

# Scholars Day

Wesley College  
Dover, Delaware



April 18, 2013

## 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 – 1:20

Keynote Address: Mark A. Rossi  
Vice President, Sales and Marketing  
Dover Motorsports, Inc.

Session I

1:25-2:10

Musical Performances

Oral Presentations

Session II

2:15-3:00

Oral Presentations

Poster Presentations

Session III

3:05-3:50

Oral Presentations

Session IV

3:55-4:40

Oral Presentations

4:45-5:15

Reception & Ceremony

Musical Performances in Wells Auditorium (Slaybaugh Hall 107),

Oral Presentations in Wells Auditorium (Slaybaugh Hall 107),

Slaybaugh Hall 104, Cannon Hall 7 (Kresge Auditorium),

Cannon Hall 110, and Parker Library 211

Poster Presentations

College Center Lobby & DuPont Gallery

Reception & Ceremony in College Center 206

**Musical Performances: Session I**

**1:25 – 2:10**

**Wells Auditorium (Slaybaugh Hall 107)**

**Moderator: David Laganella**

**Assessor: Susan Bobby**

*Wesley Gospel Choir; Director: Karla Jones*  
*Wesley Concert Choir; Director: James Wilson*

*Wesley Wind Symphony*  
Brian Cass, Conductor

**Oral Presentations: Session I**

**1:25-2:10**

**Panel 1: Cannon Hall 110**

**Moderator: William Kroen**

**Assessor: Lynn Everett**

*The Benefits of Cardiovascular Rehabilitation*  
Jordan Gendrachi

*Athletics and Academics in a Division I University*  
Timothy Putman

**Panel 2: Cannon Hall 7 (Kresge Auditorium)**

**Moderator: Stephanie Holyfield**

**Assessor: Brantley Craig**

*Living under the Drone*  
Brandon Reynolds

*The Housing Bubble: Explanatory Variables of Housing Prices*  
David Gorski

**Panel 3: Parker Library 211**

**Moderator: Susanne Fox**

**Assessor: Thomas Sturgis**

*Rome, Florence, and Venice: Italy's Diverse History and Culture*  
Alex Dello Buono and Brian David

*In Search of Irish Music*  
Taylor Jackson

**Oral Presentations: Session II**  
**2:15-3:00**

**Panel 1: Wells Auditorium (Slaybaugh Hall 107)**  
**Moderator: Ann Rogge**  
**Assessor: Jessica James**

*Restorative Justice*  
Lorrie Foy

*The Use of African-American Vernacular English in Zora Neal Hurston's*  
*Their Eyes Were Watching God*  
Bianca Bailey

**Panel 2: Slaybaugh Hall 104**  
**Moderator: Victor Greto**  
**Assessor: Marilyn Johnson**

*Robotic Technology and the Global Society*  
Azure Johnson

*Suicide Prevention: Needs Assessment*  
Shanna Bryant

**Panel 3: Cannon Hall 110**  
**Moderator: Rebecca Benson**  
**Assessor: Steven Groccia**

*Athlete's Opinion: Free Body Weight vs. Fixed Machine*  
Robert Biggs

*Calculating the Guggenheim Equation for First-Order Relations using Maple*  
Kyle Gillespie

**Panel 4: Cannon Hall 7 (Kresge Auditorium)**

**Moderator: Julie Fisher**

**Assessor: Frank Fiedler**

*Will You Retire Happy?*

Devon Bartell, Kiana Long, Byshi Watson, Tracey Walsh,  
Lindsey Dimuzio, Jarrett Williams Omega Dabale, and Sean Hopkins

*To Eat or Not to Eat?: A Study of Consumer Dine-Out Decisions and  
Restaurant Promotion Strategies*

Travis Alano

**Panel 5: Parker Library 211**

**Moderator: Susanne Fox**

**Assessor: Charlisa Edelin**

*Paris and Bruges: A Comparison of History and Culture*

Isnara St. Phard and Nicole Oyola

*History Department Museum Studies Exhibits*

Celeste Montgomery

**Poster Presentations**

**2:15-3:00 p.m.**

**College Center Lobby & DuPont Gallery**

*Approximating Unknown Masses of Asteroids by using Calculus*

Kasey Thompson

*Solvolytic Rate Study of Vinyl and Allyl Choloformate*

Aaron Givens

*Mechanism of Reaction for 5-Methylfuran-2-Carbonyl Chloride*

Ashley Harmon

*Employing Linear Free Energy Relationships (LFERs) to Deduce Solvolytic  
Reaction Mechanisms*

Maryeah Pavey and Jasbir Deol

*Perceptions which Differentiate*  
Khawaja Abdul Hameed

*Pesticides Database*  
Benjamin Barile and Aaron Givens

*Differentiating Electronic Effects in Substituted Aryl Chlorothionoformate Esters*  
Brett Sansbury

*Territoriality and Dominance Behavior in the Siamese Fighting Fish*  
Shannon Perry, OsShan Chapman, Amanda Hudson, and Amber Wiltbank

*The Effect of Agriculture and Forest Land Use on Soil Quality*  
Taylor Hendricks

*Feasibility Study of Residential Wind Power*  
Jessica Small

*How the Barbados Economy can Bounce Back*  
Shane Jacobs

*Effects of Sensory Overload and Sleep Deprivation on Patients in Intensive Care:  
A Synthesis of Current Research*  
Megan Varga

*Effectiveness of MA099 as a Prerequisite Course*  
Khwaja Abduhl Hameed

*Human Pheromones: Can Reproductive Status be Determined by Scent Alone?*  
Rachel Hausler, Jason Forges, Kiah Goodison, Amber Miller,  
Devin Price, Kristen Ward, and Jonie Woodard

*Relationship between College Students' GPA, Family Constellation, Self-Efficacy,  
Conscientiousness, and Grit Survey Scores*  
Chris Fucetola and Carissa Gilligan

*Coaching Certification as a Requirement for High School Coaches in Delaware*  
Morgan Rupp

*Involving the Community in Chemistry*  
Victor DeBarros and Maryeah Pavey

*Insights into the Solvolytic Mechanism of  $\alpha$ -Chloro-2 (trifluoromethyl)  
Benzyl Chloroformate*  
Catherine Gross and Kaylee Miller

*Comparative Study of Hairy Vetch (*vicia villosa*) and Alfalfa (*medicago sativa*)  
Under Salinity Effects and the Characterization of the PvLEA3 Gene*  
Amber Wiltbank and Michael Butler

*Nest-Box Site Preference in Eastern Screech-Owls:  
Forested vs. Non-Forested Areas*  
Olivia Hampton

*Quantifying Nutrient and Sediment TMDLs of a Residential Development Proposal*  
Melissa Savin

*A Feasibility Study on the Use of Geothermal Energy  
for Residential Homes in the Eastern United States*  
Ashley George

*Cultural Differences and Similarities between America and Barbados*  
Charminta Brown

*Coping Strategies that Positively Affect Type 1 Diabetes Management  
in the Adolescent Population: A Literature Review*  
Samantha Weiss

*Chronic Obstructive Pulmonary Disease (COPD) Education*  
Jonell Garrett and Carol Smith

*A Comparative Analysis of Acid-Base vs. Conductimetric Titrations*  
Olivia Hampton

*Solvolytic Reaction of Diallyl Carbamyl Chloride*  
Victor DeBarros and Kyle Gillespie

*An Insight into Glycogen Synthase Kinase 3 Beta's (GSK-3 $\beta$ )  
Network of Protein Substrates using Protein Ontology and Text-Mining Resources*

