

**ASSUMPTION COLLEGE**



18th Annual

# **Undergraduate Symposium**

**April 16 & 17, 2012**



# ASSUMPTION COLLEGE

## Office of the Provost and Academic Vice President

Welcome to the 18<sup>th</sup> *Annual Undergraduate Symposium*, highlighting the research and scholarly achievements of Assumption students working in collaboration with dedicated faculty mentors. These collaborations represent a model for integrating teaching, original research, and the beneficial effects of peer review in promoting intellectual development and professional growth. The *Symposium* provides the campus community the opportunity to gain a greater appreciation of the individual and collective accomplishments of our faculty and students, as well as to applaud those achievements.

I hope that you enjoy and profit from viewing the posters, hearing the papers, and speaking with the authors of this impressive work.

Sincerely,

Francis M. Lazarus  
Provost and Academic Vice President

# Undergraduate Symposium

*La Maison Française Auditorium &  
Testa Science Center Fuller Auditorium and Atrium*

## Program Schedule

**Monday, April 16, 2012**

Time	Event	Location
11:30 a.m.	Arrival & set-up	La Maison Auditorium
12:00 p.m.	Welcome Dr. Francis Lazarus, Provost	La Maison Auditorium
12:00-1:15 p.m.	Presentation Session I	La Maison Auditorium
1:30-2:45 p.m.	Presentation Session II	La Maison Auditorium

**Tuesday, April 17, 2012**

Time	Event	Location
12:00 p.m.	Luncheon for student presenters and mentors with greetings from Dr. Francesco Cesareo, President	Hagan Hall
12:20-1:15 p.m.	Keynote Address, <i>Undergraduate Research: Why Not Begin with Some Great Problems?</i> , by Dr. John Orr, WPI	Hagan Hall
1:30-2:30 p.m.	Poster Session I	Testa Atrium
2:30-4:00 p.m.	Presentation Session III	Testa Fuller Auditorium
4:15-5:45 p.m.	Presentation Session IV	Testa Fuller Auditorium
5:45-6:45 p.m.	Poster Session II	Testa Atrium



## **Dr. John Orr**

Professor, Electrical &  
Computer Engineering  
WPI

***Keynote Speaker***

**Dr. John A. Orr** received his B.S. and Ph.D. degrees in Electrical Engineering from the University of Illinois, Urbana-Champaign, and his M.S. degree in Electrical Engineering from Stanford University. He joined the faculty of WPI in 1977 and served as head of the Electrical and Computer Engineering department from 1988 to 2003.

From 2006 to 2008, Dr. Orr served as Dean of Undergraduate Studies at WPI, a period that saw the launch of an enhanced first-year undergraduate experience that included the Great Problems Seminars, a program designed to introduce students to the type of open-ended project work that will form the core of their academic experience at WPI. From 2008 to 2010, he served as Provost.

His accomplishments as an educator and innovator have won Dr. Orr a number of distinguished honors. He was made a Fellow by the IEEE (Institute of Electrical and Electronics Engineers) in recognition of his contributions to engineering education, including the development of project-based education and the renowned global projects programs at WPI by ASEE (American Society for Engineering Education).

Dr. Orr's research interests span several aspects of digital signal processing. In the aftermath of a deadly 1999 warehouse fire in Worcester, he inaugurated a major research program at WPI that has led to the development of a groundbreaking system that can track the movements of first responders in three-dimensions inside buildings and monitor their physiological health. The research program has garnered more than \$5 million in federal support and spawned the only national workshop on indoor personal location and physiological monitoring, which WPI has hosted for the past six summers.

# Presentation Session I

Monday, April 16, 2012

*La Maison Auditorium*

Time	Presenter	Title
12:00 p.m.	Gianna Gugliotti '13	Development of the Arthurian Legend Through Narrative Interiority
12:15 p.m.	Nicholas Frazier '12	Boy Meets World
12:30 p.m.	Emily Fabbricotti '12	The Early 19th Century Window in Richardson's Pamela
12:45 p.m.	Stephanie Giguere '12	The Weeping Widow: A Closer Look at Nineteenth Century American Women in Mourning

# Presentation Session II

Monday, April 16, 2012

*La Maison Auditorium*

Time	Presenter(s)	Title
1:30 p.m.	Ryan Glode '12	Lost and "Fond": An Investigation of Nostalgia as Emotion Regulation
1:45 p.m.	Erin Fitzgerald '12	Emotion Regulation in the Context of Crisis: An Examination of Cognitive Reappraisal and Expressive Suppression in the Aftermath of the 2011 Earthquake, Tsunami, and Nuclear Crisis in Japan
2:00 p.m.	Alexandra Cassidy '12	From Research to Practice: Putting Bullying Prevention to the Test
2:15 p.m.	Megan Libbey '13	Transnational Education and Awareness Via Spanish Film
2:30 p.m.	Mark Mulligan '12 & Holly Rivard '13	Difference Feminism: An Interview for the Worcester Women's Oral History Project

