14th Annual Undergraduate Research Conference

Schedule

Friday April 28, 2017

Poster Session 3:00 – 4:00
Inauguration and Keynote 4:00 – 4:50
Presentation Session 5:00 – 6:40
Reception and Award Presentation 6:30 – 7:30
Inauguration and Keynote 4:00-4:50

Lecture Center Concourse

Jeanette Altarriba, Ph.D., Vice Provost and Dean for Undergraduate Education

The Honorable George A. Amedore Jr., New York State Senator

Damian Bazadona ‘98, President & Founder of Situation Interactive

James R. Stellar, Ph.D., Interim President
Poster Session 3:00 – 4:00

Please See Abstract Section for Abstracts of Posters
Lecture Center Concourse

Erik Augspurger - Multi-Readout Nucleic Acid-Based Molecular Logic Gate Using Hybridization Chain Reaction Coupled with Gold Nanoparticles

Krista Bennett and Adriana Celaya - Street Gang Members’ Right to Health: Call to Pursue Further Evidence-Based Intervention for HIV Prevention and Care

Casey Biederman - Optimization of Annealing Parameters for Silicon Carbide (SiC) Nanowire Fabrication

Caitlin Briggs - Investigating the Roles of Felt Obligation and Politics in the Context of Procedural Justice-Outcome Relationships

Indiana Scarlet Brown – “Rezubian’ de aru to iu koto” - A Translation and Analysis of Japan’s Seminal Lesbian Studies Work

Indiana Scarlet Brown - Fluid Identities: LGBT Japanese Speaker’s Co-Optation of Gendered Language

Aaron Buissereth - Intestinal Regulation of the Fungal Organism Candida Albicans by Intestinal Peyer’s Patches

Andrew Chau, Cortland Bonilla, Josselyn Gallardo, Julia Cox, and Tori O’Neal - Flint Water Crisis

Yadi Chen - Psychotherapy Clients’ Recalled Treatment Experiences: A Survey of Perceived Evidence-Based Practice Elements

Deirdre Curry - Does College Debt Impact Where Millennials Will Take Jobs?

Paige DeWitt-Holub and Kainat Akhtar - Sustainable Landfills, Produce Compost, Greenhouses, and Concepts for Growing Suburban Populations

Cassandra Edwards - The Intrinsic Motivation of Immigrant Women in Male-Dominated Fields of Study

Molly Fleming - Estimating Environmental Emissions from Produce Waste Redistribution in the Capital Region

Jesus Frias - The Role of BMP Signaling in the Neuronal Cell Identity of Vomeronasal Sensory Neurons

Andrew Furgiuele - Popularity Prediction of E-Commerce Items using Bipartite Graphs

Rachel Genzer, Jason Balram, Colleen Levine, Damian Young, Nathaly Mucha, and Laura Mans - How Oceans are Affected by Human Activity

Jack Glass, Edward Gardner, Adam Clarke, John Perog, Senley Auguste, Elliot Weintraub, and Mariah Rickard - Climate Change and Anthropogenic Effects on the Ocean

Marissa Guttenberg, Devina Puri, and Stephen Mancini - Effect of Histological Staining on Hyperspectral Data in Tissues from an Inhalation Model of Nanoparticle Exposure

Alexander Hartwell - Fabrication of a Synthetic Blood Brain Barrier Model

Jona Hoxha - Why Do Some Extremist Organizations Become Violent and Why Some Others Do Not: A Perspective from Eastern Europe

John Huang and Daniel Post - Ozone Depletion

Minqi Huang, Arianna Martz, and Hanifah Yasin - Identifying and Characterizing Lactococcus Lactis Mutants Affecting Group II Intron Retrotransposition

Marina Danielle Infantado - Development of a Sensitive Heparin Quantitation Procedure

September Johnson - The Role of Federal and International Law in Enforcing Sexual Education to Prevent Sexual Abuse among Children with Intellectual Disabilities
Thomas Joyce III, Jennifer Jules, Taylor Powell, Benjamin Rismany, and Jess Somma - Relative Rates and Patterns of Evolution of the CCR# Proteins in Primates with Respect to Infection by SIV

Kyle Kemp, Marquees Grayson, Kim Morales, Yeongjae Jo, Elain Rabady, and Katje Thompson - Pollution; History, Effects, Solutions

Madeeha Khan - Encrypted Online Document Editing

Chris Li - Improving Resolution of ATLAS Detector Images

Alexis Lima - The Contributions of Perceived Ethnic Discrimination and Rumination to Depression, Anxiety, and Anger in Emerging Adults

Emily Mangus - A Novel Energy Reconstruction Method for Liquid Xenon Detectors

Katarina Manzi - Investigating Olfaction in a Diet-Induced Obese Rat Model

Arianna Martz, Maggie Huang, and Hanifah Yasin - Developing High-Throughput Assays for Detection and Quantification of Group II Intron Retrotransposition in Bacteria

Brandon Masri and Frank Codi - Pollution and Its Detriments to Society

Chad McCanney - Influential Factors that Advance mHealth Application Usage

Jesse Parent - The Evolution and Transcendence of Cybernetics

Jesse Parent - Critical Concerns in Artificial Intelligence Safety and Ethics

Alexandra Payne - Follow-Up to an Early Intervention for Parents of Young Children with or At-Risk for Autism Spectrum Disorder

Rynelly Perez, Jessica Starr, Therese Palmere, Rachel Orellana, Seunghwan Park, and Bryanna Gourrier - Balancing the Scales: The Costs and Benefits of Using Renewable Energy versus Traditional Fossil Fuels

Elena Pollack - Bearing Graves

Lindsey Riback - HIV in New York City: An Overview of Cultural and Social Factors Contributing to an Individual’s Decision to Disclose their Disease Status

Daniela Robayo-Rodriguez, Andrew Amarain, Alex Berezny, and Justin Moul - Human Impact on Oceans

Abdul Sanni-Adam - Low Intensity Focused Ultrasound (LOFU) Combined with Radiation Therapy Increases Immunogenic Susceptibility in Melanoma

Richard Sarnacki - Feminism & the Gospel: Worldviews at Odds?

Katherine Tare - An Exploration into Gentrification in Brooklyn, NY

Natalie Turner - Mental Health Care Treatment Seeking among African Americans and Caribbean Blacks: What is the Role of Religiosity/Spirituality?

Daniela Vinick, Kenyon Roberts, Harlan Ginsburg, Mackenzie Linn, Nikash Nanavaty, and Haley Pogonowski - The Extinction of Bees and Its Catastrophic Effects on Humanity

JiaPing Weng - Application for Environmental Friendly Amination Conditions, Synthesis of Molecular Tweezer Troger Base Analogue

Hanifah Yasin, Maggie Huang, and Arianna Martz - Establishing Interaction Networks Affecting Group II Intron Retrotransposition in Bacteria
Oral Presentation Session  5:00 – 6:40

Please See Abstract Section for Abstracts of Presentations

LC 1: Political Science, Economics, and Business Administration

Liliana Castillo - The Effects of Economic Development on Democracy in the Middle East
Maksim Papenkov - The Housing Bubble’s Effect on Macro-Level Shifts in Mortgage Lending Patterns
Sebastian Herrera - Supply and Demand in the Fast-Food Industry
Wansoo Choi - The Impact of Leverage on Hedge Fund Performance

LC 2: History, English, and Women’s, Gender and Sexuality Studies

Haley Cook - Between Church and School
Timothy Dillinger - Leading Lady: A Case Study in Submission and Success in Contemporary Christian Music
Naomi McPeters - Monstrous Souls Imprisoned in Monstrous Flesh: James Baldwin’s Discourse of God, Power, and Love from Go Tell It On The Mountain to The Amen Corner
Margaret Norway - Death & Restoration of the Goddess: Reenvisioning Women in Mesopotamian & Greek Myth

LC 3A: History, Philosophy, and English

Haylee Shepard - Tangled Subjectivities: An Examination of the Japanese Subject from 1868-1912
Matheson Curry - “Let Our Noble Wrath Boil Over Like a Wave!”: Connections Between Soviet Propaganda and Red Army War Crimes During World War II
Johnathan Drayton – A Journey into “The Untold Story of Stealing Art: The Nazi’s Rape of Europe”
Sean Johnson - Seduction and Simulation: Politics in the Desert of the Real

LC 3B: Art History, History, and English

Fernanda Giongo Fernandes - Baskin’s “The Four Mystics”; Identification of the Paper Medium and Analysis of Deterioration
Katy Kukulich - Witchcraft Imagery in Russian 19th Century Artwork
Anda Alexandru - Pioneering Modernism: Dancer Loie Fuller and Queen Marie of Romania’s Artistic Collaboration
Simone Rowe - Rhetorics of Consciousness
Seunghyun Shin - How Documentary Poetry Imagines
LC 3C: English and History

Acacia Larson - The Yani Enigma: Globalizing Contemporary Chinese Art & Cultivating a Counter-Contemporary

Jenaisha Memminger - Feigning Feminism: Gothic Depictions, Shape-Shifting and Mock Heroism in CW's Supernatural

Sonya Herbach - The Anxieties of the Appearance and Emotions: Empress Elizabeth's Challenges and Struggles in the Nineteen Century's Sexist Society

Sonya Herbach - A Study in Tudor Clothing

Fazal Hussain - TNT: Textiles N' Turmoil

LC 4: English, Psychology, and Public Health

Stacie Klinowski - “Finding Nemo”, “Finding Dory”, Finding Ourselves: How and Why We Teach Our Children to Think About Disability

Oduy Kayed - How Child Maltreatment Gets Under the Skin

Danielle Garry - Changes in Body Fatness among Mohawk Youth from 1979 to 1999

September Johnson and Rachel Eager - Bridging the Gaps in Human Rights Law in the Middle East through Enhancing Health Law Capacity

Gertrude Morgan Dadzie - Healthcare Accessibility for Syrian Refugees: Understanding Trends, Host Countries’ Responses and Impacts on Refugee Health

LC 23: Biology and Psychology

Michelle Raissa Kobou Wafo - Pomegranate Ellagitannins- Potential Dietary Agent for Breast Cancer

Vincent LaMantia - Controllable and Sequential Activation of Cancer Nanotherapy for Enhanced Synergistic Effect

Sean Smith - Alzheimer's Disease as Type 3 Diabetes: The Intimate Link Between Brain Bloodflow & Metabolism

Hasina Noory - Synthesis of a Bifunctional Macrocycle

LC 24: Biochemistry and Molecular Biology

Adam Stabell - Identifying the Molecular Mechanisms of Isoform-Specific Actions of Retinoic Acid Receptors on K5 Positive Progenitors

Molly MacIsaac - Sensitive One-Step miRNA Detection with DNA Nanoswitches

Heather Sabo - Chronic Arsenic Exposure in Nanomolar Concentration Accelerates Senescent Phenotypes in Vitro

Tyler Pocchiari - RNA Helicases Involved In Ribosome Biogenesis Are Necessary For Germline Maintenance