Gabriel Alejandro Fernandez Bueno

*United States and Barbados Differences in Business Practices*

Philip Cooper and Lance Toomer

**Oral Presentations: Session III**

**3:05-3:50**

**Panel 1: Wells Auditorium (Slaybaugh Hall 107)**

**Moderator: Jeffrey Gibson**

**Assessor: Paul Olsen**

*The Beauty System*

Megan Condon

*The Nature of Reality*

Tristin Buris

**Panel 2: Slaybaugh Hall 104**

**Moderator: Kraiwinee Bunyaratavej**

**Assessor: Jeffrey Mask**

*Publishing Under Fire*

Melissa Boyd

*Invasive Pacific Lionfish in Barbados*

Shannon Perry

**Panel 3: Cannon Hall 110**

**Moderator: Malcolm D'Souza**

**Assessor: Harry Maxson**

*Eating Habits among College Students*

Karri-Jo Walls

*The Effect of Hunting on Population Dynamics of Delaware Wild Turkeys*

Ashley Harmon

**Panel 4: Cannon Hall 7 (Kresge Auditorium)**

**Moderator: Yu Tian**



**Assessor: Sarahat Pongshree**

*Marketing Strategy of a Small Business in a Declining Industry*  
Taylor Broomall

*Exposure and Awareness: Promotional Strategies for Startup Fashion Designers*  
Omega Peter Dabale, Jason Chen, Byshi S. Watson, and Danielle Anthony

**Panel 5: Parker Library 211**

**Moderator: Susanne Fox**

**Assessor: Patricia Sherblom**

*George Washington and the French and Indian War*  
Brian Blomgren

**Oral Presentations: Session IV**

**3:55-4:40**

**Panel 1: Wells Auditorium (Slaybaugh Hall 107)**

**Moderator: James Wilson**

**Assessor: Agashi Nwogbaga**

*Music and Visual Art of the Renaissance*  
Julianne Morris

*Music Composition and Technology*  
Marissa Richardson

**Panel 2: Slaybaugh Hall 104**

**Moderator: William Kroen**

**Assessor: Elizabeth Siemanowski**

*Food Security in Urban Areas*  
LeRoy Demarest and Courtney Kozar

**Panel 3: Cannon Hall 110**

**Moderator: Malcolm D'Souza**

**Assessor: Cynthia Newton**

*Interdisciplinary Analysis of Microorganisms*

*Inhabiting Bodies of Water in Delaware*  
Brett Sansbury

*Enzyme Kinetic Comparison between Brewer's and Commercial Yeast Strains*  
Gabriel Alejandro Fernandez-Bueno

**Panel 4: Cannon Hall 7 (Kresge Auditorium)**  
**Moderator: Jill Winnington**  
**Assessor: Angela D'Antonio**

*Through their Eyes: A Look into the World of Autism*  
Lauren and Jennifer DeVore

## **How “The Great Recession” Affected the Barbados Economy**

**Shane Jacobs**

**Mentor: Kraiwinee Bunyaratavej**

This poster is about how “The Great Recession” in the U.S. affected the Barbados economy. The Barbados economy relies heavily on tourism. Due to the recent economic recession in the U.S., the number of tourists had decreased and consequently affected the Barbados economy. The poster will also explore how the unemployment rate was affected. Based upon the trip to Barbados and the visit to the Barbados Central Bank, in particular, I will show how the government and the central bank can improve the economy. The four focus areas are energy, tourism, manufacturing, and foreign investors. Barbados has made a strong push for entrepreneurship on the Island so that more people can conduct business and have a better lifestyle.

## **A Feasibility Study on the Use of Geothermal Energy for Residential Homes in the Eastern United States**

**Ashley George**

**Mentors: Bruce Allison and Jeffrey Mask**

We live in a world that we believe to be unlimited in fossil fuel resources. However, this is not the case, and a shift to renewable forms of energy will be necessary. A renewable form of energy suitable for residential buildings, geothermal, can be used for cooling and heating, but may not be a fit for all areas in the United States. The objective of this study was to determine the feasibility of using geothermal energy compared to traditional heating and cooling methods currently used in residential areas along the east coast. Three sites were selected for this project, Maine, eastern Pennsylvania and central Florida. Current forms of heating and cooling for the three selected sites were determined. Typical energy costs were determined and then compared to a geothermal system. Using geothermal energy was feasible in residential areas along the east coast and provided savings of 28% to 36%. Geothermal energy can provide a cleaner and more sustainable environment for current and future generations.

## **Human Pheromones: Can Reproductive Status be Determined by Scent Alone**

**Rachel Hausler, Jason Forges, Kiah Goodison,**

**Amber Miller, Devin Price, Kristen Ward, Jonie Woodard**

**Mentor: Kathleen Curran**

Pheromones are used by many animals, including humans, to communicate information and/or initiate a change in physiology in members of the same species. Pheromones have been isolated that are used in mate attraction, territorial marking, alarm, and communicating food location. In this experiment we will look at the relationship between gender and attractiveness of odors in humans using a variant of the classical t-shirt experiments. We will test the hypothesis that males will be able to discriminate between females that are capable of bearing offspring and those that are not based on odor by asking them to rate odors impregnated in the fabric of t-shirts worn by test subjects. Post-menopausal females should be less attractive than college aged women. Since reproductive status would not be important to other females our second hypothesis is that females will thus not be able to discriminate between different aged women based on odor alone.

**Composition for Film**  
**Marissa Richardson**  
**Mentor: David Laganella**

This presentation will discuss the process of composing for film, and will also include a world premier viewing of a short film with an entirely original musical score. The technology used in this particular project will be covered briefly, but the focus will be on creating music to fit and enhance the film, through found audio and original music and sound effects. I will describe the construction of the score from start to finish, explaining my choices in trying to achieve an effective film score, including the development of an overall theme, choice of instruments in creating contrasting musical textures and special effects enhancements. Also discussed will be the composition process of specific sections of the film and the differences in carefully planning a sequence in advance, versus a more spontaneous approach. The presentation will conclude with a viewing of the completed project.

**Through their Eyes: A Look into the World of Autism**  
**Lauren and Jennifer DeVore**  
**Mentor: Linda DeRoche**

The maltreatment of autistic children within the public school system is a rising problem in contemporary American society. In today's overly judgmental world, it has become easy for individuals to place negative stereotypes on those with special needs. However, a preventative measure is provided by educating individuals about what autism is. In order to demonstrate the relationship between society's misunderstanding about what autism is, and the need for awareness, we surveyed fifty Wesley College students. Although 82 percent of individuals claimed they were familiar with what autism is, 52 percent of students chose incorrectly when given a series of three seemingly plausible definitions of what autism is. In a side-by-side picture test, 40% of students mistook a child with mental retardation to that of an autistic child. Surprisingly, 28% of students have witnessed an individual with autism being abused, and 12% of these incidents occurred in a school setting. This information concludes that several individuals are still misinformed as to what autism is. The objective of this project is to spread awareness about the growing prevalence of the abuse of autistic children within the public school system, and how through education and inclusion, understanding can be achieved. Our hope is that through this project, we are able to educate others about what autism is and that through education we are able to foster a more compassionate society that celebrates differences, rather than degrades them.

**George Washington and the French and Indian War**  
**Brian Blomgren**  
**Mentor: Thomas Sturgis**

In an oral presentation, I will analyze and discuss George Washington's role in the French and Indian War and how it prepared him for future endeavors. More specifically, I will present a brief background of Washington's early childhood and an in depth account of his service in the British army during the war. Using a power point presentation, I will show how the failures and

learning experiences of the French and Indian War helped Washington to become the leader and commander he was in the Revolutionary War and during his presidency.