**Poster Session I**  
**Tuesday, April 17, 2012**  
*Atrium, Testa Science Center*

Time	Presenter	Title
<b>1:30-2:30 p.m.</b>	Lauren Morocco '12	Hair Today, Gone Tomorrow: The History of Mourning Jewelry from the 18th – 21st Century
	Erin Rodrigues '12	How Fashion on College Campuses Helps Form Social Groups
	Alison Marinelli '12	College Students: Attitudes, Beliefs, and Behaviors Related to Noise Induced Hearing Loss
	Jeffrey Starr '12	Ideology and Faith
	Amanda Carchedi '13	Culture of Design: The Life and Influence of David Carson
	Kirsten Chirichetti '12	Adults' Attachment to Romantic Partners: The Role of Attachment to Caregivers and Perceptions of Co-parenting and Marital Quality in Adults' Families of Origin
	Ashley Januszewski '13	Exploring the Relationship Between Parent-Child Interactions and Gross and Fine Motor Skill

**Presentation Session III**  
**Tuesday, April 17, 2012**  
*Fuller Auditorium, Testa Science Center*

Time	Presenter	Title
2:30 p.m.	Nicole Savi '13	Perception of Suffering: The Aftermath of Chernobyl
2:45 p.m.	Paula DeCosta '13	The Soviet-Afghan War: Government Propaganda and Soldiers' Stories

**Presentation III**  
**Tuesday, April 17, 2012**  
*(continued)*

<b>Time</b>	<b>Presenter</b>	<b>Topic</b>
3:00 p.m.	Patrick Williams '12	The Conflict with Joseph Kony's Lord's Resistance Army and Central Africa: Challenges to Peace and Potential Solutions
3:15 p.m.	Jordan Sweigart '14	Fraud, Young Accountants, and the Global Business Environment
3:30 p.m.	Shafayet Khan '12	Investigating Buying Cartels and Market Volatility in the Dhaka Stock Exchange
3:45 p.m.	Brianna Murphy '12	"Turning o' the tide": Teaching American Civics Through the British History Plays of William Shakespeare

**Presentation Session IV**  
**Tuesday, April 17, 2012**  
*La Maison Auditorium*

<b>Time</b>	<b>Presenter(s)</b>	<b>Title</b>
4:15 p.m.	Joseph Provost '13	How Do Neuropeptides Contribute to the Functions of the Nervous System?
4:30 p.m.	Sarah Powell '12 & Amrit Vinod '13	Does the Developing Nervous System Have its Own GPS?
4:45 p.m.	Zachary DeLoughery '12 & Jenna Garozzo '13	Netrin Interacts with Intergrin Receptors on Neuronal Growth Cones
5:00 p.m.	Erin Gombos '12	Thermal Transport Properties of Melt-Shear Oriented IPP/Carbon Nanotube Thin Films
5:15 p.m.	Stephanie Bouley '13	Dissecting the Role of BK Virus in Host Cells
5:30 p.m.	Christopher Brand '12 & Garrett Doherty '12	Stump Sprout Development of Northern Red Oak and Red Maple

**Poster Session II**  
**Tuesday, April 17, 2012**  
*Atrium, Testa Science Center*

Time	Student Name(s)	Title
<b>5:45-6:45 p.m.</b>	Michael Weselcouch '14	A My(s, t)erious Positivity
	Courtney Donovan '13 & Jeff Kmietek '13	Environmental Preferences of Forest Understory on Assumption College Campus
	Kathryn Wirzbicki '12	The Effects of Environment on White Wine Fluorescence and Characterization Using EEM
	Robert DiGiammarino '12	Sensory Processing and Attachment Related to Eating Competency in Infancy
	Erin Gombos '12, Gajinder Hoonjan' 12 & Amrit Vinod '13	Isotactic Polypropylene - Carbon Nanotubes Multifunctional Polymer Nanocomposite
	Kirsten Chirichetti '12	Parental Perceptions of Their Coparenting Dynamics and Infant Temperament
	Melysa Faria '12	Observer Versus Caregiver Ratings of Infant Temperament

***ABSTRACTS***

**Presentation Session I**

***Development of the Arthurian Legend Through Narrative Interiority***

Gianna Gugliotti '13, English

Focusing on the episode of the Giant of St. Michael's Mount, I argue that by comparing Wace's "Roman de Brut" and Layamon's "Brut" against Geoffrey of Monmouth's "History of the Kings of Britain", one



could track the development of narrative interiority in relation to the spreading of the Arthurian Legend. Despite the change in language and location of the authors, each text follows the same pattern of events, notably Bedivere's conversation with an old woman and Arthur's fight with the giant; the most significant changes stem from the amount of interiority. Examination shows that both Wace and Layamon use increasing amounts of interiority, moving their work towards medieval romance narratives and away from Geoffrey's epic narrative. While Wace's narrative blatantly represents a proto-romance, Layamon's work is difficult to categorize due to its return to epic themes until using interiority as the basis for the evolution of narrative, as it reveals a growth of interiority. With little research on narrative in these works, I suggest that using this episode as evidence, further study of interiority in reappearing scenes offers a traceable development of narrative through the Arthurian Legend.

*Faculty Mentor: Dr. Bryan Carella*

### ***Boy Meets World***

Nicholas Frazier '12, English

When introduced to someone as an English Writing Mass Communications major, there is always the response, "What do you do with that?" Last semester in Professor Land's Senior Seminar class, I spent my time learning what one could do with English after graduation. This class required the production of three radio shows. This process developed and taught skills, which could not be learned in a classroom. As well, it introduced Po Bronson's "What Should I Do With My Life" which forces its readers to answer not what do you want to do or what do you like to do, what should you do? The final requirement was to produce an audio documentary, which parallels what has been learned from Bronson, what can be learned from an individual who demonstrates similarities with an individual from the text and how it can be applied to our personal life. By using the tools and skills I acquired in Professor Land's class, this presentation encompasses the well-rounded world of being an English major. It gives us the tools to succeed in many different fields.