David Bunn - Determination of the Rate of PRP8 Intein Splicing Kinetics
Please join us for the conference reception and presentation of the Presidential Awards for Undergraduate Research from 6:30- 7:30 PM

LC 25: Chemistry, Computer Engineering, and Computer Science

**Mathew Boll** - Differentiation of Hair Using ATR FT-IR Spectroscopy: A Statistical Classification of Dyed and Non-Dyed Hairs

**Allix Coon** - Locard’s Lube: The Identification of Condom Residues Using DART-MS

**Dong Woo Yoo** - Affective Viewer Analysis: Analyzing Facial Activities of Viewers Based on Videos and Multiple Choices

**Stuti Misra** - Dynamic Spectrum Characterization with a Low-Cost Sensor

**Elaine Huang** - Visible Light Communications and Ranging with Organic Light Emitting Diodes
Faculty Advisor: Igor Lednev, College of Arts and Sciences, Department of Chemistry

Caitlin Briggs: Investigating the Roles of Felt Obligation and Politics in the Context of Procedural Justice-Outcome Relationships
Faculty Advisor: Sylvia Roch, College of Arts and Sciences, Department of Psychology

Indiana Scarlet Brown: Fluid Identities: LGBT Japanese Speaker’s Co-Optation of Gendered Language
Faculty Advisor: Vivien Ng, College of Arts and Sciences, Department of Women’s, Gender and Sexuality Studies

Deirdre Curry: Does College Debt Impact Where Millennials Will Take Jobs?
Faculty Advisor: Pinka Chatterji, College of Arts and Sciences, Department of Economics

Timothy Dillinger: Leading Lady: A Case Study in Submission and Success in Contemporary Christian Music
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Faculty Advisor: Camelia Lenart, College of Arts and Sciences, Department of History

Sebastian Herrera: Supply and Demand in the Fast-Food Industry
Faculty Advisor: Byoung Park, College of Arts and Sciences, Department of Economics

Jona Hoxha: Why Do Some Extremist Organizations Become Violent and Why Some Others Do Not: A Perspective from Eastern Europe
Faculty Advisor: Victor Asal, Rockefeller College of Public Affairs and Policy, Department of Political Science

Sean Johnson: Seduction and Simulation: Politics in the Desert of the Real
Faculty Advisor: Mary Valentis, College of Arts and Sciences, Department of English

September Johnson: The Role of Federal and International Law in Enforcing Sexual Education to Prevent Sexual Abuse among Children with Intellectual Disabilities
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Stacie Klinowski: “Finding Nemo”, “Finding Dory”, Finding Ourselves: How and Why We Teach Our Children to Think About Disability
Faculty Advisor: Laura Wilder, College of Arts and Sciences, Department of English

Acacia Mei Larson: The Yani Enigma: Globalizing Contemporary Chinese Art & Cultivating a Counter-Contemporary
Faculty Advisor: Bret Benjamin, College of Arts and Sciences, Department of English

Emily Mangus: A Novel Energy Reconstruction Method for Liquid Xenon Detectors
Faculty Advisor: Matthew Szydagis, College of Arts and Sciences, Department of Physics

Naomi McPeters: Monstrous Souls Imprisoned in Monstrous Flesh: James Baldwin’s Discourse of God, Power, and Love from Go Tell It On The Mountain to The Amen Corner
Faculty Advisor: Derik Smith, College of Arts and Sciences, Department of English
Stuti Misra: Dynamic Spectrum Characterization with a Low-Cost Sensor  
Faculty Advisor: Mariya Zheleva, College of Engineering and Applied Sciences, Department of Computer Science

Margaret Norway: Death & Restoration of the Goddess: Reenvisioning Women in Mesopotamian & Greek Myth  
Faculty Advisor: Michael Leong, College of Arts and Sciences, Department of English

Haylee Shepard: Tangled Subjectives: An Examination of the Japanese Subject from 1868-1912  
Faculty Advisor: John Person, College of Arts and Sciences, Department of East Asian Studies

Seunghyun Shin: How Documentary Poetry Imagines  
Faculty Advisor: Eric Keenaghan, College of Arts and Sciences, Department of English

JiaPing Weng: Application for Environmental Friendly Amination Conditions, Synthesis of Molecular Tweezer Troger Base Analogue  
Faculty Advisor: Qiang Zhang, College of Arts and Sciences, Department of Chemistry
Abstracts

Poster Session
Arranged alphabetically by author last name

Erik Augspurger - Multi-Readout Nucleic Acid-Based Molecular Logic Gate Using Hybridization Chain Reaction Coupled with Gold Nanoparticles
Faculty Advisor: Mehmet Yigit, College of Arts and Sciences, Department of Chemistry
Rapid progress in DNA nanotechnology has inspired scientists to engineer DNA-based bio-computing circuits for information processing. Here, we have employed the signal amplification and programmability features of hybridization chain reaction (HCR) to construct OR and AND molecular logic gates which respond to as low as 1 nM of Hg2+ and/or Ag+ inputs. Considering that the EPA recommends the inorganic mercury concentration in drinking water be no more than 2 ppb (10 nM), our DNA-based logic gate systems also operate as highly sensitive sensors in response to two environmentally important metal ions, Hg2+ and Ag+, which threaten public health and display serious toxicity to aquatic ecosystems, respectively. The quantitative output signal of the operations was recorded by measuring the rate and degree of color transition of the nanoparticles coupled with HCR. We have demonstrated that the programmed output signal is highly specific to Hg2+ and/or Ag+ inputs, but no other combinations. In addition, both gates were completely shut down by excluding the HCR components in the logic gate operation. Because of its outstanding signal amplification and programmability features, HCR-based 1D DNA nanotechnology holds great promise for building DNA-based bio-circuits for information processing.

Krista Bennett and Adriana Celaya - Street Gang Members’ Right to Health: Call to Pursue Further Evidence-Based Intervention for HIV Prevention and Care
Faculty Advisor: Kamiar Alaei, Rockefeller College of Public Affairs & Policy, Department of Public Administration and Policy
Through literature review and data analysis, we believe there is an immediate need for increased education and access to HIV prevention and care for street gang members. Stigmatization, discrimination, and criminalization of street gang members, appear to make it difficult for members to access care in preventing and treating HIV. Also, we believe that female street gang members face additional adverse health outcomes. To our knowledge, there are no published studies, and or collected data regarding the rate of HIV among street gang members. There are also few countries that collect data on street gang members, and those that do, do not gather data on health outcomes. The lack of data and research makes it difficult for governmental and non-governmental organizations to address the unique needs of street gang members’ access to HIV prevention and care. A particular aspect that we believe is influential in an increase of HIV among street gang members is sexual risk-taking behaviors. These can include: trading sex for drugs or money, having multiple sex partners, group sex, rape, men having sex with men, “earlier age of sexual debut, higher rates of sexual activity, sex while under the influence of drugs and alcohol, and lower rates of condom use.” Street gang members appear to meet all of the qualifications to be considered a key population group. Classification as a key population by UNAIDS and the WHO would open the door for research and evidence-based programming for street gang members.

Casey Biederman - Optimization of Annealing Parameters for Silicon Carbide (SiC) Nanowire Fabrication
Faculty Advisor: Spyridon Galis, College of Nanoscale Science and Engineering
Initial investigation has suggested that silicon carbide (SiC) may be a preferred material for nanowires that can be used in a wide range of applications. Some of these applications include biosensors and single photon emitters. For these applications, ultrathin nanowires are created using SiC. In most cases, a bottom-up approach is used to fabricate these nanowires. This approach causes some issues, because the resulting wires are in a random orientation. SiC is a promising material for these nanowires because it has properties such as biocompatibility and a wide bandgap. Since SiC is a relatively new material, its properties at the nanoscale still need to be investigated in more detail. The solution that we are proposing uses a fabrication process that will create ultrathin, self-aligned SiC nanowires. This will provide a nanowire array that is highly ordered, which can be more easily applied to the proposed applications. The SiC being used is deposited as an amorphous material, however, a polycrystalline SiC is desired. The crystallization process is completed through annealing. Thorough characterization of the SiC is necessary before the nanowires can be created. We need to first determine the optimal SiC film thickness and annealing conditions. This will be done through
systematic testing of various combinations of film thicknesses, annealing temperatures and annealing times. The samples that will be tested are analyzed using techniques such as Fourier transform infrared (FTIR) spectroscopy, ellipsometry, and photoluminescence (PL).

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**Caitlin Briggs - Investigating the Roles of Felt Obligation and Politics in the Context of Procedural Justice-Outcome Relationships**

Faculty Advisor: Sylvia Roch, College of Arts and Sciences, Department of Psychology

Social Exchange Theory positions employee felt obligation as a mechanism by which organizational justice leads to positive organizational outcomes such as decreased turnover and increased job satisfaction. However, little has been done to test the empirical value of this theoretical claim. Additionally, although organizational politics is generally negatively correlated with justice, investigation of the mechanism by which politics might influence justice is lacking. Here, I look at whether politics has a moderating role on procedural justice and felt obligation, and thus turnover intentions and job satisfaction, or in words, whether politics reduces the positive relationship between procedural justice and felt obligation. In the current study, a sample of Amazon Mechanical Turk users (N = 294) were compensated to take an online survey measuring procedural justice, felt obligation, politics, turnover intentions, and job satisfaction. Evidence was found to support the claim that felt obligation partially mediates procedural justice-turnover and -job satisfaction relationships. Additionally, the relationship between felt obligation and job satisfaction offers empirical support for value theory. The presence of felt obligation may indicate employee needs are being fulfilled, thus leading to greater satisfaction. No evidence was found to support politics as a moderator of the justice-felt obligation relationship. The current study should prompt further research into felt obligation as a mediator for justice-outcome relationships. Future studies should also clarify the influence of politics on justice.

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**Indiana Scarlet Brown – “Rezubian’ de aru to iu koto” - A Translation and Analysis of Japan’s Seminal Lesbian Studies Work**

Faculty Advisor: Susanna Fessler, College of Arts and Sciences, Department of East Asian Studies

For this project, I translated Kakefuda Hiroko’s seminal book “Rezubian’ de aru to iu koto” (On being a ‘lesbian’) in its entirety in order to critically analyze her assertions and theories. Kakefuda Hiroko (1964-) was a critical figure in the development of Japanese queer studies. In 1988, she came out as a lesbian to the mass media, an act that at the time was incredibly courageous. She was the first woman to come out publicly like this in Japan. A few years later, she published her book “Rezubian’ de aru to iu koto,” writing from her own experience as a lesbian in order to address misconceptions about lesbian identity and critique the way what few dialogues existed about queer identity and experience were so male dominated. Among other things, in her work she chastises Japanese feminism for excluding lesbians, and attempts to divorce the pornographic connotations of lesbianism from what she believed it meant to be a lesbian. In the accompanying research paper I seek to expose the implications of arguments that Kakefuda makes in “Rezubian’ de aru to iu koto,” focusing on the sections about lesbian existence and marriage, parallels and differences between Kakefuda’s work and Gender Trouble by Judith Butler, as well as Kakefuda’s interrogation of the limits of heteronormative language.