**Business Practices in Barbados**  
**Philip Cooper and Lance Toomer**  
**Mentor: Kraiwinee Bunyaratavej**

This poster presentation explores business practices in Barbados. Our presentation looks into several different business sectors including hotels, dining and grocery, manufacturing, and banking. During our visit in Barbados we gathered information by observing and experiencing how Barbadians conduct business. Their operations tend to be a bit slower and more relaxed but they are well developed.

**Italian History and Culture**  
**Brian David and Alex Dello Buono**  
**Mentors: Frank Gregory and Susanne Fox**

In the spring of 2012, the History Department took a trip to the Italian peninsula. Before this trip, the students learned a great deal about the history and culture of the country of Italy. We will give a brief overview of this class, as well as a brief description of the books we read. We will also give a brief description of how much we learned on the trip itself, and why the experience of traveling could not have been truly taught in a classroom environment alone. This presentation will give a small insight into the history and culture of Italy, as well as highlight the importance of traveling with the college.

**Coaching Certification as a Requirement for High School Coaches in Delaware**  
**Morgan Rupp**  
**Mentor: Diane Stetina**

The purpose of this research is to gather and evaluate the beliefs of high school coaches in the state of Delaware on requiring coaching certification for high school athletic coaches in the state. The study is considered to be phenomenological non-experimental action research with an empirical approach that is directly associated with the internship experience of the investigator. A purposive sample was selected consisting of 100 high school athletic coaches in the state of Delaware to perform inferential research. The population for this study is defined as all high school athletic coaches in Delaware. The coaches selected for the sample were chosen based on varying factors such as experience level, classification, sport, age, and gender to obtain unbiased observations. The number of coaches selected was determined by the size of the Delaware Interscholastic Athletic Association (DIAA) conferences. An online survey was created to gather the beliefs and perceptions of high school coaches on the issue of required coaching certification. It is hypothesized that interscholastic athletic coaches will support the requirement for mandatory coaching certification for all head and assistant coaches, regardless of school employment status. Based on the results obtained from the coaching certification survey, the researcher's hypothesis was supported. A total of 80% of the respondents support the concept of a coaching certification requirement and believe they would benefit from receiving certification, whereas the other 20% do not support it and do not believe they would benefit from completing

coaching certification. In regard to the level of coaches that should be required to complete coaching certification, 90% of the respondents selected the head coach, while 70% also chose the assistant coach

### **A Feasibility Study of Residential Wind Power**

**Jessica Small**

**Mentors: Bruce Allison and Jeffrey Mask**

Wind energy, like solar energy, is a common type of renewable energy with diverse applications in residential, commercial and industrial sectors. The selection of a wind generator for a residential setting is influenced by wind speed and constancy, the presence of obstructions and the cost of the wind turbine and traditional energy. The objective of this study was to determine the feasibility of installing a residential wind turbine in Dover. The Honeywell (Model WT6500) wind turbine with blade tip power system, which produces 1500kW annually (Parsons 1) was selected for the study. Energy use information and statistics from a Dover, Delaware residential electric bill were used in the analysis. The estimated annual wind generation for the Honeywell wind turbine, Model WT6500, is 1500 kWh, which would reduce the average annual energy use to 11,275 kWh. The annual total net electric charge would be \$1,483.79 with a total annual savings of \$197.40. The City of Dover offers a residential maximum grant of \$2,500, as well as a 30% federal tax credit for small turbines, making the cost of purchase and installation only \$4,500. It would take a total of 22 years or less to pay off the turbine, making the proposed turbine feasible

### **Restorative Justice**

**Lorrie Foy**

**Mentor: Elizabeth Marchioni**

This presentation will define what Restorative Justice is, explaining the principles, processes, and underlying goals of its framework. The presentation will address who the key participants are and the projected outcomes from the Restorative Justice approach. The presentation will then review the components of the American Justice system, contrasting with what restorative justice outlines its components to be. The presentation will then address the origins of restorative justice and what countries it has spread to. It then explains the four models used to implement restorative justice. The presentation shares criticism of the restorative justice process; it acknowledges that restorative justice is not a magical solution for all evils, but has the potential to change the basic course of the criminal justice system.

### **Living under the Drone**

**Brandon Reynolds**

**Mentor: Cynthia Newton**

CIA drones used in the Federally Administered Tribal Areas in North West Pakistan have killed over 3,000 people, including 411 children between 2004 and today. The two governments involved have differing claims. While the United States government claims there are agreements in place with the Pakistani government, the Pakistani government asserts that this activity breaks international laws. This project contends that these activities violate both the UN charter and international law. It outlines a strategy the United States could use to achieve the goals of its foreign policies without causing significant collateral devastation.

**History Department Museum Studies Exhibits**  
**Celeste Montgomery**  
**Mentors: Susanne Fox and Deborah Wool**

During the Spring and Summer 2012 semesters, I was a part of a team creating multiple exhibits for the History Department. These exhibits were projects completed as part of two different “Exhibiting History” classes; one taught by Professor Deb Wool and the other by Dr. Sue Fox. All exhibits are located in various areas within the History Department. For the spring class, I worked as a part of three different groups to create the “We Will Always Have Paris”, “Latin America”, and “The 1960’s: What a Long Strange Trip It’s Been” exhibits. On each one we collaborated on the design, layout, what the titles and subtopics in the exhibits would be, and worked together in putting them each together artistically. All required the use of paint, cutting foam board for our text panels, selections of font styles and colors, and for the 1960s exhibit especially, the use of decoupage. For the summer class, I created, under the indirect supervision of Dr. Sue Fox, the “Sicily”, “Amalfi Coast”, and “Belgium” exhibits. I was also given the opportunity to edit and redesign other exhibits from the previous semester. These exhibits were “World Travel”, “World War II & Women”, and “History’s Dark Side”. All of these summer projects required 244 hours of personal hard work that included research, design, layout plans, writing, editing, spackling, stenciling, foam board cutting, with multiple layers of paint and more! I am greatly honored and inspired to have had this opportunity to share part of myself with Wesley College.

**Territoriality and Dominance Behavior in the Siamese Fighting Fish**  
**Shannon Perry, OsShan Chapman, Amanda Hudson, Brittany Tieman, Amber Wiltbank**  
**Mentor: Kathleen Curran**

The male Siamese Fighting Fish, *Betta splendens*, is highly territorial. It defends the area where it builds its nest from all intruders with a stylized series of behaviors used to intimidate potential rivals. These signals work because neither fish risks injury, yet a dominance hierarchy is maintained. In the wild these fish would have adjacent territories. We hypothesize that males must be able to recognize neighbors or they would waste energy constantly displaying.

**The Nature of Reality**  
**Tristin Burris**  
**Mentor: Michael Nielsen**

What is the mind, what is the body, what is the exact nature of physical reality? Why was I born? What is this material world? This domain can be understood once every person realizes that they are the Creator of this world, literally. Each person lives his or her life through a series of actions, and each of these actions shapes the existence of the world. Whether these actions are profound discoveries, choosing to procreate, or as simple as choosing to take the bus instead of driving, they all have an impact and show one thing: humans are in control. So, the answers to the questions of the meaning of life can be very complicated, or they can be very simple. Life is what each person chooses to make it and each person can matter to the world if they choose, or they can disappear into oblivion without ever making an impact. The objective here is not to provide answers. There are no answers. Eventually there may be. Rather, the purpose intended is

to challenge each individual to carefully consider the implications of this world. Weigh all the options and decide on the best path to follow, do not simply make assumptions. It is acceptable not to know the truth, but a person who chooses not to seek it, or not to care, is a soul that is truly lost. Closed-mindedness is weakness, for the ability to learn is eliminated.

