

## Schedule of Events

1:00 – 1:15

Welcome & Opening Remarks

Dr. Patricia Dwyer

Vice President for Academic Affairs of Wesley College

1:20 – 2:00

Performances: Session I

2:05 – 2:45

Oral Presentations: Session II

Poster Presentations & Photography Display

2:50 – 3:30

Oral Presentations: Session III

3:35 – 4:15

Oral Presentations: Session IV

4:15

Reception & Ceremony

Oral Presentations and Performances in Wells Auditorium &  
Kresge Auditorium (Cannon 7)

Poster Presentations & Photography Display  
in College Center Lobby & DuPont Gallery

Reception & Ceremony in College Center 206

**Performances: Session I**

1:20 – 2:00

**Wells Auditorium**

**Moderator: David Laganella**

*Contemporary Music Ensemble*

David Laganella

*Wesley Gospel Choir*

James Wilson, Conductor

*The Rehearsal Process*

Nicholas Hancock

**Wesley Gospel Choir Program**

*City Called Heaven*

*Chasing After You*

*Total Praise - R. Smallwood*

**Wesley Gospel Choir and Contemporary Ensemble Program**

*Higher Ground* by Stevie Wonder

**WESLEY GOSPEL CHOIR**

James Wilson, Conductor

Kirshay Bowser  
Melody Dimerson  
Ifeyanyi Eze  
Travis Geiser  
Charlesha Harris  
Nefertiti Huff  
Louise Kai

Janel McCray  
Robert Price  
Marquese Proctor  
Patience Sando  
Brittany Scott  
Tiffany Smith  
Eghosa Ugiagbe

**Oral Presentations: Session II**

2:05 – 2:45

**Panel 1: Wells Auditorium**  
**Moderator: Jack Barnhardt**

*Reporting on College Statistics*  
Kim Manahan

*Cultural Metaphor: America as a  
Schoolyard Bully / America as a Farmer*  
Daniel Canova and Chris Hall

**Panel 2: Kresge Auditorium**  
**Moderator: Julie Fisher**

*First Friday Marketing Campaign*  
Garrett Kaczmarczyk, Stephanie Bailey, and Mary Ellen Wood

*Healthcare and the Internet*  
Christina Schafer and Erika Tanase

**Poster Presentations**

**College Center Lobby & DuPont Gallery**  
Poster Presentations & Photography Display

*Students' Perceived vs. Actual Grade in MA099*  
Carlé Ax

*Predicting Success with Math Diagnostic Test*  
Carlé Ax and Steven Cook

*Student's View on How to Achieve Academic Success*  
Ashley Russell & Charles Bode

*The Effects of Surrounding Land Use on Water Quality  
of the Choptank River, Maryland*  
Rachel Bozarth

*A Linear Program That Will Schedule Employees More Efficiently*  
Melissa Earley

*Chloroformates in Daily Life*  
Gabriel Fernandez and James Welsh

*Database of Common Pesticides and Fertilizers in Delaware*  
Aaron Givens

*Discriminant Analysis of Factors in Wesley College  
Students' Graduation Success*  
Abdul Hameed

*A Geospatial Analysis of the Impact of Landuse On Potential  
Loadings of Nonpoint Source Pollutants to Surface Waters*  
Taylor Hendricks

*Kids in Chemistry*  
Laura Hinkle

*Understanding Solvent Effects of sp<sup>2</sup>-hybridized Chloroformate Esters*  
Jaci Knapp

*Which high school math curriculum is more effective in  
preparing students for college level math courses?*  
Keven Lion and Nicholas Cimino

*Italia*  
Alexander Lopuchin and Courtney Davison

*Correlation of the rates of solvolysis of vinyl chloroformate*  
Peter Lorchak

*Insights into the solvolytic mechanism of alkyl thioesters*  
Brian Mahon

*Understanding Reaction Mechanism of 1-Chloroethyl Chloroformate*  
Matthew McAneny

*The Modeling of Credit Card Charge-Off*  
Patrick McCoy

*Determining Whether Math Pretests can Forecast the Future*  
Adam McGuire, Patrick McCoy, and Erich Gillespie

*A Modeling Approach to Evaluate the Effectiveness of  
Agricultural Best Management Practices*  
Greg McKee

*Solvolysis*  
Annie O'Connor and Ashley Harmon

*Effects of Varying Landuse on Macroinvertebrate Diversity  
in Freshwater Streams*

Kristopher Roeske

*In Search of Traditional Irish Music*

Amanda Sanchez and Tiffany Furtak

*Reanalyzing the Solvolysis of 2,2,2, Trichloroethyl-dimethyl-chloroformate*

Brandon Sandosky

*Using GIS to Select Wind Farm Sites*

Melissa Savin

*Stabilizing Neonates: The Need For More Effective  
Pain Management in Neonatal Intensive Care Units*

Julias Vekasy

**Photography Display**

CJ Bacote, Aaron Benson, Chloe Dawson,  
Antonio Gary, Abby Hill, Amanda Horkey,  
Alissa Kolanko, Jonathan Salacuse, and Megan Watson

**Oral Presentations: Session III**

2:50 – 3:30

**Panel 1: Wells Auditorium**

**Moderator: Victor Greto**

*Style or Substance? How the Technical Evolution of Special Effects  
in Film has Impacted American Moviegoing Culture*

Chris Agar

*Importance of Mathematics in Entertainment*

Ben Barile and Marquese Proctor

**Panel 2: Kresge Auditorium**

**Moderator: William Kroen**

*Export Efficiency Comparisons: A Country Level Analysis*

Chelsea Pratt, Songphon Kannasut, Abdu James,  
Paola Garces, Christopher Donisi, and Travis Vogl