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**Indiana Scarlet Brown - Fluid Identities: LGBT Japanese Speaker’s Co-Optation of Gendered Language**

Faculty Advisor: Vivien Ng, College of Arts and Sciences, Department of Women’s, Gender and Sexuality Studies

The Japanese language provides far more linguistic room for gender expression than is available in English. This research project examines the ways in which Japanese LGBT speakers use gendered language as a means to an end. To do this, I dissect a brief modern history of the construction of women’s language in Japan for a better understanding of the social connotations of using masculine or feminine language. Using transcripts from interviews previous researchers conducted with LGBT Japanese speakers as well as a scathing letter written in very feminized language by a notable Japanese gay author, I then analyze their motives for gendering their language in a particular way contextualized in my understanding of the social significance of using masculine or feminine language. Through this research, I have concluded that LGBT Japanese speakers will often consciously but occasionally inadvertently utilize a particular gendered language depending on the social situation in order to navigate across the heteronormative boundaries constructed in Japanese society.
At first glance, it may appear that the usage of extremely gendered language affirms sexual and gender stereotypes, but further analysis seems to show that these acts of defiance and subversion of traditional gender roles through fluid and shifting gender expression truly undermines the social binary.

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**Aaron Buissereth** - *Intestinal Regulation of the Fungal Organism Candida Albicans by Intestinal Peyer’s Patches*
Faculty Advisor: Magdia DeJesus, School of Public Health, Department of Biomedical Science
As the largest mucosal compartment, the human gastrointestinal tract (GI) is highly colonized with a complex microbial ecosystem that includes fungal organisms. Although fewer in numbers and less extensively studied in the context of the intestinal mucosa, it is unclear whether commensal members such as Candida species play a role in intestinal mucosal immunity. Recent studies have suggested that Candida sp. in the intestinal mucosa are associated with a number of human diseases such as gastric ulcers, Crohn’s disease and Hirschsprung-associated enterocolitis. Our laboratory focuses specifically on intestinal Peyer’s patches (PPs) that are considered the key sites of immune surveillance because they can selectively sample microbes and antigens that travel through the intestine. We have recently identified, a specific non-macrophage dendritic cell (DC) population within intestinal Peyer’s patches (PP) that expresses the C-type lectin receptor (CLR)-Langerin that are able to specifically uptake Candida albicans, Candida tropicalis and yeast purified β-1,3-glucan particles (GPs). We hypothesize that Langerin+ DCs are central in the sampling, presentation and regulation of C. albicans within PPs. To address this hypothesis, we are currently defining the role of Langerin+ DCs in the processing of Candida sp. after uptake using the Langerin-DTR-EGFP mouse model as well as the inflammatory model Langerin-DTR-EGFP-DSS. Using these two mouse models we are also characterizing the gene expression profiles of PP B and T-lymphocytes as well as Langerin+ DCs in response to C. albicans. Additionally, we are investigating whether Langerin+ DCs are a migratory cell subset that not only transports C. albicans near germinal centers but can also take them to tolerogenic sites such as the MLN. These studies will advance our knowledge of how commensal members that are also part of the “mycobiome” are sampled, what mucosal immune responses are elicited and how these fungal organisms are tolerated.

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**Andrew Chau, Cortland Bonilla, Josselyn Gallardo, Julia Cox, and Tori O’Neal** - *Flint Water Crisis*
Faculty Advisor: Mary Ellen Mallia, Office of Environmental Sustainability
The Flint water crisis, which started in 2014, was declared a state of emergency for the protection of the lives of each woman, man, and child in the city of Flint. More specifically, young children and pregnant women were more in danger due to the lead and other harmful substances found in the water that these civilians were drinking. For several months, the people in the city had to use bottled water for drinking, cooking, and even bathing. While the city discovered that the lead found in the water was coming from excessive corrosion from old pipes found in the river, finding the solution to the problem wasn’t going to be easy and it was going to be very costly. Repairing and replacing each old pipe in the city would take several years and cost millions of dollars. For the short-term solution, the city of Flint had changed its water supply and has cleaned out the toxic water with chlorine and other substances. It took over half a year for the water levels to be considered “safe” to drink again but the trust was lost within civilians. The projects to replace all the old pipes are still in works today but this crisis will serve as a lesson to prevent future problems.

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**Yadi Chen** - *Psychotherapy Clients’ Recalled Treatment Experiences: A Survey of Perceived Evidence-Based Practice Elements*
Faculty Advisor: James Boswell, College of Arts and Sciences, Department of Psychology
Common evidence-based practice (EBP) elements can be observed across cognitive-behavioral therapy (CBT) manuals for common disorders (Barlow et al., 2004). Example EBP elements include exposure, cognitive restructuring, and active coping skills (e.g., relaxation) (Boswell, 2013), enhancing positive affect (Carl et al., 2014), and facilitating a positive working alliance (Castonguay et al., 2010). It is unclear if EBP elements are frequently delivered or prioritized in routine psychotherapy (England et al., 2015). Also, little is known about the prevalence or pervasiveness of EBP elements from the routine client’s perspective. Objective: The objective of this study was to assess psychotherapy clients’ self-reported retrospective treatment experiences with regard to common EBP elements. Method: Participants (N = 592) were consenting university undergraduate students who received course credit. Eligibility: (a) 18 years of age or older, and (b) have current or previous experience with psychotherapy or counseling. The sample was mostly female (58.1%)
and Caucasian (54.4%), with a mean age of 19.04 years (SD=2.44). Eligible participants were invited to access a web-based survey that included (a) diverse measures of current symptoms and functioning; (b) an item assessing the problem domain(s) of focus during their therapy; and (c) the presence/absence of 8 potential EBP elements and the extent to which they were discussed during/were a focus of their psychotherapy.

Results: Overall, routine psychotherapy clients recalled receiving a variety of EBP elements, the most common being a focus on positive emotions. The presence or absence of a recalled EBP element was, in some cases, associated with endorsement of a specific problem domain. The recall of receiving an EBP element was not consistently related to better current functioning.

Implications: Future research should continue to focus on clients’ experience of psychotherapy elements, including what was/is most and least helpful to assist in the refinement and implementation of EBPs.

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Deirdre Curry - Does College Debt Impact Where Millennials Will Take Jobs?
Faculty Advisor: Pinka Chatterji, College of Arts and Sciences, Department of Economics

In the more recent years of 2012-2013, overall students have borrowed $110 billion in loans to fulfill a better level of education. There seems to be a common trend, that the more students that attend college, the more outstanding student loans that will rack up among the country. With these loans, comes interest. With the loans and the interest racking up, it seems it is getting harder and harder for college graduates to pay off their debts. The New York Federal Reserve Board states an increase in student loan balances in G.19 form March 2006, the first quarter being $477 billion outstanding to March 2015 with the ending quarter racking up to $1.27 trillion outstanding. Having what seems like no other option, the younger generation of college graduates move back home with their parents after once previously living on their own. From the year 1999 to 2013 the percentage of college graduates living with their parents has risen 21.7%. Younger generations are taking out more college loans then they can ever repay. Once college graduation comes around, they have no other option but to move home with mom and dad, thus terming them the “boomerang generation”. Among these young college graduates in 2015, 10.5 percent are neither enrolled nor employed, compared to 13.7 percent in 2007. This underemployment goes hand and hand with millennials increasing need to move home with their parents, thus shortening their search for jobs and their locations to move. College seems to become an increasingly risky investment for the younger generations, due to the limited job opportunities, the rising cost of higher education and the inability to pay back those loans.

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Paige DeWitt-Holub and Kainat Akhtar - Sustainable Landfills, Produce Compost, Greenhouses, and Concepts for Growing Suburban Populations
Faculty Advisor: Carlos Balsas, College of Arts and Sciences, Department of Geography and Planning

The Wasteland Dream Makers secured a grant, the NYSP2I 6th Annual R&D Student Competition, with the agreed upon focus on the concepts of sustainable landfills, concentration on food-waste reduction techniques for growing suburban populations. After extensive research, including visits to the Colonie Landfill and attending the Town of Colonie DEC Public Hearing, we have designed a proposal to create our own compost, and greenhouse to grow fig trees, olives, herbs, and more to provide to the economically disadvantaged in the area and implement our ideas. We, like the Regional Food Bank of Northeastern New York, hope to provide food to "children, single parents, seniors, working poor households, unemployed people, homeless," while at the same time, using compost derived from household (organic) waste compost, thereby decreasing the landfill burden ("How the Food Bank Works" 2006). We propose creating a test greenhouse to entrepreneurial food industry service site at a home, which is off-site of SUNY Albany. There is a window-paneled indoor porch, which perfectly reflects the various 19th century homes in Albany that have a porch, with at least half of the wall space being windows, which we will convert into a greenhouse. Our group’s plan is to have a few plants that reproduce asexuality (through budding), including eventually... pineapples, lettuce, and potatoes, in our greenhouse. The above plants can primarily be eaten and then submitted to water for long enough for the top clipping to become another fruit-bearing pineapple plant. We realize the importance of oxygen-giving plants, because all plants will benefit from the improved air conditions of plants with varying photosynthesis schedules. By spring, our group hopes to purchase and plant tropical guava plants, though we already have a tropical fig tree, with improved systems within the greenhouse.
**Cassandra Edwards - The Intrinsic Motivation of Immigrant Women in Male-Dominated Fields of Study**
Faculty Advisor: Anna Newheiser, College of Arts and Sciences, Department of Psychology
This study hypothesized that female students with first- or second-generation immigrant status (vs. their native-born peers) would be better prepared academically and have stronger intentions of staying within their field of study. Past research suggests that immigrant students are more successful academically than their native-born peers, suggesting that immigrant families tend to place a heavier focus on values that promote educational achievement. We focused specifically on students in STEM versus non-STEM fields, as STEM fields are traditionally male dominated. We predicted that female immigrant STEM majors would perform better than their non-immigrant male peers and cope with academic stressors more efficiently. We tested our predictions by assigning participants to one of two possible conditions where their social identity was either made salient at the beginning or end of the study. We measured academic preparedness, likelihood to stay in one's field of study, general and academic stress, coping skills, and parental involvement in academics. As predicted, female immigrant STEM majors reported a stronger intention to remain within STEM, relative to native-born male STEM majors, and may outperform their native-born male peers on some indices of academic performance, although they also reported relatively more stress.