*Faculty Mentor: Dr. Michael Land*

## ***The Early 19th Century Window in Richardson's Pamela***

Emily Fabbicotti '12, English

The innovation of the sash window style in the late 18th century, specifically in London, brought new societal and legal ramifications to the public. While the emerging middle class could flaunt their social status by installing the modern sash window, criminals were using the windows to create new ways to commit breaking and entering crimes. With a heightened social awareness of the window, it became a new vehicle of symbolism in the flourishing literary medium, the novel. Samuel Richardson's *Pamela* is one such novel that explores the spatial limitations and psyches of its characters through symbols involving windows.

*Faculty Mentor: Dr. Rachel Ramsey*

## ***The Weeping Widow: A Closer Look at Nineteenth Century American Women in Mourning***

Stephanie Giguere '12, History

Paper focusing primary research performed at the American Antiquarian Society. The paper explores gender biases in Nineteenth Century American mourning rituals.

*Faculty Mentor: Dr. Carl Keyes*

## **Presentation Session II**

### ***Lost and "Fond": An Investigation of Nostalgia as Emotion Regulation***

Ryan Glode '12, Psychology

This study investigated the nature and frequency of nostalgic experiences, the relationships among nostalgia, loneliness, and well-being, and whether nostalgia can serve as a method of emotion regulation. In a survey phase of the experiment, we solicited feedback on the frequency and nature of nostalgic experiences from a wide range of participants recruited via social networking. In an experimental phase, we exposed participants to a sad mood induction and then

randomly assigned them to either a nostalgic memory reflection or an ordinary event reflection. We will present data on the impact of nostalgic memory reflection (versus ordinary event reflection) on mood ratings and psychophysiological response.

*Faculty Mentor: Sarah Cavanagh*

***Emotion Regulation in the Context of Crisis: An Examination of Cognitive Reappraisal and Expressive Suppression in the Aftermath of the 2011 Earthquake, Tsunami, and Nuclear Crisis in Japan***

Erin Fitzgerald '12, Psychology

Emotion regulation (ER) is an important predictor of psychological functioning. However, little work has investigated the relationship between ER and culture in the context of crisis. In this study, Japanese and American members of the United States Embassy Tokyo community self-reported on ER strategies used in everyday life and psychological functioning following the March 11th, 2011 earthquake, tsunami, and nuclear crisis. They also completed a survey-based assessment of their ability to change their emotional response to negative (disaster-related) and positive pictures. Findings revealed that while there were important differences in the ability of Japanese and American participants to regulate their negative emotions during the picture-based survey, the best predictor of posttraumatic symptomatology for all participants was self-reported use of expressive suppression in daily life.

*Faculty Mentor: Dr. Sarah Cavanagh*

***From Research to Practice:  
Putting Bullying Prevention to the Test***

Alexandra Cassidy '12, HSRS

Recent legislation in many states of the United States mandates that schools create anti-bullying policies and procedures to combat this problem. This study examines the anti-bullying policies, procedures, and curricula currently used within four schools in Massachusetts and Connecticut to garner an understanding of whether these are designed based on current research and best practices. A review of relevant

literature was conducted to determine criteria by which best practices would be evaluated. The four school systems within Connecticut and Massachusetts were chosen for their diversity of student body, location, and private religious versus public affiliation. A thematic analysis was performed on each of these school systems anti-bullying programs using the Olweus Bullying Prevention Program as today's best practices gold standard. Differences between current programs were found and explored.

*Faculty Mentors: Dr. Cinzia Pica-Smith & Dr. Scott Tyner*

### ***Transnational Education and Awareness Via Spanish Film***

Megan Libbey '13, MCLC

An examination of how Spanish director Iciar Bollain, through her films, raises awareness of social issues and educates audiences on their prevalence and potential solutions. Her films incorporate reaction shots, contrasting scenes, and other techniques that cause her audiences to connect emotionally with certain characters, thereby highlighting major current issues pertaining to Spain from multiple perspectives.

*Faculty Mentor: Dr. Dona Kercher*

### ***Difference Feminism: An Interview for the Worcester Women's Oral History Project***

Mark Mulligan '12 & Holly Rivard '13, History

The Worcester Women's Oral History Project (WWOHP) aims to collect interviews of women in the Worcester area in order to make them available to researchers at the Schlesinger Library at Harvard. As a contribution to this goal, we conducted an interview with a woman who has lived in Worcester for most of her married life, working for her husband's company and raising two children. Drawing on a variety of feminist writings, we analyze our interviewee's ideas about marriage, employment, parenting, and other issues pertinent to women's experiences. She incorporates both a belief in the "natural" differences between men and women as well as a belief in the equal treatment of men and women in the workplace in her perspective. Her interview

contributes to a better understanding of women's experiences during the twentieth and early twenty-first century.