**Relationship among College Students' GPA, Family Constellation,  
Self-Efficacy, Conscientiousness, and Grit Survey Scores**  
**Chris Fucetola and Carissa Gilligan**  
**Mentor: Elizabeth Siemanowski**

Grit, a non-cognitive personality trait, investigated by Duckworth (2007), is defined as an individual's perseverance and passion to achieve long term goals. Grit appears to be a trait associated with success in life. The current study sought to replicate previous positive correlations between grit, GPA and conscientiousness. Previous research suggested that a third factor might also contribute to grit. Participants in this study were 110 students attending Wesley College. Students were asked to report basic demographic information and complete a series of questionnaires including the Grit Survey, questions derived from the Big Five Factor Personality Inventory, and the General Self-Efficacy scale. We hypothesized that grit would be positively correlated with conscientiousness and GPA, as had been previously reported. Additionally, we hypothesized that the third variable that may be correlated with grit would be an individual's level of self-efficacy or family of origin composition (intact vs. single-parent family). Our findings suggest that family composition does not predict grit levels. Interestingly, gender and age were not correlated with grit score. However, it was determined that grit scores were significantly positively correlated with self-reported levels of general self-efficacy and all subscales of the Grit Survey (i.e., perseverance of effort, ambition, and consistency of interest).

**Perceptions which Differentiate**  
**Khawaja Abdul Hameed**  
**Mentor: Derald Wentzien**

As more and more students matriculate into various colleges, research continues on how to help these students succeed. Success, as defined in this study, is the ability to achieve a letter grade of an A or B in any particular class. First year freshmen were the main target in this study because freshmen may need more guidance and direction adapting to college culture than other grade levels. This study examined data, collected via an anonymous questionnaire, to determine if different perceptions helped a student succeed or struggle in a certain class.

**Robotic Technology and the Global Society**  
**Azure Johnson**  
**Mentor: Agashi Nwogbaba**

The rise in the robotics industry worldwide is growing at a very rapid rate as the years go on. Robots are taking over the industrial work field already, especially in automotive factories. Soon enough they will be leading idols in homes and offices. According to Robotics Online, a total of 22,598 robots valued at \$1.48 billion were sold to companies in North America in 2012, beating the previous record of 19,337 robots sold in 2011. (Robotic Industries Association , 2013).



Foxconn, one of the world's largest electronics contract manufacturers measured by revenues, plans to deploy one million robots in its factories in the next 2-3 years, with intentions to sell onto the open market. (Patel, 2013). Robots help society, and are a lot of times easier to use than humans. For example, they don't require heat or air conditioning and can work in dark – saves electricity. (Kennedy, 1993). However, even with all these increases and positive impacts of robots, how does this leave the rest of the world? An increase in robot jobs in the factories has proven to result in a decrease in human jobs. The demand for this machinery and industry is so high, while human workers have personal issues of their own. Many employees were demanded at a great number of hours at a time, and for an entire week. "...Some employees work schedules approached 100 hours a week..." quotes article by New York Times "Improving Working Conditions at Foxconn." (The New York Times Company, 2012). Ultimately, the robot industry is predicted to advance and lead the world in the upcoming years. There is however a lot of controversy over the pros and cons of this revolution. A further look into the growth and statistics of several variables may shine light to new thoughts of the truth of the robotics industry.

### **A Comparative Analysis of Acid-Base vs. Conductometric Titrations**

**Olivia Hampton**

**Mentor: Malcolm D'Souza**

The solvolysis of chloroformate esters is typically studied using two methods: acid-base and conductometric titrations. In acid-base titrations, the amount of acid (HCl) produced is measured against a standard solution of sodium methylate in methanol (NaOMe) as base with lacmoid as the indicator. For conductometric titrations, the rates of reaction in the solution are measured via an electrode that is connected to a conductance box that measures the ion concentration formation in the solution that causes a potential difference, and is graphed over time to express a rate. This project has focused on analyzing the rates of reaction of phenyl chloroformate determined by these two experimental methods in a series of pure and aqueous binary organic mixtures. Initial results demonstrate that the rates of reaction determined by conductometric titrations and its acid-base counterpart do show differences in the strongly hydrogen-bonding fluoroalcohol mixtures.

### **Differentiating Electronic Effects in Substituted Aryl Chlorothionoformate Esters**

**Brett Sansbury**

**Mentor: Malcolm D'Souza**

Chlorothionoformate compounds have found commercial uses in the preparation of thionocarbamates, which are effective fungicides, and because of this a further analysis of their decomposition is essential. The rates of solvolysis of pentafluorophenyl chlorothionoformate were analyzed in a variety of pure and aqueous organic mixtures of varying nucleophilicity and ionizing powers. All of the data accumulated for these rates of pentafluorophenyl chlorothionoformate were obtained at 25°C using a titration method. Initial data results suggest that there is a significant dependence on substitution effects and an analysis using the extended (two-term) Grunwald-Winstein equation shows the occurrence of simultaneous side-by-side addition-elimination and unimolecular S<sub>N</sub>1 mechanisms. These results will be confirmed by comparing the rates of solvolysis of pentafluorophenyl chlorothionoformate with 4-chlorophenyl

chlorothionoformate, a compound I have worked with previously and whose rates of solvolysis have been published in the *Journal of Chemistry*.

### **Nest-box Site Preference in Eastern Screech-Owls: Forested vs. Non-Forested Areas**

**Olivia Hampton**

**Mentor: Kathleen Curran**

Eastern screech-owls are a secondary cavity-nesting species, meaning that they will not dig their own cavities but will readily roost in nest-boxes. Previous studies on Eastern screech-owl nest-box preference have found that the owls tend to choose boxes in wooded or woodlot edge areas more than other areas. The purpose of this study was to determine if Eastern screech-owls prefer nest-boxes in forested areas over nest-boxes in non-forested areas. Data on nest-box location was provided by Delaware Department of Fish and Wildlife and were mapped on a land use map. Numbers of owls per land use category were then compared. This study found that 56% of open space boxes were used by owls at least once during the collection period and 60% of forested boxes were used. Since the total number of open space boxes and forested boxes were relatively close and the percentages used of each were within 4% of each other, it can be assumed that nest-box site as far as open or forested does not affect Eastern screech-owl nest-box selection. This study also did not find a preference in nest-box selection based upon the direction they faced. These findings are not consistent with previous studies.

### **Calculating the Guggenheim Equation for First Order Reactions using Maple**

**Kyle Gillespie**

**Mentor: Frank Fiedler**

The study of reaction rates and mechanisms is a key component in undergraduate research at Wesley College. With students having to reallocate time to equations, many trials cannot be run in a student's limited time. By creating a program that is able to calculate common complex equation, the Grunwald-Winstein equation and the Guggenheim equation. The program will be run in Maple, allowing for the advanced computational software to drastically cut down on the time it takes to calculate.

### **Quantifying Nutrient and Sediment TMDLs of a Residential Development Proposal**

**Melissa Savin**

**Mentor: Bruce Allison**

Environmentally sound land use management is essential for the protection of local water quality. Consequences of land use change on water quality are often unknown until the development is constructed. Realizing the impacts of these changes occurs too late in the planning process. Computer models can be used as diagnostic tools to simulate proposed development and quantify their common impacts before construction. The objective of this research was to implement the Better Assessment Integrating point and Non-point Sources (BASINS) model to determine whether a current residential development proposal submitted to the City of Dover, Office of Planning met state Total Maximum Daily Loads (TMDLs) for nitrate ( $\text{NO}_3^-$ ), phosphate ( $\text{PO}_4^{3-}$ ), and total suspended solids (T-SS). A Digital Elevation Model (DEM), landuse, hydrology, and weather data were gathered and downloaded for the St. Jones

Watershed. The watershed was delineated and streams and outlets were created. A baseline simulation and alternative scenarios were simulated within each reach to determine if TMDLs for  $\text{NO}_3^-$ ,  $\text{PO}_4^{-3}$ , and suspended solids could be met. Results showed that the proposed development exceeded TMDLs for  $\text{NO}_3^-$  and  $\text{PO}_4^{-3}$  but met the T-SS threshold. Alternative development proposals were simulated with two best management practices (BMPs), riparian buffers and retention ponds, but  $\text{NO}_3^-$  and  $\text{PO}_4^{-3}$  TMDLs were still exceeded.

