

ASSUMPTION COLLEGE



19th Annual

Undergraduate Symposium

April 15 & 16, 2013



ASSUMPTION COLLEGE

Office of the Provost and Academic Vice President

Welcome to the 19th *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 Hall &
Testa Science Center Fuller Auditorium and Atrium*

Program Schedule

Monday, April 15, 2013

| Time | Event | Location |
|-----------------|--------------------------|-------------------------|
| 11:30 a.m. | Arrival & set-up | La Maison Hall |
| 12:00 p.m. | Welcome | La Maison Hall |
| 12:00-1:15 p.m. | Presentation Session I | La Maison Hall |
| 1:30-3:00 p.m. | Presentation Session II | Testa Fuller Auditorium |
| 3:00-4:15 p.m. | Presentation Session III | Testa Fuller Auditorium |

Tuesday, April 16, 2013

| Time | Event | Location |
|------------------|---|-------------------------|
| 12:00 p.m. | Luncheon for student presenters and mentors | Hagan Hall |
| 12:20-12:45 p.m. | Keynote Address, <i>"Learn, Good Soul": The Purpose of Undergraduate Research</i> , by Brianna Murphy '12 | Hagan Hall |
| 1:30-2:30 p.m. | Poster Session I | Testa Atrium |
| 2:30-3:45 p.m. | Presentation Session IV | Testa Fuller Auditorium |
| 4:00-5:00 p.m. | Presentation Session V | Testa Fuller Auditorium |



Brianna Murphy

"Learn, Good Soul": The Purpose of Undergraduate Research

Keynote Speaker

Brianna M. Murphy '12, is a faculty member at the Advanced Math and Science Academy Charter School in Marlborough, MA, where she teaches ancient and European history. She graduated cum laude from Assumption College with a double major in history and political science and a concentration in middle/secondary education with an Honors Program Certificate. Her Senior Honors thesis, entitled *"Turning o' the Tide": Teaching American Civics Through the British History Plays of William Shakespeare*, was an examination of the merits of interdisciplinary methods of instruction and how to use those methods to bring the eternal political wisdom of Shakespeare's history plays into the social studies classroom. Ms. Murphy received the award for the social science category at the 18th Annual Undergraduate Symposium for the presentation of this research. The project, which was proposed and approved in the spring of her junior year and took just over a year to complete, continues to inform her teaching practice with her seventh and tenth grade students. She is currently pursuing a Masters of Education in Curriculum and Instruction at the Lynch School of Education at Boston College.

Presentation Session I

Monday, April 15, 2013

La Maison Hall

| Time | Presenter | Title |
|-------|----------------------|--|
| 12:00 | Maura Corbett '14 | <i>Foreshadowing as a Digression in Beowulf</i> |
| 12:15 | Raphaële Faré '13 | <i>"The Past and the Future:" Victorian Periodicals and the Birth of the Political Woman</i> |
| 12:30 | Gianna Gugliotti '13 | <i>Stonc Ða Æfter Stane: Focalization and the Dragon in Beowulf</i> |
| 12:45 | Julie Haggerty '13 | <i>The Role of Women in the Late Thirteenth Century Volsunga Saga</i> |
| 1:00 | Jennifer Jackson '14 | <i>Beowulf Is a Saga</i> |

Presentation Session II

Monday, April 15, 2013

Fuller Auditorium, Testa Science Center

| Time | Presenter | Title |
|------|--------------------------|---|
| 1:30 | Paula DeCosta '13 | <i>Nancy the Rebel?: Nancy Drew and Gender Norms in Twentieth-Century America</i> |
| 1:45 | Kathryn Buckley '14 | <i>Revising the Boston Tea Party</i> |
| 2:00 | John Patrick Donegan '13 | <i>English Expectations and Perceptions of Powhatan Authority</i> |
| 2:15 | OPEN | |
| 2:30 | Garrett Hickey '13 | <i>The Popular Diffusion of the Brendan Story</i> |
| 2:45 | Molly Scott '13 | <i>"Getting to Know You": From Savage to Man, Jacques Cartier's Evolving Outlook on the First Nations of Canada</i> |

Presentation Session III

Monday, April 15, 2013

Fuller Auditorium, Testa Science Center

| Time | Presenter | Title |
|------|--------------------------|--|
| 3:00 | Nicole Savi '13 | <i>Emotional Behavioral Disorders and Social Maladjustment: Appropriately Supporting All Students with Behavior Challenges</i> |
| 3:15 | Michael Weselcouch '14 | <i>Computerized and Bijective Proof Techniques for Combinatorial Identities</i> |
| 3:30 | Alicia Bonin '13 | <i>The Role of Humor in Recovery from Self-Threat</i> |
| 3:45 | John Patrick Donegan '13 | <i>Plato's Allegory of the Cave in Hedges' Contemporary Society</i> |
| 4:00 | Nick Napoli '13 | <i>Descartes' Provisional Morality</i> |