*Faculty Mentor: Dr. Carl Keyes*

## **Poster Session I**

### ***I-A. Hair Today, Gone Tomorrow:***

#### ***The History of Mourning Jewelry from the 18th – 21st Century***

Lauren Morocco '12, History

I will be presenting a research piece about mourning jewelry and accessories from the 18th-21st century. The goal of my presentation is to explain what mourning jewelry was, how it was made, and why it was popular. There will be an emphasis on hair devices. My research is compromised of primary sources found at the American Antiquarian Society regarding the production of mourning jewelry and secondary sources discussing the cultural ideology behind the pieces themselves. Through this, I hope to bring to light this fad that has been nearly entirely forgotten about over time.

*Faculty Mentor: Dr. Carl Keyes*

### ***I-B. How Fashion on College Campuses Helps Form Social Groups***

Erin Rodrigues '12, Anthropology

My hypothesis is that what college students decide to wear on their college campuses help form the social groups that they belong to. For the Spring 2012 semester an ethnographic study was conducted using both photography and interviews with students to explore connections between students' style choices and their social groups. The methods used for the study were: participant observation, snowball sampling technique for recruiting participants to interview, semi-structured interviewing and photography to provide visual data for anthropological analysis. Photography is important in this study because it is being analyzed from a visual anthropology approach. Visual anthropology is the study of people and culture through pictures and video which help to explain what words cannot. The study was

conducted on the campuses of Assumption College, Worcester Polytechnic Institute, College of the Holy Cross, Becker College and Clark University over the months of February and March 2012.

*Faculty Mentor: Dr. Amy Gazin-Schwartz*

***I-C. College Students: Attitudes, Beliefs, and Behaviors Related to Noise Induced Hearing Loss***

Alison Marinelli '12, HSRS

Noise Induced Hearing Loss (NIHL) is the progressive loss of hearing due to consistent exposure of loud noise and/or the sudden loss of hearing due to acoustic trauma. Unfortunately, current research has documented rising rates of NIHL in today's society. Much is known about individual listening environments that are risk factors for NIHL, but hearing scientists and audiologists lack any solid understanding of how individuals act in accordance with said risk factors. One group of individuals that is absolutely at risk for NIHL is the college population. This research attempts to gather more information about the attitudes, beliefs and behaviors of college students regarding NIHL. 110 students at a small liberal arts college in Massachusetts completed a study with questions created to evoke the true attitudes, beliefs and behaviors of college students toward NIHL. Preliminary results show an awareness of noise induced hearing loss and protective listening behaviors, but a correlation between awareness and behaviors does not necessarily exist.

*Faculty Mentor: Dr. Susan Scully-Hill*

***I-D. Ideology and Faith***

Jeffrey Starr '12, Political Science

Studying the aspects of human nature that lead the many to participate in and be seduced by totalitarian ideological movements and how societies can fall victim to ideological revolutions. Examples discussed include Jacobinism in France, Communism in Russia, and modern radical Islamic ideology.

*Faculty Mentor: Dr. Daniel Mahoney*

### ***I-E. Culture of Design: The Life and Influence of David Carson***

Amanda Carchedi '13, Graphic Design

David Carson is one of the most influential designers of the 21st Century and continues to change the way the world and graphic designers view art. His influence on any new designer is undeniable in his quest to design from experience and nature. The poster aims to celebrate one of the most influential designers of our time. The research includes his influence on the world of graphic design, especially generation X for whom he designs. Carson's influence can be seen in any young designer aiming to obtain a degree in art both at Assumption and around the world.

*Faculty Mentor: Prof. Scott Glushien*

### ***I-F. Adults' Attachment to Romantic Partners: The Role of Attachment to Caregivers and Perceptions of Co-parenting and Marital Quality in Adults' Families of Origin***

Kirsten Chirichetti '12, Psychology

This study explored whether adults' attachment to caregivers, coparenting, and marital quality experienced in the family of origin are associated with qualities of their attachment to romantic partners. Participants were comprised of 51 undergraduate students who were in on-going romantic relationships. Findings indicated that the only direct association between romantic attachment and family-of-origin experiences involved adults' attachment with their caregivers. Individuals who reported lower levels of maternal overprotection in their families growing up experienced their romantic relationships as more caring and less controlling. In addition, marital conflict experienced in their family of origin combined with attachment to caregivers was also associated with adults' romantic attachments. Individuals with a generally secure outlook on attachment relationships came from families with greater paternal care and less marital conflict, self-blame, and perceived threat due to parental conflict compared to individuals with less secure general attachments. Perceptions of coparenting experiences in the family of origin were neither directly nor indirectly related to adults' romantic attachments. Future research

should focus on utilizing multiple assessment tools to measure the complex and interrelated factors influencing romantic attachment.

*Faculty Mentor: Dr. Regina Kuersten-Hogan*

***I-G. Exploring the Relationship Between Parent-Child Interactions  
and Gross and Fine Motor Skill***

Ashley Januszewski '13, Psychology

This project explores the relationship between parenting style, gross motor skill and fine motor skill in 12-month old children. Parent-child interactions were coded during free-play activities, snack time, and a structured play spoon-using task from the Transition to Parenthood data set. Walking experience was used as an index of gross motor skill and motor skill in using a spoon was coded from the spoon-using task video as an index of fine motor skill. Results revealed that parental praise and affection, use of directives, and questions and requests were positively correlated with gross motor skill but not fine motor skill. In addition, gross motor skill and fine motor skill were not correlated with each other. These results support past research that suggest the interaction between parents and children changes once infants begin walking. Interestingly, however, the same is not true for fine motor skill. The lack of a relationship between gross motor skill and fine motor skill raises important questions for understanding whether these behaviors develop independently of each other or whether they reflect separate developmental trajectories that develop in parallel.

