

2016 ASSUMPTION COLLEGE UNDERGRADUATE RESEARCH SYMPOSIUM

Monday, April 18

9:00-10:30 am

11:00-12:30 pm

1:30-3:00 pm

La Maison Salon & Hall

Tuesday, April 19

8:30-10:00 am

Carriage House

2:00-4:00 pm

Testa Atrium

9:00-10:30 am

11:30-1:00 pm

1:15-2:30 pm

La Maison Salon & Hall



For more information please visit the
Assumption Portal





ASSUMPTION COLLEGE

Office of the Provost and Vice President for Academic Affairs

Welcome to the *22nd 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 with 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 these impressive works.

Sincerely,

Louise Carroll Keeley
Provost and Vice President for Academic Affairs



Undergraduate Symposium

Program Schedule

Monday, April 18, 2016

Time	Event	Location
9:00 AM—10:30 AM	Presentation Session 1A	La Maison Salon
	Presentation Session 1B	La Maison Hall
11:00 AM—12:30 PM	Presentation Session 2	La Maison Salon
1:30 PM—3:00 PM	Presentation Session 3A	La Maison Salon
	Presentation Session 3B	La Maison Hall

Tuesday, April 19, 2016

Time	Event	Location
8:30 AM—10:00 AM	Presentation Session 4	Carriage House
9:00 AM—10:30 AM	Presentation Session 5A	La Maison Salon
	Presentation Session 5B	La Maison Hall
11:30 AM—1:00 PM	Presentation Session 6	La Maison Salon
1:15 PM—2:30 PM	Presentation Session 7A	La Maison Salon
	Presentation Session 7B	La Maison Hall
2:00 PM—4:00 PM	Poster Session	Testa Atrium

Presentation Session 1A
Monday, April 18
9:00 AM – 10:30 AM La Maison Salon

Time	Presenter(s)	Discipline	Title
9:00 AM	Cody Forbes '16	SCA	Examining the Hierarchy of the United States Secret Service in Regards to Protection Details
9:15 AM	Steven Flynn '16	SCA	Police Officers' Thoughts on the Effect of Body Cameras on Their Ability to do Their Jobs
9:30 AM	Thomas Paine '16	SCA	The Effectiveness of Surveillance Cameras in Worcester
9:45 AM	Gregory Gibson '16	SCA	Day to Day Challenges At Risk Youth Face
10:00 AM	Christina Caira '16	SCA	How to Keep Youth in School and Out of the Juvenile Justice System
10:15 AM	Sarah Crafford '16	SCA	Teacher Opinions on the Common Core State Standards in Urban Elementary Schools

Presentation Session 1B
Monday, April 18
9:00 AM – 10:30 AM La Maison Hall

Time	Presenter(s)	Discipline	Title
9:00 AM	Michaela Temple '17	NAS	The Impact of Protein Shape Change on Synapse Formation
9:15 AM	Monika Rettler '18	NAS	Conformational Shape of Proteins and the Developmental Path of Neurons
9:30 AM	Rachel Avard '17	NAS	Integrin Mutations Cause Axonal Growth Errors in Motor Neurons
9:45 AM	Kaitlin Henry '16	NAS	Adventures in Synthetic Chemistry: Synthesis and Structural Confirmation of Montamine
10:00 AM	Juan Toscano '16	NAS	Analysis of eHsp90 Regulation of Secreted Exosomes from Tumor Cancer Cell
10:15 AM	Carmino Riccio '16	NAS	Thyroid Hormone (T3) Regulates crabp1 Gene Expression in Mammary Gland Fat Cells

Presentation Session 2
Monday, April 18
11:00 AM – 12:30 PM La Maison Salon

Time	Presenter(s)	Discipline	Title
11:00 AM	Lauren McCarthy '16	SCA	College Employees' Thoughts on Sexual Assault Preparedness
11:15 AM	Cecilia Sarkodee '16	SCA	Exploring Service Provider Opinion on Sexual Assault Reporting Policies on Campus
11:30 AM	Kimberly Urena '16	SCA	Definition of Sexual Assault Across New England
11:45 AM	Nichole Rebelo '16	SCA	Stress and Coping: A Study of Child Advocacy Centers
12:00 PM	Niklas Kessel '16	SCA	An Exploratory Study of How Attorneys Are Affected by Their Clients
12:15 PM	Sadie Landon '16	SCA	How the Providers of Free Legal Resources and Help View the Effectiveness of Their Services

Presentation Session 3A
Monday, April 18
1:30 PM—3:00 PM La Maison Salon

Time	Presenter(s)	Discipline	Title
1:30 PM	Michael Hroncich '16	SCA	Recidivism in Urban Areas
1:45 PM	Eric Kneeland '16	SCA	Gimme Shelter: Homeless Service Providers' Assessments of the Effectiveness of Housing First Programs in Maine
2:00 PM	Sarah Small '16	EGS	Breaking Down the Backlash Effect: Understanding the Domestic Abuse of India's Working Women
2:15 PM	Hailey Walker '16	HSRS	The Media Portrayal of Those with Disabilities Portrayed in Film Post 2000
2:30 PM	Nicole Hebert '16	HSRS	Impact of Behavior Regulation on the Speech and Language of Children Receiving Speech Therapy
2:45 PM	Lauren Hagen '17, Krystal Kearns '17, Taylor Nardi '16 & Hailey Walker '16	HSRS	Gender Stereotypes

Presentation Session 3B
Monday, April 18
1:30 PM—3:00 PM La Maison Hall

Time	Presenter(s)	Discipline	Title
1:30 PM	Madelaine Duarte '16	NAS	The Effects of Up-Regulation of Repair Proteins after UV damage in <i>Haloferax volcanii</i>
1:45 PM	Rafael Hamawi '18	NAS	Investigation of a Formulated Methodology to Assess the Transcription Coupled Repair Mechanism
2:00 PM	Nicole Leo '16	NAS	The Progression of Neurological Impairment in Sport-Related Brain Injuries
2:15 PM	Ann-Marie Idusuyi '16	NAS	Community-Associated Methicillin Resistant <i>Staphylococcus aureus</i> : Early Indicators and Preventative Techniques for Collegiate Student Athletes in the U.S.
2:30 PM	Emma Machado '17	NAS	Holographic Scaling and General Physics
2:45 PM	Kimberly Sysopha '16	MCS	A Comparison of Current Password Systems and Biometric Alternatives

Presentation Session 4
Tuesday, April 19
8:30 AM—10:00 AM Carriage House

Time	Presenter(s)	Discipline	Title
8:30 AM	Shannon Birch '19 & Alec Capstick '19	AMT & HIS	Ensuring Special Needs Are Met: An Interview with Marjorie Cohen
8:45 AM	Colleen Birkmeyer '19 & Julie Carpino '19	AMT & HIS	The Experiences of a Worcester Woman: Sara Swillo Muckian
9:00 AM	Jonathan Bisceglia '19 & Hope Sutton '19	AMT & HIS	Exploring Abby Kelley Foster and Women's History in Worcester with Charlotte Wharton
9:15 AM	Delia Byrne '19 & Shannon Mulvaney '19	AMT & HIS	An Interview with Andrea Healy: Successfully Facing the Challenges of a Young Mother
9:30 AM	Luke Hoyt '19 & Samantha Naples '19	AMT & HIS	An Interview with Deborah Gaveron-Ravenelle: Women in the Worcester Community
9:45 AM	Suzanne Pepe '19 & Abigail Toomey-Fisk '19	AMT & HIS	Transitions and Trials: An Interview with Katrina McNamara

Presentation Session 5A
Tuesday, April 19
9:00 AM—10:30 AM La Maison Salon

Time	Presenter(s)	Discipline	Title
9:00 AM	Matthew Miller '16	AMT	Diversity in Swing: Regional Expressions of Jazz in the United States
9:15 AM	Shant Eghian '18	HIS	Codex Latinus Monacensis 849 and the Malleus Maleficarum: Necromancy in Fifteenth-Century German Lands
9:30 AM	Kelse Merrill '17	HIS	The Condemnation of Weather Magic in Medieval Europe
9:45 AM	Christina Lambert '17	ENG	Beckettian Vice: A Societal Power Struggle on Humanness
10:00 AM	Sarah Johansson '16	ENG	Uses of Twitter and Citizen Journalism: A Comparison of September 11th Terrorist Attacks and Boston Marathon Bombings

Presentation Session 5B
Tuesday, April 19
9:00 AM—10:30 AM La Maison Hall

Time	Presenter(s)	Discipline	Title
9:00 AM	Andrew Lampi '16	PSY	Evaluating the Role of Social and Motor Engagement for Reducing Restrictive and Repetitive Behaviors in Autism
9:15 AM	Christina DiTolla '16	PSY	Conquering Invisible Elephants: Analyzing the Effectiveness of Parental Involvement in Adolescent Recovery from Mental Illness
9:30 AM	Joseph DiPilato IV '16	PSY	The Benefits of Breaks
9:45 AM	Patrick Giroux '16	BUS	Millennials in the Workplace
10:00 AM	Nicole Damaschi '16	BUS	What the Sarbanes-Oxley Act Does Not Include: An Examination of Audit Firm Rotation, Audit Firm Credibility and Tone at the Top
10:15 AM	Meghan Dwyer '16	EDU	Tablet Usage in Secondary Mathematics Education and Recommendations for its Effectiveness in the Classroom

Presentation Session 6
Tuesday, April 19
11:30 AM—1:00 PM La Maison Salon

Time	Presenter(s)	Discipline	Title
11:30 AM	Maia Campbell '19	HIS	The Advertisements of Colonial America: A Gateway for Digital Humanities
11:45 AM	Elizabeth Curley '19	HIS	Adverts 250: Bringing Technology, History, and Social Media Together
12:00 PM	Trevor Delp '18	HIS	“Doing” History: Working as a Guest Curator on the Adverts 250 Project
12:15 PM	Kathryn Severance '17	HIS	Working with T-Pen: A Look at Transcriptions of Historical Sources
12:30 PM	Mary Aldrich '16	HIS	Practicing History in Public: My Work on the Isaiah Thomas Broadside Ballads Project
12:45 PM	Andrew Lampi '16	HIS & PCS	Pirates, Privateers, and Print Culture of Eighteenth-Century Boston

Presentation Session 7A
Tuesday, April 19
1:15 PM—2:30 PM La Maison Salon

Time	Presenter(s)	Discipline	Title
1:15 PM	Ralph Cola '16	HIS	The Man Whose Fame Survived All: Public Perceptions of Union General Ambrose Burnside During the American Civil War
1:30 PM	Samantha Davis '16	HIS	The Republican and Religious Northern Woman in Patriotic Songs During the Civil War
1:45 PM	Zachary Szymkowicz '17	HIS	Christian Patriotism: The Civil War Through the Lens of Christian Sermons
2:00 PM	Joshua DellaFera '16	POL	Sayyid Qutb's Definition of Jihad as Liberation and its Relationship to Modern Terrorism
2:15 PM	Samantha Davis '16	HIS	Gender Parallelism in the Maya Cah: Women in Eighteenth- Century Yucatan

Presentation Session 7B
Tuesday, April 19
1:15 PM—2:30 PM La Maison Hall

Time	Presenter(s)	Discipline	Title
1:15 PM	Kaitlyn Hirtle '16	PCS	A Hot Meal Upon Arrival: The Refugee Experience Once Arriving in Worcester
1:30 PM	Lucas LaRoche '16	THE	Extraordinary Ministers of Holy Orders: A Historical, Sacramental, and Canonical Analysis
1:45 PM	Corinne Murphy '17	THE	Called to Receive, Called to Give: The Vocation of Women in Light of the Feminine Genius
2:00 PM	Joshua Stopyra '16	THE	The Davidic Covenant: A Study on G-d's Promise to the Jewish People
2:15 PM	Michael Hoyer '16	THE	Charity as Friendship, According to the Thought of Thomas Aquinas