*Foreign Direct Investment Determinants:*

*The case of the United States and China*

Evan Day, William Sutton, Daniel Canova,  
and Ashley Murphy

**Oral Presentations: Session IV**

3:35 – 4:15

**Panel 1: Wells Auditorium**

**Moderator: Jessica James**

*Amazing Contributions of Women in Mathematics*

Azure Johnson and Jessica Curry-Keith

*African American Stereotypes*

Chardiney Wood

*Disregarded, Degraded, and Disrespected:  
How Racism Worsened in the Northeastern United States  
from the 1950s into the early 1970s*

Jim Dorton

**Panel 2: Kresge Auditorium**

**Moderator: Lynn Lofthouse**

*Abortion & Its Effects on the American Home*

Victoria Hall

*A Canadian at War: The Wartime Exploits of  
Chancy Morey, Royal Canadian Air Force*

Eric Czerwinski

*Expatriate Philosophy in The Sun Also Rises*

Nicholas Hancock

## ***The Rehearsal Process***

Nicholas Hancock

Mentor: Dr. David Laganella

An analysis of rehearsal techniques and strategies for a success performance.

## ***Reporting on College Statistics***

**Kim Manahan**

Mentor: Prof. Victor Greto

Reporting on College Statistics will examine how student journalists may gather public information about colleges, both public and private.

I will show how a student journalist may specifically gather the information that pertains to salaries, budgets, averages and retention.

The Internet has become a powerful tool for this reporting. Using IRS 990 forms, government databases and other sites, I will show how to compile the information so that data (in context and with accompanying interviews with both administration and students) may be of use to students who make choices about their education -- just as citizens in a democracy rely on professional journalists reporting and data-gathering to understand how their government works and what it does with their money.

This collection of reporting data and putting it into context is an essential role for journalism, both on the college level and in the country.

## ***Cultural Methaphor: America as a Schoolyard Bully / America as a Farmer***

**Daniel Canova and Chris Hall**

Mentor: Dr. Susanne Fox

The cultural Metaphor of America as a school yard bully is a complex metaphor broken down into a few major points. First the concept of the schoolyard as the world stage, and how the bully uses the schoolyard as the world stage. Next the idea of Americas Military Industrial Complex as the size and strength of the bully. Next is how bullies uses other students to do his homework as compared to America uses outsourcing. the next component is the bullies typical lack of intelligence compared to Americas falling standardized test scores. The final component of the metaphor has to deal with the bullies future which typically is limited, in comparison to the United States possible future. These components show validity of the Cultural Metaphor of America as a Schoolyard Bully.

This presentation seeks to show how America, including its history and its people, are best compared to a farmer. America is like a farmer. As Americans seem to be open people, yet prefer some privacy, farmers have large open fields that they gate off to protect what is theirs, and to keep out others. As Americans understand the importance and merits of diversity in population, Farmers understand the need for diversity in what they produce. As Americans are driven towards overall success, A farmer is totally driven by the success of their crops. As Americans take pride in their culture and way of life, Farmers are also proud of their work, their lifestyle, and their farms. As Americans support charity and giving to one another, farmers, at least at one point, engaged in mutualism, or partnerships and shared use of tools with other farmers.

### ***First Friday Marketing Campaign***

**Garrett Kaczmarczyk, Stephanie Bailey, and Mary Ellen Wood**

Mentor: Dr. Ying Zhang

The Downtown Dover Partnership and Wesley College have worked together in past projects, so they helped assist this group with their project. Every first Friday in downtown Dover, the “First Friday” event has been held. However, it has not been as populated as anyone would like, so this group took on the task of creating a marketing campaign to increase awareness of the event on campus, and to integrate Wesley’s campus with downtown Dover. This campaign involved getting discounts for the students in the boutiques and stores downtown, creating flyers and advertisements, securing faculty and staff from Wesley College to perform downtown, securing clubs and organizations to be part of the event, creating surveys to give to merchants to measure the success, and simply increasing awareness of the event overall.

### ***Healthcare and the Internet***

**Christina Schafer and Erika Tanase**

Mentor: Lynn Lofthouse

The average doctor’s appointment lasts approximately 5 to 10 minutes. During this time, patients might not receive all the information they need about their condition. Also, in today’s busy technological age, people want access to quick yet reliable means of finding current and valid information about symptoms and/or treatments for different conditions. Online medical journals and Web MDs are a few of the sources utilized by Internet users who might be curious about symptoms they have or others who are too busy to go to a doctor. We came up with a study that would find out how people use the Internet on the topic of healthcare. We wondered if there would be colossal differences in the age and demographics in usage of medical websites. How trustworthy do younger and elderly people find the Internet?

### ***Students’ Perceived vs. Actual Grade in MA099***

**Carlé Ax**

Mentor: Dr. Derald Wentzien

This study was conducted to determine if the students enrolled in MA099, Basic Math Skills, knew how well they were actually performing in the class. A survey was administered to 117 students in 11 sections of MA099 at the end of November. The students were asked to identify their current grade and the instructors were asked to provide their actual grade at the time of the survey. A Paired-Sample Sign Test was conducted to determine if the students could determine their actual performance. The results indicated that the students did not perceive their true performance; instead the students overestimated their grades. In particular, as students’ actual grades

decreased there was a greater difference between perceived and actual grades.