Poster Session I

Tuesday, April 16, 2013

Atrium, Testa Science Center

| Time | Presenter(s) | Title |
|------------------|--|--|
| 1:30—2:30 | Alyson Catalan '13 | <i>From Sugar Cane to Sugar Packets</i> |
| | Katelyn Colburn '14 & Nabil Georges '13 | <i>Exploring Serenity: Identifying Distinguishing Features</i> |
| | Michael Daly '13 & Amrit Vinod '13 | <i>Organization of Complex Systems</i> |
| | Paula DeCosta '13 & Elena Despotopoulos '13 | <i>Made in America: Marketing Patriotism in Post-Revolutionary America</i> |
| | Nabil Georges '13, Jacqueline Castiglioni '13 & Briana Brown '13 | <i>Do Personality Traits Moderate Between Facebook Usage and Self-Esteem?</i> |
| | Britni Hagopain '13 & Allison O'Malley '13 | <i>Identification of an Unknown Bacterium</i> |
| | Amanda Jean Nowak '13 | <i>Exploratory Research of How Probation Officers Perceive Their Relationships with Probationers</i> |

Presentation IV

Tuesday, April 16, 2013

Fuller Auditorium, Testa Science Center

| Time | Presenter | Title |
|------|-----------------------|---|
| 2:30 | Courtney Donovan '13 | <i>Using Linkages Between Solution Chemistry and Plant Physiological Response to Help Inform Critical Loads Calculations: A Literature Review</i> |
| 2:45 | Marie Ebacher '13 | <i>The Politics of Playdates: Stay-at-Home Fathers and Other Primary Caregivers of Children</i> |
| 3:00 | Katherine Boucher '13 | <i>The Relationship Between Income Inequality and Healthcare</i> |
| 3:15 | Erica Micciche '13 | <i>Student Debt, Upward Mobility & The American Dream</i> |
| 3:30 | Marie Ebacher '13 | <i>Gender Empowerment in Production</i> |

Presentation Session V

Tuesday, April 16, 2013

Fuller Auditorium, Testa Science Center

| Time | Presenter(s) | Title |
|------|--|--|
| 4:00 | Amrit Vinod '13 | <i>An Investigation of the Cytotoxic Effects of a Moschamine Analog on Cancerous Cells</i> |
| 4:15 | Brianna Carey '14 | <i>Water Quality in Worcester Ponds</i> |
| 4:30 | Matthew Cooke '13 | <i>Waste Water Treatment and Levels of Enterovirus Infection</i> |
| 4:45 | Chandler Ervin '14, Jenna Garozzo '13 & Devyn Oliver '14 | <i>Which Way to Turn? Exploring Activation of Axonal Integrins in Neuro2A Cells</i> |

ABSTRACTS

Presentation Session I

Foreshadowing as a Digression in Beowulf

Maura Corbett '14, English

Many critics have focused on *Beowulf's* narration and the possible occurrence of digressions. Though in the past the poem's lack of adherence to strict chronology was criticized, contemporary critics focused on these digressions. John Leyerle, in *The Interlace Structure of Beowulf*, says the integration of the poem's main plot with non-chronological "digressions" fits the time's artistic aesthetic. Generally, a digression is an episode which does not follow the chronology of *Beowulf's* supposed main plot. However, there is no unanimously decided digressions list. Following this general definition, even the literary element foreshadowing could be considered digressive. In this paper, I will look closely at one sentence in *Beowulf*: "Sceolde [li]þendaga æþeling ær-gōd ende gebīdan, worulde līfes, ond se wyrm somod, þēah ðe hord-welan heolde lange," which Howell Chickering, Jr., translates to "The king, long good, was to reach the end of his seafaring days, his life in this world, together with the serpent, though long it had ruled the wealth of the hoard." Foreshadowing *Beowulf's* and the dragon's battle, it fits digression's general definition due to its non-chronological nature. By examining digression's various definitions, I will determine whether or not foreshadowing should be considered digressive.