Poster Session
Tuesday, April 19
2:00 PM—4:00 PM Testa Atrium

Time	Presenter(s)	Discipline	Title
2:00 PM - 4:00 PM	Hailey Rennick '16	BUS	Take Back Health by Taking Down TB
	Rebecca Levesque '17	HIST	Three Generations of Imbeciles are Enough
	Stephen Johnson '16 & Kyler Huffert '16	HSRS	Biomechanics of Walking and Running with a Loaded Jogging Stroller
	Kimberly McCullen '16	HSRS	Unique Experiences and Perspectives of Grandparents in the Childhood Cancer Community
	Caryna Wright '16	MCS	Appreciating Mathematics Through Geometric Art
	Andrea Koslowski '17 & Michaela Temple '17	NAS	When Your Phone Picks Up More Than Just a Call: The Identification of an Unknown Phone Case Bacterium
	Anna Gill '16 & Kaitlyn Riley '16	NAS	Characterizing an Unknown Bacterium Isolated from a Toilet Seat

(continued on next page)

**Poster Session
Tuesday, April 19
2:00 PM—4:00 PM Testa Atrium**

(continued from previous page)

Time	Presenter(s)	Discipline	Title
2:00 PM - 4:00 PM	Alaina Short '16	NAS	Infection of RAW264.7 Cells by <i>Klebsiella pneumonia</i> Results in an Immunological Response
	Elizabeth Morgan '16 & Alyssa Quigley '17	NAS	Identifying and Characterizing an Unknown Bacterium Cultured from a Cell Phone
	David Gazzola '17	NAS	Osmoregulation and Salinity Tolerance in the Mosquito Species <i>Aedes albopictus</i>
	Carmino Riccio '16	NAS	Identification of Cell Adhesion Molecules that Facilitate Glutamatergic Synapse Formation in <i>C. elegans</i>
	Nicolas Siegelman '16	NAS	Exponential Rate of Increase of Organization in Complex Systems
	Anna doCurral '17	PSY	Coparenting and Temperament Predict Fathers' Responsiveness in Father-Infant Interactions from 3 to 12 months
	Jacqueline LaForce '16	PSY	The Relationship Between Coparenting and Depression
	Cassandra Bates '16	PSY	Adverse Childhood Experiences and College Adjustment
	Margaret Azar '16, Katie Coderre '16, Eileen Finck '16, Anna Gill '16 & Rachel Montgomery '16	PSY	Effects of Gender and Type of Praise on Task Performance in College Students
	Rachael Hickey '16, Gianna Caruso '16, Amanda Cavicchi '16 & Sarah Henderson '16	PSY	Impact of Personality Characteristics on Task Performance
	Brianna Allard '17, Alicia Bylsma '16 & Erin Sullivan '17	PSY	Self-Esteem, Self-Disclosure, and Facebook: A Replication of Forest and Wood (2012)
	Raysa Guerrero '18	SCA	Repeat and Multiple Victimization in a College Sample

ABSTRACTS

Presentation Session 1A

Monday, April 18

9:00 AM - 10:30 AM La Maison Salon

Examining the Hierarchy of the United States Secret Service in Regards to Protection Details

Cody Forbes '16

Sociology, Criminology and Anthropology

This study of special agents in the United States Secret Service aims to find out how the hierarchal structure in this prestigious agency works to complete the goals and missions of protection details. Like most other major organizations, there is a hierarchy in the U.S. Secret Service. Most of the office consists of special agents, who follow the orders of their supervisors and spend much of their time in the field. Above them are the Assistants to the Special Agent in Charge, also known as ASAICs. They receive orders from the top agent and they instruct the special agents on their assignments. At the top of the hierarchy is the Special Agent in Charge, or SAIC. They run the office and coordinate the assignments. Everything is cleared by them. This research examines the efficiency of the hierarchy. Agents were interviewed to find out their opinions on the system, and information regarding the proficiency of the hierarchy within protection assignments was gleaned from their answers.

Faculty Mentor: Dr. Alison Cares

Police Officers' Thoughts on the Effect of Body Cameras on Their Ability to do Their Jobs

Steven Flynn '16

Sociology, Criminology and Anthropology

The purpose of this research is to look at police officers' thoughts about the effects of body cameras on their ability to do their job. The research includes open-ended interview questions asked to police officers regarding their thoughts on civilians, media coverage of police, effectiveness of body cameras and other aspects of police work. Evidence shows that there is a growing mistrust between civilians and police officers, and many people believe that the use of body cameras by police officers can help bridge this gap of mistrust. Although public backing shows that there is growing support for body cameras among civilians, this research addressed whether or not there is a growing support among police officers, and what advantages and disadvantages these police officers foresee with the use of body cameras. This research contributes to the larger issue of effective policing that continues to be a discussion among U.S. citizens.

Faculty Mentor: Dr. Alison Cares

The Effectiveness of Surveillance Cameras in Worcester

Thomas Paine '16

Sociology, Criminology and Anthropology

In 2013, the city of Worcester began implementing a camera surveillance network called the Real Time Crime Center in order to address crime within the city. Camera surveillance effectiveness with regard to deterring crime has yielded mixed results in other cities in the past. The purpose of this study is to discover whether the cameras of the Real Time Crime Center have effectively decreased the crime rate in the city, or whether the cameras have been ineffective in reducing crime. This research project explores this question through comparative statistics from before and after the establishment of the cameras, and through first-hand accounts from the police officers that patrol the streets.

Faculty Mentor: Dr. Alison Cares

Day to Day Challenges At Risk Youth Face

Gregory Gibson '16

Sociology, Criminology and Anthropology

After being at my internship working with “at risk” youth I have noticed that many of my clients come from unstable home lives and have already been through the criminal justice system. Some seem to struggle to maintain self-control on a daily basis. This study uses interviews with personnel who work in a treatment program for at risk youth to explore what they identify as the daily challenges faced by their clients.

Faculty Mentor: Dr. Alison Cares

How to Keep Youth in School and Out of the Juvenile Justice System

Christina Caira '16

Sociology, Criminology and Anthropology

The school-to-prison pipeline is the phenomenon where youth are pushed out of the education system by way of strict zero-tolerance and suspension policies and shuttled into the juvenile and criminal justice systems. If we are to bring this herding of students into the justice systems to a halt, we must identify ways we could keep students in school. This study involved interviews with teachers and social workers who work in an urban school setting. Their perspectives were gathered, which shed light on how current policies reduce the likelihood of adolescents completing their education and increase the probability that they end up on probation or in lock-up. Ideas for reversing that trend were also solicited.

Faculty Mentor: Dr. Alison Cares

Teacher Opinions on the Common Core State Standards in Urban Elementary Schools

Sarah Crafford '16

Sociology, Criminology and Anthropology

The Common Core State Standards have been the topic of much controversy in the field of education. The standards largely focus on preparing elementary school students for the standardized testing they will encounter in the future. However, many teachers have spoken out against the standards, arguing that they do not establish a challenging enough curricula for students. This research study gauges teachers’ opinions on the implementation of the Common Core State Standards in one urban elementary school. The research questions how finances and school environment affect the effectiveness of the standards on academic achievement.

Faculty Mentor: Dr. Alison Cares

Presentation Session 1B

Monday, April 18

9:00 AM - 10:30 AM La Maison Hall

The Impact of Protein Shape Change on Synapse Formation

Michaela Temple '17

Natural Sciences

There are trillions of cells in the human body. More specifically, the brain is composed of millions of specialized cells called neurons. These highly specialized cells are responsible for sending signals throughout the body, allowing us to perform everyday tasks such as walking, talking, and eating. Neurons send signals down a long projection called an axon, and communicate to other neurons through a communication site called a synapse, or a gap junction. This gap is where a signal flows from the first neuron to the second. Previous studies demonstrate that the protein integrin plays an important role in axon guidance; however, the impact that integrins have on synapse formation is not well understood. Integrins are comprised of two parts: one alpha and one beta subunit. This research aimed to understand the impact that shape change of the alpha subunit would have on synapse formation. To study the effects of the alpha subunit on synapse formation, the genetically powerful model organism *Caenorhabditis elegans* was employed. The impact of one alpha subunit mutation on synapse formation was observed. Preliminary data suggests that mutations in the alpha subunit may cause a

decrease in the area of pre- and post-synaptic endings. A decrease in the area of synapses, as compared to wild type, suggests that the signal may not be properly sent through the synaptic gap. This finding highlights a novel insight into the importance of integrin shape on synapse formation during development.

Faculty Mentor: Dr. Michele Lemons

Conformational Shape of Proteins and the Developmental Path of Neurons

Monika Rettler '18

Natural Sciences

During development, a neuron's objective is to extend through the body and reach a target cell. Accuracy in reaching these target cells is imperative in the function of the nervous system, and yet the molecular mechanisms underlying axonal navigation are not fully understood. Previous studies show that integrins, proteins that interact with molecules outside the neuron, play a key role in axon guidance. These proteins are made of two parts: one alpha and one beta subunit. The impact of integrin shape on axonal patterning *in vivo* is not well known. To study the effects of integrin shape, we utilized the genetically powerful *Caenorhabditis elegans*. My experiment focused on a subset of neurons called GABA neurons and their axonal patterning in worms with an activating or inactivating shape mutation in the beta/pat-3 integrin subunit. Axonal mispatterning was observed in transgenic worms with a beta/pat-3 integrin inactivating mutation as compared to control. However, axonal mispatterning was significantly less compared to control in worms with a beta/pat-3 activating mutation. These novel findings add insight to the significance of conformational shape of integrins in the beta subunit on axon patterning during development.

Faculty Mentor: Dr. Michele Lemons

Integrin Mutations Cause Axonal Growth Errors in Motor Neurons

Rachel Avard '17

Natural Sciences

All living organisms are made up of cells. There are many types of cells: muscle cells, skin cells, liver cells, *et cetera*. One highly important class of cells is neurons. Neurons are responsible for sending and receiving signals throughout the body. Without neurons, people would not be able to move, talk, or feel pain. Neurons have long projections, called axons, which reach out to other neurons so that signals can be sent from one neuron to the next. The mechanisms through which these axons grow are not well understood, but it is believed that the protein integrin may be important in axon navigation. Integrins are made up of an alpha and a beta subunit. This research looked specifically at the impact that conformational changes in the alpha subunit would have on axon guidance. The genetically powerful model organism *Caenorhabditis elegans* was used to test if the conformation of integrins was important for axon guidance. Two mutations were looked at; one mutation caused the integrin to take on a more inactive conformation, while the second mutation impacted the proteins ability to bind to ligands, but did not alter the shape of the protein. The mutation that altered the integrin conformation caused significant axon patterning errors, and preliminary data for the mutation that altered ligand bonding affinity suggest that this mutation also causes significant axonal patterning errors. These data provide insight into the mechanisms of axonal growth, particularly in regards to the protein integrins.

Faculty Mentor: Dr. Michele Lemons

Adventures in Synthetic Chemistry: Synthesis and Structural Confirmation of Montamine

Kaitlin Henry '16

Natural Sciences

Naturally-occurring chemical compounds have many advantages in medicine and synthetic organic chemistry. This paper explores the process of synthesizing montamine, a natural product of *Centaurea montana*. The structure of this compound was reported in 2006 and has been found to have some anticancer and antioxidant applications. The original data on the structure of montamine reported two moschamine dimers joined by a N-N bond. Recent research, however, indicated that this was an incorrect report of the structure, due to the significantly upfield NMR shifts of the α and β methylene protons. This work started by hypothesizing that the monomers were actually joined through a biaryl bond at the aromatic rings. This structure was investigated

using a simpler model system to find an oxidation technique that could successfully form a biaryl bond. NMR analysis of the model product showed both symmetric and asymmetric oxidative coupling of the aromatics. Next, montamine was successfully synthesized through oxidation of Boc-serotonin. NMR data revealed similar results to the model system, demonstrating symmetric and asymmetric coupling at the O-O and O-O' positions, respectively. Additionally, the α and β methylene protons exhibited shifts in accordance with the newly proposed structure of montamine.

