentor: Dr. Kathleen Curran

Many animals use pheromones to communicate with each other. Attracting mates, marking territories, food location, and raising alarm are just a few of the types of chemical messages possible. Pheromones are produced by exocrine glands normally located near the surface of the body. While many animals use pheromones for their primary source of communication, humans often mask their natural odors with perfumes, deodorants, and scented soaps. In this experiment, we will test if humans can differentiate between the sexes based solely on the scent of their natural pheromones. An anonymous group of subjects will be given t-shirts to wear for a period of time, and then a separate group will determine if they can identify sex of the wearer, and rate how attractive it is to them. The hypothesis being tested is that females will be able to identify gender more accurately than males, and both males and females will find the scent of members of the opposite sex more attractive.

Advance Care Planning in the Primary Care Setting

Robin Maracle

Mentor: Dr. Karen L. Panunto

Advance care planning is the process of continued conversations between healthcare providers and patients regarding diagnosis, treatments options, and prognosis while including the values, beliefs, and family of the individual. Advance care planning is not only about end-of-life care; it is focused on quality of life throughout the entire disease process (Simpson, 2012). Advance care planning has been shown to increase patient and family satisfaction as well as increase completion rates of advance directives (Bischoff, Sudore, Miao, Bocardin & Smith, 2013). For several reasons, many physicians do not initiate these conversations leading to end-of-life care dilemmas. The purpose of this program is to increase completion rates for advanced directives.

Tree ring analysis of eastern red cedars from the St. Jones Reserve, Dover DE

Lihoshimar Gonzalez

Mentor: Dr. Stephanie Stotts

Dendrochronology is the science of using tree rings dated to their exact year of formation to analyze temporal and spatial patterns of processes in physical and cultural sciences. This study compares the tree rings of eastern red cedars growing along the marsh edge and growing in upland areas at the St. Jones reserve to determine the impact of storm surge and sea level rise on tree rings for this species. Tree cores were collected and processed by drying them and sanding them to the point of ring exposure. Then the ring widths were measured and compared.

Assessing the Spatial Distribution of Red Knots within the Delaware Bay at Low Tide

Joshua Barth

Mentor: Dr. Kent Hurst

The rufa population of Red Knots (*Calidris canutus*) has declined substantially in the past two decades, and was recently listed as a threatened species on the endangered species list. Current research has shown this decrease to correlate directly with the overharvesting of horseshoe crabs (*Limulus polyphemus*); however, there are gaps in the research that prevent a comprehensive understanding of all limiting factors affecting the recovery of the species. An example is: how do Red Knots utilize exposed mudflats at low tide? This is an important question worth answering since these intertidal mudflats are targeted by the aquaculture industry for shellfish production. This assessment will be done in two phases. The first phase: understanding the Red Knot behavior at high tide. The second phase: analyzing data retrieved from nano-tags and radio towers.

Art Song of the World Wars

Marissa Richardson

Mentor: Dr. David Laganella

This presentation will cover the highpoints of a Senior Capstone Project, and is a combination lecture and recital that explores the effect of the World Wars on art song composers and their music. The project examines many different aspects of the music, such as text setting and musical style as well as various different national perspectives, including British, French, German, American and Jewish. Several notable composers' music is included, such as Debussy, Strauss, Ives, and Britten, as well as a song from a Lithuanian ghetto. The presentation will include the performance of selections from the project along with information on the respective composer and analysis of the piece.

Western Classical Music and East Asia

Julianne Morris

Mentor: Dr. James Wilson

Western classical music has had a significant impact throughout Asian countries such as South Korea, Japan, and China. The purpose of this presentation will be to discover the history and reason behind this influence, the effect of cultural differences of Asia versus the West (in regard to classical music), a brief comparison of Western classical music and the classical music of these Asian countries, as well as the results of such influence in regard to the development classical music in these countries.