Faculty Mentor: Dr. Bryan Carella

"The Past and the Future:" Victorian Periodicals and the Birth of the Political Woman

Raphaële Faré '13, English

In the words of Professor DiBiasio, my mentor for this research project, "Nearly all English and American nineteenth century novels and

short stories were originally published in periodicals.” I will be looking at 1849 editions of *The Lady’s Newspaper* (July to December), a fourteen page, six-penny weekly newspaper that was published from 1847 to 1863, at which point it merged with the *Queen*. In the words of its editor, Charles Dance, the purpose of the paper was to “make [women] acquainted with all the leading events of the day, without fatiguing or disgusting [them] with lengthy disquisitions. We can tell [them] that a battle has been won or lost, without shocking [their] sensibilities by its painful details. We can inform [them] that a minister has resigned, and yet omit the long dull speeches that preceded his doing so. [...] Accidents and offences even can be recorded without heart rending particulars.” This changed after the revolution-laden year of 1848. In looking at the 1849 editions, one sees the paper becoming more and more politicized, particularly in regards to the Hungarian revolution and the French siege of the Roman Republic. The goal of this research project is to utilize the *Lady’s Newspaper* to trace the emergence and evolution of the political woman in the Victorian era.

Faculty Mentor: Dr. Becky DiBiasio

Stonc Ða Aefter Stane: Focalization and the Dragon in Beowulf

Gianna Gugliotti '13, English

In the translation of *Beowulf*, there are a number of lines which are subject to multiple translations and disagreements between scholars. One such line is 2288a, where the translation of “stonc” has suffered from controversy. I will argue in favor of a particular reading of the line as it reveals the use of focalization within the narrative. The line describes an action of the dragon and his interaction with a rock after a thief steals a cup from his cave. There are multiple translations of the line which Thomas Klein, in his article, “Stonc æfter Stane (Beowulf, 1. 2288a): Philology, Narrative Context, and the Waking Dragon” narrows into two categories: one of movement or one of smelling. Klein himself sides with the translation of “smelling” and claims that this translation both points out and is supported by the “interiority” of the dragon. However, what that translation actually reveals is the focalization of the dragon. This focalization is repeatedly seen in descriptions of other characters, in particular, the monsters in the text. While the debate over

the translation of this line may appear inconsequential, it affects the poem in its entirety and thus deserves further research.

Faculty Mentor: Dr. Bryan Carella

The Role of Women in the Late Thirteenth Century Volsunga Saga

Julie Haggerty '13, English

This paper examines the role of women in *The Saga of the Volsungs*, a story of old Norse mythology and human misfortune composed in Iceland during the late thirteenth century. The unidentified author narrates the saga using focalization: i.e., the art of centering the attention on the perspective of certain characters while inviting readers to “get inside their heads.” In the longer version of the paper, I draw conclusions about the author’s perspective of Viking women based on the three main female characters through which the action is focalized: Signy, Brynhild, and Gudrun. Their individual tragedies and their sentiments of sorrow, grief, anguish, and hatred are brought to light. The focus of this presentation will be on the earliest female character, Signy, who influences the plot of the rest of the saga. This paper argues that the author perceives females as emotionally stronger than males and more important to the Viking community because strength and power are emphasized through the psychological hardships of women.

Faculty Mentor: Dr. Bryan Carella

Beowulf Is a Saga

Jennifer Jackson '14, English

Beowulf, an Old English heroic poem written sometime between 800 and 1000 AD, cannot be easily compared to any other writing in the Old English literary corpus. Because of its uniqueness, it cannot be straightforwardly identified with epics or with other long, narrative poems. Above all, the poem's uniqueness makes it difficult to classify in any specific genre. Some light may be shed on this problem, however, by the definition of "saga" outlined in Margret Ross's book *The Cambridge Introduction to the Old Norse-Icelandic Saga*. In my paper, I will argue that *Beowulf* best fits the criteria of a saga. While *Beowulf* has many generic characteristics of an epic, and many have categorized it as

such, the number of similarities it bears to known sagas, for example *Volsungasaga*, strongly suggests that we should consider it to be a saga. To make my case, I will be looking closely at *Beowulf*'s plot, its narrator, and its narrative structure to argue that it is a saga. By creating a concrete definition of a saga and comparing connections to sagas I will demonstrate how *Beowulf* should be regarded as a saga.

Faculty Mentor: Dr. Bryan Carella

Presentation Session II

Nancy the Rebel?: Nancy Drew and Gender Norms in Twentieth-Century America

Paula DeCosta '13, History

The character of Nancy Drew was created in 1930, presenting a female character that continues to intrigue readers to this day. For Nancy's over seventy years history, many changes and revisions were made to modernize the series, eliminate racism and broaden the readership. In the revision process that started in 1959 however, the highly autonomous, skilled and intelligent Nancy Drew of the first editions became the chaperoned, ladylike and deferential Nancy of the second editions. As the character changed, her relationships changed as well. Nancy became less dominant and even subordinate in relations with the authorities, as well as her father, and she was also chaperoned and mothered by female friends. The power shifts in Nancy's relationships reflect broader changes in gender expectations—towards a more deferential, relational and vulnerable role for women in post-World-War II-society. Three books in the series: *The Hidden Staircase*, *The Sign of the Twisted Candles*, and *The Whispering Statue* demonstrate the changes in Nancy's relationships to others from the first to the second editions.