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**Molly Fleming - Estimating Environmental Emissions from Produce Waste Redistribution in the Capital Region**
Faculty Advisor: Beth Feingold, School of Public Health, Department of Environmental Health Sciences
Every year in New York's Capital Region a large amount of food goes to waste, a lot of this wasted food is produce. However, many organizations in the Capital Region have put in efforts to redistribute this surplus produce to the food insecure to help improve their diets. This project looked at how that surplus produce is redistributed to the food insecure in the Capital Region, the environmental impact of that redistribution, and how that redistribution could be improved. Working with local partners through survey data collection, interviews, and energy and environmental transportation cost modeling, we quantified the amount of surplus produce being redirected from the waste stream to consumers and determined the energy consumption and greenhouse gas (GHG) emissions of transporting the surplus produce in the Capital Region. We used Argonne National Laboratory's The Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) Model to calculate greenhouse gas emissions from the transportation of the surplus produce from food banks and grocery stores to food pantries and soup kitchens, and we used the Environmental Protection Agency's (EPA) Waste Reduction Model (WARM) to calculate the environmental impact of alternatives of redistributing the surplus produce, such as landfilling or composting the excess produce. By doing this we hope to be able to calculate the optimal amount of produce for redistribution that minimizes the environmental impact of transporting surplus produce, while also improving access to produce for the food insecure.

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**Jesus Frias - The Role of BMP Signaling in the Neuronal Cell Identity of Vomeronasal Sensory Neurons**
Faculty Advisor: Paolo Forni, College of Arts and Sciences, Department of Biology
The vomeronasal organ (VNO) is an olfactory subsystem that detects pheromones, which are crucial molecules for the regulation of social interactions in many vertebrates. The VNO consists of two populations of vomeronasal sensory neurons (VSNs) differentiated by location in the epithelium and their expressed receptor family. VSNs in the apical area of the VNO express the vomeronasal 1 receptor (V1R) superfamily and the G-protein subunit Gαi2. VSNs in the basal area express V2R superfamily and Gα0. Our lab has identified the transcription factor AP2ε as a necessary molecule for basal neuronal program. In AP2ε KO mice we observe a decrease in the basal population of VSNs. Now, our lab aims to understand how AP2ε is capable of influencing the neuronal cell fate of the VSNs. Is AP2ε acting on its own? Are other signals necessary in conjunction with AP2ε for the VSNs to obtain the basal identity? Our lab hypothesizes that morphogens like Bone Morphogenetic Protein (BMP) from the surrounding vasculature are key to induce AP2ε expression, which leads to basal VSNs. BMP regulates gene expression through receptor regulated(R-SMAD- Smad 1,5,8) and Co Smad(Smad4). To investigate our hypothesis we have generated a conditional Smad4 KO in which BMP signaling is impaired in the basal VSNs. We are characterizing this knockout by checking the expression pattern and levels of basal neuronal markers like Gα0, Ap2e and V2r through immunofluorescence.

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Andrew Furgiuele - *Popularity Prediction of E-Commerce Items using Bipartite Graphs*
Faculty Advisor: Charalampos Chelmis, College of Engineering and Applied Sciences, Department of Computer Science

Apple’s release of the iPhone 7 in 2016 saw a 7% decrease in iPhone sales compared to the iPhone 6. Why was iPhone 6 more appealing than iPhone 7? Amazon.com, the largest online e-commerce website, sold over 27 million items last Cyber Monday. Can we predict which item is going to become a bestseller while another wither with time? With modern e-commerce and online retailing on the rise, the ability to predict the potential popularity of items has become critical. Popularity prediction of e-commerce items prior to their listings can facilitate but is not limited to efficient inventory management to meet consumers’ demand and targeted management and monetization. A growing body of research has focused on popularity characterization and estimation. However, prior work does not fully address two major challenges: (1) that the eventual popularity of an item may be an inherently unpredictable property, and (2) that popularity values follow a skewed distribution with highly popular items being quite rare. We propose to model popularity as a quantity to be tracked over time and develop a novel approach based on accurately modeling online purchase logs as a bipartite graph. We study item popularity in a large-scale real-world dataset from online e-commerce site Etsy.com, which caters to more than one million sellers and nearly 35 million unique product listings. By computationally analyzing this dataset, we discovered potential indicators of popularity such as social closeness, centrality, and rarity of attributes. Using our findings, we plan to develop a multimodal method for popularity prediction. Our prediction approach, even though developed for Etsy.com will be applied to diverse applications including popularity prediction of upcoming movies and television shows and citations of academic publications.

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Rachel Genzer, Jason Balram, Colleen Levine, Damian Young, Nathaly Mucha, and Laura Mans - *How Oceans are Affected by Human Activity*
Faculty Advisor: Mary Ellen Mallia, Office of Environmental Sustainability

Human activity has devastating impacts on marine ecosystems. Our research focused on understanding and developing solutions to anthropogenic oceanic problems such as coral bleaching, marine debris gyres, overfishing, oil and mercury pollution, and the effects of tourism on coastal areas. Comprehending the multitude of ways that humans are degrading the oceans can help to ensure that aquatic species and the environment are protected and ensure further success of marine conservation programs. This research project called for a detailed review of existing government and university-level studies and papers about human environmental impacts. This review of several documents and articles has led to our conclusion that collaborative policy and regulatory measures are wholly necessary to prevent the further destruction of Earth’s most vast biome, as the oceans are shared by all the world’s people. This work will help to reveal more avenues for multilateral cooperation between intergovernmental organizations, nongovernmental organizations, and individual nations in halting this ecosystem damage.

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Jack Glass, Edward Gardner, Adam Clarke, John Perog, Senley Auguste, Elliot Weintraub, and Mariah Rickard - *Climate Change and Anthropogenic Effects on the Ocean*
Faculty Advisor: Mary Ellen Mallia, Office of Environmental Sustainability

Oceans take up the largest portion of the planet Earth. Although humans have not yet explored the entirety of its wonders, we do know that we are dependent on the marine biome for both environmental and economic resources. In spite this knowledge, it seems as though we take advantage of the gifts that the ocean offers us, and in turn soil the waters endlessly for the purpose of personal gain. Through the exploration of topics such as ocean acidity, ocean temperatures, pollution, dead zones, coral reef death, and overfishing, various anthropogenic causes will be examined and interpreted for the future of not only our oceans, but of our planet as well.

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Marissa Guttenberg, Devina Puri, and Stephen Mancini - *Effect of Histological Staining on Hyperspectral Data in Tissues from an Inhalation Model of Nanoparticle Exposure*
Faculty Advisor: Sara Brenner, College of Nanoscale Science and Engineering

Hyperspectral imaging (HSI) and mapping are established methods that are being applied in new ways to the analysis of nanoscale materials in a variety of matrices. HSI collects a spectrum (400nm-1000nm) from each pixel in a hyperspectral image, also known as a datacube. Spectra from pixels corresponding to known
materials can be collected into reference spectral libraries (RSLs), which can then be used to map these materials in datacubes of experimental samples by using a mapping algorithm. The sample matrix has been shown to affect hyperspectral data. As such, sample preparation must be consistent and RSLs should be created from positive control samples that have the same matrix as the experimental samples. In this study, enhanced darkfield microscopy (EDFM) and HSI were used to visualize and analyze industrial metal oxide nanoparticles (NPs) in lung tissue from rats exposed to ceria or alumina NPs via inhalation, mimicking potential real-world occupational exposures. The lung tissues were histologically prepared; some tissues were stained with hematoxylin and eosin (H&E) and some were left unstained. We hypothesize that, even though the tissue matrix is the same, the H&E stain will influence the spectral data, when compared to the data obtained from unstained tissues. As HSI is increasingly utilized for NP characterization for clinical, environmental, and health and safety applications, this investigation is important for further refining HSI protocols and ensuring appropriate data collection.

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**Alexander Hartwell - Fabrication of a Synthetic Blood Brain Barrier Model**

Faculty Advisor: Magnus Bergkvist, College of Nanoscale Science and Engineering

An accurate blood brain barrier model is necessary for the assessment of drug transport into the central nervous system for therapies related to various neurological diseases. Many current blood brain barrier models require large volumes of static fluid and exhibit unrealistic cell growth patterns, such as Transwell systems which fail to replicate proper in-vivo conditions. Also, traditional photolithographically generated microfluidic channels require lengthy waiting periods for any design adjustment, and offer limited geometric possibilities. This work seeks to integrate pre-existing cell scaffold designs into a 3D-integrated microfluidic flow blood brain barrier model. The scaffolds have already been utilized for growth of epithelial cells both for in vitro and in vivo use, and have also been used for the growth of human dermal microvascular endothelial cells. The regular, porous grid pattern provides liquid access to cells and facilitates establishment of cell to cell communication needed for blood brain barrier function. This scaffold structure has proved to promote uniform cell growth with well-established cell-cell junctions. The microfluidic channels would be generated by computer numerical controlled machining. This machining technique allows for increased channel geometry possibilities, including three dimensional designs, and reduces waiting time to apply design adjustments into the working model.

Overall, the microfluidic flow blood brain barrier model can create biologically consistent cell growth and micro environmental characteristics in an easy to manufacture system which can readily be adapted for large-scale production.

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**Jona Hoxha - Why Do Some Extremist Organizations Become Violent and Why Some Others Do Not: A Perspective from Eastern Europe**

Faculty Advisor: Victor Asal, Rockefeller College of Public Affairs and Policy, Department of Political Science

My research addresses the question of why do some extremist organizations choose to use violence and why some others do not – particularly focusing on Eastern European organizations. There has been previous research on why certain organizations opt for the use of violence while others do not, but mainly examining the Middle East (Asal, Schulzke & Pate, 2014). This research aims to expand the scope of this question and extend it to Eastern Europe – an understudied region when it comes to extremist organizations, particularly during the last decade. I created a dataset by using a sample of 30 groups in Eastern Europe. The groups were randomly selected and their inclusion criteria is based on the POD codebook. The information was extracted from open sources, including newspaper articles, journals, government and think-tank reports, etc.

According to the results of my research, organizations that use violence in Eastern Europe, from 2002-2014, have the following ideologies, experience the following repression, and engage in the following violent activities:

1. Religious Ideology
2. Nationalist Ideology (claims to autonomy or independence)
3. Ethnic Ideology (no claims to autonomy or independence)
4. Goals include Change in State Boundaries
5. Goals include Change in Regime Type
6. Experience State Repression
7. Experience State Violence

Eastern Europe is an important and strategic region that needs to be stable for both national and international security purposes. It is important to closely monitor existing and rising organizations with the
above-mentioned characteristics, particularly at this crucial moment in history, when violent extremism is a major threat to global security and stability.

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**John Huang and Daniel Post - Ozone Depletion**
Faculty Advisor: Mary Ellen Mallia, Office of Environmental Sustainability

The ozone layer, located in Earth’s stratosphere, prevents most harmful ultraviolet light in the UVB spectrum from passing through Earth’s atmosphere. In the late 1970s, two distinct but related phenomena were observed. This includes a steady decline of about four percent of the total amount of ozone in Earth’s stratosphere, and during springtime a much larger decrease in stratospheric ozone around Earth’s polar regions was observed. This was attributed to the rise in halogens, present in refrigerants, solvents and propellants, and chlorofluorocarbons (CFC). The depletion of the ozone layer was suspected to have had a variety of biological consequences, and posed a threat to the environment and human health. The increase in harmful UVB radiation was correlated with the increase in severity and impact of cataracts, damage to plants, and various biological cycles. This led to the adoption of the Montreal Protocol that banned the production of CFCs, and other ozone-depleting chemicals. The Montreal Protocol was designed to protect the ozone layer, and was agreed on 26 August 1987. Since then it has undergone revision eight times, and because of the agreement the ozone hole is slowly recovering. Due to the success in the recovery of the ozone layer, the agreement has been stated to be the “single most successful international agreement to date”.