*Faculty Mentor: Dr. Paula Fitzpatrick*

## **Presentation Session III**

***Perception of Suffering: The Aftermath of Chernobyl***

Nicole Savi '13, History

On April 26, 1986, the greatest nuclear power plant disaster, known as the Chernobyl disaster, spread throughout much of the Soviet Union and subsequently Western Europe taking the lives of many people. Despite an attempt to shut down an unexpected power



malfunction, another sudden power surge caused the explosion, and massive amounts of radioactive materials immediately began to fill the air. In many societies, men are seen as the “protectors,” and a greater responsibility was placed on them to volunteer their efforts in the immediate clean up of Chernobyl. Although this meant that the men were exposed to the most radiation and faced unimaginable suffering, historians have argued that women, who were left to run the household and continue to assume their domestic duties, suffered just as much, if not more than the men did. Looking at gender roles during and after Chernobyl, did men and women perceive their suffering as equal? While women were left vulnerable to radiation exposure and to grieve the loss of their husbands (i.e. emotional suffering), men were urged to leave their families to help clean up the disaster, and their return home left an overwhelming sense of uncertainty for them and their wives. The unintended consequences of the Chernobyl power plant disaster forces one to investigate the gender roles in a time of heightened fear, anxiety and crisis.

*Faulty Mentor: Dr. Irina Mukhina*

***The Soviet-Afghan War:  
Government Propaganda and Soldiers' Stories***

Paula DeCosta '13, History

In 1979 the Soviet Union invaded Afghanistan and started a nine year long occupation of the country in order to support the communist Afghan government that was threatened by an internal counter revolution. Throughout the nine years of this war, the Soviet government released statements about the war that shed a favorable light on the Soviet Union and often used propaganda to make the situation appear positive. The reports released by the Soviet Union are only a part of the story of what happened in Afghanistan. The experiences of Soviet soldiers, as described in memoirs and diaries, provide an insider's perspective on what was occurring in Afghanistan that both counters and confirms the information that the Soviet government released.

*Faculty Mentor: Dr. Irina Mukhina*

***The Conflict with Joseph Kony's Lord's Resistance Army and Central Africa: Challenges to Peace and Potential Solutions***

Patrick Williams '12, Economics & Global Studies

The Lord's Resistance Army (LRA) has devastated northern Uganda since 1987 and recently spread into Democratic Republic of the Congo, South Sudan, and Central African Republic. The ruthless rebel group has committed numerous human rights abuses against innocent civilians in these areas. The research carried out is in regards to the peace talks that have occurred between the Government of Uganda (GoU) and the LRA. There have been many initiatives throughout the conflict, most recently the Juba Peace Talks that started in July 2006 and ended in February 2008. The world is still waiting on the signatures on the Final Peace Agreement by LRA leader Joseph Kony and President of the Republic of Uganda His Excellency Yoweri Kaguta Museveni. I will investigate the challenges that peacemakers face today and how these challenges can be overcome in order to achieve a lasting peace in the Great Lakes Region.

*Faculty Mentor: Prof. Kevin Hickey*

***Fraud, Young Accountants, and the Global Business Environment***

Jordan Sweigart '14, Business Studies

A problem arises when young accountants and businessmen and women are misinformed about fraud as they enter the workforce. My presentation delves into how students should be enlightened about fraud and how they should be aware of its relation to the global economy. In order to sufficiently support my observations, I collected information from various books, articles, and videos on the topic of fraud. Using my analytical skills and intuition, I was able to gather that there are many responsibilities a student must assume in order to understand fraud in a globalized sense. Furthermore, I concluded that an educated student will be able to minimize how many people are annually affected by fraud because they will be able to detect signs of this fraud before it escalates.

*Faculty Mentor: Prof. Frank Marino*

***Investigating Buying Cartels and Market Volatility in the  
Dhaka Stock Exchange***

Shafayet Khan '12, Economics & Global Studies

The paper investigates the Dhaka Stock Exchange (DSE) crash in January 2011. Share prices have increased steadily over the past four years, gaining by as much as 410 percent in value over the period. Contrary to what seems like a positive growth in the investment sector of Bangladesh, these figures suggest that there exists a fundamental flaw in the market. Since December 2010, the persistent fall in share prices have left thousands of investors facing bankruptcy. The crisis was externally triggered by a real interest rate hike. In order to prevent the market from overheating, the Securities and Exchange Commission and the Central Bank jointly undertook various measures in December 2010; however, this was not the heart of the problem. Government and regulators enforce monetary policy rules all the time in response to the economy. The stock market crash was essentially caused by a nexus of influential investors, negligent auditors and a bureaucratic Securities and Exchange Commission. The primary investigation of the thesis is to determine the extent of market manipulation already prevailing in the Dhaka Stock Exchange through studying the existence of buying cartels and its negative impact on the stock market.