Faculty Mentor: Dr. Deborah Kisatsky

Revising the Boston Tea Party

Kathryn Buckley '14, History

Benjamin L. Carp's book *Defiance of the Patriots* provided a solid example of historical revisionism that enabled me to explore the political role of women in the events leading up to the Boston Tea Party; the symbolism behind the choice of costumes by participants; and whether John Adams endorsed the concept of political assassination. Benjamin Woods Labaree's *The Boston Tea Party*, a widely accepted history of the event, provided insight and context. *Tea Leaves: Being a collection of Letters and Documents Relating to the Shipment of Tea to the American Colonies in the Year 1773*, provided original source material about and from individuals involved.

Faculty Mentor: Dr. Carl Keyes

English Expectations and Perceptions of Powhatan Authority

John Patrick Donegan '13, History

When the English began settling around Jamestown in 1607, they encountered the Powhatan paramount chiefdom at the height of its rule over the Algonquian speaking Indians of Virginia's coastal plain. When the English settlers arrived in Virginia they already had preconceived notions about the nature of a monarchical government. These expectations, informing the enactment of monarchical authority find their clearest expression in King James I of England's political treatises, *Basilicon Doron* and *The Trew Law of Free Monarchies*, which relate the necessary characteristics of a King and his rule. Whether or not any of the authors of the Jamestown narratives ever read any of King James' works, these royal treatises offer the best example of English monarchical expectations operating at the time. From the moment the English settlers were introduced to Chief Powhatan, their expectations and understanding of his rulership were shaped by their experiences of monarchism from England. Already accustomed to rule under a king, they attempted to fit the Powhatan monarchy in the same framework as that modeled by their English King. Because of the English political expectations, combined with their perceptions of Powhatan politics and culture, the English settlers misapprehended the nature of

Chief Powhatan's political authority.

Faculty Mentor: Dr. Lance Lazar

The Popular Diffusion of the Brendan Story

Garrett Hickey '13, History

The allures of fabulous voyage tales and exotic wonders are sometimes underestimated by scholars examining why Europeans attempted to venture to faraway lands during the Age of Discovery. Many stories of explorers who made voyages before the Age of Discovery tend to appear solely in literary works or oral tradition in the absence of sources created by the men involved in those voyages. Although it is hardly new to acknowledge the appeal of such tales, one legendary explorer does not receive the attention he deserves. According to legend, St. Brendan, an Irish monk born in County Kerry around 486, set sail with a group of monastics sometime during the sixth century and discovered the "Promised Land." St. Brendan's story and its debatable veracity raise many questions. Some argue the legend is based in fact while others claim it is just another Irish tall tale. This presentation will demonstrate that the reality of an actual voyage may be less important than the power of the story itself as a motivation and goal for explorers during the Age of Discovery.

Faculty Mentor: Dr. Lance Lazar

"Getting to Know You": From Savage to Man, Jacques Cartier's Evolving Outlook on the First Nations of Canada

Molly Scott '13, History

Jacques Cartier, a sixteenth century French explorer, sailed from France to what is now Canada three times within a ten year period, where he met and interacted with many of the same native groups of people on each of the three voyages. He recorded his judgments and conclusions in his narratives, which included a broad spectrum of impressions and inferences regarding the native peoples whom he encountered. Throughout these voyages, Cartier watched and learned from the Iroquoian tribes who lived along the St. Lawrence River. This presentation will trace the evolution of Cartier's views over the course

of his three voyages, as he grew to challenge his European peers in their view of the native peoples of the “New World,” specifically in the Northwest. This intellectual transformation led Cartier to a more appreciative evaluation of the native peoples—viewing them as men and not as savages.

Faculty Mentor: Dr. Lance Lazar

Presentation Session III

Emotional Behavioral Disorders and Social Maladjustment: Appropriately Supporting All Students with Behavior Challenges

Nicole Savi '13, Education

Students with emotional behavioral disorders (EBDs) and students who are deemed socially maladjusted are often under-identified in the general education classroom setting. One likely reason that identification occurs less than it should is because the definition of EBD under the Individuals with Disabilities Education Improvement Act (IDEIA) provides only vague specifications in identifying and clarifying EBD and social maladjustment. IDEIA categorizes EBD and social maladjustment as different and separate diagnoses, only one of which (i.e., EBD) merits special education eligibility. For educational purposes, it should not matter if a student has an EBD or is socially maladjusted if the student’s behavior impacts his or her ability to learn. In addition to discussing the similarities and differences between EBD and social maladjustment and the idea that students in both categories should be eligible for services, this presentation will address how an effective response to intervention (RTI) model may be a solution to support all students with behavior issues without waiting for a certain label (or lack thereof).