Dover Urban Beekeeping

David Payne

Mentor: Dr. Kathleen Curran

In recent years the concern over the plight of the honey bee, as well as a renewed interest in eating locally grown produce has caused many cities to relax restrictions regarding the keeping of bees within city limits. Cities such as New York, San Francisco and Denver now allow beekeeping on roof tops and backyards. At this time, Dover, Delaware – the site of Wesley College allows beekeeping on properties with more than 100 feet of frontage. This precludes the majority of homeowners from beekeeping. This research will examine the pros and cons of beekeeping in small cities, and formulate a suggested policy allowing for urban beekeeping in Dover, Delaware.

Solvolysis of Cyclohexyl Chloroformate in HFIP and TFE

Laura Malinowski

Mentor: Dr. Malcolm J. D'Souza

Secondary chloroformate esters are organic compounds where one side of an ester contains a secondary carbon and the other side contains a chloride. These compounds are used as an intermediate compound in areas ranging from the food industry to pharmacy. Cyclohexyl chloroformate which is used in steroid production is a focus of this project. Prior research has described its reaction in solutions of ethanol, methanol, acetone, and aqueous mixtures of ethanol and 2-2-2 trifluoroethanol (TFE), but the rates of reaction with aqueous TFE and aqueous 1,1,1,3,3,3 hexafluoro-iso-propanol (HFIP) are unknown. Also unknown is whether cyclohexyl chloroformate follows the addition-elimination reaction common for secondary chloroformate esters or if it undergoes a solvolysis decomposition mechanism similar to that of another secondary chloroformate ester, isopropyl chloroformate. This research project will attempt to finish providing information on the reaction rates of cyclohexyl chloroformate and decide which reaction mechanism it undergoes.

Nursing Interventions to Alleviate Suffering in Patients Undergoing Cancer Treatment

Ruth Ann Elston

Mentor: Dr. Julie Fisher

Patients with cancer who undergo chemotherapy treatment are at risk for developing many debilitating complications that reduce their quality of life and cause them to suffer. My research included gathering scholarly articles that described chemotherapy related adverse reactions. These articles and studies applied evidenced based nursing practice interventions to help alleviate the serious side effects of these drugs. For nurses to properly treat these adverse reactions, they need to know what they are and how they affect the patient. Common adverse reactions from chemotherapy include oral mucositis, fatigue, malnutrition, pain, alopecia and constipation. Nursing interventions include assisting patients with beneficial therapies, administering medication, assessing patients.

Assessing the Spatial Distribution of Red Knots within the Delaware Bay at Low Tide

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Red Knots utilize exposed mudflats at low tide? This is an important question worth answering since these intertidal mudflats are targeted by the aquaculture industry for shellfish production. This assessment will be done in two phases. The first phase: understanding the Red Knot behavior at high tide. The second phase: analyzing data retrieved from nano-tags and radio towers.

Solvent Reactions of Electron-Donating Chloroformates and Carbonyl Tosylates

Dionne Williams

Mentor: Dr. Malcolm J. D'Souza

Chloroformate esters are used to study substitution reactions and serve as stable intermediates. Chloroformates are beneficial in environmental science because of their ability to be recycled to create new chemicals. This project primarily focuses on the reaction rates of 4-methoxyphenyl chloroformate and 4-methoxyphenyloxy carbonyl tosylate in various pure and mixed aqueous solvents. We will compare and contrast the reaction rates between the two compounds, and determine whether the leaving group has an effect on the reaction mechanism. The reaction rates obtained in this project will be compared to previously published kinetic rate data for 4-methoxyphenyl chloroformate.

In this study, the reaction rates will be measured using an acid-base titration method. A solution of sodium methoxide (sodium methylate) is used as the volumetric base solution. The position of the equilibrium in the reaction can be visually followed as lacmoid is used as the indicator solution.

Salmonella and Campylobacter Presence in Meats

Kirsten Ward

Mentor: Professor Jonathan Kidd

Salmonella and *Campylobacter* are the most common causes of food borne illness worldwide. Commercial poultry meats are the main vehicles of transmission for these organisms. The risk of these bacteria being transmitted to humans depends on control measures and practices used in the production and preparation of poultry meats for marketing and consumption. Data concerning the prevalence of contamination with multiple food borne pathogens in retail meats in the United States is rare. This study is to determine whether *Campylobacter* and *Salmonella* are present in meats collected from a local retail market.