*Faculty Mentor: Dr. Demetrius Kantarelis*

***“Turning o' the Tide”: Teaching American Civics Through the British  
History Plays of William Shakespeare***

Brianna Murphy '12, Political Science

The plays of William Shakespeare have been studied for centuries for their remarkable position in the whole of world literature, but the political relevance of Shakespeare's plays is often overlooked by many who study him. Inspired by the class Shakespeare's Politics that I took with Prof. Bernard Dobski in Fall 2010, I decided to study the eternal political wisdom contained within the British history plays of William Shakespeare and apply them to American civics for my Senior Honors thesis project. Drawing upon the three themes of ambition, constitutionalism, and the challenges presented to a nation at war, I

propose a high school elective course centered on these themes to be taught through a social studies department. My symposium presentation will provide a defense of the values of interdisciplinary methods of instruction, a summary of these three themes that span the British history plays, and a sample lesson that would be taught through this elective course.

*Faculty Mentor: Dr. Bernard Dobski*

## **Presentation Session IV**

### ***How Do Neuropeptides Contribute to the Functions of the Nervous System?***

Joseph Provost '13, Natural Sciences

Observing the phenotypes of *C. elegans* with gain of function mutations will lead to the functions of neuropeptides and GPCRs in the human nervous system.

*Faculty Mentor: Dr. Michele Lemons*

### ***Does the Developing Nervous System Have its Own GPS?***

Sarah Powell '12 & Amrit Vinod '13, Natural Sciences

Neurons are unique cells found in the nervous system. During development, neurons have a specialized feature called a growth cone, a hand-like projection at the end of the axon. The growth cones use environmental cues to navigate through the nervous system to reach target destinations. One environmental cue is netrin-1. Netrin-1 is a protein that interacts with integrin receptors embedded in the neuronal membrane. Previous studies from our lab show that netrin-1 causes integrins to become activated. Activation causes a shape change in the integrin receptors. This activation could either occur through direct binding of netrin-1 to integrin, or it could be indirect. We tested the direct pathway. We blocked integrin function using function blocking antibodies and peptides on cultured chick embryonic neurons. After application of netrin-1, we found that there was a reduction of integrin activation compared to the control. These results suggest that netrin-1

directly activates integrins. This data sheds some light on how developing neurons interact with proteins during development. We hope that our study could contribute to research on the regeneration of adult spinal cords following injury.

*Faculty Mentor: Dr. Michele Lemons*

***Netrin Interacts with Integrin Receptors on Neuronal Growth Cones***

Zachary DeLoughery '12 & Jenna Garozzo '13, Natural Sciences

Neurons are tiny cells responsible for controlling human perception and motion. During development, neurons grow long wire-like axons. These axons are guided by a structure called the growth cone at its tip. The growth cone can sense its environment via receptors on its surface. When a chemical known as an axon guidance molecule binds to a specific receptor, it tells the growth cone to grow towards or away from that area. Netrin was the first of these proteins to be discovered. Previous literature has shown that netrin can bind to certain receptors such as DCC, Unc5, and Neogenin. Recent studies suggest that a protein called integrin is another candidate for a netrin-binding receptor. Integrins are proteins that are made of two subunits which interact to attach the membrane of a cell to a surface. A specific portion of the integrin protein that can bind to many extracellular molecules has been isolated, and is the subject of our studies. This experiment utilized a direct protein binding assay coupled with gel electrophoresis to test if netrin can bind to integrins. Our research suggests that netrin directly binds to integrins—a ubiquitous cell adhesion protein. This has implications in the field of axon guidance and will further elucidate the mechanisms of neuronal development. This research may aid in efforts to treat previously irreparable damage to neurons in the spinal cord that result in paralysis. Knowledge of how neurons grow provides insight into methods of provoking their regeneration.

*Faculty Mentor: Dr. Michele Lemons*

***Thermal Transport Properties of Melt-Shear  
Oriented IPP/Carbon Nanotube Thin Films***

Erin Gombos '12, Natural Sciences

We investigate how the addition of carbon nanotubes (CNTs) to the polymer, isotactic PolyPropylene (iPP), alters the composite's ability to conduct heat, a property known as thermal conductivity. IPP is a widely used polymer that acts as a good thermal insulator. Carbon nanotubes, however, exhibit high thermal conductivity. Because the CNTs diameter is much smaller than its width, CNTs also exhibit anisotropy, the property of directional dependence. The CNT anisotropy is suspected to induce alignment in oriented iPP films under shear stress, thus, altering the physical properties of the composite. We demonstrate an increase in thermal conductivity in composites with greater CNT concentration. Oriented CNTs induce a novel property of anisotropy of thermal conductivity preferentially along the shear-direction. This increase is not linear, suggesting other mechanisms other than simple volume weighted superposition of this property. This finding could prove important for applications like temperature sensing and packaging.