Faculty Mentor: Dr. Diane Myers

***Computerized and Bijective Proof Techniques for
Combinatorial Identities***

Michael Weselcouch '14, Mathematics

The beginning of this presentation describes work performed in Summer 2012: constructing a computerized proof using Zeilberger's Algorithm to show that 5 given binomial coefficient summations are equal. The second part covers work done in Fall 2012: constructing bijective proofs of these identities. Each summation is interpreted as counting the number of intersection points that a family of lattice paths makes with a given diagonal. My work in Spring 2013 seeks to generalize these facts. Examples of these generalizations include the case where the diagonal has arbitrary integer slope, or rational slope; and counting the "fake" intercepts whose coordinates are non-integer valued. Open questions include finding a closed form expression for these summations.

Faculty Mentor: Dr. Joseph Alfano

***The Role of Humor in Recovery from Self-Threat:
An Initial Validation Study***

Alicia Bonin '13, Psychology

As part of a larger investigation of whether exposure to humorous stimuli can result in better recovery from negative emotions than positive or neutral stimuli, we present an initial validation study. In this study we selected and experimentally validated: 1) positive (non-humorous), humorous, and neutral pictures with explanatory captions and 2) neutral faces combined with threatening statements for the induction of negative affect. We share the results of this study and our plan to use these stimuli to explore humor as a coping mechanism.

Faculty Mentor: Dr. Sarah Cavanagh

Plato's Allegory of the Cave in Hedges' Contemporary Society

John Patrick Donegan '13, Philosophy

In Book VII of *The Republic*, Plato introduces the Allegory of the Cave. Although the Allegory is most commonly discussed in relation to

Plato's theory of the forms, it also suggests a political interpretation connecting back to the political discussions earlier in *The Republic*. Despite being a piece of ancient philosophy, the political implications of Plato's cave are still relevant in contemporary society. In his book *Empire of Illusion: the End of Literacy and the Triumph of Spectacle*, Chris Hedges both explicitly and implicitly provides contemporary examples of the cave and how contemporary society can be thought of as those slaves chained to the wall.

Faculty Mentor: Dr. Paul Gallagher

Descartes' Provisional Morality

Nick Napoli '13, Philosophy

Rene Descartes was an extremely influential early modern philosopher. In his well-known work, *Discourse on Method*, Descartes establishes his belief of a new science and way of thinking. A philosopher drenched in mathematical physics, he saw the real world purely through a scientific lens. He establishes a rule, the method, in which to eventually conceive the world in this light, but that includes a provisional morality. What exactly is this morality and why is it needed to obtain certain knowledge, and truth? The supposed point of the provisional morality is its pragmatic quality, and not its attempt at the truth. My claim here is that morals are of little to no concern for Descartes, rather there is a sort of hedonism lurking in Descartes, towards the utility of nature.

Faculty Mentor: Dr. Daniel Maher

Poster Session I

From Sugar Cane to Sugar Packets

Alyson Catalan '13, Latin American Studies

From Sugar Cane to Sugar Packets is a study of the conditions on the sugar cane fields in the Dominican Republic. Companies today have a goal of creating more for less in order to meet the demands of the public. In order to attain these goals, cane cutters work and live in

subhuman conditions that remain ignored by the global community. How is it that the Western consumer has become so far removed from the people who grow and harvest the sugar that is used every day? In order to seek answers, I have examined the sugar cane plantations of the Dominican Republic and have identified the key contributors to the problem: American trade agreements and domestic corruption. My paper suggests a solution through a social justice approach to awareness and putting accountability back into the role of the consumer.

Faculty Mentor: Dr. Esteban Loustaunau

Exploring Serenity: Identifying Distinguishing Features

Katelyn Colburn '14 & Nabil Georges '13, Psychology

Although many individuals report experiencing serenity in their lives, this emotional experience varies across individuals, cultures, and religions. The purpose of the present study was to explore the common characteristics of serenity in order to better understand it. Participants (N=80) were recruited to complete an exploratory survey investigating their beliefs of what serenity is, what it means to them, and how and when they experience it in their lives. Out of all the senses, sound and sight were reported to prompt the experience of serenity most often. Participants who reported experiencing serenity less than once a month reported lower life satisfaction, while participants who reported experiencing serenity more often in their lives reported higher life satisfaction. In addition, those who reported experiencing serenity more frequently believed that serenity is a lasting experience, while those who reported experiencing serenity less frequently believed that serenity is a fleeting experience. The present findings provide an initial understanding of common experiences of serenity and how this emotional experience is correlated with life satisfaction.