Promo MGMT

William Crockett

Mentor: Dr. Yu Tian

Retailers often run specials and promotions to drive sales or move unpopular inventory. Often, headquarters send large boxes full of signage for the stores' employees to place in front of the original price labels. The signage is printed on heavy stock paper with colorful ads showing the retail price and the sales price along with descriptions of the promotions. Corporate does so without checking inventory at the store level but they send every store all the signage. In reality, many stores do not carry many of the sale items. The many man-hours spent on creating, the printing and shipping, sorting and discarding signage add significant cost to the operations.

This study intends to find an efficient and effective solution (electronic pricing and promotional system) and provide cost-benefit analysis. Retailers can easily recover the significant up-front cost with reduced man-hours, low wasted supplies, and accurate price/promotion management.

Senior Media Project: The Ben Knapp Story

Brian Baker

Mentor: Professor Ron Douglas

The project is a documentary film about Ben Knapp and the Knapp family. Ben had a heart attack 3 years ago and was left physically impaired. The documentary explains what happened to Ben and how Ben is recovering now, as well as how the family has dealt with the abrupt change in their lives.

Reservoir Analysis of Lyme Disease

Devin Price

Mentor: Dr. Kathleen Curran

Lyme disease is one of the most commonly reported vector-borne diseases in the U.S. today. Transmission requires that susceptible hosts come into contact with infected hosts, vectors, or reservoirs. Unfortunately our growing proximity to infected vectors tick *Ixodes scapularis* and infected mouse hosts *Peromyscus leucopus* has placed humans at a higher risk of infection. In this study, seasonal climate changes affecting habitat composition will be assessed using fluorescent powder tracking of *P.leucopus* in a residential area. Because they are a dominant host reservoir for Lyme disease, resulting variations in habitat and path selection behavior can provide crucial insight as to where encounters with infected vector tick occur. Factors that affect frequencies of host-vector encounters can be used to predict high occurrences on a spatiotemporal scale in areas that humans are most likely to become infected- in their own backyard.

Trends in the Polar Ice Caps

Brittany Kowalewski

Mentor: Dr. Derald Wentzien

This research wields the application of Mathematical concepts of summation and software coding, along with geographical information systems software, ArcGIS, to approximate northern sea ice extent calculations and determine whether sea ice has been overall decreasing. Essentially, the data is imported into ArcGIS to be used in two selected methods for calculating how extent and trends are identified in terms size of the ice increases and decreases during its minimum period in September and maximum period in March. It is ultimately shown that sea ice is gradually decreasing although there are periods of fluctuation.

Comparison of Two Methods of Estimating Body Fat

Brynae Goodley

Mentor: Dr. Lynn Everett

According to the Centers for Disease Control and Prevention, more than one third (34.9%) of the U.S. adult population is classified as obese and overweight (1). The determination of a person's body fat percentage can be calculated using many different methods. The problem lies in determining which method is the most accurate. The main focus of this investigation is to determine the correlation between two methods of estimating body fat percentage. The height and weight of Wesley College's Anatomy and Physiology II students will be used to determine their body mass index. Skinfold thickness measurements will also be taken from this same pool of subjects. Body fat estimates can then be made using standardized tables for each method. All measurements will be collected between March and April of 2015. The data collected from the research will be interpreted using hypothesis testing.

Alternative Pedagogies and Outcomes for African American Students in Higher Education

Morgan Williams

Mentor: Dr. Jessica James

The purpose of the research is to identify the state of African Americans in Higher Education and to address the educational achievement gaps between them and their cohorts. Although the gap has decreased over the years, it is still a quite prevalent issue. This study provides a profile of African Americans through enrollment rates, graduation rates, college readiness, and the factors that might affect college readiness such as their socioeconomic background and previous school curricula. The study will compare Predominately White Institutions (PWIs) vs. Historically Black Colleges and Universities (HBCUs) and highlight the positives and negatives of each type of institution in an effort to understand the success or failure of African Americans on these campuses. Not only will this study examine national trends, it will also compare Wesley College's acceptance rates, enrollment rates, and graduation rates based on racial demographics.