**Enzyme Kinetic Comparison between Brewer's & Commercial Yeast Strains**  
**Gabriel Alejandro Fernandez-Bueno**  
**Mentor: Jonathan Kidd**

Today's expansive collection of knowledge and processes affectionately termed as science is a conglomeration of multiple disciplines working to discover the multiple facets of nature, and to understand the intricate mechanisms and structure of systems that constitute the greater picture of life. One discipline of science within cellular biology is the analysis of chemical reactions that are carried out by important biochemical structures with specific tasks, known as enzymes. Previous experiments in the field of enzymology have yielded a broad spectrum of information, ranging from the detailed understanding of certain cellular components at every level of organization within organisms to the development of techniques which measure enzyme levels to determine whether some type of cellular damage has occurred. In this experiment, the enzyme activities of different brewer's yeasts are analyzed, by measuring the consumption of substrate over time using a specific enzyme known as alcohol dehydrogenase. The main function of alcohol dehydrogenase, ADH, is to convert sugar molecules to ethanol as a waste product in the overall process of creating energy for the organism. By observing the specific sugar molecules that the yeast strains can each individually process over time, along with identifying the rate of enzyme activity of ADH using specialized laboratory techniques, the results can be compared to a standard based upon the commercially available strain which will allow a detailed insight into the differences between strains based upon metabolic activity. The results will be graphed using Michaelis-Menten and/or Lineweaver-Burk methods to determine the rate, the affinity of the enzyme for the substrate (given by  $K_m$ ), and if there is any type of inhibition present. This type of information is beneficial to various industries that use enzyme kinetics to develop specialty products, and to produce them faster and/or at a higher efficiency.

**Exposure and Awareness. Promotional Strategies for Startup Fashion Designers**  
**Omega Peter Dabale, Jason Chen, Byshi S. Watson, and Danielle Anthony**  
**Mentor: Yu Tian**

How could a start-up fashion designer attract the eyeballs of its target segment? How would a start-up fashion designer reach a broader audience? How should a start-up fashion designer maximize the return with a limited marketing budget? We try to answer these questions for the clothing line "Duke and Winston", a Philadelphia-based small fashion house. Fashion businesses pose a unique challenge since the so-called target market or segments are ever changing. The uncertainty comes from the economy, social and cultural environment, and fast developing technology. We analyze the fashion business and study the market potential. We look into the most popular social platforms as potentially efficient promotional tools. And more importantly, we try to identify some key segmentation variables to better match consumers with effective

promotional messages. The owner and designer of the business works closely with us and contributes greatly to define the brand and its identity. We propose marketing strategies to increase the awareness of the brand, improve the communications with the customers and evaluate the effectiveness of a few marketing channels. The representative of the designer house will join us and participate during the brand identity and personality component of the presentation.

**Eating Habits among College Students**  
**Karri-Jo Walls**  
**Mentor: Lynn Everett**

The purpose of this particular study is to determine what percentage of college students follows the United States Department of Agriculture (USDA) guidelines for recommended daily portions of fruits, vegetables, grains, protein (meat), and dairy. Also, to determine what percentage of students are classified as average weight according to USDA guidelines for body mass index. With these findings a comparison can be done between the eating habits of males and females, athletes and non-athletes, and those who have a meal plan versus those who do not. Additionally, it will determine whether or not students who major in health science and general science differ in body mass index between those who major in other fields such as education, business, liberal arts, etc. To complete the study, a questionnaire with 20 health related questions will be given to at least 500 students. The ideal environment needed to hand out the questionnaires will be in classes that typically every major at the college is required to complete. This will ensure a variety of data between different majors and age groups so that when comparing percentages the data will not be limited. The significance of this study is to acknowledge whether or not there are unhealthy eating habits among college students. Once there is a foundation the option to act on the situation, perhaps make necessary changes to better influence healthier eating habits, and/or do a follow up survey in a few years and do a comparison between the two results to analyze any improvements will both be readily available. Improving the eating habits of young adults is the main focal point of this study as well as previous similar studies that have been done. In knowing that eating habits formed by late adolescence contribute to those in early and late adulthood, it is critical to better understand the factors which lead to unhealthy eating habits.

**Approximating Unknown Masses of Asteroids by using Calculus**  
**Kasey Thompson**  
**Mentor: Derald Wentzien**

The goal of this research is to explore how NASA uses Calculus. This research is based on NASA material from the Space Math information at NASA's webpage. The research will allow us to produce polynomials to approximate the profile of the asteroids and use calculations to estimate the masses of the asteroids by using the equation  $\text{Mass} = \text{Density} \times \text{Volume}$ . We selected images of asteroids with unknown masses and plotted the data points on a Cartesian plane, allowing us to produce a function that fits to the profile of the asteroids. From this, we will use the disk method from Calculus to estimate the volume of the asteroid. Thus, it will allow us to approximate the unknown masses of the asteroids. When available, the actual mass will be compared to the estimated mass to get a sense of accuracy. Our goal is to find estimations of the unknown masses because it will be helpful information in case the asteroids ever approach Earth.

**Comparative Study of Hairy Vetch (*vicia villosa*) and Alfalfa (*medicago sativa*) Under Salinity Effects and the Characterization of the PvLEA3 Gene**

**Amber Wiltbank and Michael Butler**

**Mentors: Lynn Everett, Venu Kalavacharl, Kalpalatha Melmaiee, Sathya Elavarthi**

Hairy Vetch (*vicia villosa*) and Alfalfa (*medicago sativa*) are both legumes in the Fabaceae family. Both species are important to farmers since the plants can be used as cover crops and as livestock feed. High salinity in fields hinders plant growth by enabling them to uptake as much water from the soil. Late Embryogenesis Abundant (LEA) Proteins accumulate when plants are placed under environmental stress such as drought or salinity. These genes act as a defense mechanism to help the plant thrive in harsh conditions. In the present study, *vicia villosa* and *medicago sativa* were placed under different salinity concentrations with the goal to find the PvLEA3 gene through molecular process of Real Time Polymerase Chain Reaction (PCR). Physiological measurements were also taken by the process of the Portable Photosynthesis System.

**Employing Linear Free Energy Relationships (LFERs)  
to Deduce Solvolytic Reaction Mechanisms**

**Maryeah Pavey and Jasbir Deol**

**Mentor: Malcolm D'Souza**

The compound 4,5-dimethoxy-2-nitrobenzyl chloroformate is a haloformate ester. Chloroformates can be found in pesticides, perfumes, drugs, food-stuffs, polymers, dyes and are also found in complex organic compounds such as peptide-based pharmaceuticals. During this solvolytic study of 4,5-dimethoxy-2-nitrobenzyl chloroformate, we tried to evaluate the mechanism in which a nucleophilic or ionizing solvent is used as reagent to essentially split the compound, thus forcing the leaving group to leave. During this study, the solvents that were used included methanol, ethanol, acetone, HFIP, and TFE. This study was done using acid-base titrations. When doing the acid-base titrations, the compound (4,5-dimethoxy nitrobenzyl chloroformate) in a solvent is added to an acid such as Lacmoid, for example. Then the quenched reaction solution of NaOMe is added in order to neutralize the reaction and determine the reaction rate based on the amount of base added. Performing this study gives results that can then be calculated to show the rates of reaction of this compound in each solvent. With these rate calculations, one can then select the best solvent to use in other synthetic methodologies where this compound is employed. Also along with this information, it is important to know the rate calculations so that it is known how this compound would react within the human body if an interaction were to ever occur.