Faculty Mentors: Dr. Maria Parmley & Dr. Fang Zhang

Organization of Complex Systems

Michael Daly '13 & Amrit Vinod '13, Natural Sciences

In order to measure self-organization in complex networks a

quantitative measure for organization is necessary. This will allow us to measure their degree of organization and rate of self-organization. We apply as a measure for quantity of organization the inverse of the average sum of physical actions of all elements in a system per unit motion multiplied by Planck's constant, using the principle of least action. The meaning of quantity of organization here is the inverse of the average number of quanta of action per one node crossing of an element in the system. We apply this measure to the central processing unit (CPU) of computers. The organization of several generations of CPUs shows a double exponential rate of change of organization with time. The functional dependence follows an S-shaped curve, which is evidence of some mechanisms of self-organization. We also studied the dependence of organization on the number of transistors. This approach can help to describe, quantify, measure, manage, design, and predict the future behavior of complex systems to achieve the highest rates of self-organization, improving their quality.

Faculty Mentor: Dr. Georgi Georgiev

***Made in America: Marketing Patriotism in
Post-Revolutionary America***

Paula DeCosta '13 & Elena Despotopulos '13, History

In post-Revolutionary America, a nation was forming a shared identity as Americans in a united country rather than separate colonies or states. The creation of American nationalism was encouraged and reflected in newspaper advertisements from all over the country, but especially in advertisements published in Philadelphia. Many advertisers in the new nation attempted to sell their goods by linking consumption with American patriotism. Artists and printers created patriotic goods such as prints of famous American heroes or scenes of the Revolution for the citizens of the new country to consume. In buying these goods, according to the advertisers, citizens would be supporting the new country by contributing to the American economy and also by becoming part of a community of Americans. By buying prints of American heroes, consumers were pledging their allegiance not to specific regions or states but to the new nation.

Faculty Mentor: Dr. Carl Keyes

Do Personality Traits Moderate Between Facebook Usage and Self-Esteem?

Nabil Georges '13, Jacqueline Castiglioni '13 & Briana Brown '13,
Psychology

The study examined the relationship between self-esteem, the Big Five personality traits and Facebook usage; it also investigated the moderating effects of the Big Five personality traits on the relationship between self-esteem and Facebook usage. Data was collected from fifty undergraduate students who respectively completed a self-report Facebook usage questionnaire, the Rosenberg Self-Esteem Scale, and the NEO Personality Inventory. The results showed that people who spent 2-3 hours per day on Facebook tended to report higher self-esteem than those who spent less than 2 hours on the site. Additionally, people with higher self-esteem were found to update their Facebook status more often than those with lower self-esteem; extraverts also reported more Facebook activities compared to the others. Finally, the Big-Five was found only to moderate the relationship between self-esteem and Facebook activity.

Faculty Mentor: Dr. Fang Zhang

Identification of an Unknown Bacterium

Britni Hagopian '13 & Allison O'Malley '13, Natural Sciences

In this study, the identity of an unknown bacterium was determined. A bacterial sample was isolated from the bottom of a winter boot and successfully purified on nutrient agar. Using structural stains, we found this particular bacterium was Gram-negative bacilli. Our data suggest that it may form endospores, but it does not have a capsule or flagella. This bacterium grew under high salt conditions and in acidic (pH 5.5), basic (pH 9), and neutral (pH 6.8) conditions. The respiratory process of the bacterium was determined to be facultative anaerobic based on the positive results of the catalase test and OF-glucose test. The bacterium did not ferment sucrose or lactose, but could ferment mannitol and glucose (OF-glucose). The bacterium possessed the metabolic enzymes amylase, hemolysin, ornithine decarboxylase, but not gelatinase, urease, tryptophanase, or

phenylalanine deaminase. Bacterial DNA was isolated, 16s rRNA gene amplified through PCR, and the sequence determined. The bioinformatics software BLAST (Basic Local Alignment Search Tool) was used to determine that the unknown bacterium is a member of the *Bacillus* genus, and its closest relative is *Bacillus pumilius*, an aerobic, Gram-positive bacterium. It doesn't produce spores but is highly resilient to harsh environmental conditions. It can break down oxidizers like hydrogen peroxide and can tolerate high salt concentrations. Our bacteria exhibited many of *Bacillus pumilius*' characteristics. In conclusion, we have identified an unknown bacterium as a close relative of *Bacillus pumilius* by using structural stains, metabolic tests, and molecular sequencing.