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**Minqi Huang, Arianna Martz, and Hanifah Yasin - Identifying and Characterizing Lactococcus Lactis Mutants Affecting Group II Intron Retrotransposition**
Faculty Advisor: Olga Novikova, College of Arts and Sciences, Department of Biology

Bacterial group II introns are self-splicing retroelements. They are evolutionarily related to spliceosomal introns and has been identified as the progenitors of other reverse transcriptase elements. However, the relationship between the host and group II intron still remains unclear. We utilize group II intron LI.LtrB and its native host Lactococcus lactis in order to unveil the host-retrotransposon relationship. We have generated a library of mutants in L. lactis using insertional mutagenesis with ISS1 transposon. Further experiments have indicated that certain mutants have had increased levels of group II intron LI.LtrB mobility in comparison with wild type. We also identified number of mutants which displayed, at the first glance, somewhat decreased levels of group II intron LI.LtrB mobility. However, there are certain difficulties when describing a decrease in phenotype – the difference in comparison with wild type is very subtle; and there are many other factors which are not related to the intron regulation but may cause the decrease in retrotransposition phenotype. In this project, we are searching for the approach to identify more accurately the mutants with decreased levels of group II intron LI.LtrB mobility. We have selected several mutants of interest based on our preliminary screens. Next, to identify the ISS1 tagged mutation locus, we perform inverse PCR followed by sequencing of resulted product. We also repeat mobility assays to verify our original results. In parallel with mobility assays, we spot cultures on membranes and detect retrotransposition events using hybridization with selective probe. So far, this approach seems to be sensitive enough to detect mutants with decreased levels of group II intron LI.LtrB mobility.

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**Marina Danielle Infantado - Development of a Sensitive Heparin Quantitation Procedure**
Faculty Advisor: Susan Sharfstein, College of Nanoscale Science and Engineering

Heparin is an important anticoagulant, medicinally used to prevent blood clotting, commonly for patients requiring surgery and kidney dialysis. Presently, it is produced from animal tissues, but a recent contamination crisis pointed to the need for a safer source of the drug from non-tissue sources. Our project seeks to develop a high-throughput assay to sensitively and rapidly quantitate the production of heparin and other glycosaminoglycans (GAGs) from cultured mammalian cells. Since the most sensitive chemical heparin assays, the microcarbazole assay and the 3-phenylphenol assay, suffer interferences from other components of culture media, a purification method is needed to isolate and concentrate the heparin to accurately allow its quantitation. To quantify these dilute media solutions, several precipitation methods followed by two assays were examined. Solvent precipitation using acetone or ethanol in combination with acetic acid or NaCl was tried; however, solvent precipitation was unable to quantitatively precipitate the low levels of heparin needed for these analyses. An alternate method, using cetyl ammonium bromide (CTAB), was also examined, and although this process proved linear within the range analyzed, the method lacked the required sensitivity.
as it also did not quantitatively precipitate the heparin from these solutions. Detection of the concentrated heparin was examined using the microcarbazole assay and the 3-phenylphenol assay, in which the microcarbazole assay proved much more sensitive. We are currently conducting ion-exchange resin-binding experiments to test the ability of the positively-charged Ecteola Cellulose to bind the heparin from the media samples, followed by release with concentrated NaCl. Preliminary results indicate the heparin specifically binds to the resin, however optimization of the protocol is underway.

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November Johnson - The Role of Federal and International Law in Enforcing Sexual Education to Prevent Sexual Abuse among Children with Intellectual Disabilities
Faculty Advisor: Kamiar Alaei, Rockefeller College of Public Affairs & Policy, Department of Public Administration and Policy

15% of children with an intellectual disability will experience a form of sexual violence. These children are 4.6 times more likely to be abused compared to a child without an intellectual disability. Those aged 13-18 years are at the highest risk for abuse. This population has a right to sexual education and could benefit from it greatly, however, this right is often denied or overlooked. Sexual education is rarely provided through provisions of special education even through providing proper and tailored sexual education to this population can give these children the skills and information needed to protect themselves from sexual violence. The United Nations Convention on the Rights of Persons with Disabilities and the United States Individuals with Disabilities Education Act both require that children with intellectual disabilities have access to equal and appropriate education, including sexual education. This research explores how the United States is held accountable to provide children with intellectual disabilities sexual education through Federal and International law and provides recommendations to prevent childhood sexual abuse among children with intellectual disabilities through improvements in education and law.

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Thomas Joyce III, Jennifer Jules, Taylor Powell, Benjamin Rismany, and Jess Somma - Relative Rates and Patterns of Evolution of the CCR# Proteins in Primates with Respect to Infection by SIV
Faculty Advisor: Caro-Beth Stewart, College of Arts and Sciences, Department of Biology

Simian Immunodeficiency Virus (SIV) is endemic in most African apes and monkeys, yet these species appear largely resistant to infection or to progression to AIDS. In contrast, Asian apes and monkeys, do not harbor endemic strains of these lentiviruses, and those that have been infected in captivity become immunodeficient, similar to humans infected with Human Immunodeficiency Virus (HIV). HIV and SIV infect T-cells through the protein CD4 and one of several transmembrane co-receptors within the CCR# protein family. Previous studies have shown signs of positive selection on CD4 and CCR5 in select African primates, while other proteins of the CCR# family have not been studied in depth with respect to adaptation. The purpose of this project was to study the evolution of all members of the CCR# protein family in primates, with the goal of identifying other possible targets of selection. To accomplish this, members of our research team retrieved the coding sequences for the 10 members of the CCR# protein family from a set of sequenced primate genomes of known phylogenetic relationship. For this project, I am focusing on CCR5 and CCR6. These protein-coding sequences were aligned manually with the aid of the computer program MEGA7. Phylogenetic trees were built using the program MacClade and the amino acid replacements were mapped onto the known phylogeny of the primate species. The patterns of evolution were compared across family members. We compared genes that are known to be involved in SIV infection with genes that are not known to be involved in SIV infection, as well as species with endemic SIV to uninfected species. The goal of this project is to identify possible host adaptation to SIV over evolutionary time, with the longer-term goal of identifying possible targets for blocking HIV infection and disease progression.

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Kyle Kemp, Marquees Grayson, Kim Morales, Yeongjae Jo, Elain Rabady, and Katje Thompson - Pollution; History, Effects, Solutions
Faculty Advisor: Mary Ellen Mallia, Office of Environmental Sustainability

Pollution is the introduction of contaminants into the natural environment that can cause adverse change and can take the form of chemical or physical substances, and energy such as noise, heat or light. Pollution has been an issue since humans have inhabited the Earth and has evolved with people. It has harmful effects on both the environment and human health. Currently, there are some regulations in place to limit a portion of the effects. However, if these activities are left unregulated the environment will continue to deteriorate at a
rapidly increasing rate. Despite the major improvements that have been made over recent years to clean up the environment, pollution remains a major problem and poses continuing risks to health. In the fight against pollution, there needs to be a decrease in the harmful production methodologies, monitoring of the effects of the manufacturing companies on the environments around them, and the waste disposal methods currently in place. One solution is to create programs to identify the pollution sources, appropriate environmental waste programs address reducing the toxicity and waste volume at production sites as well as at discharge points. There should be incentives for factories to comply with legislation that would protect the environment. Solutions to air pollution include research projects aimed at improving electric transportation and lastly, developing and switching to renewable energy sources like solar, wind, and geothermal that would decrease the burning of fossil fuels. This deterioration will affect human health in an increasingly negative context, as well as increase wildlife and ecosystem detriment. Humans need to decrease the amount of pollution we emit to disallow the continuance of the current deterioration rates.

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Madeeha Khan - Encrypted Online Document Editing  
Faculty Advisor: Pradeep Atrey, College of Engineering and Applied Sciences, Department of Computer Science  
Millions of users worldwide use online cloud-based document editing services to manage document and work on collaborative projects with other users. These services, such as Google Docs, are cost-free and provide a range of functionality including accessibility and storage. However, the information stored on these cloud-based services is not secure and raises privacy concerns. SecureCEdit is a web-based application recently made available that provides a secure approach to store documents over cloud storage in encrypted form and provides users with a range of online editing functions. However, a user defined key is needed for the encryption, and if multiple users are working on the same file, there is no secure way to share the key. We are going to implement SecureCEdit in a different method, using Shamir Secret Sharing. Secret Shamir Sharing is a technique that creates multiple shares of the information (secret) and each share can be stored on separate servers. To reconstruct the secret, a pre-defined number of shares (k) are needed. If there is information leakage, the secret is still secure if less than k number of shares were compromised. Through this method, no key is needed and it eliminates the need to find a secure key sharing technique. This algorithm possesses information-theoretic security.

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Chris Li - Improving Resolution of ATLAS Detector Images  
Faculty Advisors: Vivek Jain and Jonathan Petruccelli, College of Arts and Sciences, Department of Physics  
The purpose of this project is to sharpen images of the ATLAS inner detector using secondary hadronic interactions, which are produced by the collision of particles, produced in the primary proton-proton interaction, with the detector material. These secondary collisions produce new particles which leave tracks as they travel through the detector. An inclusive vertexing algorithm finds the position of these interactions. Uncertainties in track measurements smear the position of the true interaction position; this smearing can be modeled as a point spread function (PSF). The image is further degraded by the presence of fake vertices, which are a by-product of the track reconstruction software. To obtain the clearest possible image, the effect of the PSF is removed using image deconvolution methods implemented in MATLAB. Several deconvolution algorithms are investigated. Due to the discrete nature of the data, deconvolution methods which assume images generated by Poisson processes are found to outperform alternative methods.

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Alexis Lima - The Contributions of Perceived Ethnic Discrimination and Rumination to Depression, Anxiety, and Anger in Emerging Adults  
Faculty Advisor: Leslie Halpern, College of Arts and Sciences, Department of Psychology  
Perceived ethnic discrimination (PED), a type of race-based social stress, is conceptualized as a subjective experience of discrimination based on phenotype, linguistic, or cultural characteristics. As an environmental stressor, it is associated with the same negative outcomes as other stressors such as greater depressive and anxious symptoms, poorer academic performance, and poorer health outcomes. Previous research has focused on PED’s association with mental and physical health outcomes, but cognitive factors (i.e., cognitive ruminations, coping strategies, executive functioning) that might mediate or moderate outcomes have received less attention. Moreover, while some research has investigated the associations of anger rumination and perceived discrimination on depression, anxiety, and aggression, the relations of depressive rumination
and PED to negative emotions in an emerging adult sample have not been extensively studied. Therefore, this study’s goal was to explore how cognitive factors such as anger and depressive rumination and PED contribute to negative emotions (anxiety, depression, and aggression), in both ethnic minority and White emerging adults. This study also investigated gender differences in rumination, perceived discrimination, and negative emotional outcomes.