**The Effect of Hunting on Population Dynamics of Delaware Wild Turkeys**

**Ashley Harmon**

**Mentor: Kathleen Curran**

Wild turkeys were reintroduced into Delaware in 1984 and have had a stable population large enough to reinstate turkey hunting since 1991. Female turkeys nest in brush to lay their eggs at the end of mating season. Males are looking for these female turkeys, and listen for their calls. The main tactic for human hunters is to use a call that mimics the sound of the females to lure in

unsuspecting males. It is suggested that younger males are more susceptible to the hunters call since they have little experience with a real female's call. Therefore a majority of hunted harvested turkeys should be young males. This hypothesis will be tested using data collected during the Delaware turkey hunting season.

### **Mechanism of Reaction for 5-Methylfuran-2-Carbonyl Chloride**

**Ashley Harmon**

**Mentor: Malcolm D'Souza**

5-methylfuran-2-carbonyl chloride is used to create other compounds. These compounds can be light sensitive. A major reaction that occurs is the blockage of receptors on neurons in the brain and nervous system. It is important to study the reaction for 5-methylfuran-2-carbonyl chloride because these important reactions have potential to help in the body. Measuring the rate of reaction in various substances to dissolve 5-methylfuran-2-carbonyl chloride is essential to analyzing the mechanism in which it dissolves. Knowing the mechanism can be applied when working with the compound in other experiments.

### **Interdisciplinary Analysis of Microorganisms Inhabiting Bodies of Water in Delaware**

**Brett Sansbury**

**Mentor: Jonathan Kidd**

The worldwide bacterial biomass exceeds that of all plants and animals on Earth. With such high diversity among microorganisms, various research possibilities concerning their viability must be studied to maximize microbial application to industrial and health care use as the wellbeing of local ecosystems. This project serves to analyze bacterial populations inhabiting bodies of water in the Delaware area including fresh, brackish, and sea water sources. The samples being screened for bacterial growth will also be analyzed for chemical composition, for the purpose of collecting biological and chemical data by season for an interdisciplinary analysis. Data obtained in this project will further the understanding of the ecosystems from which the bacteria are derived and have the potential to identify bacterial species that are harmful to human health and the surrounding environments.

### **Effectiveness of MA099 as a prerequisite course**

**Khawaja Abdul Hameed**

**Mentor: Derald Wentzien**

MA099 is a prerequisite for other necessary mathematics courses. Testing the effectiveness of courses will allow insight into whether improvement is necessary in this course.

### **Solvolytic Rate Study of Vinyl and Allyl Chloroformate**

**Aaron Givens**

**Mentor: Malcolm D'Souza**

The specific rates of allyl and vinyl chloroformate were determined in a wide range of organic solvents using a method known as solvolysis, which is a special type of organic reaction where the solvent (the dissolving solution) participates in a reaction with the solute (compound

dissolved). In the wide variety of either pure or aqueous solvents vinyl chloroformate was found to react at higher rate than allyl chloroformate. The rates of solvolysis were analyzed by multiple regression analysis using the extended (two-term) Grunwald-Weinstein equation incorporated with literature values for solvent nucleophilicity (NT) and solvent ionizing power (YCl). From the analysis it was found that both compounds react via similar mechanisms based on the solvent characteristics. This type of result makes sense since both compounds feature similar functional groups that are inversion of one another.

### **The Effect of Agriculture and Forest Land Use on Soil Quality**

**Taylor Hendricks**

**Mentor: Bruce Allison**

Different land use types are able to affect the health and quality of the soil. Agricultural areas, whether used for pasture or cropland, are susceptible to poor soil quality because of the application of agricultural chemicals, the use of machinery, or the type of cropping system. Typically forested areas will have better soil quality because they are less susceptible to human disturbances. The objective of this study was to determine how differences in land use type affect the soil's overall quality. The study was located in the Deer Creek watershed located in Harford County, Maryland on a farm that is comprised of the Neshaminay soil series. Five land practices were studied: corn under conservation tillage and conventional tillage, pasture hay and pasture cow and forest. The forest soil was used as a reference site following the theory of soil degradation. Seven soil quality parameters included in the Soil Science Society of America (SSSA) minimum data set were measured. Soil tests included aggregate stability; bulk density; infiltration; organic matter content; pH; soil respiration; and texture by feel. Data were tested for normality and appropriate statistical analyses were selected to compare different land use management practices. Bulk density values were within the expected range for each management scenario; the forested area had the lowest values. Respiration data were compared with standards set by the SSSA; moderate to ideal respiration rates ranged from 7-29 kg CO<sub>2</sub>-C acre<sup>-1</sup> day<sup>-1</sup>. While the cow pasture and conventional tillage sites had the highest respiration values, all sites had moderate or ideal respiration rates. Measured soil pH for all sites agreed well with expected values. The project described was supported by the Delaware EPSCoR through the National Science Foundation Grant EPS-0447610 and Wesley College.

### **Involving the Community in Chemistry**

**Victor DeBarros and Maryeah Pavey**

**Mentor: Malolm D'Souza**

Wesley College, in collaboration with the Delaware Section of the American Chemical Society, has participated in the celebration of the 25th anniversary of the National Chemistry Week program by building awareness in chemistry at a more local level. Wesley undergraduates enrolled in the second semester of the organic chemistry course traveled to The Independence School and conducted a variety of rudimentary general chemistry demonstrations with a focus on interesting local students in grades 3 through 8. The experiments included the "Gigantic Growing Spheres", which taught students how bonding between hydrogen and water molecules is connected to the ability of polymers to absorb water. Another experiment "Sour Power," was used to show how the acidity of a liquid can be determined by using an indicator. "Sour Power"

was primarily chosen as a demonstration because it gives a basic understanding of some of the fundamentals (acid/base titrations) of undergraduate chemical research that many of us are currently involved in at Wesley College. Even though this program provided a path for future aspiring young scientists to follow, it also gave the participating Wesley undergraduates a chance to truly connect with the local community through a topic we both enjoy engaging in: Science!

**Insights into the Solvolytic Mechanism of  
 $\alpha$ -Chloro-2-(trifluoromethyl) Benzyl Chloroformate  
Catherine Gross and Kaylee Miller  
Mentor: Malcolm D'Souza**

Substituted benzylic chloroformate esters have found wide commercial use in the agrochemical, pharmaceutical, and the related chemical product industry. In this undergraduate research project, the specific rates of solvolysis of  $\alpha$ -chloro-2-(trifluoromethyl)benzyl chloroformate have been measured in several solutions including a variety of fluoroalcohol mixtures. The kinetic rates of this benzyl chloroformate containing electron-withdrawing substitution were determined using acid-base titration and conductometric titrations. Our results indicate the nucleophilic attack plays an important part in the rate-determining step.

**Food Security in Urban Areas  
LeRoy Demarest and Courtney Kozar  
Mentor: Alban Urbanas**

Food security is a growing global epidemic; affecting nearly one billion people. Food security can take the form of malnutrition, food deserts, and even obesity. While it is often associated with under-industrialized nations, 1 in 6 Americans struggle with food security. The greatest majority of these people live in urban settings. The causes of food security are complex and multifaceted; factors include water shortages, the expense of modern agriculture, and increased urban sprawl. While there is no quick fix that can address this global crisis, we outline two solutions that can ease food security problems within urban areas. These methods, aquaponics and permaculture, could be utilized to help reduce food pressures on urban areas while creating a means of freedom and independence while increasing social cohesion and well-being.