### ***Predicting Success with Math Diagnostic Test***

**Carlé Ax and Scott Cook**

Mentor: Dr. Agashi Nwogbaga

Diagnostic tests in mathematics are tests that are used to determine if students have the appropriate prior math knowledge to be in a certain mathematics course. In particular, this study tested if diagnostic tests given at Wesley College in Intermediate Algebra course are good predictors of students' success in the course at the end of the semester. We collected a large sample of students and compared their scores in the diagnostic test with their overall score in the course. We made this comparison using a number of statistical tools to confirm and reconfirm our conclusions. In particular, we compared the proportion of people who passed and failed, and performed a paired sample sign test on the data to determine if the diagnostic tests significantly predicted students' success in the course. This study is therefore important to both students and teachers because it helps the students to make informed decisions and assists the teachers in enriching their courses for the greater good of our society.

### ***Student's View on How to Achieve Academic Success***

**Ashley Russell and Charles Bode**

Mentor: Dr. Derald Wentzien

In this study we wish to find out what factors from a given survey are important to student's in obtaining academic success. The student's responses to this survey were compared by the different math courses taken by each student, as well as what grade each student received in that math course. Students in randomly selected math courses, consisting of MA099 (6), MA101(3), MA102(3), and MA108(2), were given a survey at the end of their final exam Fall 2010. The survey consisted of ten factors that the students were asked to rate on whether they believed were important or not in obtaining academic success. In order to compare the answers retrieved by the students, a series of means were calculated for different academic groups, such as; students who earned As, Bs, etc, as well as the different courses taken by the students. The means of each group helped to determine what factors, according to students' grade and the level of the math course taken, were most important to the students success and which were not as important. We also ran a series of T-tests between the different groups of students to also help us compare the means of the different groups. This study will aid Wesley College in the future to show new students what factor's a group of their peers believed to be important in obtaining academic success.

## ***The Effects of Surrounding Land Use on Water Quality of the Choptank River, Maryland***

**Rachel Bozarth**

Mentor: Dr. Bruce Allison and Dr. Lynn Everett

Previous research has shown that land use, primarily agricultural and urban, influences the water quality of surface waters. Agriculture is the dominate land use in the Choptank River

watershed, located in Maryland Eastern Shores. The objective of this research was to determine the water quality of the Choptank River. Water quality measurements were determined from June 19th to October 10th 2010. Nitrates, phosphates, dissolved oxygen and turbidity were measured at six sites and the Stream Visual Assessment Protocol (USDA) was used to rate each sampling site. Significant differences between testing sites were observed, however, a further analysis would be useful in determining if any relationships among tributaries and main-stream sites exist. Nevertheless, the ratings from the Stream Visual Assessment Protocol were a suitable representation of the actual measured water quality based on significant differences between good and poor testing sites.

## ***A Linear Program That Will Schedule Employees More Efficiently***

**Melissa Earley**

Mentor: Dr. Derald Wentzien

Most Operation Management textbooks use a work-force heuristic rule to schedule workers for a service company. A linear program will be developed and tested to determine a quantitative approach to work-force scheduling. The linear program will find an optimal solution if there is one, whereas the heuristic may not find the optimal solution every time. We also expect the linear program to be more efficient with large scale scheduling problems, enabling the company to run smoothly and be more productive in its everyday business.

## ***Chloroformates in Daily Life***

**Gabriel Fernandez and James Welsh**

Mentor: Dr. Malcolm D'Souza

Chloroformates have found use in many aspects of our society. They have the ability to react with amines and alcohols. Chloroformates have been working their way into the agrochemical and pharmaceutical industry. The derivatives of chloroformates, carbamate and carbonate, are mainly used in those two important industries. In the agrochemical industry chloroformates have been used for crop protection. This in return plays an important role in increasing food production, and decreases the amount of insect fragments found within high quality produce. In the pharmaceutical industry they are used for drugs such as Ampiroxicam (anti-inflammatory agent) and Candesartan (used to treat high blood pressure). Chloroformates research is still being conducted today.

## *Database of Common Pesticides and Fertilizers in Delaware*

**Aaron Givens**

Mentor: Dr. Malcolm D'Souza

This project's goal is to create a working and usable database of pesticides commonly found and administered in Delaware. Delaware does a lot of business through the agricultural endeavors of farming crops. The presenting author's family (for many generations) are resident farmers and throughout the course of a season could administer at least one type of pesticide from the eleven distinct classes. However most of the basic information for the pesticides, including water solubility, is sometimes missing from the manufacture's provided data. This project uses the commercial KnowItAll® Informatics System (Bio-Rad Laboratories) to build a database of pesticides containing individual chemical structures, water solubility and available toxicological data. The main goal of the project is to make information of these pesticides more globally accessible.

This project was supported by NIH NCRR INBRE grant number 2 P20 RR016472-10, a NSF-ARI R2 grant (0960503), and a NASA Space Grant NNG05GO92H.

## *Discriminant Analysis of Factors in Wesley College Students' Graduation Success*

**Abdul Hameed**

Mentor: Dr. Frank Fiedler

This honors thesis aims to better understand the factors that influence Wesley College students ability to graduate.

## *A Geospatial Analysis of the Impact of Landuse On Potential Loadings of Nonpoint Source Pollutants to Surface Waters*

**Taylor Hendricks**

Mentor: Dr. Bruce Allison

Recently, the Chesapeake Bay has been scrutinized for poor water quality, including high levels of nitrogen and phosphorus, large algae blooms, low levels of dissolved oxygen, and increased turbidity. Land use contributes to nutrient and sediment loadings to the Bay. The effect of land use on potential nutrient loadings from a smaller sub-watershed can be determined and analyzed with computer models. The Sassafras River watershed, a sub-watershed on the Eastern shore of Maryland, was selected as a study site. The objective of this research was to use the GLEAMS model to simulate how agricultural management practices affect potential nutrient loadings on non-tidal streams in the Sassafras River watershed. The GLEAMS-NAPRA model was used to simulate nitrogen, phosphorus and sediment dynamics. Soil data was found in the STATSGO Soil Survey and chemical use and planting information was obtained from the GLEAMS internal databases and University of Maryland publications. A three crop rotation of corn, winter wheat, and soybeans was simulated using different conservation practices. The outputs were loaded into hy-

drology, erosion, plant growth, and nutrient files then imported into Microsoft Excel and analyzed. Rainfall variation among years affected the amount of runoff and possible loadings. Years with higher precipitation amounts generally had higher nutrient and sediment loadings. The GLEAMS model appears to be suited as an environmental planning tool because the effects of management practices, geographical location, and ecological toxicity can be simulated. The project described was supported by Delaware EPSCoR, through National Science Foundation Grant EPS-0447610 and Wesley College.