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Emily Mangus - *A Novel Energy Reconstruction Method for Liquid Xenon Detectors*
Faculty Advisor: Matthew Szydagis, College of Arts and Sciences, Department of Physics
This project involves coming up with a model for researchers to use when trying to detect a dark matter particle. The term dark matter refers to the missing 25% of the mass/energy content of the entire universe. The scientific community is looking for this with underground detectors like the LUX (Large Underground Xenon) experiment, away from the “noise” of naturally occurring cosmic radiation on the surface of the earth, in the hopes of a particle from space traversing the detector. The search for dark matter has been identified by the U.S. Department of Energy and National Science Foundation and their advisory panels as a top near- and long-term priority for high-energy physics in the United States. The goal of this project is to introduce a new reconstructed-energy formula, more accurate, precise, and useful than the currently-used equation at low energies. The outcome will be to obtain better calibrations of the detector with radioactive sources, and a stronger ability to identify “peaks” in the data corresponding to specific exotic types of dark matter which interact only with electrons.

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Katarina Manzi - *Investigating Olfaction in a Diet-Induced Obese Rat Model*
Faculty Advisor: Ewan McNay, College of Arts and Sciences, Department of Psychology
Olfactory deficits are a common symptom of Type II diabetes (T2DM), and often an early symptom of Alzheimer’s Disease (AD). Both these pathologies are linked to insulin resistance in the brain, and T2DM is a major risk factor for subsequent AD. The olfactory bulbs are a brain region that is known to be insulin-regulated, expressing both insulin receptors and the insulin-regulated glucose transporter GluT4; the olfactory deficits observed in T2DM and AD may therefore be due to insulin dysregulation in the olfactory bulbs. Olfactory impairment might therefore be an early marker for AD risk in T2DM. Obesity is a common cause of insulin resistance, and T2DM in human patients is commonly caused by lifestyle factors such as poor diet. The present study used a rat model of diet-induced obesity (high fat diet and 25% fructose water, vs. regular chow and water for control animals) to explore the impact of obesity and/or insulin resistance on olfactory abilities. Two dimensions of olfaction were tested: identification (buried food test) and discrimination (olfactory discrimination test). Diabetic status was assessed across the duration of this experiment. Surprisingly, the diet intervention of the experimental rats induced obesity but not insulin resistance; however, this allowed us to evaluate the effects of obesity on olfactory function independent of diabetic status. The experimental group did not differ from their age-matched controls in their olfactory abilities in either identification or discrimination. Current research is underway with a new diet to more reliably induce insulin resistance.

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Arianna Martz, Maggie Huang, and Hanifah Yasin - *Developing High-Throughput Assays for Detection and Quantification of Group II Intron Retrotransposition in Bacteria*
Faculty Advisor: Olga Novikova, College of Arts and Sciences, Department of Biology
Group 2 introns (G2I) are mobile, self-splicing ribozymes that when cut from the original RNA transcript may invade genomic DNA by reverse transcription. G2I are believed to be progenitors of retrotransposons, which are mobile genetic elements involved in genome mutation, gene duplication and chromosome rearrangement. Thus, research into the poorly understood reproductive and evolutionary mechanisms of G2I may influence our understanding of eukaryotic cell development and cancer. The goal for this project is to develop a greater understanding of the interactions and regulation pathways that exist between G2I Ll.LtrB and its natural host, bacteria Lactococcus lactis. In order to identify host factors involved in regulation of Ll.LtrB mobility, we have created over one thousand individual mutants of L. lactis using saturation insertional mutagenesis with ISS1 transposition vector. To study intron mobility, we utilize a retrotransposition indicator gene (RIG) assay which allows us to detect and quantify retrotransposition (RTP) events by the appearance of kanamycin resistant (KanR) colonies. We select those mutants with elevated levels of RTP in comparison with wild type. These selected mutants are further characterized by DNA sequencing in order to understand how the
mutated loci affect intron RTP. Additionally, we are developing high-throughput methods for detection of ISS1 insertions in generated mutants as well as for detection of novel Ll.LtrB retrotransposed copies. We plan to utilize vectorette display and modified transposon insertion display to detect copy number and insertion diversity for ISS1 and Ll.LtrB. Our data will help us to elucidate interaction pathways between a G2I and its native host.

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Brandaon Masri, and Frank Codi - *Pollution and Its Detriments to Society*
Faculty Advisor: Mary Ellen Mallia, Office of Environmental Sustainability
This presentation looks at the harmful effects of pollution on society. Many forms of pollution are considered including air, water, and light pollution. Air pollution is analyzed in two forms; air pollution and its effects on daily life, and air pollution as it affects animals and their habitats. Air pollution affects our planet greatly by causing global climate change, negative health effects, and ozone depletion. Water pollution is analyzed in three forms: lake pollution, river pollution, and ocean pollution. Light pollution is addressed as it pertains to humans and their sleeping patterns, as well as the energy required to continually produce light. The aggregation of the previous topics covers these aspects of pollution directly. This relates to the economy as pollution is causing the economy to adapt, but also simultaneously having a crippling effect. Finally, we address the law and policy regarding pollution specifically in the United States of America. We have found that these forms of pollution have a significant and detrimental impact on society as a whole. However, there are solutions to combat these types of pollutions to ensure a healthy and sustainable earth.

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Chad McCanney - *Influential Factors that Advance mHealth Application Usage*
Faculty Advisor: Victoria Kisekka, School of Business, Department of Information Technology Management
Technology has become increasingly prevalent in our everyday lives especially when considering smart phones. Smart phone applications (apps) are being utilized in numerous areas today including, entertainment, financial services, access to healthcare services, news, and so on. Existing research has focused heavily on mHealth application usage by healthcare professionals. Though this provides a good starting point, findings are not applicable to patients and other everyday users. The primary focus of this research is on the use of mobile healthcare applications (mHealth applications) and specifically investigating the factors that influence the use of smart phone mHealth applications. We adopt the Unified Theory of Acceptance and Use of Technology (UTAUT) and focus on information assurance factors that have yet to be studied in this area. We contribute to the current body of literature by examining how mHealth applications are impacted by the following information assurance factors: Information Clarity, Security Behavior, Ease of Use, and Extent of information control. Our research uses survey data from The Pew Internet and American Life Project to test the hypothesized model to understand the assurance factors that influence the usage of mHealth applications.

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Jesse Parent - *The Evolution and Transcendence of Cybernetics*
Faculty Advisor: Jonathan Crispino, College of Engineering and Applied Sciences, Department of Informatics
This study examines the evolution of the multidisciplinary field of study know as Cybernetics; investigating its origin, development, and eventual fragmenting via question "What happened to Cybernetics?" We trace the roots of the discipline, map the historical-cultural pressures and opportunities that shaped its development as well as successive contributions from STEM and philosophy that infused Cybernetics, and draw connections to contemporary technologies and disciplines. We are finding that Cybernetics has substantially facilitated modern and emerging technologies, and hope to illuminate lines of influence from Cybernetics’ apex in the late 20th century to its contemporary successors.

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Jesse Parent - *Critical Concerns in Artificial Intelligence Safety and Ethics*
Faculty Advisor: Jonathan Crispino, College of Engineering and Applied Sciences, Department of Informatics
This project seeks to identify substantial problems and opportunities in the realm of artificial intelligence, from macro-level existential risk to more immediate challenges regarding security and the ubiquitous nature of AI-infused modern society. We did this by conducting a literature review from thought leaders and analyzing recent conferences including Ethics of AI 2016 in New York and Beneficial AI 2017 in Asilomar. We
hope to identify areas of concern for general society to be mindful of, and aim to determine specific opportunities for research and investigation that will facilitate a safe and ethical future.

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**Alexandra Payne - Follow-Up to an Early Intervention for Parents of Young Children with or At-Risk for Autism Spectrum Disorder**

Faculty Advisor: Kristin Christodulu, College of Arts and Sciences, Department of Psychology

The goal of this research was to study a training program for parents of young children with or at genetic risk for autism and assess the program's impact on self-reported parent stress levels and competence beliefs. The current study was part of a larger parent training project at the Center for Autism and Related Disabilities (CARD) at the University at Albany, State University of New York. Parents completed assessment measures of stress, knowledge, and competence at pre-training, post-training, and again six weeks following the completion of the parent training. Paired samples t-tests were used to assess for significant changes in parent scores between pre-training and follow-up and between post-training and follow-up. Neither stress nor competence scores at follow-up were significantly different from scores at pre-training or post-training. Knowledge scores at follow-up were significantly different from scores at pre-training but not from scores at post-training. Despite the limitations of the study due to small sample size, the results are discussed in terms of how they relate to previous research on similar parent training programs.

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**Rynelly Perez, Jessica Starr, Therese Palmere, Rachel Orellana, Seunghwan Park, and Bryanna Gourrier - Balancing the Scales: The Costs and Benefits of Using Renewable Energy versus Traditional Fossil Fuels**

Faculty Advisor: Mary Ellen Mallia, Office of Environmental Sustainability

The success of any society is rooted in its ability to be resilient and adaptable. This poster examines the costs and benefits of renewable energy versus traditional fossil fuels. The major traditional fossil fuels: oil, natural gas, and coal are assessed to view the overall effects they can have on society and the environment. The renewable energy sources: biomass, hydropower, solar, wind, and geothermal energy are also assessed to view the overall effects they can have on society and the environment. These effects are noted and used to conclude why certain forms of energy may or may not benefit society and the environment more than another in both the short-term and long-term. However, the goal is to note that an important factor in surviving in the long-term is to use resources that are not finite, or discover technologies that can aid in prolonging the limited amount of resources we do have available for use.

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**Elena Pollack - Bearing Graves**

Faculty Advisor: Michael Leong, College of Arts and Sciences, Department of English

In Theodor Adorno's Commitment, Adorno discusses the pros and cons to art, specifically poetry, after the Holocaust. Within the text itself, Adorno says that while "to write poetry after Auschwitz" is "barbaric", he also says that literature needs to "resist this verdict". While scholastic concerns about "poetry after Auschwitz"- that art will undervalue and degrade the reality of what happened- are valid, the necessity of using art as a medium to emotionally connect the present and future generations outweighs this fear. In my paper, using Anna Rabinowitz's Darkling and Yosef Sheinson's A Survivor's Haggadah as textual examples, I will demonstrate how art is a necessary form of remembrance post-Holocaust and that, in Judaism, this remembrance of the deceased is an obligation and an honor, as well as a necessity to cement a Jewish ethnic identity. I will begin by discussing Adorno's essay, and the philosophy behind art and tragedies. Then I will discuss art's relationship with society, its impact, and the Jewish philosophy on art. Finally, I will examine Darkling and A Survivor's Haggadah, as vital works in remembrance, as well as analyzing Jewish remembrance rituals and obligations. I will conclude with society's obligations to remember the past, both to honor the victims and to ensure that the past does not repeat. My sources are centered around understanding Adorno philosophy, Holocaust art and its pros and cons, and Jewish philosophies and the impact on identity.