**Shanna Bryant  
Suicide Prevention: Needs Assessment  
Mentor: Angela D'Antonio**

After the age of 15, suicide rates in the United States can be seen to significantly increase. Suicide is often recorded as being the number one cause of death in adolescents and young adults (Leming & Dickinson, 2011). Since suicide and suicidal ideation is so prevalent among young adults, there is a much greater need to implement prevention programs across the nation. Suicide prevention may sound like an attempt to stop someone from dying but it is actually the act of helping someone to not want to die. "Prevention encompasses the concepts of risk reduction (disease prevention) and resiliency (health promotion)" (Maris et al, 2000, p.528). There is a large amount of evidence that indicates its importance among society. Since suicide is commonly regarded as a rather taboo topic, many people feel awkward or ashamed when discussing and



admitting to having suicidal thoughts or tendencies. A key factor in suicide prevention is being able to establish an open portal for discussion without judgment. If people feel that they can talk about these feelings when they first manifest, then they may be able to be assisted early on instead of enduring emotional tension. This presentation aims to address the current need for a Suicide Prevention program to be implemented at Wesley College.

### **Marketing Strategy of a Small Business in a Declining Industry**

**Taylor Broomall**

**Mentor: Yu Tian**

This is a study of the visual communications service industry in the Mid-Atlantic region with a focus on printing services and promotional products. In the face of social media and online marketing, there remains demand for value-added visual communications services and many clients still need to engage customers with physical vehicles. An analysis of the market history helps to identify key segments of core customers and dominant products and services. With this information, I am able to offer customized solutions to individual clients and match their needs with my products and services. This value-added service offers my business a greater profit margin. Promotional products and services play an important role in branding and advertising for many businesses. The success and growth of my clients will in turn be essential for my business through referrals and increased brand awareness. I've developed a marketing strategy to promote a small business in an otherwise declining industry.

### **Cultural Differences and Similarities between America and Barbados**

**Charminta Brown**

**Mentor: William Kroen**

The purpose of my study is to distinguish the differences and similarities in Culture between the United States and Barbados. When comparing and contrasting the cultures of Barbados and America I will be using Hofstede's four Dimensions of Culture, which entail Individualism vs. Collectivism, Power Distance, Masculinity vs. Feminism, and Uncertainty Avoidance. When using the four components to evaluate Barbados's culture I will be observing people who live in Barbados to determine high or low levels of each component.

### **Invasive Pacific Lionfish in Barbados**

**Shannon Perry**

**Mentor: William Kroen**

The recent spread of the lionfish (Pterois) in the Southwest U.S Atlantic coast and Caribbean is one of the most rapid marine invasions in history. Though native to the Pacific and Indian Oceans, lionfish were introduced and found in abundance in many Caribbean islands, the Florida Keys, and northward to North Carolina. While lionfish are most known for their elaborate ornamentation and aquarium appeal, recent interest has focused on their predators, habitat, and dietary habits that can cause ecological problems. Lionfish have few predators in the Caribbean, a low number of parasites that affect them, and can greatly reduce the number of fish in a short amount of time through predation. Because of these factors, lionfish have easily upset the delicate balance found in coral reef ecosystems which are already under pressure from climate

change, overfishing, and pollution. Research in the past five years has focused on control and management solutions regarding the increased population of this species. Possible solutions include lionfish culling programs and developing a market for lionfish for human consumption. Similar to the Caribbean, management and control issues have been faced in mid-Atlantic regions involving invasive species like the Emerald Ash beetle. Fixing an invasive species problem can be difficult when costs, man-power, and regulatory actions all have to be taken into consideration. This talk lays out general information about lionfish, proposes possible solutions to correct the lionfish problem, and updates management solutions in Barbados learned on our trip.

### **Will you Retire Happy?**

**Devan Bartell, Kiana Long, Byshi Watson, Tracey Walsh.  
Lindsey Dimuzio, Jarrett Williams, Omega Dabale, and Sean Hopkins  
Mentor: Jill Winnington**

As young adults we view money as a sense of happiness, but is happiness really dependent on money? Yes, money can buy you possessions that make you happy; however, happiness comes from your own actions. What if we told you that if you saved up \$75,000 over the next five years for retirement, you would be just as happy as Beyonce and Jay-Z? Would you do it?

### **In Search of Irish Music**

**Taylor Jackson  
Mentor: Susanne Fox**

"In Search of Irish Music" is a presentation on the richly diverse history and culture of Ireland as represented in its music and dance, understood through readings and a visit to the country.

### **COPD Education**

**Jonell Garrett  
Mentors: Judith Strasser and Carol Smith RN, CCRN**

Chronic Obstructive Pulmonary Disease (COPD) is currently the third leading cause of death in the world. It is a progressive lung disease which will slowly result in the body's inability to convert carbon dioxide into oxygen within the lung. Each year millions of people are diagnosed with the illness, and this population is on the rise. There has been much research done with regard to COPD, however the data does not seem to be assisting in reducing the rate of diagnosis or hospital admission rates. COPD patients are thought to be provided with education regarding the disease process, lifestyle changes, prognosis of the disease, medication that is prescribed, and other applicable information. If all of the above are provided, why does the mortality rate for this illness continue to rise? The patients may be provide with the appropriate education, medications, and lifestyle changes necessary to manage COPD, but there is a considerate lack of research suggesting that the patient perception of the illness is correct. All perceptions are patient specific in that a follow-up to the current research should include a qualitative assessment of the patient's own perception of the disease so that additional education may be provided. One may suggest that the mortality rate may decrease with follow-up education provided to those with

incorrect perceptions of the illness, and that a better understanding of COPD will help to increase hope and compliance within the COPD community.

**To Eat or Not to Eat? A Study of Consumer Dine-Out Decisions  
and Restaurant Promotion Strategies**

**Travis Alano, Sha (Susan) Zhan, and Ishamar A. Malcolm**

**Mentor: Yu Tian**

Restaurants constantly run promotions or offer specials. Conventional wisdom suggests that such strategies are designed to attract the price-sensitive consumers. Similar to the retail industry, restaurateurs hope that those consumers would order more than just the specials and maybe frequent the business. But questions remain whether it is really just one price-sensitive segment or even whether it is indeed profitable strategy. To help the restaurants have a better understanding of consumers, target attractive segment(s) and designing promotional strategies, we create an on-paper restaurant here in Dover. Sifting through industry reports, analysis and survey data, we learn about what attracts consumers to restaurants and what they consume. Our finding suggests that we can divide the so-called price-sensitive segment into at least two or three smaller consumer clusters. And subsequently, we can create better and custom-designed positioning and promotional strategies for each of these smaller groups. We illustrate these strategies through the business proposal of the on-paper restaurant.

**Study of how Athletic Participation and Academics work together at a D-I University**

**Timothy Putman**

**Mentor: Diane Stetina**

This study will examine how much time athletes invest in their given sport compared to their academic and social life in an average in-season week. The study will also look at how the athletes feel their participation in athletics has affected their academics.

**Benefits of Cardiovascular Rehabilitation**

**Jordan Gendrachi**

**Mentor: Barb Abbott**

Cardiac Rehabilitation is a proficient administered program to recover from heart attacks, heart surgery, and percutaneous coronary intervention procedures such as stenting and angioplasty. Cardiac Rehab programs can cover a number of areas for a recovering heart attack or heart disease patient such as providing education and counseling services, which will help increase physical fitness in less fear, reduce cardiac symptoms, improve health and reduce the risk of future heart problems. Cardiac Rehab has many benefits that can assist heart disease patients in the right direction, but not everyone is aware of the great outcomes of this program.