Faculty Mentor: Dr. Aisling Dugan

Exploratory Research of How Probation Officers Perceive Their Relationships with Probationers

Amanda Jean Nowak '13, Sociology

The previous research surrounding the social aspects of the probation process has been limited, which suggests the need for this rarely-researched, yet socially significant topic. For the purpose of this study, the principal investigator recorded multiple interviews with Probation Officers from Worcester District Court. During these interviews, the participants were asked questions regarding their perceptions of the specific aspects that can enhance their relationships with probationers. The results from these interviews suggest that Probation Officers identify the development of positive relationships with their probationers as highly important and propose that it can lead to successful probation.

Faculty Mentor: Dr. Alison Cares

Presentation Session IV

Using Linkages Between Solution Chemistry and Plant Physiological Response to Help Inform Critical Loads Calculations: A Literature Review

As the branch of a larger study, the compilation of a review of information found in available literature was constructed to help further understand soil solution chemistry in Northeastern forests. With the completion of a literature review, the ability to understand the linking traits of soil chemistry and vegetation response was drawn. Through identifying thresholds of base cations and critical loads within study plots similar to those with vegetation response information available, these linkages were constructed to express the possible causes of decreasing health of Northeastern ecosystems.

Faculty Mentor: Dr. Richard Warby

The Politics of Playdates: Stay-at-Home Fathers and Other Primary Caregivers of Children

Marie Ebacher '13, Sociology

Previous research has found that stay-at-home fathers are viewed with both suspicion and praise. The scholarship has also addressed stay-at-home fathers as part of changing structural conditions in gender since the 1960s; at-home dad studies have also documented some limited narrative accounts of their identity. Our study builds on the literature by analyzing stay-at-home fathers' experiences with other primary caregivers of children. We document how the "social organization of the at-home community" impacts stay-at-home fathers' interactions with other members of the at-home world. We explore the underlying discursive, interactional, and structural conditions that influence stay-at-home fathers' lives in the at-home community. We find that stay-at-home fathers feel that other participants in the at-home community are often wary of their involvement. This wariness is rooted in what we call a "biopolitics of gender discourse," where biological assumptions about childrearing divide men and women caregivers. In order to become integrated into the community, we argue that at-home fathers must adopt practices demonstrating their efficacy in maintaining a household and caring for children, as well as present themselves as friendly and sexually unthreatening.

Faculty Mentor: Dr. Steven Farough

The Relationship Between Income Inequality and Healthcare

Katherine Boucher '13, Sociology

Medical expenses are the leading cause of personal bankruptcy in the United States. Rising healthcare costs are forcing individuals to devote a greater percentage of their income to health-related expenses, in many cases leading to financial insolvency. As a result, the American healthcare system is a major contributor to the growing disparity among income groups. In order to explore the detrimental relationship between income inequality and healthcare, this research draws on the work of a number of organizations and individuals. These include the American College of Physicians and the Agency for Healthcare Research and Quality, in addition to individual researchers such as Wayne Kondro, Arnold Relman, and Elizabeth Warren. This project contributes to our understanding of the increasingly unsustainable nature of the American healthcare system.

Faculty Mentor: Dr. Steven Farough

Student Debt, Upward Mobility and the American Dream

Erica Micciche '13, Sociology

My research found a relationship between undergraduate student debt and students' perceptions of their chances for upward mobility. To do this, I invited about 2,000 undergraduates at a private liberal arts college in the Northeast to complete a survey, and 477 students responded. The results revealed that students at this school are beginning their lives with much debt to repay, yet believe that the cost is worth the benefit. They are still optimistic of achieving a middle class life, and thus still believe in the American Dream. Despite this, student debt really is a problem today, especially when the Great Recession's impact is taken into consideration.

Faculty Mentor: Dr. Steven Farough

Gender Empowerment in Production

Marie Ebacher '13, Sociology

Previous research on gender and globalization has made the case

that multinational corporations outsource to developing nations because they believe that women in third world nations are naturally docile, and thus better workers. However, Salzinger (2003) has argued that production processes deeply shape the performance of gender, showing that gender is not innate, but is produced by specific social context. Therefore, women in various production settings display gender differently. Following Salzinger's argument, I looked into the question of how gender is performed within the production setting of a fair trade company in Senegal. In this paper I use the term "gender empowerment," or a woman's sense of self-worth and self-confidence on an individual, social, economic and political level, to explore the specific way gender is performed in a production process that is supposed to enhance women's economic well-being. Through intensive interviews and participant observations, I found that the influence of Sufism within the community impacted the idea of the ideal worker as the religiously-called woman, thus displaying gender in a highly religious context. The results of my study offer further insight into how social context matters in the performance and empowerment of gender identity.