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**Lindsey Riback - HIV in New York City: An Overview of Cultural and Social Factors Contributing to an Individual's Decision to Disclose their Disease Status**

Faculty Advisor: Kamiar Alaei, Rockefeller College of Public Affairs & Policy, Department of Public Administration and Policy

By focusing on the HIV positive homosexual male population in New York City, this paper will examine what effect cultural norms surrounding race and sexual orientation, as well as four specific social factors (alcohol use during sex, injection drug use, social support and the importance of religion) have on whether an HIV positive individual, specifically an urban homosexual male, chooses to disclose their disease status. This paper will discuss those cultural norms and social factors through the AIDS Risk Reduction Model, available literature, and the data collected by the National Institute of Mental Health for the Positive Connections intervention trial.

Of those surveyed, 38 percent were intoxicated during anal intercourse, 17 percent have injected drugs, roughly 60 percent had at least some social support, and for 66.1 percent religion plays at least some role in their lives. In total, 42 percent had disclosed their disease status to their primary partner.

Data regarding various social factors contributing to disclosure can guide interventionists in adequately targeting the population they are trying to help, such as through social and religious networks. It is expected that increasing awareness of HIV and how to prevent it, will lead HIV positive individuals to openly discuss their disease status with their sexual partners and potentially their family and friends. Additionally, studying the rate of HIV disclosure in a city such as New York City, can provide insight into the cultural dynamic surrounding HIV in other large American cities, such as Los Angeles, Chicago, and Houston and Philadelphia.

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**Daniela Robayo-Rodriguez, Andrew Amarain, Alex Berezny, and Justin Moul - Human Impact on Oceans**

Faculty Advisor: Mary Ellen Mallia, Office of Environmental Sustainability

The negative effect of human activity on the stability of the oceans health is a well-known phenomenon. Thus our interest is in examining the viability of the many solutions available to solving this issue. Reviewing the oceans’ history for the past 100 years, we examine the trends of the sea level, temperature and composition. We look at how the food chain and natural ecosystem are affected by the human generated change as well as which specific species have been affected. We examine factors like oil spills, carbon emissions, plastic gyres, melting glaciers, over-fishing and rising temperature to determine which provides the biggest large-scale effect. Through an understanding of these issues and their effects, we have determined that carbon emissions is the most pressing matter to which solutions must be tailored towards. Thus, we have shown that solutions combating our reliance on carbon emitting energy producers are the most effective way to reduce our impact on the oceans. We demonstrate the valuation brought from technologies of solar, wind, and hydroelectric as a way to ease our addiction. We show that advantages of cap-and-trade economic policy surpass carbon taxes. The banning or taxing of harmful industries can be fruitful to both the economy and the oceans using the exportable model of the plastic bag ban movement. Where these given solutions have run into problems and opposition in the past, we show that the modernity of our current world provide the perfect setting for these proposed techniques in order to correct our mistakes in ocean stability.

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**Abdul Sanni-Adam - Low Intensity Focused Ultrasound (LOFU) Combined with Radiation Therapy Increases Immunogenic Susceptibility in Melanoma**

Faculty Advisor: Indranil Basu, Albert Einstein College of Medicine, Department of Radiation Oncology

Tumors have intricate mechanisms for evading detection of the immune system, making immunotherapy treatment ineffective. High intensity focused ultrasound (HIFU) is promising non-invasive ablative approach for local tumor control but has limited ability in management of tumor recurrence and metastatic spread outside of the primary tumor site. Non-ablative, low intensity focused ultrasound (LOFU) coupled thermal heating has been shown to induce a sonic stress in tumors, enhancing tumor immunogenicity by increasing intracellular HSP70 and decreasing STAT3 activity at 2-6 hours post thermal heating. Tumors pre-treated with LOFU prior to radiation results in significant tumor growth retardation, and prevention of tumor recurrence and metastases. We have investigated the utility of combining LOFU and hypo-fractionated radiation therapy (RT) in a clinically relevant model of spontaneously metastatic melanoma. LOFU+RT treated murine B16 melanoma cells were analyzed for surface membrane expression of stress and immunogenic cell death markers using flow cytometry. The results showed that the combination treatment increased the expression of stress and immunomodulatory markers like CRT, HSP70, GRP78, MHC-I, CD40, CD47, CD86 and FasL that play a major role in immunogenic cell death. This was further supported by increased apoptosis in LOFU treated B16 cells. Further, in-vivo efficacy of LOFU+RT is presently being studied.
in B16 tumor model in C57BL/6 mice. The immune priming effect of LOFU and its efficacy as a radiosensitizer will provide important preclinical data for future tumor vaccine trials for patients with metastatic disease. The preliminary results demonstrated here require further investigations tailored to augment tumor-specific immune responses to control recurrent and metastatic cancer.

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Richard Sarnacki - Feminism & the Gospel: Worldviews at Odds?
Faculty Advisor: Kristen Hessler, College of Arts and Sciences, Department of Philosophy

Feminism and Christianity appear to many as incompatible worldviews; each makes claims about the world and the structure of society that seem to be at odds. This leads proponents on both sides to treat one another as enemies and shuts out the possibility of useful dialogue and mutual understanding. Despite apparent differences, however, I argue that when Christianity is examined for its central features, a core commitment to anti-oppression, pro-woman aims arises which shows its compatibility with and usefulness for feminism. To demonstrate this, I argue for a gospel-centered conception of Christianity that takes the gospel, the narrative about Jesus Christ in his person, message, and accomplishments to be essential to understanding and interpreting the claims of Christianity in the way most self-consistent with its content. When this occurs, the core meaning and message of Christianity is uncovered, revealing in part aims for social change that hold the promise of eradicating oppression in all its forms, including sexism. Through an examination of key biblical ideas, I argue that God’s purpose in the gospel is redemptive and that Jesus Christ, as the agent of God’s restorative work and purpose in the world, highlights through the aspects of his life keys for understanding oppression both in terms of its sources and potential solutions. When the mutual ideals of a gospel-centered Christianity and feminist theory are set side-by-side, congruencies can be seen that suggest mutual benefit in understanding and embracing aspects of one another’s viewpoints, despite relevant differences.

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Katherine Tare - An Exploration into Gentrification in Brooklyn, NY
Faculty Advisors: Pinka Chatterji and Gerald Marschk, College of Arts and Sciences, Department of Economics

Gentrification is associated with the displacement of residents and a change in economic and social factors. There currently are ongoing debates concerning the impact of gentrification on neighborhoods. These debates are complicated by the lack of consensus on how to properly measure gentrification. Here, replicating the strategy used by Meltzer and Ghorbani (2015), I conduct a time series analysis and identify gentrifying neighborhoods by improvements in their relative economic status over a period of time, as judged by changes in median household income. I also consider race, age, education, poverty status, and housing value in my analysis. Using US Census data from American Fact Finder, I identified ZIP codes in Brooklyn that were gentrified between the years 2000 and 2015. Then, I looked at the change in labor force participation rate, unemployment rate, and industry sector. This revealed that while unemployment rates in gentrified ZIP codes both rise and decline over the time period studied, there is a clear increase in labor force participation rate in gentrified areas. Further, across all of the gentrified ZIP codes, the relative distribution of industry sectors change, with the percentage of population working in professional, scientific, arts, and entertainment industries increasing over the time period studied, and a decrease in public administration, manufacturing, transportation, and warehousing industries.

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Natalie Turner - Mental Health Care Treatment Seeking among African Americans and Caribbean Blacks: What is the Role of Religiosity/Spirituality?
Faculty Advisor: Julia Hastings, School of Social Welfare

According to the 2014 SAMSHA National Survey on Drug Use and Health (NSDUH), 18.1% of American adults (ages 18 and over) experienced some sort of mental health issue. Furthermore, estimations have shown that around 20% of older adults experience some sort of mental health problem. While the percentage of older adults increase, they are less likely to use mental health care services than younger and middle aged adults. In addition, racial/ethnic minorities, such as African American and Caribbean Blacks are less likely to use mental health care services. The percentage of older racial/ethnic adults is also increasing from 18% in 2004 to 22% in 2014, and this is expected to continue increasing. The underutilization of mental health services indicates that many members of the older population are left untreated, which can decrease an individual’s quality of life and can result in significant costs to families, employers, and health systems. This study seeks to explore the differences in relationships between mental health care seeking behavior and strength of
religious/spiritual beliefs between older adults (aged 54 years or older) and adults (18-53) from two racial/ethnic groups, African Americans and Caribbean Blacks living in the US using data from the National Survey of American Life (NSAL). Descriptive statistics and logistic regression analyses were conducted using Stata version 13.1. Preliminary analyses show that mental health treatment seeking alone is related to spirituality and or religiosity (OR = XXX; p = 0.000). Significant demographic controls are age, gender, race, being from the South, and earning an education beyond a graduate degree. The study indicated statistical support for strong religious/spiritual beliefs which may prevent mental health treatment seeking. Future studies will need to examine the strength of religious/spiritual beliefs on mental health care seeking behavior among different demographic groups.

Daniela Vinick, Kenyon Roberts, Harlan Ginsburg, Mackenzie Linn, Nikash Nanavaty, and Haley Pogonowski - The Extinction of Bees and Its Catastrophic Effects on Humanity
Faculty Advisor: Mary Ellen Mallia, Office of Environmental Sustainability
Over the course of the past decade, the bee population has been declining at an alarming rate. There are many factors that have contributed to this decline that are both natural, and human-induced. Some of these factors include disease and parasites (including Varroa mites as an example), pesticides, and habitat loss. Not only do the pesticides that farmers are using effect the nervous system of the bees individually causing them to have trouble retreating back to their own colonies, but if they do get back, the pesticides that they are carrying back have the potential to also poison the pollen that they are carrying. Colony Collapse Disorder (CCD) is the scientific term for the phenomenon of the large numbers of bees lost. However, there are little to no dead bees found near the hives. Through thorough research on this dilemma, this paper has concluded that the effects would be catastrophic economically, socially, and human health. Although there have already been regulations implemented as an attempt to solve this crisis, this paper will also address what more humans can do as individuals and collectively to reduce the harm on bee colonies. The main purpose of this paper is to shed light on this situation, which not only could turn out to be detrimental to the bee population, but also catastrophic to human life as well.