**Pesticide Database**

**Benjamin Barile and Aaron Givens**

**Mentors: Frank Fiedler and Malcolm D'Souza**

Approximately 42 percent of Delaware is used for agriculture. In order to manage pests, such as insects, weeds, nematodes, and rodents, pesticides are used profusely to biologically control the

normal pest's life stage. The October 15 (2012) issue of *Chemical & Engineering News* suggested the idea that the decrease in the honeybee population could be directly related to the use of pesticides. Hence, we developed a database of 62 pesticides used in Delaware and developed a compatible application for smartphones. This research is funded in part, by a National Science Foundation (NSF) EPSCoR grant (EPS-0814251); the National Institute of General Medical Sciences (8 P20 GM103446- 12) grant from the National Institutes of Health; a NSF ARI-R2 grant (0960503), and a DESGC NASA Undergraduate Tuition Award.

### **Solvolysis of Diallyl Carbamyl Chloride**

**Victor DeBarros and Kyle Gillespie**

**Mentor: Malcolm D'Souza**

Diallylcarbamyl chloride has found use in patented herbicidal applications and as a useful precursor in the formation of many pharmaceutically useful inhibiting compounds. We have analyzed the rates of reaction of this chemical at room temperature in a variety of green solvents. In this presentation we explain the chemistry involved in the application of such useful household molecules.

### **Athlete's Opinion: Free Body Weight vs. Fixed Machine**

**Robert Biggs**

**Mentor: Kerry Harbor**

This study is aimed at further analyzing the mind of an athlete. The two choices, free body weight and fixed weight machines, are common weight room tools. The point will be to possibly show a correlation between what types of athletes like which particular machines. The data will be broken down into age, gender, and sport for comparison purposes.

### **Publishing Under Fire**

**Melissa Boyd**

**Mentor: Victor Greto**

After two administrators simultaneously resign from Wesley, The Whetstone begins the search to cover the news behind the resignations. A day after the resignations, one of the former employees, the Dean of Students, threatens to sue Wesley and the newspaper. The Whetstone proves its independence by using the Student Press Law Center and publishing the controversial stories.

### **Music and Visual Art of the Renaissance**

**Julianne Morris**

**Mentor: James Wilson**

I will present a Powerpoint presentation about the primary characteristics of Renaissance visual art and music, as well as discuss prominent figures in both areas during that time. I will also address how the music and visual art (architecture, paintings, sculptures) from this period are connected.

**The Beauty System**  
**Megan Condon**  
**Mentor: Susan Bobby**

An insight into the beauty system through the perspectives of Edith Wharton's *The House of Mirth* and today's society.

**An Insight Into Glycogen Synthase Kinase 3 Beta's (GSK-3 $\beta$ ) Network of Protein Substrates Using Protein Ontology and Text-Mining Resources**  
**Gabriel Alejandro Fernandez-Bueno**  
**Mentors: Cecilia Arighi, Cathy H. Wu, and Malcolm J. D'Souza**

Bioinformatics is a rapidly growing field of biological science that mainly deals with the troubles of storing, organizing, and analyzing various types of biological data. It helps researchers and scientists develop more advanced software, more efficient data mining tools, better algorithms, and increased image processing amongst a variety of other useful research tools. In this project, over 100 different search results on protein substrates and kinases, with a keen interest on Glycogen Synthase Kinase 3 Beta (GSK-3 $\beta$ ), were reviewed and annotated using protein ontology research tools provided by PIR, such as RLIMS-P (a rule based text-mining application), UniProt, and PubMed. The results on GSK-3 $\beta$  show its involvement in diseases such as Alzheimer's and some types of cancer. The focus of the project was to obtain as much information possible as on GSK-3 $\beta$ , create a visual network map of all the substrates it affects, and better understand GSK-3 $\beta$ 's role in these diseases. This project was supported by Delaware INBRE and NASA.

**The Housing Bubble: Explanatory Variables of Housing Prices**  
**David Gorski and Ben Barile**  
**Mentor: Kraiwinee Bunyaratavej**

This empirical research looks to model housing prices in America before and after the Housing Bubble between 2006 and 2009. Explanatory variables of housing prices will be researched for use in this model. Of these include the price of real estate and real rates on loans, among others.

**Coping Strategies that Positively Affect Type 1 Diabetes Management in the Adolescent Population: A Literature Review**  
**Samantha Weiss**  
**Mentor: Nancy Rubino**

Type 1 diabetes is a chronic disease requiring life-long management and permanent changes in lifestyle and it affects countless adolescents throughout the world. Because this disease makes such a profound impact on the lives of those who must manage it, it is therefore important to thoroughly understand the techniques these individuals can use to promote a healthy lifestyle and an improved quality of life. This literature review focuses on several research articles that have come to find that coping strategies including problem solving, acceptance, and verbalization of emotions are associated with positive outcomes in relation to glycated hemoglobin (HbA1C) and overall quality of life. Negatively associated coping strategies include disengagement,

aggression, avoidance, internalization of problems, and anger. Recommendations associated with this research indicate that healthcare providers need to be supportive to these patients and treat them as equals when compared with adolescents who are non-diabetic. Also, education and encouragement of coping strategies associated with positive outcomes is indicated while those associated with negative outcomes should be explained and discouraged.

**Effects of Sensory Overload and Sleep Deprivation on  
Patients in Intensive Care: A Synthesis of Current Research**  
**Megan Varga**  
**Mentor: Chris Jarrell**

Patients admitted into intensive care units experience many disturbances that can lead to an alteration in the internal circadian rhythm. REM and NREM sleep have been indicated as essential needs for adequate recovery in patients in the hospital. Factors such as excessive noise, light exposure, and nocturnal patient care interactions significantly affect sleep deprivation in ICU patients. Throughout the span of studies in this review, the research indicates that earplugs and eye masks increase sleep quality of patients in intensive care. Recommendations for future research should include the effects of noise, light and nocturnal patient care interactions on other specialty units. Also, research should focus on the effect that nurses and other health care providers have in relation to these factors.

**The Use of African American Vernacular English in  
Zora Neale Hurston's *Their Eyes Were Watching God***  
**Biana Bailey**  
**Mentor: Linda DeRoche**

My presentation looks at the usage of African-American Vernacular English (AAVE ) in Zora Neale Hurston's *Their Eyes Were Watching God* and other works of literature at the time, the importance it has on character development, and the lack of the usage of AAVE by other African- American writers.

**Reception in honor of all Scholars  
Day student participants  
4:45-5:15  
College Center 206**

**Mentors**

Barbara Abbot  
Bruce Allison  
Cecilia Arighi  
Susan Bobby  
Kraiwinee Bunyaratavej  
Kathleen Curran  
Angela D'Antonio  
Malcolm D'Souza  
Linda DeRoche  
Sathya Elavarthi  
Lynn Everett  
Frank Fiedler  
Susanne Fox  
Frank Gregory  
Victor Greto  
Kerry Harbor  
Chris Jarrell  
Venu Kalavacharla  
Jonathan Kidd  
William Kroen  
David Laganella  
Elizabeth Marchioni  
Jeffrey Mask  
Kalpalatha Melmaiee  
Cynthia Newton  
Michael Nielsen  
Agashi Nwogbaga  
Nancy Rubino  
Elizabeth Siemanowski  
Diane Stetina  
Judith Strasser  
Thomas Sturgis  
Yu Tian

Alban Urbanas

Derald Wentzien  
James Wilson  
Jill Winnington  
Deborah Wool  
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