### ***Kids in Chemistry***

**Laura Hinkle**

Mentor: Dr. Malcolm D'Souza

Kids in Chemistry is an event designed to stress the importance of chemistry to young children and to give them a hands on experience. This year, we emphasized experiments that brought them "Behind the Scenes" of chemistry. We explained the science behind sand that can't get wet, snow that expands to twice its volume, the making of slime, as well as various others. Our hopes are that the approximately 600 elementary aged children who participated will learn about the wonders of chemistry and develop an interest in the sciences. This remains an important activity in order to further the knowledge of young children in the field of not only chemistry, but also other sciences as well.

### ***Understanding Solvent Effects of $sp$ -hybridized Chloroformate Esters***

**Jaci Knapp**

Mentor: Dr. Malcolm D'Souza

Chloroformate esters such as 2-Butyn-1-yl chloroformate are used as intermediates in the synthesis of carbacephem antibiotics and in herbicidal compositions. Therefore, it is crucial that we understand the reaction of this compound in a variety of different aqueous and organic solutions. This study examined the electronic effects of the R groups in chloroformate esters. In this study, the extended Grunwald- Winstein equation was used to determine the effects of solvent variation of the specific rates of solvolysis of 2-Butyn-1-yl chloroformate and previously studied propargyl chloroformate. The results obtained are consistent with our previous suggestion that these compounds solvolyze by the addition-elimination and SN1 mechanisms, which heavily depend on the solvents ionizing ability and the type of R group present. This work was also presented at the 2011 National ACS Meeting in Anaheim California.

***Which high school math curriculum is more effective in preparing students for college level math courses?***

**Keven Lion and Nicholas Cimino**

Mentor: Mary Jo Benson

We are studying how a college freshman's high school math education has prepared them for college level math classes and why they were placed in a MA099 class. We are analyzing what math curriculum the student followed in high school (traditional, integrated or mixed) and observing which curriculum is more effective in preparing them for college level math courses. We obtained the data by going to each MA099 class here at Wesley and handed out a survey for each student to take. The survey asked the student what type of math classes they took in high school, what state they attended high school, and if they followed a traditional, integrated, or mixed curriculum. We also asked the student what they believed their current grade in the class was, and what their expected grade in the class will be at the end of the semester. We compiled the data in Excel with the students' names hidden for their protection. Our plan is to take this data gathered from the surveys, and compare their final grades with the high school math curriculum and see if these two variables have any correlation. We are ultimately looking to see if the style of math courses taken in high school more or less prepared them for college level math classes. We are going to be constructing various pivot tables that compare the students' final grades with the various high school curriculums to see how well their high school prepared them. We also will be performing multiple Analysis of Variance tests (ANOVA test) for the mean scores of the different states the students are from along with their high school math curriculum and schedule type.

***Italia***

**Alexander Lopuchin and Courtney Davison**

Mentor: Dr. Susanne Fox

This is a photographic exploration of our trip to Italy last Spring. Starting in Rome, the trip covers Vatican City, Naples, Sorrento, Pompeii, and the Amalfi Coast. Through our pictures, we plan to show everyone the wonders of Italy and perhaps convince people to go see them first hand; either with the school or on their own.

***Correlation of the rates of solvolysis of vinyl chloroformate***

**Peter Lorchak**

Mentor: Dr. Malcolm D'Souza

Chloroformate esters have been researched by scientists for many years to try to better understand their pharmacologic capabilities. The idea of pharmacologically active polymers is still at its early stages. However, current research on chloroformate properties (i.e. chemical reactivity, solvent effects, etc.) may provide a clearer picture as to how the compound can be utilized. On completion of the conductometric titrations of vinyl chloroformate, the extended Grunwald-Win-

stein equation is used to analyze the effect of solvent variation on the specific rates of solvolysis. The goal is to identify the reaction mechanism of the compound. By understanding the reaction mechanism, researchers will be able to better utilize the known data and develop enhanced drug and polymer designs. [This project was supported by NIH NCRN INBRE grant number; 2 P20 RR016472-10]

### *Insights into the solvolytic mechanism of alkyl thioesters*

**Brian Mahon**

Mentor: Dr. Malcolm D'Souza

Alkyl thioesters have been shown to be successful precursors in pharmaceutical formulations. Specifically they have been shown to be useful in regards to viricidal drugs and also elastase inhibitors. Thus understanding correlations between solvent effects, chemical structure, and chemical reactivity remains very important. In this study the effects of solvent variation of the available specific rates of solvolysis of tert-butyl chlorothioformate were completed using LFER Grunwald-Winstein equation. previously, it was shown that thioester derivatives of carboxylic acid tend to solvolyze with competing addition-elimination and ionization SN1 pathways. In this particular case, due to the variance in R-group, a unimolecular SN1 mechanism appeared to be favored over the bimolecular addition-elimination pathway. Further data is being gathered to confirm this prediction in order to fully understand the mechanism of solvolysis of tert-butyl chlorothioformate. This research will also be presented at the ACS 241st National Meeting and Exposition.