Upland Forest Buffer Losses due to Inundation Caused by Sea Level Rise in the Upper and Lower Sub-Watersheds of the Broadkill River

Kyle Frame

Mentor: Dr. Stephanie Stotts

Riparian buffer zones improve water quality by filtering and reducing nutrients that run off of adjacent properties. These important barriers are threatened in the Broadkill River Watershed by inundation from sea level rise and infringement by development, especially where buffer regulations are weak. Using Geographical Information Systems software, 2012 aerial imagery, buffers were digitized and overlaid with Bathtub Model Sea Level Rise (SLR) scenarios of 0.5 meters, 1.0 meter, and 1.5 meters to calculate the geometric acreage of riparian forest inundation extent for both the Lower and Upper Broadkill River sub-watersheds. With a build out condition and the existing 50 foot buffer, up to 64.13% of the non-protected forested riparian area in the 2 watersheds could be inundated at 0.5 meters sea level rise; 82.53% at 1 meter and 91.51% at 1.5 meters. A recommendation for an appropriate buffer would be 45.72 meters (150 feet).

Decoding Gender Identities in Commercial Advertisements

Marlon S. McNeill

Mentor: Professor Victor Greto

Decoding Gender Identities in Commercial Advertisements will be a presentation that engages the audience and applies academic and cultural terms while deciphering two different advertisements. The purpose of this presentation is to inform and raise awareness about the subliminal messages that lie hidden in everyday ads, which appear to be normal to the naked eye. By the end of the presentation the audience will be able to take these terms with them and apply them to media representations they encounter daily, and quite possibly never look at an "innocent" advertisement the same way again.

The Impact of Title VIII Funding on the Nursing Shortage

Sharon Yeager- Bilbrough, Jennifer Zimmerman, Aja Terry, Marjorie Berna, Brandi Patterson, Christine Mogire

Mentor: Dr. Denise Morris

Title VIII Funding, also known as the Nurse Workforce Development Program, is a resource provided through the Health Resources and Services Administration which invests 230 million dollars in nursing education annually.

This program provides grants for entry level nursing education as well as educational advancement for experienced nurses. Further, the act supports nursing faculty and schools with program development.

In addition to the expansion of nursing education, the community benefits from this funding through the promotion of nurses into advanced practice roles, service for underserved communities, and support for minority students.

Research methods used were systematic literature review, and a cause and effect analysis examining the impact of funding upon the nursing shortage. Results of this process indicate that continuation of funding for the Nurse Workforce Development Program will positively impact access to healthcare for the unserved and underserved communities within the United States.

Integrative Undergraduate Biological Chemistry Program Includes the use of Informatics Tools, GIS and SAS Software Applications. Project-Based American Obesity Case Study Using GIS Maps and SAS Software

Catherine Gross, Jasbir Deol, Alora Wilson, Dr. Frank Fiedler, Dr. Kent Hurst, and Dr. Richard J. Kashmar

Mentor: Dr. Malcolm J. D'Souza

The new pandemic in the United States is obesity. Open-sourced georeferenced census, health and health disparity data were coupled with GIS (Geographical Information System) and SAS (Statistical Analysis System) tools, in a public health surveillance system project, based on US county zip-codes, to develop use-cases for chronic adult obesity where income, poverty status, health insurance coverage, education, and age were categorical variables. Across the 48 contiguous states, obesity rates are found to be directly proportional to high poverty and inversely proportional to median income and educational achievement. For the State of Delaware, age and educational attainment were found to be limiting obesity risk-factors in its adult population. Furthermore, the 2004-2010 obesity trends showed that for two of the less densely populated Delaware counties; Sussex and Kent, the rates of adult obesity were found to be progressing at much higher proportions when compared to the national average.