*Faculty Mentor: Dr. Georgi Georgiev*

***Dissecting the Role of BK Virus Infection in Host Cells***

Stephanie Bouley '12, Natural Sciences

BK virus (BKV) is a common pathogen infecting 80% of human adults and the etiological agent of polyomavirus-associated nephropathy (PVAN). PVAN occurs in 5-10% of kidney transplant recipients and results in the lytic destruction of the new graft. As BKV is an intracellular pathogen, its lifecycle is intimately connected with the host cell that it infects. To better understand the host factors that contribute to BKV pathology, we examined the role of host cell autophagy in cells that are challenged with BK Virus (BKV). Vero and Hela cells were treated with autophagy inhibitor 3-Methyladenine (3-MA) and infected with BKV. 3-MA-treated cells showed a decrease in BKV infection. Conversely, cells treated with an activator of autophagy, rapamycin, showed an increase in BKV infection. To determine if BKV induces autophagy during the

infectious process, host cells were transfected with an autophagy marker, microtubule-associated protein light chain 3 (LC3) fused to green fluorescent protein (GFP), and infected with a high MOI of BKV. BKV infection increased the number of LC3-GFP+ vesicles indicating that BKV induces the formation of autophagosomes. Finally, host cells were treated cells with siRNA directed against LC3 and Beclin-1, both proteins involved in autophagy. A decrease in Beclin-1 protein expression, but not LC3 expression, resulted in a decrease in BKV infection. These data suggest that autophagy occurs in response to BKV infection, and that autophagy helps the virus establish productive infection.

*Faculty Mentor: Dr. Aisling Dugan*

### ***Stump Sprout Development of Northern Red Oak and Red Maple***

Christopher Brand '12 & Garrett Doherty '12, Natural Sciences

*Acer rubrum* (Red Maple) and *Quercus rubra* (Red Oak) are two common species of deciduous trees in the Northeast of the United States. Stumps of maple and oak that survive after severe storms or tree cutting can produce sprouts from the ground level. This study was designed to quantify annual growth of sprouts in relation to stump size across different light conditions. The evidence reveals that *Acer rubrum* and *Quercus rubra* have optimal stump diameters for sprout growth, though the optimal stump diameter of *Acer rubrum* varies with light availability while that of *Quercus rubra* does not.

*Faculty Mentor: Dr. Owen Sholes*

## **Poster Session II**

### ***II-A. A My(s, t)erious Positivity***

Michael Weselcouch '14, Math

Let  $s, t$  be indeterminates. Define the bivariate Fibonacci polynomials  $U_n$  by  $U_0 = 0$ ,  $U_1 = 1$ , and  $U_n = s \cdot U_{n-1} + t \cdot U_{n-2}$  for  $n \geq 2$ . Define Fibonacci-polynomial factorials by  $(U_0)! = 1$  and  $(U_n)! = (U_{n-1})! \cdot U_n$ ,  $n \geq 1$ . The  $(s, t)$ -binomial coefficients,  $C(\{m + n\}, \{m, n\})_U = (U_{\{m+n\}})! / ((U_{\{m\}})! (U_{\{n\}})!)$ , are known to be

polynomials with nonnegative integer coefficients. This readily follows from the combinatorial tiling interpretations of  $C(\{m + n\}, \{m, n\})_U$ . The Fibonacci-polynomial Catalan numbers  $(U_{2n})! / ((U_n)! (U_{n+1})!)$  are also known to lie in  $\mathbf{N}[s,t]$  since they can be shown to equal  $C(\{2n-1\}, \{n-1, n\})_U + t \cdot C(\{2n-1\}, \{n-2, n+1\})_U$ . In this note we conjecture an arithmetically motivated generalization of the nonnegativity property for products of ratios of Fibonacci-polynomial factorials that happen to be polynomials.

*Faculty Mentor: Dr. Joseph Alfano*

### ***II-B. Environmental Preferences of Forest Understory on Assumption College Campus***

Courtney Donovan '13 & Jeff Kmietek '13, Natural Sciences

*Thelpteris noveboracebsis* (New York fern), *Osmunda cinnamomea* (Cinnamon fern), *Thelypteris simulata* (Massachusetts fern), and *Athyrium filix-femina* (Lady fern) coexist on the campus of Assumption College. Within this experiment, specific preferences competitive tendencies of each of these species were depicted. Five transects at two locations were used for data collected pertaining to species of fern, soil moisture, soil pH, soil nutrient levels, and light availability with 1 square meter divisions of each transect. 249 individual ferns were counted as the New York fern was most popular of the four; it was 66 percent of the total fern data count. It was determined that fern growth had a direct relationship to light availability and soil moisture. Each species preferred a different soil value, but all preferred acidic conditions. It was found that while one environmental feature can play a large role in fern abundance of an area, none will have a perfectly balanced direct relationship with fern growth and fern population. The four fern species studied grew in relation to several factors of the environment; no single trait was overpowering in determination of fern population and growth placement.

*Faculty Mentor: Dr. Owen Sholes*



***II-C. The Effects of Environment on White Wine Fluorescence and Characterization Using EEM***

Kathryn Wirzbicki '12, Natural Sciences

Over the centuries, wine cultivation has become a true art form. Certain types of wine have been coveted by many, for their age, how they were made and what region they have originated from. Characterization of wine has now become a popular way to guarantee the authenticity of wine types and to disclose their actual origin. A new way to characterize wine cheaply and quickly is by measuring fluorescent characteristics through fluorimetry and excitation emission matrices. In this project white wine samples from small unopened store bottles were measured right after they were opened. Samples from the bottles were put in two different containers with different surface areas and placed in a room temperature environment or the fridge unclosed. Their fluorescence was measured over time periods up to 24 hours later. Results yielded from contour graphs displayed differences in peaks and intensity over time showing that different environments have an effect on wine fluorescing particles. The purpose of this research was to look at two different environmental effects on wine and how storage can affect the quality of fluorescence of wine. Information obtained from this research project will be used in future analysis of white wines by Professor Hauri.