### *Understanding Reaction Mechanism of 1-Chloroethyl Chloroformate*

**Matthew McAneny**

Mentor: Dr. Malcolm D'Souza

Delaware 1-chloroethyl chloroformate is used in the producing of drug metabolite reference material for forensic toxicological applications (1). Its primary function is once drugs are extracted from human urine they are first subjected to an N-demethylation reaction involving the use of 1-chloroethyl chloroformate. As a result there has been significant interest in its hydrolysis, alcoholysis, and aminolysis processes; as such reactions are useful models for enzymatic mechanisms. The effects of solvent variation of the available specific rates of solvolysis 1-chloroethyl chloroformate, is analyzed in terms of the extended Grunwald-Winstein equation using the NT scale of solvent nucleophilicity (S-methyldibenzothiophenium ion) combined with a YCl scale based on 1-adamantyl chloride solvolysis. Reference: [1] Pelandera, Anna. (1997) Preparation of N-demethylated drug metabolites for analytical purposes using 1-chloroethyl chloroformate. Forensic Science. Vol. 85, Iss. 3: 193-198 [This project was supported by NIH NCRN INBRE grant number; 2 P20 RR016472-10]

## ***The Modeling of Credit Card Charge-Off***

**Patrick McCoy**

Mentor: Dr. Derald Wentzien

The focus of this Scholar's Day Project is study charge off-rates for credit card companies. From studying these charge-off rates, the goal is to create an accurate model of these rates in order to make future predictions. Using reliable websites like the Bureau of Labor and Statistics, and Federal Reserve, economic variable data will be extracted. All data was organized into excel, seasonally adjusted by quarter. Data must be analyzed as a quarterly time period of a year because a lot of the data extracted can vary. Some data will be found quarterly and monthly. It would be impossible to take a quarter average value and extrapolate what each month value could be without certain error.

All data organized will then have regressions tested in order to determine the level or correlation and by what time period. From the best correlation, a model is made.

In the future, newly posted credit card charge-off will be compared to what my model will predict, to see if the model works or not.

## ***Determining Whether Math Pretests can Forecast the Future***

**Adam McGuire, Erich Gillespie, and Patrick McCoy**

Mentor: Dr. Agashi Nwogbaga

Pretests are essential tools used in educational environments to evaluate, assess, and predict a student's learning proficiency in a specific course. Ideally, good pretests should accurately determine how successful a student will be in a course. This means that the scores from the pretest are correlated with the final course the student receives in that class. Using data from a general education math course (MA 108) at Wesley College where the students' overall course grades and their scores on pretests in recent semesters were recorded and provided, we analyzed the data to see if the pretests turned out to be a good predictor of how the students ultimately performed in the course. Good pretests are efficient mechanisms by which educators can tailor their instruction to maximize students' performance and comprehension during a course. This, in turn, serves dual purposes: to help students reduce their costs of education (by taking courses in which they have demonstrated proficiency), and to help the college increase retention (by reducing the number of students who enroll in courses in which they have questionable proficiency).

## ***A Modeling Approach to Evaluate the Effectiveness of Agricultural Best Management Practices***

**Greg McKee**

Mentor: Dr. Bruce Allison

The Sassafras River watershed, which is located in Cecil and Kent County Maryland, and New Castle County Delaware, is comprised of 57% agricultural land and about 5% residential or

industrial land. The Sassafras River Association has documented that the Sassafras River is challenged by nutrient and sediment loading from agricultural runoff. The implementation of best management practices (BMPs) could potentially reduce the loading of pollutants into the Sassafras River. Environmental modeling applications make it possible to predict the reduction of nutrient loading that would result from the usage of best management practices. The objective of this research was to use the Spreadsheet Tool for Estimating Pollutant Load (STEPL) model in the planning of BMPs of cropland. Inputs for this model include the acreage of all land uses in the watershed. A BMP can then be applied to each land use, resulting in the simulations of nitrogen, phosphorus, and sediment loading. The STEPL BMP calculator can be used to plan the spatial configuration of BMPs in a field system. The BMPs tested were contour farming, diversion, filter strips, and reduced tillage farming. For all BMPs simulated, there was a linear decrease in loading at all percentage levels of implementation. Filter strips and reduced tillage farming consistently show the greatest reductions of nitrogen, phosphorus, and sediment. When BMPs were implemented at 33.3%, they generally showed the highest efficiencies when placed in the third position. This project was supported by Delaware EPSCoR, through National Science Foundation Grant EPS-0447610 and Wesley College.

### *Solvolysis*

**Annie O'Connor and Ashley Harmon**

Mentor: Dr. Malcolm D'Souza

Solvolysis is a term used to describe a mechanism in which the solvent, a nucleophile, is also a reactant. While many of these reactions are substitution reactions, elimination and fragmentation reactions can also be a product of solvolysis under certain conditions. Elimination and fragmentation reactions often occur when the reaction takes place at a high temperature or when a strong base is present. Generally, solvolysis reactions are named after the solvent involved in the reaction. Common chemistry terms such as hydrolysis and glycolysis are forms of solvolysis.