Faculty Mentor: Dr. Elizabeth Colby Davie

Analysis of eHsp90 Regulation of Secreted Exosomes from Tumor Cancer Cell

Juan Toscano '16

Natural Sciences

Cancer is a deadly disease due to how tumor cells invade and migrate to other parts of the body, a process called metastasis. Cells under stress secrete microvesicles called exosomes, and one of the proteins found inside of exosomes in high concentrations is the chaperone heat shock protein-90 (Hsp90). Once Hsp90 is released via exosomes to the extracellular space (eHsp90), it can activate multiple pro-invasive proteins that are known to be involved in tumor metastasis. Thus, we hypothesized that eHsp90 may function in exosome trafficking in cancer cells. We tested this hypothesis by treating MDA-MB-231 breast cancer cells in culture with the Hsp90 inhibitor STA-12-7191 and measured the release of exosomes and eHsp90 from these cells. We reported that drug treatment resulted in a 50% reduction in exosomes as assessed by protein concentration and Hsp90 compared to no drug controls indicating that inhibition of Hsp90 decreases in exosome release. Our findings support a functional role for Hsp90 in exosome release from cancer cells, a new and important process for the communication of tumors with their extracellular environment. This also suggests that STA-12-7191 could be beneficial in treating invasive and aggressive breast cancer cells.

Faculty Mentors: Dr. Jessica McCready and

Dr. Daniel G. Jay, Department of Cellular, Molecular and Chemical Biology, Tufts University, Boston, MA

Thyroid Hormone (T3) Regulates crabbp1 Gene Expression in Mammary Gland Fat Cells

Carmino Riccio '16

Natural Sciences

Pregnancy-associated breast cancers (PABCs), cancer diagnosed during pregnancy, lactation or within a year after the mother has given birth, are typically found at an advanced stage, are extremely aggressive and have a poor prognosis. Cellular retinoic acid binding protein 1 (crabbp1) has been specifically identified to promote PABC. Adipose stromal cells that have been isolated from the mammary gland during lactation (ASC-L) express increased levels of crabbp1 when compared to adipose stromal cells isolated from a mammary gland that is nulliparous (ASC-N). Previous studies have shown that ASC-Ls promote more aggressive tumors than ASC-Ns due to the level of crabbp1 expression present in the cells. The primary function of crabbp1 is to regulate the accumulation of lipids by the cells, however the underlying mechanism and regulation of crabbp1 in the mammary gland is unknown. Previous studies performed by our lab and others suggest that thyroid hormone (T3) may increase crabbp1 gene expression during lactation; therefore, we hypothesize that crabbp1 is directly regulated by T3. To test this hypothesis, we systematically treated cells with T3 and conducted qPCR to determine the level of fatty acid synthase (FAS) and crabbp1 gene expression. Preliminary data suggest that long term exposure of T3 increases crabbp1 mRNA levels in ASC-Ns. Understanding the effects of T3 on crabbp1 function in adipose stromal cells of the mammary gland will advance the research of PABC by providing new insight into the mechanism responsible for aggressiveness of the disease.

Faculty Mentor: Dr. Jessica McCready

Presentation Session 2
Monday, April 18
11:00 AM - 12:30 PM La Maison Salon

College Employees' Thoughts on Sexual Assault Preparedness

Lauren McCarthy '16

Sociology, Criminology and Anthropology

Because of the heightened awareness of sexual assault in the United States in recent decades, colleges are more prepared than ever before to attempt to prevent and deal with sexual assaults. College faculty and staff are often required to undergo training when starting their job and sometimes have follow up training specifically related to Title IX laws. The purpose of this study is to trace college employees' preparedness in relation to Title IX laws through interviews.

Faculty Mentor: Dr. Alison Cares

Exploring Service Provider Opinion on Sexual Assault Reporting Policies on Campus

Cecilia Sarkodee '16

Sociology, Criminology and Anthropology

Sexual assault on campus is a major issue. Current statistics state that 1 in 5 women and 1 in 16 men are sexually assaulted during their college years, and it is estimated that at least 90% of assaults are not reported. Sexual assault on campus has become a concern not only for students and parents, but the federal government and the president as well. There has been substantial amount of research on sexual assault and the various laws and programs in place to help protect students. Some of the laws to address campus sexual assault include the Clery Act, Title IX, and The Campus SaVE Act. These laws are there to ensure that institutions of higher education report any sexual assault incidents that occur on college campuses. This study involved interviews of rape crisis counselors regarding their opinions of these laws. With their direct experiences working with survivors of sexual assault, the counselors had great insight regarding factors that would encourage students to report assaults to their institution.

Faculty Mentor: Dr. Alison Cares

Definition of Sexual Assault Across New England

Kimberly Urena '16

Sociology, Criminology and Anthropology

Attention to the issue of sexual assault on campus is at an all-time high, as the president and others have highlighted that between one in four and one in five college women will experience a sexual assault while they are in college (Fisher, Cullen, & Turner, 2000). The first step to stopping sexual assaults on college campus is for students to understand what it is. Colleges are now required to make information about sexual assault, including definitions of sexual assault and sexual misconduct, available on their websites. This study utilizes a random sample of 50 colleges and the universities in the Northeast to analyze and compare their definitions of sexual assault as made available on their websites.

Faculty Mentor: Dr. Alison Cares

Stress and Coping: A Study of Child Advocacy Centers

Nichole Rebelo '16

Sociology, Criminology and Anthropology

Work can affect an employee in a positive or in a negative way. When there are many stressors involved, an employee risks being burnt out from the stress one may carry. Burnout is a term that consists of three components: self-efficacy, occupational stressors, and secondary trauma. These three areas encompass personal beliefs about oneself and their goals; stress from workloads, and client characteristics and behaviors; and exposure to traumatic events. The purpose of this study is to explore, through interviews, how employees in a child advocacy unit cope with burnout in their workplace due to the child abuse and neglect they see throughout

their workplace.

Faculty Mentor: Dr. Alison Cares

An Exploratory Study of How Attorneys Are Affected by Their Clients

Niklas Kessel '16

Sociology, Criminology and Anthropology

The Court Service Center provides the following information to clients: "The Court Service Center provides free one-on-one assistance filling out court forms; general information regarding court rules, procedures and practices; workspace to prepare forms and documents; access to interpreter services; contact information regarding community resources and legal services; and user-friendly self-help materials. The Center does not give legal advice and cannot act as your attorney." This study will explore the challenges attorneys face in providing publicly funded legal assistance to a predominantly low income population, like that in the CSC. Based on my experiences in the CSC, I expect that the participating attorneys may identify differences in working with clients depending on their gender and race/ethnicity. A 20-minute interview was completed with various questions regarding my research question. In the paper, the findings from multiple interviews will be presented and compared to find consistent patterns in their answers.

Faculty Mentor: Dr. Alison Cares

How the Providers of Free Legal Resources and Help View the Effectiveness of Their Services

Sadie Landon '16

Sociology, Criminology and Anthropology

The purpose of this study is to see how providers of free legal support that work with low income litigants feel about the free legal and community services that are provided through the Court Service Center and other community support services. The goal of the study is to determine how the providers of these services view the effectiveness of their programs and tools used with the litigants, and evaluate other possible resources to better the quality of service provided by the centers. Bettering the quality of service can better the clients' experience within the legal system, making it a more streamlined and straightforward process. The participants were chosen from multiple court service center employees and other providers of legal services to low-income clients in Massachusetts. The Court Service Center is a free service provided to litigants who are seeking help completing forms, giving clients the forms they need, and general information in regards to their own cases. The participants were interviewed in person and were asked questions about their feelings towards the services they provide and recommend to clients.

Faculty Mentor: Dr. Alison Cares

Presentation Session 3A

Monday, April 18

1:30 PM - 3:00 PM La Maison Salon

Recidivism in Urban Areas

Michael Hroncich '16

Sociology, Criminology and Anthropology

Recidivism rates have become an increasing concern in today's society and especially in urban areas. This project draws on the valuable opinions of prosecutors to gain their insight on the main factors that may lead to recidivism. The purpose behind this project is to gain more knowledge on the characteristics of repeat offenders so that preventive measures can be identified.

Faculty Mentor: Dr. Alison Cares

Gimme Shelter: Homeless Service Providers' Assessments of the Effectiveness of Housing First Programs in Maine

Eric Kneeland '16

Sociology, Criminology and Anthropology

This honors thesis focuses on the Housing First model of addressing chronic homelessness in the state of Maine, primarily in the city of Portland. Preble Street, an organization based in Portland, operates a Housing First program called Logan Place, which houses 30 chronically homeless adults. Eight members of the staff at Preble Street were interviewed using a semi-structured style: three caseworkers, three administrators, and two administrators with casework responsibilities. The major themes that were revealed from the interviews are the successes of the program, the ongoing challenges of securing funding to continue the program's successes, the role of public perception of the homeless, and how the political climate in Maine affects the ability of Preble Street to fulfill its mission.

Faculty Mentor: Dr. Richard Gendron

Breaking Down the Backlash Effect: Understanding the Domestic Abuse of India's Working Women

Sarah Small '16

Economics and Global Studies

Many point to female employment as a means of liberation and empowerment for women. However, previous research indicates that working women in India suffer higher rates of partner violence than their non-working counterparts. Many economists and sociologists have attributed this to the 'backlash effect': a husband feels his role as patriarch being threatened and thereby reasserts his dominance and household bargaining power through abuse. This research examines socioeconomic variables that make a working woman more or less likely to be abused. Using demographic and health survey data and logit regressions, several variables that amplify a working woman's likelihood of domestic abuse were identified. For instance, if the working woman makes more money than her husband, has more education than him, has children, belongs to a scheduled caste, or lives in an urban residence, she is more likely to be abused. If she works in a white-collar industry, is ethnically a member of a tribal group, or is in the richest wealth index, she is less likely to be abused. Ultimately, if organizations are encouraging growth in female labor force participation, they must understand and encourage healthy household bargaining dynamics.

Faculty Mentor: Dr. Smriti Rao

The Media Portrayal of Those with Disabilities Portrayed in Film Post 2000

Hailey Walker '16

Human Services and Rehabilitation Studies

Film portrayals of people with disabilities have had a significant, but perhaps unnoticed, role in shaping how the general public views individuals with disabilities. Research has documented the impact of films on creating and perpetuating misconceptions of a variety of disabilities and disability groups. Numerous stereotypes are portrayed in films depicting the lives of people with disabilities, which lead to barriers that keep people with disabilities in marginalized roles. Much research has been conducted on films produced prior to the year 2000. These studies have identified the themes and stereotypes portrayed that have been harmful to the lives and empowerment of individuals with disabilities. This current research attempted to study if and how the depictions of people with disabilities has changed after the year 2000 and after the passing of significant legislation prohibiting discrimination against people with disabilities. This study analyzed twenty films representing four disability categories (physical, psychiatric, sensory, and intellectual/developmental). This study attempted to determine if these laws or other social justice initiatives have had a positive impact on the portrayal of disabilities, thus having a positive impact on the millions of Americans with disabilities. The review of a random sample of films depicting characters with disabilities has demonstrated improvement in the portrayal of disabilities but that there is still much room for more accurately representing characters with disabilities. Implications of this research include providing education and disability awareness to filmmakers on how people with disabilities can be more accurately portrayed.

Faculty Mentor: Dr. Susan Scully-Hill

Impact of Behavior Regulation on the Speech and Language of Children Receiving Speech Therapy

Nicole Hebert '16

Human Services and Rehabilitation Studies

The current study investigated the role that behavior regulation plays in speech and language therapy. The researcher hypothesized that children who struggle with regulating their behavior are at a disadvantage to those who do not struggle with behavior regulation. Data was collected by interviewing 5 current speech-language pathologists who work with children, primarily in public schools. They were each asked the same questions and their answers were analyzed and compared. Results suggest that negative behaviors are a hindrance to speech and language therapy and speech-language pathologists are ill-prepared in graduate school to handle them. These results show the importance of SLPs being aware and prepared for poor behavior regulation in therapy in order to have the most effective session possible.

Faculty Mentor: Dr. Susan Scully-Hill

Gender Stereotypes

Lauren Hagen '17, Krystal Kearns '17, Taylor Nardi '16 & Hailey Walker '16

Human Services and Rehabilitation Studies

This research project focused on understanding the process involved in the acquisition of societal gender stereotypes. Using an ecological systems theoretical framework, we examined what social expectations there are for boys and girls, and how these are transmitted through a socialization process. Research shows that consumer culture contributes to stereotypes as well. However, if boys and girls are both shown playing with the same toy, children will later identify that toy as for both boys and girls. We conducted a literature review, interviewed individuals regarding their perceptions of gender, and created a video representation of our findings.