Studying Reactivity and Leaving Group Effects in Aryl Chloroformate Esters

Ariel Bilbrough, Dionne Williams

Mentor: Dr. Malcolm J. D'Souza

Chloroformate esters are used to study substitution reactions and serve as stable intermediates in chemical synthesis. This project focuses on the reaction rates of 4-methoxyphenyl chloroformate (4-MeOPhOCOCl) and 4-methoxyphenyl *p*-toluenesulfonate (4-MeOPhOCOOTS). 4-MeOPhOCOCl is beneficial in environmental science because of its ability to be recycled to create new chemicals.

Equimolar amounts of analytical grade 4-methoxyphenyl chloroformate and silver *p*-toluenesulfonate were allowed to react at room temperature. The silver chloride quickly precipitated out and the resultant (filtrate) 4-methoxyphenyl *p*-toluenesulfonate solution was used as a substrate. The solvolysis of 4-MeOPhOCOCl and 4-MeOPhOCOOTS were followed in ethanol (EtOH), methanol (MeOH) acetone, 2,2,2-trifluoroethanol (TFE), 1,1,1,3,3,3-hexafluoro-2-propanol (HFIP), and in TFE-EtOH mixtures. This study was completed at 25.0 °C using the acid-base titration method. Here we show that the leaving group has no significant effect.

Implementation of the SAS Program in Analyzing Water Quality Data

Laura Malinowski, Kyle Gillespie, Victor DeBarros

Mentor: Dr. Frank Fiedler

This presentation will show how SAS can be integral in undergraduate research at Wesley College. Using water quality data from the Delaware National Estuarine Research Reserve's (DNERR) Division Street site on the St. Jones River, we will explain the steps necessary to manage, analyze, and present data sets using SAS. We will display the correlation between dissolved oxygen and temperature over the course of a year and a side-by-side comparison of dissolved oxygen for two seasonally distinct months. The resulting analysis may be the starting point for a hypothesis test in undergraduate research.

First-Generation Students and Their Success at Wesley College Through the Writing and Tutoring Center

Elizabeth Ostermann

Mentor: Christine McDermott and Jessica Pilewski

First-generation college students are an emerging and unique population of students that are often underserved due to their lack of guidance and knowledge regarding college-level resources. Wesley College is considered a Minority Serving Institution where there exist a large percentage of first-generation college students. One method of serving the first-generation community at the college-level is through the use of peer tutoring which can be highly effective at reinforcing course material and helping students develop the study skills needed to be a successful college student. Peer tutoring is a valuable service offered by numerous colleges and universities; specifically Wesley College, and is included in the student's tuition costs to attend the college. This research focuses on the impacts of peer tutoring in terms of the academic gains and attitudes experienced by first-generation students at Wesley College.

Kinetics and Mechanism of Cyclohexyl Chloroformate

Laura Malinowski, Catherine Gross

Mentor: Dr. Malcolm J. D'Souza

Cyclohexyl chloroformate is known to explode if heated. It decomposes into CO₂ and cyclohexyl chloride at temperatures slightly above room temperature.

Because of convenient rates of reaction at temperatures close to ambient, the specific rates of solvolysis of cyclohexyl chloroformate are analyzed using the extended Grunwald-Winstein equation. Previous research from this laboratory has shown that isopropyl chloroformate solvolyses via a dominant addition-elimination channel and only in the more ionizing and least nucleophilic solvents does the principal reaction channel involve an ionization-fragmentation process. Hence, it will be of interest to see if cyclohexyl chloroformate, a secondary chloroformate, also follows similar pathways.

Using SAS to Analyze Water Data
Catherine Gross, Jasbir Deol,
Tyler Dominiak
Mentor: Dr. Frank Fiedler

In this expository presentation, we will show how SAS can be an integral part of undergraduate research at Wesley College. We use water quality data from the Delaware National Estuarine Research Reserve's Division Street and Scotton Landing sites along the St. Jones River to explain the steps necessary to manage, analyze, and present data using SAS. In particular, we display the correlation between water level and dissolved oxygen at 6:00 a.m. at these two sites for a year. Since one site is fresh water whereas the other is brackish, the resulting analysis may be the starting point for a hypothesis test in undergraduate research.