Faculty Mentor: Dr. Steven Farough

Presentation Session V

An Investigation of the Cytotoxic Effects of a Moschamine Analog on Cancerous Cells

Amrit Vinod '13, Natural Sciences

Cancer has affected millions of lives globally. This has encouraged researchers to find potential chemotherapeutic agents. One such compound under testing is moschamine, a monomer of montamine. This compound, isolated from *Centaurea montana*, was shown to have moderate chemotherapeutic effects on Caco-2, colorectal cancer cells (Shoeb *et al.*, 2006). Many analogs of moschamine have been synthesized (Lupien, 2009), and the initial purpose of this study was to determine which of these are cytotoxic towards colon cancer cells. This would allow for the isolation of

structurally simpler, and potentially more effective, compounds for the treatment of Caco-2 cells. Cytotoxicity was analyzed using MTT. Results revealed that (E)-N-(2-(1H-indol-3-yl)ethyl)-3-(4-hydroxy-3-methoxyphenyl)acrylamide (analog number 15) was ineffective against Caco-2 cells but seemed to be effective against HeLa, cervical cancer cells. It is possible that the Caco-2 cells are susceptible to the intact compounds montamine and moschamine, but not its analogs. Surprisingly, results showed that increasing the concentration of the vehicle (DMSO) in serum-free media increased its cytotoxicity towards HeLa cells. Future experiments would require optimizing the vehicle so that the cytotoxic effects of these analogs may be analyzed.

Faculty Mentor: Dr. Elizabeth Colby Davie

Water Quality in Worcester Ponds

Brianna Carey '14, Natural Sciences

Elm Park Pond and the Duck Pond are two ponds in the Worcester area which were tested for water quality. Multiple samples were taken from each up to one time per week for ten weeks from May to July. Specific conductivity, temperature, carbon amounts, carbon signatures, pH levels, bacteria and ion levels were all measured. It was found that the Elm Park Pond is much more stable which may be due to the fact it is tap water fed. The Duck Pond area results were more varied, and *E. coli* bacteria were found to be coming from upstream.

Faculty Mentor: Dr. James Hauri

Waste Water Treatment and Levels of Enterovirus Infection

Matthew Cooke '13, Natural Sciences

Enteroviruses cause pathogenic human diseases, such as polio, hand, foot, and mouth disease, and some cases of meningitis. Diseases caused by enterovirus infection afflict millions of people each year worldwide through the fecal-oral route of transmission. Enterovirus levels have been well documented in human waste water. In this study, we collected waste water samples (after primary physical treatment, after secondary biological treatment, and after tertiary chemical treatment) from the Blackstone Valley Wastewater Treatment Plant in

Millbury, MA in January 2013. Water collected from the various stages of sewage influent was filtered and applied to a green monkey renal cell line (Vero). After various times after inoculation, cells were evaluated for viral infection using two assays. The presence of enterovirus antigen (protein) was determined using a pan-specific enterovirus antibody followed by indirect immunofluorescence microscopy. RNA extraction from cells exposed to waste water followed by reverse transcriptase PCR was used to detect the presence of enterovirus RNA in cells.

Faculty Mentor: Dr. Aisling Dugan

Which Way to Turn? Exploring Activation of Axonal Integrins in Neuro2A Cells

Chandler Ervin '14, Jenna Garozzo '13 & Devyn Oliver '14,
Natural Sciences

Neurons are the building blocks of the nervous system that carry messages that coordinate actions necessary for life. Neurons are unique from other cells because they have specialized structures called dendrites and axons. Dendrites receive messages, while axons pass these messages to other cells. During development, environmental cues guide the growing axon to its target destination. One of these cues is netrin-1. However, the molecular mechanisms by which netrin-1 steers axons are not fully understood. Our work suggests that integrins, heterodimeric transmembrane proteins, play an important role in netrin-mediated axon guidance. Netrin-1 activates integrins; changes integrins to a high ligand-affinity state. Integrin activation is necessary for specific netrin-mediated growth cone behaviors. Techniques including Western Blot, RNA inhibition, and immunocytochemistry have been used to lay the foundation to test a possible indirect pathway of netrin-mediated integrin activation. This indirect pathway is one in which netrin-1 binds to a netrin-1 receptor which leads to intracellular signaling that ultimately activates integrins. RNA inhibition was used to knock down netrin-1 receptor DCC. Preliminary evidence shows successful DCC knockdown with decreasing protein expression. Future experiments will test the link between DCC knockdown and integrin activation.

Faculty Mentor: Dr. Michele Lemons



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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