Faculty Mentor: Dr. Pica-Smith Cinzia

Presentation Session 3B

Monday, April 18

1:30 PM - 3:00 PM La Maison Hall

The Effects of Up-Regulation of Repair Proteins after UV damage in *Haloferax volcanii*

Madelaine Duarte '16

Natural Sciences

DNA damage caused by ultraviolet (UV) light occurs in most organisms. Repair mechanisms exist in that fix the damage before mutations can occur. We are investigating the regulation of these DNA damage responses in *Haloferax volcanii*, a halophilic archaea isolated from the Dead Sea. We are asking if basal levels of repair proteins are adequate for promoting survival after UV damage or if damage-inducible protein synthesis is required for optimal recovery after UV. The presence or absence of an UV-inducible response may be detectable through survival curves. Cells were split into two groups: one group is treated with an inducing dose of UV, while the control is not. The cells are then given challenge doses of UV at four time points: 0, 30, 60, and 120 minutes. The challenged cells are quantitatively analyzed by plating on solid media and counting survivors. If there is a DNA damage inducible response in *Haloferax*, we predict an increase in cell survival in the cells pre-induced with UV. The alternative is that the cells that received the inducing dose have the same survival as the cells that did not receive that dose. Preliminary data suggests that an inducible response, if present, is not having a significant effect on increasing cell survival.

Faculty Mentor: Dr. David Crowley

Investigation of a Formulated Methodology to Assess the Transcription Coupled Repair Mechanism

Rafael Hamawi '18

Natural Sciences

During DNA transcription, transcription-coupled repair (TCR) occurs when a damaged DNA site is encountered. TCR is the process in which RNA polymerase is removed with a transcription-coupled repair factor

and a nucleotide excision repair protein adjusts the site of damage. The assessment of TCR has been challenging since the method of separating DNA with an alkaline gel, and performing a southern blot and hybridization is expensive and offers much opportunity for error. A formulated assay to determine an efficient methodology in measuring TCR will be evaluated with *Escherichia coli* and then variables will be manipulated to measure TCR in the halophilic archaea. Currently, digesting the plasmid to isolate the preferred strand has been difficult and the procedure is constantly configured to address errors. The future plan is to UV-irradiate *E. coli* cells and take samples in consecutive time intervals after exposure. The plasmid will be digested, an alkaline gel electrophoresis will be performed, and T4 endonuclease V will be applied to some samples. Intensity of bands will be quantified in relation to one another to determine the kinetics of repair. If effective, this procedure can be utilized by scientists to investigate TCR in other organisms.

Faculty Mentor: Dr. David Crowley

The Progression of Neurological Impairment in Sport-Related Brain Injuries

Nicole Leo '16

Natural Sciences

Millions of Americans sustain traumatic head injuries each year when participating in various high- and low-risk activities. Athletes, in general, are more prone to sustaining brain injuries than others, particularly those that participate in collision sports. This thesis discusses brain damage and the long-term effects incurred by collision sport-related traumatic brain injuries, such as the formation of amyloid-beta plaques in brain tissue and the increased possibility of developing neurodegenerative diseases such as Alzheimer's. In addition, brain development and plasticity over time are reviewed revealing the concept that brain plasticity and brain development are key processes that occur throughout childhood, adolescence, and, to some degree, into adulthood. Together, the discussions of these topics are the basis for the creation of a logical and analytical hypothesis as to whether young or adult athletes have the potential to incur more severe, long-term damage. The resulting hypothesis is that it is worse for young athletes to sustain head injuries since brain development largely impacts an individual's quality of life. However, their injuries might be less apparent than in an adult as a result of the brain's plastic abilities enabling them to compensate and remain functioning at a high level despite their injuries.

Faculty Mentor: Dr. Stuart Cromarty

Community-Associated Methicillin Resistant Staphylococcus aureus: Early Indicators and Preventative Techniques for Collegiate Student Athletes in the U.S.

Ann-Marie Idusuyi '16

Department of Natural Sciences

The rapid emergence of Community-Associated Methicillin Resistant *Staphylococcus aureus* (CA-MRSA) has become a major health concern in the community. It has become widespread in the athletic environment and, unfortunately, can be transmitted very easily through superficial cuts and obscure skin trauma. CA-MRSA infections are extremely contagious and associated with substantial morbidity. CA-MRSA clinical manifestations frequently appear as an abscess or cellulitis amongst other morphological characteristics. The gold standard for treatment of CA-MRSA is incision, drainage, and obtaining a culture of the wound. A range of effective oral antibiotics and topical antimicrobials may also be used as well; however, beta-lactam antibiotics have proven to be ineffective for treatment. In the athletic environment there are many risk factors for CA-MRSA; these include contact sports with recurrent close contact with other participants, open cuts or scrapes, and sharing personal equipment or gear. Many sports teams have presented cases of CA-MRSA infection with the highest incidences being found in football and wrestling. Improper diagnosis of CA-MRSA infections may cause large scale infections in athletic environments. The goal of this review is to assist athletes, athletic trainers, and sports medicine physicians in preventing, recognizing, and providing treatment for CA-MRSA skin infection in athletic environments.

Faculty Mentor: Dr. Stuart Cromarty

Holographic Scaling and General Physics

Emma Machado '17

Natural Sciences

Many high school and college students are required to take physics, but few actually learn to discover the mysteries of the field because they are too busy trying to memorize equations and solve "plug and chug" style problems. Looking into the calculations and equations of physics, a holography can be seen within the subject. By studying the duality that exists between electricity and gravity this holography can be discovered and made accessible to general physics students. Furthermore, the concept of mass in physics (ADM-mass) can be calculated, within this holography, for various black holes along with orbits of massive and massless particles.

Faculty Mentor: Dr. Leo Rodriguez

A Comparison of Current Password Systems and Biometric Alternatives

Kimberly Sysopha '16

Math and Computer Science

The presence of online accounts and digital information today has increased greatly from its inception decades ago. Yet, despite the growing amounts of personal and private data online, data security has remained relatively the same. Current data security involves password protection and encryption that have both shown vulnerability to hacking. As a result, biometric identification and authentication have been offered as an alternative. Biometric authentication involves physical or behavioral characteristics as a means of identifying a user, such as fingerprinting and speech recognition, respectively. These characteristics are unique to each user and cannot be guessed, unlike passwords. I will compare the benefits and shortcomings of current data security and biometric alternatives and propose an ideal system of authentication.

Faculty Mentor: Dr. Robert Fry

Presentation Session 4

Tuesday, April 19

8:30 AM - 10:00 AM Carriage House

The Tagaste Project's "Express Yourself" Students and Community Service Learning

During the Spring 2016 semester, first-year students in the "Express Yourself: Visual Messages and Historical Narratives" learning community sponsored by the Tagaste Project simultaneously enrolled in Graphic Design 215 – "Meaning and Messaging" and History 181 – "United States, since 1877." Working in collaboration with the Worcester Women's Oral History Project, students conducted oral history interviews with local women as a Community Service Learning component of the history course. They are in the process of preparing transcripts and legal documents to be deposited in the Schlesinger Library on the History of Women in America at Harvard University. For this project, students supplemented the list of questions provided by the WWOHP with questions about "compassionate service" brainstormed in class. In addition, as a Community Service Learning component of the graphic design course, each student created public service announcements for an advocacy, humanitarian, or service organization important to their interviewee. These projects allowed students to engage in service activities in two different disciplines while learning more about other ways Worcester residents practice thoughtful citizenship and compassionate service in their daily lives.

Ensuring Special Needs Are Met: An Interview with Marjorie Cohen

Shannon Birch '19 and Alec Capstick '19

Department of Art, Music and Theatre & Department of History

In this oral history interview Marjorie Cohen discusses the tremendous amount of work she has done for families whose members have both mental and physical disabilities. Her daughter Caroline was diagnosed with Cerebral Palsy, setting in motion her continuing mission to make the world a better place for handicapped individuals. Cohen has led several committees in order to get the community together to help families care for

those with special needs; she has also petitioned schools to extend educational and co-curricular programs to those who were denied those opportunities. She continues to work to make the world a place where everyone, no matter their ability, is given a fair chance at life and at education.

In her interview, Cohen discussed the struggles of being the mother of a child with disabilities and seeking the proper treatment and care that people with handicaps and disabilities deserve. Making the families of the differently abled comfortable is equally important. In recognition of that, Cohen organized group events so siblings and parents could see that they are not alone in the struggle to help their child. Through her actions, Cohen demonstrates true love and dedication by caring for her daughter and others.

Faculty Mentors: Dr. Carl Robert Keyes & Prof. Lynn Simmons, M.F.A.

The Experiences of a Worcester Woman: Sara Swillo Muckian

Colleen Birkmeyer '19 & Julie Carpino '19

Department of Art, Music and Theatre & Department of History

This presentation examines the experiences of Sara Swillo Muckian, who was born and raised in Worcester, Massachusetts, where she has resided her entire life. In 2005, she graduated from her favorite college, Holy Cross. She then started a career at Assumption College, where she developed an interest of helping others by working in Student Affairs. Currently, Muckian is the Associate Director of Student Involvement at Holy Cross. Recently, she and her husband welcomed a daughter, who is now one year old, into the world. Muckian remains driven and positive while working, caring for her family, and learning the stages of motherhood.

In our oral history interview, Muckian expressed her love for the city of Worcester. It is out of this love that her dedication to help others and give back to the community emerged. Muckian volunteered in several different organizations, especially LLS (Leukemia Lymphoma Society). She ran five Boston Marathons to help raise money for this cause, and also directed other fundraising for the organization. By being involved with LLS and many other organizations, Muckian has connected even more to Worcester and its people. She asserts helping others is highly rewarding and continues to fulfill her roles as a college administrator, wife, and mother.

Faculty Mentors: Dr. Carl Robert Keyes & Prof. Lynn Simmons, M.F.A.

Exploring Abby Kelley Foster and Women's History in Worcester with Charlotte Wharton

Department of Art, Music and Theatre & Department of History

Jonathan Bisceglia '19 & Hope Sutton '19

This presentation examines the life and experiences of Charlotte Wharton, a local artist who painted Abby Kelley Foster's portrait in Worcester's Mechanics Hall. Wharton was born in the Midwest; she moved to New England following her marriage. Wharton earned a Bachelor of Arts degree from Clark University and currently works out of a small studio in her home. Wharton has earned dozens of major awards, including the Oil Painters of America Award for Excellence in Painting.

In our oral history interview Wharton discussed her process in approaching the portrait of Abby Kelley Foster and her journey throughout the creation of the piece. Originally Wharton was not aware of who Foster was. She read many biographies, novels, and diary entries about Foster in order to capture her likeness and personality. The painting featured in Mechanics Hall has a significant meaning to her, as she later discovered she was related to Foster years after the painting was completed. Her spiritual journey is a touching one and Wharton ties her strong sense of faith to the entire process. From the discovery of Foster's character to the symbolism tied into the painting itself, this interview with Charlotte Wharton depicts a woman with a deep tie to her faith, her community, and her history.

Faculty Mentors: Dr. Carl Robert Keyes & Prof. Lynn Simmons, M.F.A.

An Interview with Andrea Healy: Successfully Facing the Challenges of a Young Mother

Delia Byrne '19 & Shannon Mulvaney '19

Department of Art, Music and Theatre & Department of History

This presentation explores the life of Andrea Maria Healy, the director of Human Resources at Cutler Associates, a construction company. She was born and raised near Worcester, in Boylston, and currently lives on the Paxton-Worcester line. Healy became a mother at the age of nineteen. She raised two daughters, Courtney and

Lindsey, on her own, having never married. Although she would never change this aspect of her life, she confessed that becoming a mother so young was a challenge, especially balancing motherhood and her career.

Healy attended Quinsigamond Community College for a short time and then enrolled in Assumption College. She later took the qualifying exam to become a certified Senior Professional in Human Resources. She has had several jobs throughout her life; however, throughout all of her positions, she has continually put her family first.