### *Effects of Varying Landuse on Macroinvertebrate Diversity in Freshwater Streams*

**Kristopher Roeske**

Mentor: Dr. Kathleen Curran

Many agricultural practices contribute to the degradation of stream water and habitat quality, and subsequently any established macroinvertebrate communities. A paired stream assessment was conducted to compare the health of two streams using macroinvertebrates as pollution indicators. One stream was located within a protected wildlife area; the other was adjacent to an agricultural field. The objectives of the study were to compare the health of each stream and to identify what factors best serve as indicators of poor or high stream quality. Over the summer of 2010, starting on June 24th and ending on August 3rd, basic water quality measurements (water temperature, turbidity, DO, pH, nitrate, phosphate) were taken and a habitat assessment was conducted at both sites. Macroinvertebrate populations were collected using standard EPA protocols and were identified and characterized after all the sampling had been conducted. This information was then used to calculate various metrics pertaining to stream health, and to calculate the Shannon-Weiner

and Simpson index values for both sites. Agricultural land use resulted in higher mean values for turbidity, nitrate and phosphate concentrations, decreased DO and pH levels, impaired riparian buffers, and low diversity among macroinvertebrates. The forested site displayed water quality, riparian buffer, and macroinvertebrate values characteristic of pristine conditions.

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

**Amanda Sanchez and Tiffany Furtak**

Mentor: Dr. Susanne Fox

In order to bring a sense of Irish history and culture back to Wesley College, we will be creating a poster presentation of our trip to Ireland during Spring Break of 2011. Our search for all things that can be characterized as “traditional” Irish culture will be displayed on the poster with a central theme of music. The presentation will include pictures of our personal experience while in Ireland, showing the significance of Irish culture through their history and language and how these aspects influenced their music. Most of our knowledge about traditional music and dancing will be gathered by our interaction with the Irish and the information on the different musical periods that we learned in the “Irish History and Culture” course. The poster will include a combination of the criteria that we learned in class through Irish movies and documentaries, as well as a conclusion on how we interpreted the Irish culture and its importance after visiting the island.

### ***Reanalyzing the Solvolysis of 2,2,2, Trichloroethyl-dimethyl-chloroformate***

**Brandon Sandosky**

Mentor: Dr. Malcolm D’Souza

Chloroformate esters are utilized as intermediates in the synthesis of useful pharmaceutical and agricultural compounds. The manufacturing of such compounds can increase in efficiency by analyzing the reaction mechanism of their intermediates. Previous studies have suggested that 2, 2, 2-Trichloro-1, 1-Dimethylethyl Chloroformate reacts via an addition-elimination pathway. However these studies neglected to observe reaction mechanism in the high ionizing solvents TFE and HFIP with greater than 80% purity. It is suggested that high concentrations of these solvents alter reaction mechanism because of high electronegative effects. The purpose of this study is to reanalyze the mechanism of 2,2,2-Trichloro-1,1,-Dimethylethyl Chloroformate with the addition of these solvents, and observe its rate of reaction at 35o C. This study brings further support to an addition-elimination mechanism in 13 of the 15 solvents studied. 97% and 90% HFIP produced highly variable data which could suggest mechanism in these solvents as SN1 in nature.

## *Using GIS to Select Wind Farm Sites*

**Melissa Savin**

Mentor: Dr. Bruce Allison

As the United States moves toward using renewable energy resources, there is a need to quantitatively analyze regional data to optimize the location of suitable wind turbine sites. The siting of large-scale wind generators is dependent on numerous factors. A geographic information system was used to analyze geospatial data to determine the best locations to site a wind energy farm in Colorado. Data for this project was accessed and downloaded for Colorado. Data layers used in this geospatial analysis included location and size of cities; location of the Continental Divide, state highways, interstates, federal lands, rivers, and counties; spatially distributed wind energy and speed; DEMs and demographic data from Census.gov. The data was stored, accessed, and analyzed using ArcGIS 9.3.1. The specific location criteria were: • Wind Power Class of at least 4 • Less than 5 miles from a highway, for easy access and maintenance • Less than 50 miles from a city containing at least 25,000 people, to ensure a nearby target market • Not on Federal Land • On land that is at least 1 square kilometer in size, large enough for a wind farm. Spatial patterns that were found appeared to suggest that a suitable location existed on the eastern side of the Continental Divide. Due to the proximity to large cities, highway access, lack of federal land use and reservations, and strong prevailing winds; the Front Range provided an ideal wind farm site location.

## *Stabilizing Neonates: The Need For More Effective Pain Management in Neonatal Intensive Care Units*

**Julias Vekasy**

Mentor: Dr. Nancy Rubino

Neonatal pain management is virtually a new concept to the world of medicine. It was once believed that a neonates' anatomies were not formed enough to feel the sensation of pain. Through thorough research and studies, this pretense has been proven to be false. The results of research studies conducted by nurses, provide the answer to the question: in a neonatal intensive care unit, will pain management being provided in either a pharmalogical or nonpharmalogical manner, allow vital sign values of the neonate to remain in the safe clinical range? The lack of policies and protocols leaves a nurse to operate in a unit in constant battles with ethical and moral dilemmas, questioning how it is ok to inflict pain on a helpless infant. The evidence based findings in research studies have concluded that there is a definite need for pain management standards in the neonatal intensive care units operating around the world.

*Style or Substance? How the Technical Evolution of Special Effects in Film has Impacted American Moviegoing Culture*

**Chris Agar**

Mentor: Dr. Jessica James

“Style vs. Substance: The Evolution of Special Effects in Film and Their Impact on Movie Making” chronicles the technical evolution of special effects in movies, specifically focusing on the time period of 1975-present. The paper discusses in detail the technical advancements that have taken place since the early days of cinema, briefly touching on early techniques such as stop-motion animation and matte paintings. The bulk of the paper describes how movies such as *Jaws* and *Star Wars* not only changed how movies were made but also how they impacted the entire industry. *Jaws* and *Star Wars* were extremely successful both critically and commercially and ushered in a new era of exciting action movies. The works of Steven Spielberg, George Lucas, and James Cameron were highly influential during this time. Nearly every movie these legendary filmmakers released had groundbreaking visuals and made millions of dollars, but also featured engaging plots, showing executives that audiences craved thrills and stories. The third section of the paper deals with the aftermath of *Jurassic Park*’s computer generated imagery revolution and how filmmakers used the new computer technologies to create movies that had outstanding visuals, but lacked the heart and emotion of effects-heavy films of the past. Many blockbuster films today are oversaturated with action sequences and effects and very thin on plot and character development. Also in this section, the works of Peter Jackson, Christopher Nolan, and JJ Abrams are analyzed. These modern directors are the leaders of a select group of filmmakers who try to meld substance with style. Their critical and box office success shows, despite the allure of special effects, moviegoers still appreciate a good story.