'Frere Jacques', A New Perspective
Emily Overlander, Sharnice Wallace
Mentor: Professor MaryJo Benson

In everyday life you use trigonometric equations by simply using your smart phone. The sound produced by touching each button on a touch-tone phone is described by the equation: $y = \sin 2\pi lt + \sin 2\pi ht$, where l and h are the low and high frequencies. When you press each number on your cell phone, it produces a sound that emits both a high and low frequency. Using the sum of sines and product of sines and cosines, we are going to determine the specific sound each number in the phone sequence for the song Frere Jacques produces. The touch tone phone sequence is: 4564, 4564, 69#, 69#, ##964, ##964, 414, 414. We will be graphing the equation which corresponds to each number in the song sequence.

Selecting a Methodology to Estimate the Missing Values from a Times Series Data Set that Measures the Extent of the Northern Polar Ice Cap

Riza Bautista
Mentor: Dr. Derald Wentzien

This research analyzed different methodologies to estimate missing values from a time series data set. A data set containing the daily extent of the northern polar ice cap contained missing values during a 10-day period in September 2002 when the extent of the ice would be at its maximum. Interpolating polynomials, mean substitution, and imputation through the SPSS software methodologies were analyzed to determine which would provide the lowest Mean Absolute Deviation (MAD) for the missing values in the data set. A 3rd degree polynomial yielded the lowest MAD, 43605.8, and was used to estimate the maximum extent of the ice.

Egg Color, Size and Spacing

Salma Binateeq, Jessica Collins, Rachael Kery, Samantha Weber, Karri-Jo Walls

Mentor: Dr. Kathleen L. Curran

In this experiment we are attempting to determine the effect of color, size, and spacing on the survival rate of the eggs of ground nesting birds in the wild. Chicken eggs will be used since they are readily available. Half will be dyed brown to simulate camouflage, and all will be sprayed with preservative so that their scent will be uniform. The eggs will then be placed in a grid pattern in Blackstone Wildlife area 1 meter apart observed daily to determine what happens to them. Based on previous studies, we hypothesized that eggs that are white in color are more susceptible to predators than eggs that are brown. In addition, it is more likely that larger eggs will be removed more quickly by the predators than smaller ones.

The Effect of Riparian Buffers on Water Quality

David Payne

Mentor: Dr. Stephanie Stotts

Riparian buffers consist of dense trees and shrubs that border waterways and act as a natural filter of excess nutrients (e.g., nitrogen and phosphorus) that runoff from surrounding land. The filtration function of riparian buffers is important because it helps to prevent hypoxic zones where fish and submerged aquatic vegetation (SAV) cannot thrive due to diminished oxygen. The goal of this study is to investigate the impact of riparian buffer zones on water quality in Delaware by comparing phosphorus, nitrate, temperature, and dissolved oxygen between fifteen sites with and fifteen sites without riparian buffers. Preliminary results indicate that there is a significant difference in nitrate levels and dissolved oxygen between study sites with and without buffers. Phosphorus as well as temperature did not show significant differences.

Confirming the Use of Phenyl Chloroformate as an Appropriate Addition-Elimination Standard in LFER Analyses

Jasbir Deol

Mentor: Dr. Malcolm J. D'Souza

Two decades ago, phenyl chloroformate (PhOCOCl) was extensively studied 49 solvent mixtures and an addition-elimination mechanism was proposed. Since then, it has served as a reference compound in linear free energy relationship studies (LFERs). The principal goal of the project is to determine the presence or absence of any correlation trends between the rates of reaction (energy barriers) observed and the differences in anionic leaving group abilities. The synthetic analog, PhOCOOTs, was synthesized from equimolar additions of silver tosylate to PhOCOCl. The specific rates of reactions were determined by acid-base titrations and conductometry. The specific rates of PhOCOOTs in a wide range of solvents were found to be very similar to those observed for PhOCOCl. We therefore conclude that the mechanism of reaction of PhOCOOTs is

exactly the same as PhOCOCl, and hence, it is very appropriate to continue to use PhOCOCl as a standard for A-E reactions.