In her interview, Healy discussed her passion and vision for Worcester. She is very proud of Worcester and is excited for the future progress in the city. For fifteen years, Healey has been a member of Rainbow Child Development, which provides child care for low-income families. Healy strongly emphasizes the importance of everyone being involved in the community and finding an organization they are passionate about. She is a role model of strength and dedication for women of all ages.

Faculty Mentors: Dr. Carl Robert Keyes & Prof. Lynn Simmons, M.F.A.

An Interview with Deborah Gaveron-Ravenelle: Women in the Worcester Community

Luke Hoyt '19 & Samantha Naples '19

Department of Art, Music and Theatre & Department of History

This presentation examines the life experiences of Deborah Gaveron-Ravenelle, who was born and raised in New Jersey. Right out of college she moved to Worcester, but then resided in various other locations until she married Bob Ravenelle and moved back to the city, joined by their two dogs.

She attended St. Michael's College in Colchester, Vermont, where she majored in both journalism and political science. Along with working hard academically, she was thoroughly involved in the school community. She furthered her education by attending law school and eventually became a lawyer for an insurance company.

While in college, Gaveron-Ravenelle balanced her academic responsibilities with extracurricular activities, which paralleled the balance she has established between her career and working with community service organizations in Worcester. In her interview, Gaveron-Ravenelle explained her passion for assisting women in her community, an important part of her life. Through several organizations, including the YWCA, Women's Initiative, and Girls Inc., she has helped young girls and women gain confidence and self esteem. She accomplishes this by aiding the organizations with fundraising that is necessary for them to operate. She has made a difference by dedicating her time and involving herself in the Worcester community.

Faculty Mentors: Dr. Carl Robert Keyes & Prof. Lynn Simmons, M.F.A.

Transitions and Trials: An Interview with Katrina McNamara

Suzanne Pepe '19 & Abigail Toomey-Fisk '19

Department of Art, Music and Theatre & Department of History

This presentation examines the life and work of Katrina McNamara, a housing advocate at Abby's House in Worcester. McNamara was born in Derry, Ireland and moved to the United States by herself to work for an international nanny service. She eventually accepted an invitation from her neighbor to work at Abby's House. Her neighbor, Annette Rafferty, happened to be the founder of that local affordable housing organization.

Throughout the interview McNamara discussed the struggles she faced growing up in Derry, as well as how the ethno-nationalist conflict known as "The Troubles" affected her. She also discussed her transition into life in Worcester. One of the advantages of life in America was the assistance she received in college as she struggled with dyslexia.

McNamara spoke of the benefits and challenges involved with her job. Abby's House seeks to provide housing for homeless women and their children as well as assisting them until they are able to live on their own. McNamara considered the ability to help women in need an uplifting benefit to her job. On the other hand, some women have to be turned away because the organization lacks space and resources for the large number of applicants or sometimes because the applicant does not meet the Abby's House guidelines. McNamara lamented that this is a difficult reality of the job of a housing advocate. McNamara credited the strong women who surround her as a source of support and inspiration despite some of the emotional tolls.

Faculty Mentors: Dr. Carl Robert Keyes & Prof. Lynn Simmons, M.F.A.

Presentation Session 5A
Tuesday, April 19
9:00 AM - 10:30 AM La Maison Salon

Diversity in Swing: Regional Expressions of Jazz in the United States

Matthew Miller '16

Art, Music and Theatre

The purpose of this study is to chronicle the development and regional expression of Jazz music through the United States. The research explores the origins of Jazz in the United States including Dixieland Jazz in New Orleans during the early twentieth century, the development into bebop in Kansas City and New York City in the 1940s, the shift towards hard bop in the 1950s and Jazz Fusion in the early 1970s and beyond. In addition, there will be emphasis on figures within the Jazz community and their relevance to the genre as a whole such as Louis Armstrong, Duke Ellington, Benny Goodman, Miles Davis, John Coltrane, Herbie Hancock and so on. In addition, I want to explore the varying subgenres and styles creating a more prominent and thorough understanding of the large genre of Jazz as a whole.

Faculty Mentor: Dr. Peter Clemente

***Codex Latinus Monacensis 849 and the Malleus Maleficarum:
Necromancy in Fifteenth-Century German Lands***

Shant Eghian '18

History

In this paper, I am studying medieval views on necromancy, the practice of demonic magic in a fifteenth-century manual from Munich and the *Malleus Maleficarum*, the most popular fifteenth-century witch-hunting manual. These works are significant because they provide an important look into how magic was viewed in late medieval Europe. Comparing these texts is an interesting exercise because they hold contrasting attitudes to the practice of magic. The Munich necromancy manual clearly supports its use, while the *Malleus Maleficarum* explicitly condemns it. Despite such disparate views, viewing these two works together helps to clarify the Medieval mindset towards demonic magic. By reading the often vague and messy descriptions that the Munich necromancy manual gives about demonic magic in light of the scholastically structured *Malleus Maleficarum*, the historian can better understand precisely what the necromancer thought he was doing.

Faculty Mentor: Dr. Winston Black

The Condemnation of Weather Magic in Medieval Europe

Kelse Merrill '17

History

What causes changes in the weather? Who causes these changes to take place? Often the answers to these questions to those living in Medieval Europe were weather magicians. The belief in weather magic was widespread in Medieval Europe and grew out of Pagan traditions and beliefs. The practice of weather magic, as well as what weather magic was believed to be and what it called for, went through many changes during the Middle Ages. Along with the changes in its practice came changes in how the church and secular authorities felt about weather magic.

The focus of my discussion will be answering the question, how did feelings about and condemnations of weather magic change during the Middle Ages? Focusing on the years 700-1350 CE, I will trace the evolution of the Church's condemnation of the practice of weather magic. Using primary sources from church officials as well as contemporary Penitential books, I will demonstrate that weather magic was not condemned with consistency, and that the consensus on weather magic as a heretical practice, worthy of serious investigation, was not truly formed until the birth of scholasticism in the thirteenth century.

Faculty Mentor: Dr. Winston Black

Beckettian Vice: A Societal Power Struggle on Humanness

Christina Lambert '17

English

To talk about vice with reference to Beckett's works, one should consider what vice is and where it derives from. Vice, as an immoral disposition, makes one question the source of morals: society or our humanness? In Samuel Beckett's short stories, such as "Murphy," the human person must be looked at in a Cartesian light. This viewpoint indicates that human knowledge consists of simultaneous intellect and choice. Repetition is crucial in many of his works, from repeating words and phrases to circling full dramas, such as *Play*, which ends with "repeat." These are clear signs of giving up one's choice and falling into compulsive repetition or blind following. What is commonly thought of as vice comes from society and causes a power struggle between the parts of the human person. Beckett is attempting to normalize these known 'vices' in order to move forward and highlight the most vicious condition, which is compulsive repetition.

Faculty Mentor: Dr. Paul Shields

Uses of Twitter and Citizen Journalism: A Comparison of September 11th Terrorist Attacks and Boston Marathon Bombings

Sarah Johansson '16

English

The microblogging site, Twitter, was created in 2006 and changed the way the news is received and distributed. Since its inception into daily life, Twitter provides users with an outlet to both access and produce news updates anywhere, at any time. Even average citizens join the news cycle by posting descriptions, photographs, or videos of events in the community. This honors thesis examines the relationship between professional journalists and these citizen journalists, focusing on the influence of Twitter. Using interviews with a selection of broadcast and print journalists, this thesis investigates how professional journalists use Twitter and citizen journalists' reports in everyday news production. Furthermore, an in-depth comparison of the news organizations' coverage of the September 11th terrorist attacks (2001) and the Boston Marathon Bombings (2013) allows for a closer examination of the influence these tools have during high-intensity reporting.

Faculty Mentor: Dr. Becky DiBiasio

Presentation Session 5B

Tuesday, April 19

9:00 AM - 10:30 AM La Maison Hall

Evaluating the Role of Social and Motor Engagement for Reducing Restrictive and Repetitive Behaviors in Autism

Andrew Lampi '16

Psychology

The two main diagnostic criteria for Autism Spectrum Disorder (ASD) are difficulties in social communication and interaction and the presence of restricted and repetitive behaviors (RRBs). While previous research has demonstrated that those with ASD have problems with theory of mind, joint attention, motor control, and social synchrony, effective treatments, especially those that target RRBs, have been elusive. This study explored whether the frequency and duration of RRBs presented by children with autism were impacted by the level of social and motor engagement. The relationship between the presentation of RRBs and social and clinical measures was also investigated. We found that RRB presentation was significantly decreased by both high social or high motor engagement, with the strongest effect coming from a combination of both. We also found significant correlations between the presentation of RRBs and almost all social and clinical measures. Implications of these findings for guiding future research on incorporating social and motor engagement as a treatment of ASD are discussed.

Faculty Mentor: Dr. Paula Fitzpatrick

Conquering Invisible Elephants: Analyzing the Effectiveness of Parental Involvement in Adolescent Recovery from Mental Illness

Christina DiTolla '16

Psychology

This paper explored the extent to which current treatments for adolescents with anorexia nervosa (AN), conduct disorder (CD), and depression have involved families in therapy. Various past and present therapies for all three adolescent disorders were reviewed and effective treatment components of family therapy were identified and compared across the treatment approaches. A review of the literature indicated that family therapy was more effective and beneficial for the adolescent patient than individual treatments not involving families. While individualized treatments helped to improve adolescent symptomatology, family therapy provided a more comprehensive approach as it focused not only on symptom reduction but also on changing the very family environments and dynamics that oftentimes played a role in the etiology of these disorders. The McMaster Model of Family Functioning was utilized to highlight the different dimensions of family functioning included in current treatments of AN, CD, and depression. Suggestions regarding dimensions of family functioning that should be included in family treatments to provide the most comprehensive approach for adolescents with mental disorders were provided.

Faculty Mentor: Dr. Regina Keursten-Hogan

The Benefits of Breaks

Joseph DiPilato IV '16

Psychology

The question as to whether or not taking breaks from work is beneficial for improving employee productivity has not been thoroughly examined, as it is still a fairly new topic of discussion. This thesis project sought to compile evidence to support the claim that breaks are indeed useful for this purpose. A review of the literature found not only information that directly supports this assertion, but also information that shows the numerous negative side-effects of not taking breaks from work. Certain workplace factors that influence break-taking behaviors were also discussed. For the purpose of providing modern-day companies several means by which they can provide their office workers with support for effective break-taking behaviors, this review also researched activities that have proven to be effective in positively affecting productivity and physical and mental health. The implementation of progressive muscle relaxation, meditation, and the active use of sit-to-stand work stations were shown to be the most effective. To conclude the project, further research was proposed to examine gender, individual, and cultural differences. This thesis has improved understanding of the effects of breaks on employee health and productivity and has opened doors for researchers to further increase knowledge in this field of study.

Faculty Mentor: Dr. Catherine Pastille

Millennials in the Workplace

Patrick Giroux '16

Business Studies

This study includes an analysis on the millennial generation in the workplace. The millennial generation is one that is called the most “high maintenance” generation in the workplace and makes up one-third of the American labor force. They grew up living through September 11th and through the Great Recession. They were introduced to the original iPod and currently are adapting to the iPhone 6. They are a generation that wants to work from home more, are hungry for praise by their managers, and rely on networks to advance their careers. There are about 54 million millennials in the United States, between the ages of 18 to 34, who are today’s innovators and tomorrow’s leaders. They have grown up in the digital world they seek personal relationships with colleagues as well as a chance to leave their mark at their company. The presentation will display millennials’ expectations and desires in the workplace, and also how companies are adapting to this generation’s desire to leave their mark in the workplace.

Faculty Mentor: Prof. Paul Bailey

***What the Sarbanes-Oxley Act Does Not Include:
An Examination of Audit Firm Rotation, Audit Firm Credibility and Tone at the Top***

Nicole Damaschi '16
Business Studies

This thesis is an examination of the Sarbanes-Oxley Act (SOX) that was passed in response to a wave of accounting frauds, including Enron and WorldCom. Paul Sarbanes and Michael Oxley established SOX in attempt to restore investors' confidence in the financial statements of publicly traded companies. However, there are critical elements of financial reporting that it fails to address, like audit firm rotation, audit firm credibility and management's tone at the top. Mandatory audit firm rotation and credible audit firms are believed to result in high-quality audits while management's tone at the top is reflected through the honesty and accuracy of the financial statements produced. A combination of these three aspects will help to further restore investor confidence in the financial statements of public companies in the future and this project makes a case for these amendments to SOX in order to help accomplish this.