*Faculty Mentor: Dr. James Hauri*

***II-D. Sensory Processing and Attachment Relate to Eating Competency in Infancy***

Robert DiGiammarino '12, Psychology

The goal of this research is to identify predictors of eating competency in infancy. Previous research has shown a relationship between insecure attachment and low weight and failure-to-thrive in toddlerhood. However, there was a lack of research regarding the relationship between attachment and healthy eating behaviors, as well as regarding the association between sensory processing and normal eating behaviors. This study addressed this research gap. The author hypothesized that the more secure the infant attachment, the better the

mother-infant interaction and demonstration of healthy eating behaviors and that a low sensory threshold would relate to poorer eating behaviors. Thirty-eight infants and their mothers were observed in structured and non-structured tasks to measure attachment and eating competency. Mothers rated their child's sensory processing. Results showed that security and smooth interaction with the mother related to better responsiveness cues to food and social engagement. Sensory sensitivity related to poorer responsiveness and higher threshold to lower social engagement. Regression analyses showed that attachment was a better predictor of eating competency than sensory processing. These findings are significant in terms of providing appropriate intervention strategies for infants experiencing eating difficulties.

*Faculty Mentor: Dr. Maria Kalpidou*

***II-E. Isotactic Polypropylene - Carbon Nanotubes  
Multifunctional Polymer Nanocomposite***

Erin Gombos '12, Gajinder Hoonjan '12 & Amrit Vinod '13  
Natural Sciences

We investigated the interactions of Carbon Nanotubes (CNTs) dispersed in Isotactic Polypropylene (iPP), a popular polymer used in a many applications including medical packaging, bottling, and textiles. The polymer component contributes to the optical properties and integrity of the polymer film, while the carbon nanotubes change the electrical and thermal conductivity and sensitivity. Because the diameter of the CNTs is much smaller than the width, CNTs exhibit a property known as anisotropy, defined as directional dependence. We found that when CNTs are combined with iPP, the optical, thermal, and electrical properties of the nanocomposite film are affected. Specifically, the electrical and thermal conductivity increase and the optical transmission decreases. Also, we found that these changes are accompanied by anisotropic effects, meaning there are differences in the properties along the perpendicular and parallel direction of orientation. The conductivity measurements are higher in the perpendicular orientation. Because this anisotropic property does not exist in pure iPP addition of oriented CNTs induce the effect.

***II-F. Parental Perceptions of Their Coparenting Dynamics and Infant Temperament***

Kirsten Chirichetti '12, Psychology

Coparenting involves the coordination of parenting between two caregivers as well as parental satisfaction with this teamwork. Coparenting dynamics play an important role in children's social-emotional functioning, though few investigations have explored the relationship between coparenting and infant temperament. The present study is the first to utilize both interviews and observations to explore the connection between coparenting and infant temperament. Forty-four families with a 12-months-old infant were observed in a laboratory as part of a larger investigation into couples' transition to parenthood. Mothers and fathers were separately administered the Coparenting Interview to obtain their perceptions of their current coparenting relationship with their partner. Coparenting was also directly observed during play and snack time. Mothers completed the Infant Characteristics Questionnaire (ICQ, Bates, 1979) to determine infants' temperamental characteristics. Findings indicated that parental perceptions of their coparenting relationship were associated with coparenting observed almost exclusively during family snack interactions rather than play interactions. Coparenting perceptions by mothers though not fathers were also associated with infant temperament. Infants described as more fussy, difficult, and unpredictable tended to come from families where mothers were less satisfied with their coparenting relationship and had more negative perceptions of their coparenting dynamics.

*Faculty Mentor: Dr. Regina Kuersten-Hogan*

***II-G. Observer Versus Caregiver Ratings of Infant Temperament***

Melysa Faria '12, Psychology

Most studies of infant temperament rely exclusively on parental reports of temperamental qualities rather than on their direct observations. It is still unclear whether such parental reports are

consistent with temperamental qualities infants display during laboratory observations. This study investigated the consistency between observer and parental reports of infant temperament at 12 months. Forty-four two-parent families with a 12-months-old were observed during laboratory play, snack time, and various child assessment tasks for a total of two hours. Observer-reported infant temperament was coded from videotaped family visits using the Infant Behavior Record (IBR, Stifter, 2004). In addition, mothers completed the Infant Characteristics Questionnaire (ICQ, Bates, 1979) to provide caregiver reports of temperament. Results indicated only limited associations between observer and caregiver ratings for infants' temperamental characteristics. Children observed to be generally happy in a laboratory context were rated as better adapting by caregivers, while children rated as being less fussy were observed to be more social during the laboratory visit. Parental and observer reports were also consistent for infants' activity level. Perhaps infants' temperamental qualities are more variable between their everyday life and an unfamiliar laboratory context, or, alternatively, caregivers perceive their infants' temperamental qualities differently than do observers.

*Faculty Mentor: Dr. Regina Kuersten-Hogan*

# Notes





# Thank you

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*Landy Johnson and James Lang  
Undergraduate Symposium Planning Committee*

# Undergraduate Symposium Planning Committee

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**“Somewhere, something incredible is waiting to be known.”**  
*Carl Sagan*



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