*Importance of Mathematics in Entertainment*

**Ben Barile and Marquese Proctor**

Mentor: Dr. Agashi Nwogbaga

The importance and uses of mathematics in the sciences and engineering are well known. What is usually not so obvious is, as aptly stated in *Numb3rs*, that “we all use mathematics everyday” in handling money, analyzing crimes, detecting patterns, predicting behavior and in so many other ways. In this work, we examine and analyze the importance and uses of mathematics in the entertainment industry. Specifically, we will show how mathematics is used in different areas of entertainment including the areas of music, sports, video games, games like Sudoku, movies, animatronics, love relationships, and poetry. Furthermore, smart phones are an important part of the entertainment industry today because of the games, movies, and internet capabilities a phone possesses. Consequently, in this project and apart from explaining the importance of mathematics, we will use statistical hypothesis to test an industry claim about the use of smart phones. Overall, this project shows the significance of mathematics in entertainment, and thus underscores the importance of mathematics in our lives.

## *Export Efficiency Comparisons: A Country Level Analysis*

**Chelsea Pratt, Songphon Kannasut, Abdu James, Paola Garces,**

**Christopher Donisi, and Travis Vogl**

Mentor: Dr. Kraiwinee Bunyaratavej

In order to successfully export, the country has to have advantages that will be gained through exporting and use these advantages efficiently. Top exporters have strengths and weaknesses in producing goods and services. One nation needs different inputs to produce final products. China is a leading exporting country because it uses its strength and produces goods and services at the lowest cost. The question becomes whether or not China is the most efficient exporter. In this paper, we examine the top 26 exporter countries in order to see their export efficiencies. We have broken down what determines a country's potential involvement in trade practices by focusing on a country's wage, capital, technology level, and productivity. We have developed two hypotheses and used Data Envelopment Analysis (DEA) to explore the export efficiencies of these countries. By analyzing the export determinants, we also applied the trade theories of Adam Smith and David Ricardo, as well as H-O theory.

## *Foreign Direct Investment Determinants: The case of the United States and China*

**Evan Day, William Sutton, Daniel Canova, and Ashley Murphy**

Mentor: Dr. Kraiwinee Bunyaratavej

Foreign Direct Investment (FDI) refers to long term investment by a firm from one country to other countries. There are two types of FDI: inward FDI and outward FDI. In this paper we will focus on inward FDI of two countries namely the United States and China. To be more specific, we will investigate the determinants of the inward FDI to these two countries which represents developed and developing countries. Using a multiple regression, we will examine the following FDI determinants--market size, infrastructure, natural resources, and economic freedom. We found that the motivations for the FDI inflows are different between the two countries. In the U.S., increasing the market size and the level of economic freedom helps increase the FDI inflows while in China, improving the level of infrastructure is more important.

## *Amazing Contributions of Women in Mathematics*

**Azure Johnson and Jessica Curry-Keith**

Mentor: Dr. Agashi Nwogbaga

When people think of famous mathematicians that have created and impacted our studies of mathematics, most of the people thought of are men, like Aristotle, Euclid, and Pythagoras, just to name a few. Without doubt, these men are great mathematicians whose accomplishments are truly amazing. However, there are many women that have played important roles in mathematics as well. Women who have impacted mathematics and their discoveries date back to the early centuries A.D, and some earlier in B.C. Hypatia, a female mathematician from the fourth cen-

tury, and Maria Gaetana Agnesi, a female mathematician from the eighteenth century, are a few women to name who have had major discoveries in the field of mathematics. Shakunatala Devi is a woman and a famous mathematical genius from India. Her mathematical prowess is legendary. She is known worldwide as the ‘Human Computer’ because of her extraordinary talent and skill in solving complicated math problems in her mind. For instance, she can compute the cube root of 332812557 in less than a minute and multiply two 13-digit numbers like 7686369774870 x 2465099745779 in less than half a minute. This project is done with help of countless online resources, encyclopedias and books. This topic is important today in our society for a number of reasons. It shows that not all the important discoveries in math are from men only. It is very instructive for those who aren’t aware of these women and their discoveries. Furthermore, it serves as an inspiration to motivate current students to work hard when we bear in mind that many of these women achieved all they did by overcoming a lot of obstacles and barriers.

### *African American Stereotypes*

**Chardiney Wood**

Mentor: Dr. Jessica James

The project is an oral presentation with a Microsoft PowerPoint of fourteen different slides. The presentation can be divided into three separate parts. First the presentation begins by actually defining of stereotypes. In regards to the background and history specifically with African Americans the audience can have a further understanding. Secondly the presentation illustrates primary examples of African American Stereotypes. Thirdly the presentation ends with Famous films with key stereotypes from past to present. The examples of *The Birth of a Nation* and *Crash* are used to connect society’s stereotypes with old and more new films. The purpose of the presentation is to simply enlighten audience members of the history behind stereotypes specifically amongst the African American race in film and different aspects of the media. The course of African American History focused on the growth and transformation throughout the decades that the entire race makes when living amongst American society.