Faculty Mentor: Prof. Francis Marino

***Tablet Usage in Secondary Mathematics Education and Recommendations
for its Effectiveness in the Classroom***

Meghan Dwyer '16
Education

This presentation is the result of research conducted on the ways that teachers are currently using tablets in their secondary mathematics classrooms. It compares the benefits and drawbacks of having tablets in classrooms, tablets for every student, or no tablets at all. It highlights the ways teachers are currently using tablets in their classrooms, as well as explains some aspects that teachers are not yet taking advantage of with tablets. Strategies for tablet use to improve and enhance the teaching and learning experience for teachers and their students will be presented.

Faculty Mentor: Dr. Jessica de la Cruz

**Presentation Session 6
Tuesday, April 19
11:30 AM - 1:00 PM La Maison Salon**

The Advertisements of Colonial America: A Gateway for Digital Humanities

Maia Campbell '19
History

My presentation features the Adverts 250 Project, a history blog that examines advertisements from America's colonial period. The project primarily focuses on advertisements from exactly 250 years ago that are available in the Early American Newspapers database. These advertisements are a gateway to everyday life in colonial America: historians consult them to examine the goods and services that had exceptional value to British colonists. I will present on my involvement with the project as a guest curator. One focus will be on my duties in selecting advertisements, researching when necessary, and writing commentary. Another focus will be on the Adverts 250 Project as an introduction for many to what is referred to as digital humanities. Digital humanities opens up a world of interactions for historians; this interdisciplinary and relatively new field brings together further research opportunities, platforms to share findings, and utilizes the Internet as a means of exchanging educational ideas. This presentation will explore how the Adverts 250 Project plays a role in this exchange, especially through the use of Twitter.

Faculty Mentor: Dr. Carl Robert Keyes

Adverts 250: Bringing Technology, History, and Social Media Together

Elizabeth Curley '19

History

I have contributed to the Adverts 250 Project as guest curator as part of the coursework for my Public History class. This involved working with many different colonial newspapers accessed online via the Boston Public Library's website. The American Antiquarian Society and Readex partnered to create that online database, Early American Newspapers. I located colonial newspapers and developed a schedule of advertisements for each of the weeks I was the guest curator. As with any research there were dilemmas throughout the process, but for each problem I devised a solution. As part of the process, my faculty mentor and I identified a metadata error that I brought to the attention of Readex and then worked with my mentor and the digital humanities curator at the American Antiquarian Society to fix. This was hands-on history, the kind of work that public historians do beyond traditional classrooms. Along with identifying the advertisements themselves, additional research went into the commentary process. The skills that I developed throughout this process will be skills that will help me throughout my college and professional career as an educator. The Advert 250 Project was a way for me to take what I was learning in the classroom and applying it to a public history project in "real life."

Faculty Mentor: Dr. Carl Robert Keyes

"Doing" History: Working as a Guest Curator on the Adverts 250 Project

Trevor Delp '18

History

This presentation is about my contributions as a guest curator for the Adverts 250 Project, a historical blog that analyzes advertisements from colonial American newspapers. Every day the blog posts a colonial advertisement that was circulated 250 years ago to that day as well as an analysis explaining its context and meaning in the colonial period. During my time as guest curator, I found the advertisements gave me insight into how commerce in the colonies operated and what was valued, both economically and culturally, by colonists. Such glimpses into colonial America give historians a chance to interpret history from all many different angles of society. In addition, the Adverts 250 Project was my introduction into the field of digital humanities. Digital humanities allow historians and scholars from other disciplines to research history through online sources and other developing technologies and then share their research with others, both scholars and general audiences, through the freedom of the Internet. For the first time in my academic career, my work was to be published to a public domain where anyone could view it. In the beginning, this idea was daunting, but I found it gave my work a new sense of meaning.

Faculty Mentor: Dr. Carl Robert Keyes

Working with T-Pen: A Look at Transcriptions of Historical Sources

Kathryn Severance '17

History

My presentation will feature my work on the American Antiquarian Society's Isaiah Thomas Broadside Ballads Project. Consulting with my faculty mentor and the AAS digital humanities curator, Dr. Molly Hardy, about the project in early February provided me with skills to tackle the process of transcribing historical documents using digital humanities resources. My work further develops an ongoing project featuring the collection of broadsides purchased by AAS founder Isaiah Thomas in the early nineteenth century. Many components came together to produce the three documents I transcribed for the AAS website. My tools included a laptop and the software program T-Pen 2.0, which provided me with digital means to access and convert high resolution images of nineteenth-century printed documents into keyword searchable material. I spent considerable time with each broadside ballad assigned to me, taking care to tag historically significant terms as I converted historical writing into machine readable text. I worked with three thought-provoking and unique ballads: "The Dying Words of Capt. Robert Kidd, A Noted Pirate," "An Irishman's Observations on British Politics," and "Paul Jones's Victory". I found the project to be a thrilling adventure and I hope that my audience is able to gain knowledge of the function of public history work and appreciate the value of public history as a field.

Faculty Mentor: Dr. Carl Robert Keyes

Practicing History in Public: My Work on the Isaiah Thomas Broadside Ballads Project

Mary Aldrich '16

History

This presentation is about my contributions to the American Antiquarian Society's Isaiah Thomas Broadside Ballads Project. This project was started by the AAS in order to digitize the collection of broadside ballads that their founder, Isaiah Thomas, procured during the early nineteenth-century. The collection contains over three hundred broadsides that the AAS ultimately aims to make keyword searchable. My responsibility for the project consisted of transcribing the ballads using T-Pen software and tagging various categories of key terms identified by digital humanities curator Molly Hardy. Although I could do most of this work online, one of the ballads was particularly challenging to transcribe and I visited the reading room at the AAS where I worked with the original ballad. I have transcribed four ballads, one for Revolutionary America last semester and the other three for Vocations in Public History this semester. As a result, I have viewed these ballads through two different lenses. As an academic historian, I used the ballads as a primary source to gain information about how nineteenth-century Americans viewed the War of 1812. Then, as a public historian, I looked at the ballads as a significant resource that should be shared and available to as many people as possible. By viewing these ballads through these lenses, I have come to appreciate how both academic and public historians "do" history.

Faculty Mentor: Dr. Carl Robert Keyes

Pirates, Privateers, and Print Culture of Eighteenth-Century Boston

Andrew Lampi '16

Department of History & Peace Studies Program

This project, which fulfills the requirements for the Peace and Conflict Studies capstone, is a collaborative effort between the History department at Assumption College and the American Antiquarian Society. It combines the use of primary sources from the early nineteenth century and contemporary analyses of the lives of pirates (and sometimes privateers) and their impact on Atlantic World governments and people during the period. This project includes fifteen transcriptions of nineteenth-century documents using the online software T-Pen, utilizing XML tagging that allows scholars to search the texts for content. Modern research has demonstrated ways in which pirates engaged in illicit activity, as well as how these actions were viewed by both the governments of the Atlantic world and by common people. Differences in how the government and people responded to the often violent actions of pirates often depended on who the acts were committed against. When the crimes involved attacks on fellow subjects or citizens, public outcry matched the government's response. On the other hand, when attacks targeted foreign subjects or vessels, governmental penalties sometimes did not match public sentiment regarding the perpetrators. This project analyzes the circumstances when the violent actions of pirates and privateers elicited punitive responses by the governments with jurisdiction over these seafarers.

Faculty Mentor: Dr. Carl Robert Keyes

Presentation Session 7A

Tuesday, April 19

1:15 PM - 2:30 PM La Maison Salon

The Man Whose Fame Survived All: Public Perceptions of Union General Ambrose Burnside During the American Civil War

Ralph Cola '16

Department of History & American Studies Seminar

This project examines the American public's perception of Union general Ambrose Burnside during the entirety of the Civil War. Highlighted and explained will be Burnside's national fame at the war's beginning, the origins of his negative public perception, his nadir at the Battle of Fredericksburg, and his ultimate redemption in the eyes of our country after the war's conclusion. This presentation will demonstrate that despite the polarizing image that many Americans have of Burnside today, his popularity within our nation survived his failures during the war and continued to rise until the time of his death.

Faculty Mentor: Dr. Carl Robert Keyes

The Republican and Religious Northern Woman in Patriotic Songs During the Civil War

Samantha Davis '16

Department of History & American Studies Seminar

This presentation highlights research conducted at the American Antiquarian Society on the role of Northern women during the Civil War by looking at ballads, songs, letters, and other assorted documents from the period. The resulting paper concludes that the patriotic songs from the Civil War were intended to promote the ideal gender role for Northern women: the republican and religious mother. I will present the findings of my research and review various songs used in my paper to demonstrate the role of Northern women during the Civil War.

Faculty Mentor: Dr. Carl Robert Keyes

Christian Patriotism: The Civil War Through the Lens of Christian Sermons

Zachary Szymkowicz '17

Department of History & American Studies Seminar

This research project focuses on one of the defining moments in American history: the Civil War. This long and bloody conflict would ultimately cement America as a nation but before that the struggle between North and South ultimately had to be played out. This project explores the war through the lens of three different Protestant sermons, all delivered in the North between 1861 and 1863. These sermons reveal what some Northern ministers perceived God's role in the war to be. They also offered a great amount of guidance for what the role of the Christian patriot should be in such trying times.

Faculty Mentor: Dr. Carl Robert Keyes

Sayyid Qutb's Definition of Jihad as Liberation and its Relationship to Modern Terrorism

Joshua DellaFera '16

Political Science

While the military and intelligence aspects of fighting terrorist activity has been a focus of policy, the goal of waging a "war of ideas" has been largely ignored. An author who provides a fairly comprehensive explanation of the goal and purpose of these Islamic groups is Sayyid Qutb of the Muslim Brotherhood. Qutb provides a justification for jihad as not only a useful but a necessary tool for Islam's purpose. Qutb's definition explains why jihad is necessary for the construction of the Caliphate and for the liberation of mankind from tyrannical forces that deny man his proper place in the universe. The United States and the rest of the West are especially large threats to Islam in Qutb's worldview. Several leaders of terrorist groups draw on his writings as both a theoretical basis and a guide for the types of activity they should engage in. This presentation attempts to explain both the significance of the claims made by Qutb and how his thought can be used in a dialogue in a "war of ideas."

Faculty Mentor: Dr. Bernard Dobski

Gender Parallelism in the Maya Cah: Women in Eighteenth-Century Yucatan

Samantha Davis '16

History

This presentation explores the impact of gender in political and socioeconomic status in the Maya village of Ixil in the eighteenth century. My research brings to light the everyday lives of Maya women and commoners, people who would otherwise have been forgotten by history, using a recent archival discovery of a corpus of 106 last wills and testaments from the village of Ixil written from 1738 to 1807. I conclude that the Maya practiced gender parallelism by examining the wills of both men and women to identify bequeathing patterns and gendered objects. This research expands on and contributes to existing research on the colonial Maya using these new sources.

Faculty Mentor: Dr. Mark Christensen

Presentation Session 7B
Tuesday, April 19
1:15 PM - 2:30 PM La Maison Hall

A Hot Meal Upon Arrival: The Refugee Experience Once Arriving in Worcester

Kaitlyn Hirtle '16
Peace Studies

Since 2015 the number of refugees, asylum seekers and internally displaced people in the world has exceeded 50 million. In the midst of this refugee crisis, many countries are stepping up to help those in need. Through text, video and audio this visual article captures the work Worcester organizations do for the refugee community and what resettled refugees must do once they have arrived in Worcester.

Faculty Mentor: Dr. Kathleen Fisher

Extraordinary Ministers of Holy Orders: A Historical, Sacramental, and Canonical Analysis

Lucas LaRoche '16
Theology

Throughout much of the Latin Church's history, privileges have been extended to priests to ordain others to both minor and major orders. This presentation provides historical, sacramental, and canonical analyses to the problem and speculates about the current standing of these privileges after the Second Vatican Council.