The Burden of Hypertension and Heart Disease among African-Americans

Anumeet Cheema

Mentor: Dr. Robert Contino

The focus of this capstone research project is to investigate whether an education offering for African-American College Students on the risk factor for coronary heart disease (CHD) would be effective in helping them understand these risks and establish healthy heart habits. According to the Delaware Health Tracker, between the years 2007- 2011 there were 192 coronary heart disease deaths per 100,000 population in African-Americans vs. 170.8 in Caucasians. Additionally, previous research has identified young adults with some college education to be demonstrating the most rapid increase in the prevalence of being overweight, a major risk factor for CHD . A convenience sample of eighteen African-American Wesley College students between the ages of 18- 26 were recruited through advertisement. Participants will be asked to attend a one hour teaching session to be held at the college. A pre and post-test, and a course evaluation survey will be used to determine effectiveness of intervention. This study is currently in progress, and will be completed in the first week of April 2015.

Kinetic Study of Alcohol Dehydrogenase

Maryeah Pavey

Mentor: Professor Jonathan Kidd

The reason that beer contains alcohol is because of a biochemical process called fermentation, which converts glucose into ethanol and carbon dioxide. This process is done in part by an enzyme alcohol dehydrogenase. There are four different kinds of yeast being studied in this kinetic study. By characterizing ADH it will help to show the rate that ethanol and carbon dioxide are being made by ADH. Knowing the different kinetic rates of ADH will help to allow for a comparison of the different yeast that are used to make different beers.

Wetland Values of the Restored Wetlands in the Blackiston Wildlife Area

John Dougherty

Mentor: Dr. Stephanie Stotts

When studying non-tidal, freshwater wetlands, a value is given to each wetland based on a variety of parameters. With the help of the Delaware Rapid Assessment Procedure v6.0 (DERAP) and Geographic Information Systems (GIS), the condition and efficacy of a wetland can be determined. Using Delaware's Department of Natural Resources and Environmental Control's "Guidance for Rating Wetland Values in Delaware" and DERAP, wetland value scores

were found for 4 restored wetlands. Study wetlands were selected because they were restored at the same time with different approaches (planting and natural vegetation). Preliminary scoring indicates that the 4 wetlands examined are in the rich value category with a score above 45. These results provide evidence that planting during wetland restoration does not produce a more valuable wetland.

Horseshoe Crabs and Climate Change

Erin Wilson

Mentor: Dr. Kent Hurst

Horseshoe crabs are important to the Delaware Bay estuary for many ecological and socio-economical reasons. Therefore, the longevity of the horseshoe crab population is crucial. However, they come to spawn in an environmentally sensitive area, especially with the onset of global climate change. Changes in ocean chemistry such as temperature, salinity, and dissolved oxygen may impact the environment in which the eggs develop and hatch. This makes it important to determine how climate change may affect the horseshoe crabs and adapt management strategies accordingly. My research has consisted of extensive literature review thus far, however this spring I hope to raise horseshoe crabs from hatchlings under different environmental conditions to assess the impact that the changing environment may have on growth, development, and survival.

Concurrent Malaria and Dengue Infections

Rachel Hausler, Kirsten Ward

Mentor: Professor Jonathan Kidd

Dengue fever and malaria are prevalent mosquito-borne illnesses in the world. Both diseases are similar, even though dengue is viral and malaria caused by a protozoan. Each disease comes from a different species of mosquito however concurrent infection in a patient is possible. A concurrent infection occurs when a patient has both diseases at the same time. Cases of malaria and dengue co-infection are rare. Concurrent infection of malaria and dengue has shown to cause no increased severity of either disease. This is an informational poster on the co-infections of dengue and malaria compiled from previous studies.

Digital Photography 2015

Lily Engel

Mentor: Professor Ron Douglas

These photos explore space, time, and the aesthetic use of color. Lily Engel's work leads a viewer to question what might happen next or how did the subject come to occupy the limited space of the photo. Mark Mattern accentuates the intensity of the moment by capturing a fraction of a second not possible to analyze with the human eye. The photos transform moments into questions and focus attention on what might pass without further notice.