### *Disregarded, Degraded, and Disrespected: How Racism Worsened in the Northeastern United States from the 1950s into the early 1970s*

**Jim Dorton**

Mentor: Dr. Linda DeRoche

How have the majority of white Americans viewed their black counterparts? Is racism really worse in the south than in the north? These are not simple questions nor do they have simple black and white answers. There have been many changes in this perspective from the days of slavery until today. As we near the end of the twenty-first century’s first decade, interracial perspectives, particularly white to black, though not perfect, certainly appear better than ever. But the differences have not been the result of a steady progression, but rather a series of jagged increases and decreases, punctuated by violent bursts of social activity and change. Racial tension peaked during these eras of change, and white versus black racism often worsened before it improved. Parts of three twentieth century decades – the fifties, sixties, and seventies – saw of some of the

most tumultuous changes in this area and exemplify this notion of drastic, up and down changes. There were changing perspectives of black Americans by all white Americans from the 1950s into the early 1970s. However, during this period of the most strident attempts for racial equality, racism became worse in the North.

***Abortion & Its Effects on the American Home***

**Victoria Hall**

Mentor: Dr. Jessica James

My paper and my presentation discuss the ideas of birth control and abortion in the 20th Century. It does not present one idea or the other as morally right or wrong, it is simply a timeline of women's reproductive rights through the 20th Century. There is also a focus on the women's movement as well as the politics involved in the debate of women's choice of reproduction. Pro-life and pro-choice ideas are presented, however not debated, in this look at reproductive rights in women's history.

***A Canadian at War: The Wartime Exploits of Chancy Morey, Royal Canadian Air Force***

**Eric Czerwinski**

Mentor: Dr. Susanne Fox

Presentation will be an oral discussion with Power Point slides based on a paper done for my Historical Professions Internship. The material covers the service of Chancy Morey, a Bombardier of the Royal Canadian Airforce who flew 27 missions over Germany during World War II. His life on a farm in Alberta Canada during his childhood and his participation in the major raids on the Ruhr as well as the famous Peenemunde raid on the German rocket site will be explained. The presentation will also feature the methods and sources used to complete the paper, including a trip to the Public Records office at Kew, London, several phone calls with Chancy's 88 year old brother and access to his service records. To round up the presentation, Chancy's medal group will be displayed.

***Expatriate Philosophy in The Sun Also Rises***

**Nicholas Hancock**

Mentor: Dr. Linda DeRoche

The essay is a look at the expatriate as it appears as a character type in *The Sun Also Rises* and a few other Hemingway works. The paper is done, but I plan to expand it and I may include more Hemingway works than I originally wrote about for class, so I'll need to change the summary and probably the title.

## Scholars Day Participants

Chris Agar of Felton, DE  
Carlé Ax  
Clemente Bacote  
Stephanie Bailey  
Ben Barile  
Aaron Benson  
Charles Bode  
Rachel Bozarth  
Daniel Canova of Ocean City, NJ  
Nicholas Cimino  
Steven Cook  
Jessica Curry-Keith  
Eric Czerwinski  
Courtney Davison  
Chloe Dawson  
Contemporary Music Ensemble  
Evan Day of Sewell, NJ  
Christopher Donisi of West Deptford, NJ  
Rev. James M. Dorton Jr. of Camden, DE  
Melissa Earley  
Gabriel Fernandez  
Tiffany Furtak  
Paola Garces of Bayonne, NJ  
Antonio Gary  
Erich Gillespie  
Aaron Givens  
Chris Hall  
Victoria Hall  
Abdul Hameed  
Nicholas Hancock  
Ashley Harmon  
Taylor Hendricks of Havre de Grace, MD  
Abby Hill  
Laura Hinkle of Rehoboth Beach , DE  
Amanda Horkey

Abdu J. G. James IV of Landover Hills, MD  
Azure Johnson  
Garrett Kaczmarcyk  
Songphon Kannasut of Bangkok, Thailand  
Jaci Knapp  
Alissa Kolanko  
Keven Lion of Newark, DE  
Alexander Lopuchin  
Peter Lorchak  
Brian Mahon  
Kim Manahan  
Matthew McAneny  
Patrick McCoy of Camden, DE  
Adam McGuire of Dover, DE  
Greg McKee of Dover, DE  
Ashley Murphy of Dover, DE  
Annie O'Connor  
Chelsea Lynn Pratt of Rock Hall, MD  
Marquese Proctor  
Kristopher Roeske  
Ashley Russel  
Jonathan Salacuse  
Amanda Sanchez of Lumberton, NJ  
Brandon Sandosky  
Melissa Savin  
Christina Lynn Schafer of Middletown, DE  
William Sutton of Washington, DC  
Erika Tanase of Dover, DE  
Julias Vekasy  
Travis Vogl of Harrington, DE  
Megan Watson  
James Welsh  
Wesley College Choir  
Chardiney Wood  
Mary Ellen Wood of Queen Anne, MD

## Extended Biographies

Chris Agar

Chris Agar is from Felton, DE. He is a media arts major at Wesley graduating in May 2011.

Daniel Aloysius Canova jr.

Dan Canova is a history major under the tutelage of Dr. Fox. Before joining Wesley College he attended Ocean City High School.

Rev. James M. Dorton Jr.

Jim Dorton is Associate Pastor at the Wyoming United Methodist Church. He is married to Kathy and they have four children.

Kim Manahan

Born in 1988, Kim Manahan grew up on Long Island, New York, and began attending Wesley during the fall of 2006. She's graduating this spring with a double major, in Media Arts and Political Science.

She's been writing for the campus newspaper, The Whetstone, since her freshman year, and has been editor-in-chief for the past year and a half.

She will be interning at the Delaware News Journal this summer.