Faculty Mentor: Fr. Roger Corriveau

Called to Receive, Called to Give: The Vocation of Women in Light of the Feminine Genius

Corinne Murphy '17
Theology

In his letter *Mulieris Dignitatem* (On the Dignity and Vocation of Women), Pope John Paul II proposes the idea of the feminine genius. The feminine genius is the unique gift given to and by women, characterized by their special receptivity and capacity for another person. As Pope John Paul II writes in *Mulieris Dignitatem*, "Women are ever ready and willing to give themselves generously to others...they exhibit a kind of affective, cultural, and spiritual motherhood which has inestimable value for the development of individuals and the future of society." The greatest example of the feminine genius is found in the Blessed Virgin Mary, whose physical and spiritual motherhood changed the course of human history. This presentation serves to explore the vocation of women in light of the feminine genius.

Faculty Mentor: Fr. Roger Corriveau

The Davidic Covenant: A Study on G-d's Promise to the Jewish People

Joshua Stopyra '16
Theology

No Biblical promise is more important and widely discussed as G-d's ancient covenant with the people of Israel and David. A kingdom forever to lead the nations of the world, the Davidic covenant is to bring the people of Israel a future king, from the bloodline of David, to rule and lead them and the rest of the world in the messianic age. No figure who has claimed this title is more well-known than Jesus Christ, the patron of Christianity. How does Jesus' claim as messiah compare with what has been said in the *Tanakh*? Is there any merit to his claim? And another important question to ask is what importance does the Davidic covenant play in Judaism today? These are the questions that are at the root of Christian and Jewish theological talks. For the Jewish people, the Mashiach has yet to come and Israel awaits their future king. What is needed is a careful study on the Davidic covenant, how it compares to other covenants made by G-d in the *Tanakh*, what exactly the messiah is destined to do, and whether or not the messiah has come.

Faculty Mentor: Fr. Roger Corriveau

Charity as Friendship, According to the Thought of Thomas Aquinas

Michael Hoye '16

Theology

The Angelic Doctor of the Church, Saint Thomas Aquinas, is among the greatest minds to contribute to the Catholic tradition. What this important Doctor of the Church teaches about charity, however, has not been widely received in the seven centuries since Aquinas' career. Charity is not only the highest theological virtue, as compared to faith and hope, but charity is also that virtue on which all other virtues depend; St. Paul writes: "Without charity, I am nothing" (1 Cor. 13). The height and summit of the Catholic faith is the Holy Eucharist, which is often referred to as the Sacrament of Charity. According to Thomas Aquinas, the essence of charity is friendship with God. Though he is not the first one to think of charity as friendship, he is the first to employ Aristotle's qualifications of friendship in explaining the love that God has for man and how man ought to love God in return. This project seeks to elucidate Aquinas' thought on charity and to help current students of theology understand the importance of this virtue in light of God's salvific plan for humanity

Faculty Mentor: Dr. Marc LePain

Poster Session

Tuesday, April 19

2:00 PM - 4:00 PM Testa Atrium

(in order of discipline)

Take Back Health by Taking Down TB

Hailey Rennick '16

Business Studies

Tuberculosis is an infectious disease that has afflicted humans for hundreds of years. It has plagued the majority of countries at some point in history. The United States faced the peak of its epidemic in the beginning of the twentieth-century but has since gained control over the disease, limiting cases to a point where it was virtually forgotten, until recently. This is not true everywhere; according to the New South Wales, Australia, Government Health there are still at least 117 high burden countries, where high burden is defined as at least 40 incidences per 100,000 people. The continent of Africa is the geographic location with the highest collective burden, with Swaziland being the specific country with the highest burden. This study proposes a program that aims at educating children and adults in this area on the true threats of TB. A proven factor to the continual issue of TB is the lack of treatment or completion of treatment. We believe this is due to a lack of understanding of the consequences of leaving TB untreated. We hope to use our educational campaign to compel more people to get tested and in turn begin and complete treatment.

Faculty Mentor: Dr. Cary LeBlanc

Three Generations of Imbeciles are Enough

Rebecca Levesque '17

History

For many, the actions of Hitler during the Holocaust are ruthless, hateful, and indescribably inhumane. However, his broad plan to rid society of degenerates was grounded in a movement that first took shape in the United States. In the Eugenics Movement, Americans articulated the harsh realities behind the concept of "survival of the fittest." At the time, forced sterilizations were performed to limit procreation, specifically denying that God-given right to those perceived to be unfit for society. This project examines negative sterilization, as a major component of the eugenics movement in the United States between the years 1914-1945. Although often overlooked, eugenics played an integral role in transforming the American psyche to believe that everyone is created equal.

Faculty Mentor: Dr. John McClymer

Biomechanics of Walking and Running with a Loaded Jogging Stroller

Stephen Johnson '16 & Kyler Huffert '16

Human Services and Rehabilitation Studies

While use of jogging strollers are highly prevalent in society, surprisingly little is known about the impact of using these devices on people's walking and jogging patterns. In the current study, subjects were asked to walk at 1.3 m/sec and run at 2.6 m/sec under three different loaded conditions: 1) no load, 2) pushing a jogging stroller with a 25lb added load, and 3) pushing a jogging stroller with a 50lb added load. Three dimensional position data were collected using a Vicon motion capture system with 8 cameras at 100Hz. Kinematic variables including forward lean, stride length, stride frequency, and thoracic and pelvis rotation were calculated using MatLab. Additionally, kinetic variables such as transverse thoracic stiffness will be calculated and compared to kinematic variables in the future. Our findings have relevance to innovations in the design of modern jogging strollers but also inform our understanding of how the human body responds to external perturbations, or forces, while walking and jogging.

Faculty Mentor: Dr. Robert Caron

Unique Experiences and Perspectives of Grandparents in the Childhood Cancer Community

Kimberly McCullen '16

Human Services and Rehabilitation Studies

This study examined the experiences of grandparents who have, or have had, a grandchild diagnosed with a form of pediatric cancer or brain tumor. Through an anonymous, online survey, the experiences of 67 grandparents were explored to help better understand the effects of having a grandchild diagnosed with cancer or a brain tumor. More specifically, the relational changes between the grandparents and their children and grandchildren were studied, and common trends emerged that included the change in closeness, feelings of guilt, strength, helplessness, and experiencing a "doubled pain." This study also analyzed the use or desire for psychosocial services to be offered to grandparents to help cope with the challenges associated with having a grandchild with cancer. Overall, the findings of this study help give insight into the experiences of this population of grandparents and allow their voices to provide a unique perspective on childhood cancer.

Faculty Mentor: Dr. Alison Cares

Appreciating Mathematics Through Geometric Art

Caryna Wright '16

Math and Computer Science

The impetus of this thesis is to show how the subject of mathematics can be appreciated by admiring works of art that involve the use of mathematics, mainly geometry. Subcategories of geometry observed in this thesis include the Golden Ratio, symmetry, tessellations, and fractals. Mathematics has been used in art since the times of Ancient Egypt and Ancient Greece. The Golden Ratio was used by many artists and architects to determine the proportions of their paintings and buildings. Symmetry involves objects appearing the same if a certain rotation or reflection is performed on them and has been used in some religious pieces of art such as Buddhist mandalas. Tessellations are patterns of shapes that fit perfectly with each other and can be seen in quilt art as well as the tiling of floors. A fractal, being a more modern form of mathematics, involves patterns that endlessly repeat onto itself in smaller scales. Fractals are used in the film industry to create CGI landscapes. In this thesis, all four of these categories are explained mathematically and are represented in various artistic examples. One can easily admire these works of art, therefore appreciating it as well as the mathematics behind them. This is just one of many ways to increase the appreciation of mathematics.

Faculty Mentor: Dr. Joyce Brown

**When Your Phone Picks Up More Than Just a Call:
The Identification of an Unknown Phone Case Bacterium**

Andrea Koslowski '17 & Michaela Temple '17

Natural Sciences

Mobile phones have been considered fomites, potentially carrying thousands of pathogenic bacteria. This study aimed to identify the bacteria swabbed from a phone case. To identify the bacteria, a sample was swabbed off a cell phone; morphological stains, physiology assays, metabolic assays, and genetic analysis of the 16s rRNA gene sequence were employed. Morphological stains determined the bacterium was a gram positive staphylococcal shaped bacterium. Physiological assays were used to determine the phone bacterium was a non-motile, facultative anaerobe with optimal growth at 37°C and a pH of 6.8. Metabolic assays used to determine respiration and fermentation pathways concluded that the phone bacterium cannot reduce nitrate, is aerobic, can break down hydrogen peroxide, performs aerobic respiration of glucose, and ferments glucose and sucrose. Starch hydrolysis, Simmons citrate, and special media assays were used to determine the phone bacterium can break down starch, can use citrate as its carbon source, can lyse red blood cells, and is salt tolerant. Sulfide Indole Motility and Motility Indole Ornithine assays concluded that the phone bacterium, can catabolize glucose and decarboxylate ornithine. Genetic analysis concluded the closest match to the phone bacteria is *Achromobacter insuavis*, an emerging pathogenic bacteria commonly found in mucus.

Faculty Mentor: Dr. Soraya Bentancourt-Calle

Characterizing an Unknown Bacterium Isolated from a Toilet Seat

Anna Gill '16 & Kaitlyn Riley '16

Natural Sciences

Swabs were conducted around Testa Science Center to survey the different species of bacteria that existed on common surfaces. An unknown bacterium that was isolated from a toilet seat was studied further to determine if it was pathogenic. Many assays that investigated the morphology, genetic sequence, growth preferences, and metabolism of the unknown were performed to determine the identity of the bacterium. These assays showed that the bacterium was a non-motile, gram positive, staphylococcal shaped microorganism. The unknown bacterium could ferment glucose and sucrose, but not lactose. The bacterium was not able to break down starch, lyse red blood cells, or reduce sulfur. Moreover, our bacterium was unable break down most proteins. Analysis of the bacterial DNA sequence that encodes for the 16SrRNA gene showed that the closest relative to our bacterium was *Kocuria rhizophila*, which showed a 97% sequence identity. Morphological and metabolic results we reported matched the characteristics reported for *Kocuria rhizophila*, with the exception that *K. rhizophila* grows best at a different pH. The *Kocuria* genus is normally found on human skin, which is most likely how it was transferred to the toilet seat. Contrary to earlier beliefs, this bacterium is not pathogenic, and actually may secrete polyketides, which kill harmful bacteria surrounding it. Therefore, this bacterium may be beneficial to human health.

Faculty Mentor: Dr. Aisling Dugan

Infection of RAW264.7 Cells by *Klebsiella pneumonia* Results in an Immunological Response

Alaina Short '16

Natural Sciences

The role of the immune system is to protect an organism against disease-causing pathogens by using a variety of physical, chemical, and cellular barriers. In vertebrates, a vital barrier against pathogens are macrophages, phagocytotic antigen-presenting cells that participate in the innate immune response. In our study, we cultivated RAW264.7 cells, which are a mouse macrophage cell line and exposed them to *Klebsiella pneumonia* to determine how the cell responds to the bacterial challenge. *Klebsiella pneumonia* was chosen since it can induce a variety of diseases in humans including pneumonia, thrombophlebitis, urinary tract infection, diarrhea, upper respiratory tract infection, cholecystitis, meningitis, and osteomyelitis. Specifically, we questioned whether these macrophages responded to *Klebsiella pneumonia* infection by investigating if the macrophages could produce reactive oxygen and nitrogen species, secrete the cytokine TNF α , phagocytose the bacterium, activate an intracellular signal called p38, and kill the bacterium. Through this study we hope to have a better understanding of how macrophages control *Klebsiella pneumonia* infection.

Identifying and Characterizing an Unknown Bacterium Cultured from a Cell Phone

Elizabeth Morgan '16 & Alyssa Quigley '17

Natural Sciences

There are a vast number of unknown species of bacteria living in the world around us. Bacteria inhabit numerous surfaces and devices that we come in contact with daily. These microbes are expansive in diversity and therefore vary greatly in characteristics including morphology, metabolism, environment preferences, and genetics. A study was conducted on unknown bacterium isolated from a cell phone and cultured on nutrient agar for three months. The goal of the study was to identify the bacterium through several assays. Additionally, the genetic sequence of the 16s rRNA gene was isolated and compared to that of all other known sequences, to identify the closest bacterial relative. *Achromobacter marplatensis* was the closest match both genetically, and comparatively based on other laboratory assays. *Achromobacter marplatensis* is bacillus-shaped, catalase positive, and cytochrome c oxidase positive which was similarly found through observations and assays in the studied bacterium. The cultured bacterium was negative for all glucose and protein metabolism assays and its optimal growth conditions include anaerobic environments, room temperature, and on nutrient agar at a pH of 6.8. The identity of the unknown bacterium as *Achromobacter marplatensis* was significantly supported, and additional testing could confirm these data.