Members: Wesley College Choir

Emily Bentz Joy Gordy-Stith
 Elizabeth Hazlett Dr. Bill Kroen
 Lanea Lawrence Jacob Sasso
 Marissa Richardson Sara O'Neill
 Teledalase Ogundipe

Members: Wesley College Symphonic Band

Yamir Alicea-Rivera Katheleen Cene
 Alexa Cherico Milaine Desir
 Aric Dryda Allainna-Caitlyn Earl
 Leah Lowry Esmeralda Elsakhawy
 Elisabeth Genetti Aubrey Krabill
 Sarah Lynch Crystal Meredith
 Nicole Munz Eugene Nelson
 Nicholas Oakley Jose Santana
 Valrie Shorter Alexis Waugh

Members: Wesley Jazz Band

Yamir Alicea- Rivera, Drums
 Kathleen Cene, Saxophone
 Alexa Cherico, Clarinet
 Esmeralda N. Elsakhawy, Clarinet
 Alexis Melancon, Trumpet, Clarinet
 Rayna Monroe, Viola
 Eugene Nelson, Drums, Piano
 Nicholas Oakley, Saxophone
 John Shaver, Guitar

Members: Wesley Gospel Choir

Shaylynn Bivens JaiRonna Boskett
 Devante Ford Nicole Frasier
 Jelynn Frisby Elizabeth Hazlett
 Destiny Hollis Ann Louty
 Breanne Smith Shantae Taylor

Mentors

Barbara Abbott	Kathleen Curran	Brian Cass	Lynn Everett
Malcolm D'Souza	Frank Fiedler	Ron Douglas	Victor Greto
Jessica James	William Kroen	David Laganella	James Wilson
Agashi Nwogbaga	Stephanie Stotts	Derald Wentzien	Yu Tian
Jessica Pilewski	Denise Morris	Jonathan Kidd	Kent Hurst
Karen Panuto	Robert Contino	Mary Jo Benson	Darla Davidson
Julie Fisher	Christine McDermott		

Moderators

Victor Greto	Yu Tian
Jessica James	Frank Fiedler
Julie Fisher	Paul Olsen
Karen House	Shari Tenner
Jeffrey Gibson	James Wilson

Assessors

Angela D'Antonio	Elaine Guertler
Jack Barnhardt	Cynthia Newton
Jill Cole	Susan Bobby
Saharat Pongsree	Dianitza Runser
David Laganella	Jeffrey Gibson

Volunteers

Krystle Boyd	Olivia Wallace	Frank Fiorella	Markita Jones
Shatiera Moore	Jana Dean	Lorrie Bunker-Foy	Stacie Blair
Stephanie Malakuskie	Kezia Ince	Devin Mackay	Jaironna Boskett
Quiana Nixon	Chelsie Rogers	Yaa Yamoah	Francis Quartey
Nicole Evanko	Blake Roberts	Da'neara Henry	Adeline Cheyson
Lauren Gray	Tiffany Ayisi	Mark Stinsman	Elizabeth Moyna
Jennifer Carey	Alexis Branca	Kimberly Jefferson	Mouad Bekka
Natalie Trujillo	Chomin Dalton	David Werner	Valerie Bucior
Rachael Robinette	Lena Kinzinger	Kaitlin Brennan	Melissa Zerra
Alysia Welsh	Elvie Domond	Rodneisha Scott	Lynn Baglin
Joe Gordon			

Special Thanks

April Mahoney	Kris McGlothlin	Tina Heesh-Mosley	Gregg Potts
Malcolm D'Souza	Patricia Dwyer	Emily Woods	Cynthia Newton
Wesley College SGA	Louise Major	Paul Kempf	Jessica Cook
Nancy McCoury	Abdul Hameed		

Scholars Day Committee

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Scholars Day is sponsored in part by the DE-INBRE and the DE-EPSCoR grants

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