Faculty Mentor: Dr. Aisling Dugan

Osmoregulation and Salinity Tolerance in the Mosquito Species *Aedes albopictus*

David Gazzola '17

Natural Sciences

Insects account for almost five-sixths of known animal life, and flourish in some of nature's most extreme environments. Oddly enough, there are almost no insects that spend most or a significant portion of their life in the ocean. I speculated that the ocean's surface tension inhibited the development of larval insects by inhibiting gas exchange. Mosquitos and their larvae are in theory good candidates for marine life: the warm temperatures of an intertidal zone or salt marsh would favor the physiology of their larval and pupal stages. Mosquito larvae and pupae from the species *Aedes albopictus* were reared in various seawater percentages from 0-100%. There is no evidence that suggests surface tension was the determining factor for survival, however issues in osmoregulation (through anal gills) in relation to solute concentration were observed. Different stages of development were able to withstand different solute concentrations. Impressively, half of reared larvae survived in 50% seawater and all pupae survived in the same solution. These results lend implications towards understanding reproductive capabilities for these insects and possible methods of controlling their coastal breeding grounds.

Faculty Mentor: Dr. Owen Sholes

Identification of Cell Adhesion Molecules that Facilitate Glutamatergic Synapse Formation in *C. elegans*

Carmino Riccio '16

Natural Sciences

Glutamatergic synapses mediate the bulk of excitatory neurotransmission in the vertebrate central nervous system, but key aspects of their formation and maintenance are still unknown. These synapses are characterized by post-synaptic ionotropic glutamate receptors and pre-synaptic glutamate-containing vesicles, among other components. The identification of novel molecules in glutamatergic synapses has shown that glutamate receptors are not stand-alone proteins and it is suggested that glutamatergic signaling may be dependent on accessory molecules. However, it is not well understood what genes play a role in regulating the organization of molecules that facilitate these synapses during normal nervous system development. The objective of this study is to identify new genes that influence the formation, structure and function of glutamatergic synapses. We plan to examine the role of cell-adhesion molecules (CAMs) based on reported information that CAMs have an important influence on synapse formation in cell culture. The nematode, *C. elegans*, is an appropriate model organism for this study because it has a well-characterized nervous system and is particularly suitable for genetic manipulation. Using this model system, we will knock down expression of CAMs by feeding worms bacteria that produce specific double stranded RNA (dsRNA) that is complementary to

genes of interest. The importance of a specific CAM can be observed by determining if glutamate dependent behavior has been affected in worms in which the expression of that CAM has been suppressed. Using a light-sensitive channel-rhodopsin expressed in a pair of mechanosensory neurons, we will exploit a known reflex to determine whether synaptic transmission is functioning normally. In the presence of blue light during optogenetic screening, the worm undergoes a sudden reversal in locomotion. Prior research informs us that this reflex is dependent on the activation of glutamatergic synapses. We hypothesize that reduced expression of some CAMs will affect glutamatergic synapse development and function, causing a noticeable decrease in the light-evoked reversal in locomotion. These experiments will provide new insight into the function of specific CAMs involved in normal glutamate signaling and identify promising candidates for future *in vivo* studies of glutamatergic synapse formation. These advances may also lead to the identification of new proteins that are essential for synaptogenesis and a better understanding of glutamatergic transmission in health and disease.

Faculty Mentor: Dr. Jessica McCready and Dr. Peter Juo, Tufts University

Exponential Rate of Increase of Organization in Complex Systems

Nicolas Siegelman '16

Natural Sciences

It is known that during the process of self-organization, complex systems increase the entropy in their surroundings and decrease their internal entropy, but the mechanisms and the physical laws delineating this processes are still a question of debate. In our approach, energy gradients across complex systems lead to change in the structure of systems, decreasing their internal entropy to ensure the most efficient energy transport and therefore maximum entropy production in the surroundings. This approach stems from fundamental variation principles in physics, such as the principle of least action, which determine the motion of particles. We compare energy transport through a fluid cell, which has random motion of its molecules, and a cell, which can form convection cells while changing the depth of the fluid. We examine the various signs of change of entropy, and the action needed for the motion inside those changing systems. The system in which convective motion occurs reduces the time for energy transmission compared to random motion. For more complex systems, those convection cells form a network of transport channels for the purpose of obeying the equations of motion in this geometry. Those transport networks are an essential feature of complex systems in biology, ecology, economy and society in general. This approach can help explain some of the features of those transport networks, and how they correlate with the level of organization of other natural systems, as literature research has shown correlations with brains, stars, and computers.

Faculty Mentor: Dr. Georgi Georgiev

Coparenting and Temperament Predict Fathers' Responsiveness in Father-Infant Interactions from 3 to 12 months

Anna doCurral '17

Psychology

The father-child interaction is believed to be markedly different from the mother-child interaction, with fathers being more playful and mothers more nurturing. In an effort to understand responsiveness in the father-infant interaction, we investigated the longitudinal and concurrent relationship between coparenting and aspects of father-infant interaction at 12 months. Temperament was also examined. We recorded the interactions of 17 fathers and their 12-month-olds while they engaged in free play for 10 minutes. Six behaviors, such as encouragement and affect, were coded every 10 seconds. We observed coparenting during the Lausanne Trilogue Play at 3 months and during free play of triads at 12 months. Temperament was assessed at 12 months using the Infant Characteristics Questionnaire. Negative attitudes towards coparenting at 3 and 12 months were related to passive involvement and less encouragement. The propensity of future coparenting was also correlated with fathers' passive involvement, suggesting that fathers' beliefs about their coparenting relationship may be implicated in their ability to behaviorally engage their infants. As expected, fathers' affection decreased when the infants' fussiness and unadaptability increased. Altogether, the results imply that dynamics of father-infant interactions are potentially influenced by a combination of temperamental dimensions and characteristics of the coparenting relationship over time.

The Relationship Between Coparenting and Depression

Jacqueline LaForce '16

Psychology

The purpose of this study was to explore the role of parental depressed mood and coparenting expectations during the transition to parenthood. The moods of twenty-one couples were assessed during pregnancy and 3 months postpartum, and their expectations about future coparenting were explored. Findings indicated that parents' prenatal depression predicted their postpartum levels of depression. In addition, both mothers and fathers with negative perceptions of coparenting relationships in their families of origin were more depressed during pregnancy and fathers continued to be more depressed after birth. Postpartum depression in mothers, on the other hand, was more influenced by the prenatal expectations they had about their future family life. It was also found that couples who demonstrated less understanding of each other's family-of-origin experiences or who perceived their experiences as less similar included mothers with higher levels of depression during pregnancy. In conclusion, despite the small sample size of this study, a pattern emerged linking depressive symptoms during pregnancy to parents' ideas about their future coparenting relationship. Both prenatal depression and coparenting ideas voiced during pregnancy helped to predict parents' postpartum depression.

Faculty Mentor: Dr. Regina Kuersten-Hogan

Adverse Childhood Experiences and College Adjustment

Cassandra Bates '16

Psychology

Adverse childhood experiences (ACEs) have been linked to mental and physical health problems in late adulthood such as depression, anxiety, addiction, obesity, and earlier death. However, there is little evidence about how ACEs influence young adults especially during the transition to adulthood. Moreover, the links between ACEs and outcomes has not been fully explained. This study aimed to address this limitation by examining the relationship between ACEs and college adjustment as mediated by executive functioning and coping. It was predicted that higher levels of ACEs would correlate with reduced executive functioning and more ineffective coping strategies which, in turn, would be negatively related to college adjustment. Participants were 110 college students (18 to 22 years). Participants completed questionnaires and two computer tasks that assessed inhibition, a component of executive functioning. As predicted, there was a significant negative correlation between ACEs and adjustment. Those with high ACEs reported greater cognitive failure and negative coping. Regression analyses showed that the relationship between ACEs and adjustment was fully mediated by negative coping. Cognitive failure had a unique contribution to the explaining adjustment. Positive coping was not a significant mediator. The results pinpoint that ACEs can set individuals on a maladaptive path via ineffective coping that is persistent and influence transition to adulthood in the context of college life.

Faculty Mentor: Dr. Maria Kalpidou

Effects of Gender and Type of Praise on Task Performance in College Students

Margaret Azar '16, Katie Coderre '16, Eileen Finck '16, Anna Gill '16 & Rachel Montgomery '16

Psychology

Past research has indicated that different types of praise have varying influence on school-age children's task performance, though little research has been conducted with older students. In the present study, 130 Assumption College undergraduate students (81 females, 49 males) completed eight word search puzzles, with the word "MINA" hidden multiple times in each one. Each participant completed the first two puzzles with the help of one of the researchers, and the researcher then delivered either person (i.e., "You are so good at these!") or process (i.e., "You are working so hard!") praise before leaving the participant for three minutes to complete the remaining six puzzles. Participants' task performance was operationalized as the total number of "MINA"s they found in the six puzzles they completed independently. The results suggest that type of praise had no significant effect on task performance, and that there was no significant influence of gender on students' task performance. As the present results differ from those found by past researchers, it is clear that further research

must be conducted in the future to discover why these discrepancies exist. Conclusive information about the most beneficial type of praise for students would be valuable to instructors working in academic environments.

Faculty Mentor: Dr. Maria Parmley

Impact of Personality Characteristics on Task Performance

Gianna Caruso '16, Amanda Cavicchi '16, Sarah Henderson '16 & Rachael Hickey '16

Psychology

Stress and Locus of Control (LOC) were examined as factors that influence task performance, measured by using SAT questions. Participants were randomly assigned to either high stress or low stress conditions. Stress was manipulated using a time restriction. Although the interaction was not significant, the internal LOC group outperformed the external LOC group, and this difference was larger in the high stress condition. LOC was found to be a significant predictor of task performance. These findings suggest that an internal LOC leads to higher performance.

Faculty Mentor: Dr. Maria Parmley

Self-Esteem, Self-Disclosure, and Facebook: A Replication of Forest and Wood (2012)

Brianna Allard '17, Alicia Bylsma '16 & Erin Sullivan '17

Psychology

Social media websites, such as Facebook, play a prominent role in people's lives. People could potentially use them to communicate with others and disclose in a more comfortable setting than face-to-face conversations. In a replication of Forest and Wood (2012), the relationship between self-esteem and perceptions of Facebook was examined. We predicted that high self-esteem individuals would see Facebook as a place to connect with others, and low self-esteem individuals would see it as a place to safely express themselves and as offering more advantages than in-person interactions. Findings indicate that participants viewed Facebook as a safe place to disclose but did not see it as a place to connect with others, express emotions, or as being beneficial over in-person conversations.

Faculty Mentor: Dr. Maria Parmley

Repeat and Multiple Victimization in a College Sample

Raysa Guerrero '18

Sociology, Criminology and Anthropology

Rates of victimization for college students, especially violent victimization such as sexual assault, are unacceptably high. However, young people ages 18 to 24 (including college students) experience high rates of all types of victimization. Experiencing a violent victimization can have a broad range of negative consequences for individuals that can interfere with the ability to enjoy academic and social success in college. This project uses data from a campus-wide survey at a mid-sized university to investigate the experiences of college students with repeat and multiple victimization, and whether or not students who have experienced different types of victimization (single, repeat only, multiple only, both repeat and multiple) differ in their views of campus safety.

Faculty Mentor: Dr. Alison Cares

NOTES

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**Next year's Symposium will be held on
Monday, April 17 and Tuesday, April 18, 2017**

Please mark your calendars!

April 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

Program artwork by Cassandra Waung '16



**“The more that you read,
the more things you will know.
The more that you learn,
the more places you’ll go.”**

 **Dr. Seuss** 