JiaPing Weng - Application for Environmental Friendly Amination Conditions, Synthesis of Molecular Tweezer Troger Base Analogue
Faculty Advisor: Qiang Zhang, College of Arts and Sciences, Department of Chemistry
Green Chemistry is a growing field in chemistry that tackles the health of Earth has been introduced and developed by many scientists. Pursuing of environmental-friendly and minimum waste production is still the pinnacle of the organic chemistry research. Our research group has been interested in developing the new chemistry protocols and techniques that are environmentally benign and efficient. We are currently developing a new route for synthesizing [3.3.1] as the Troger base analogues. The conditions involve using TCEP (tris(2-carboxyethyl)phosphine), NaHPO4, 10%THF, and H2O, at room temperature. Such mild conditions successfully synthesized the analogue of Troger Bases, which is otherwise synthesized from much harsh condition using organic solvent, metal catalyst, and at 100 C. What is more important is that all of those reagents used are environmental-friendly. Moreover, in our experiment we have demonstrated the click chemistry-like mechanism, which brings our substrate together with amino acids, oligopeptides, and other non-peptide substrates that contains primary amine. Our research group is exploring more in depth studies towards these synthesized compounds.

Hanifah Yasin, Maggie Huang, and Arianna Martz - Establishing Interaction Networks Affecting Group II Intron Retrotransposition in Bacteria
Faculty Advisor: Olga Novikova, College of Arts and Sciences, Department of Biology
Bacterial group II introns are self-splicing retroelements that are evolutionarily related to spliceosomal introns and eukaryotic retrotransposons. While mechanism(s) of retrotransposition and evolutionary dynamics of bacterial group II introns as progenitors of other reverse transcriptase-bearing elements are well established, the relationship of this group of mobile elements to their hosts is less understood. Previously, we have shown that whereas some replication functions and nucleoid components promote group II intron retromobility, the host mounts counterattacks to inhibit intron proliferation. Both RNases and DNases keep retromobility in check. Interestingly, some genes involved in energy metabolism also affect the rate of group II intron mobility in Escherichia coli. Here, we are studying the host-retrotransposon relationship of the
group II intron Ll.ltrB and its native host Lactococcus lactis using biochemical, genetic and systems approaches. To achieve this we have generated a library of mutants in L. lactis using saturation insertional mutagenesis with the ISS1 transposon. The host effects in these mutants are studied using a retrotransposition indicator assay. We have developed several techniques that allow high-throughput (HT) screening of mutants for increased and decreased levels of intron retrotransposition. By sequencing the library of mutants using HT targeted sequencing on an Illumina platform we are establishing host factor interaction networks that are implicated in Ll.ltrB intron retrotransposition. Mutants showing interesting phenotypes will be characterized to elucidate interaction pathways between a group II intron retrotransposon and its native host. Finally, HT screens for retrotransposition efficiency under various environmental conditions ('conditional' retrotransposition) is yielding data on a post-transcriptional regulatory role of group II intron splicing and retrotransposition in bacterial genome plasticity.
LC 1: Political Science, Economics, and Art History

Liliana Castillo - The Effects of Economic Development on Democracy in the Middle East
Faculty Advisor: Victor Asal, Rockefeller College of Public Affairs and Policy, Department of Political Science
The current literature on the Middle East exceptionalism to democratic governance suggests that economic development is an indication for why there are no viable democracies. Focusing on economic development, this study examines the relationship between economic development and higher levels of democracy. Secondly, it examines whether broad economic development, measured by income distribution, is consequential for transitioning democracies and the level of democratization in the state. Using data from the Quality of Government Dataset and Income GINI Coefficient table, this study affirms the notion that economic development affects the process of democratization. The results of the analysis indicate that there is a probabilistic relationship between being a low or high income country, and that being positively correlated with having lower or higher levels of democratization, respectively. Because the results demonstrated that about a quarter of countries that were low income were still transitioning without broad economic prosperity, the correlation between low-income/low indexes of democracy and high-income level/high indexes of democracy is not deterministic. When examining the income distribution in several Middle Eastern states to ascertain whether or not income inequality affects democratization, the findings did not support the initial hypothesis. The data revealed that 83%, or 5 out of the 6 wealthy countries, did not experience high levels of skewed wealth distribution. Of the 5 wealthy countries with low GINI coefficients, only two of the countries experienced high levels of democratization, or 40% of the sample. Therefore, the results of the analysis indicate that one cannot determinately say that low levels of income inequality inversely correlate with higher levels of democratization.

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Maksim Papenkov - The Housing Bubble’s Effect on Macro-Level Shifts in Mortgage Lending Patterns
Faculty Advisor: Lewis Segal, College of Arts and Sciences, Department of Economics
The Home Mortgage Disclosure Act (HMDA) was passed by Congress in 1975 to provide a public archive of mortgage data, for the purpose of monitoring lending patterns by financial institutions. Significant research has been published with the use of HMDA data, identifying such patterns on a micro-level, examining disparities between communities in a single city, but fewer research has been published identifying larger changes on a macro-scale, particularly over multiple decades. Here, I perform a “big data” analysis for a “Middle Class Family” sub-population, defined as mortgages for owner-occupied home purchases, by families with incomes between 80% and 120% of their state’s median income level (utilizing U.S. Census data). I analyze shifts in lending patterns across both race and sex, for three periods: pre-housing bubble (1995), peak-housing bubble (2005), and post-housing bubble (2015), using multivariate bubble-plot and boxplot graphs to visualize compositional differences in lending between the demographic populations. Further, I use time series graphs to observe gradual shifts in approval rates and income-to-loan ratios, using data between 1995-2015. By considering both the decade preceding the housing bubble, and also the decade following its bust, I attempt to identify changes in lending patterns on a systemic scale, particularly across race and sex on a national level.

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Sebastian Herrera - Supply and Demand in the Fast-Food Industry
Faculty Advisor: Byoung Park, College of Arts and Sciences, Department of Economics
Fast-food as we know it today has drastically expanded in the United States since the end of WW2. This is an industry that has grown by 3 thousand percent from the 1970 to 2016 in terms of aggregate revenues and that has been growing at an average rate of 2.5% since the 2008 recession. Thus, it’s natural to question whether the determinants of supply and demand proposed by academics can help us understand what drive consumers’ demand for fast-food—despite having been proved to be detrimental to people’s health, thus suggesting an inelastic demand—and companies to keep expanding despite certain market conditions. The goal of this research paper is to analyze the growth of the fast-food industry in the U.S within the framework of supply and demand.
The methodology used initially compromises a simple regression analysis across each of the surveyed companies’ revenues and the variables collected which are consistent and coherent with the classic
determinants of supply and demand. Most variables are expected to double count, meaning they have influence over the consumers and the corporations in this business—naturally, at different degrees. This regression would allow us to evaluate to what point certain variables determine the expenditure in each establishment and how much these companies are willing to supply to the market, both measured by the gross revenues of 17 of the biggest fast-food companies in the U.S. Once the relationships have been determined, an econometric model with two equations will be used to model supply and demand. The findings of this research project will be interesting in two dimensions. First, the fast-food business itself is a rapidly growing industry so it is important to better understand its growing pattern. Second, the fast-food industry is closely related to other social issues such as health, nutrition, and obesity.

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Wansoo Choi - The Impact of Leverage on Hedge Fund Performance
Faculty Advisor: David Smith, School of Business, Department of Finance
In this paper, the effect of leverage on hedge fund performance is measured. TASS data from 1994 to 2016 are used to measure the impact of leverage on hedge fund performance. Three hedge fund performance measurements are regressed on degree of leverage with eight control variables including fund size, strategies, and use of derivatives. The results show that for strategy-adjusted return as a performance measurement, hedge fund leverage has a negative impact on fund performance. Also there is evidence of diseconomies of scale where funds with medium-sized assets under management (AUM) tend to show better performance than funds with high AUM. No significant relation between use of leverage and performance is observed for other performance measurements, including the Fung and Hsieh seven and eight-factor alpha and style-adjusted return.

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LC 2: History, Women's, Gender and Sexuality Studies, and English
Haley Cook - Between Church and School
Faculty Advisor: Laura Wittern-Keller, College of Arts and Sciences, Department of History
In 1962 and 1963, the United States Supreme Court attempted to untangle two cornerstones of American society. The Court decisions did not sit well with many Americans who feared subversion and juvenile delinquency as a result of mandatory school prayer and Bible reading being declared unconstitutional. This paper will argue that the rise of Evangelical Christianity, the moral panic over the nation's youth and anti-Communist rhetoric can explain the immense public reaction to Engel v. Vitale (1962) and Abington v. Schempp (1963). This paper will look at the mid-twentieth century intersections of anti-Communist fear, the rise of Evangelical Christianity, and the fear of juvenile delinquency. It will do so by examining the legal culture's attitudes towards school and religion.

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Timothy Dillinger - Leading Lady: A Case Study in Submission and Success in Contemporary Christian Music
Faculty Advisor: Vivien Ng, College of Arts and Sciences, Department of Women's, Gender and Sexuality Studies
"Leading Lady: A Case Study in Submission and Success in Contemporary Christian Music" investigates the life and career of Pam Mark Hall, a popular recording artist in the Contemporary Christian genre in the 1970's and 1980's. Contemporary Christian Music (originally called Jesus Music) is widely believed to be entrenched in the ideology of the Christian Right, but Hall's life and body of work are explored as a counter-narrative to that more-often-than-not accurate generalization. Utilizing a series of interviews that I conducted with Hall in addition to reviews and features from music industry publications over the course of her career, I examine the co-opting of the Jesus Movement by the Religious Right, the evolution of Jesus Music into a multi-million dollar industry and the ways that Hall wrestled with the expectation of submission and conformity to fundamentalist norms while simultaneously pursuing a platform to which few women within the field were granted access. Despite her success, Pam's ultimate arrival at self-possession led to expulsion from her musical and spiritual communities. Hall's experience serves as a snapshot of the misogyny and sexism that exists within the establishment church and the complicated relationship within that structure for women who do not subscribe to a position of submission and insist on being heard.

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Naomi McPeters - Monstrous Souls Imprisoned in Monstrous Flesh: James Baldwin’s Discourse of God, Power, and Love from Go Tell It On The Mountain to The Amen Corner

Faculty Advisor: Derik Smith, College of Arts and Sciences, Department of English

In the middle decades of the twentieth century, James Baldwin offered a critique of a corrupt church framework in a way that differed from other black writers and social activists of his time, particularly in how he deals with racial attitudes within the black church and white Christianity's tendency to scapegoat black Americans. Baldwin’s first novel, Go Tell It On The Mountain, and his last work to deal with the church, The Amen Corner, show figures of power within the black church who have abused their positions and betrayed those under their authority. He exposes the failure of religious power figures to recognize love as a humanizing force rather than an apathetic, submissive sort of concept that perpetuates an abusive cycle. Through these figures, Baldwin shows that love necessitates confrontation of these religious power figures, resulting in their fall. This fall is necessary in order for love to be humanized (Baldwin removes God from the conversation as the source of this love) and for individuals to gain a greater awareness of their own humanity and need for love. Baldwin’s work suggests that this need is suppressed and denied by the church in a way that dehumanizes an already “monstrous” black community, a concept that has been placed on black men in particular by white America. In some ways Baldwin’s black church is analogous to white America’s Christian foundation, its patriarchy, and its persecution and monsterization of the “other,” driven by its misunderstanding of love. Therefore, Baldwin’s confrontation of religious, black figures of power also provides a confrontation of white America.

Margaret Norway - Death & Restoration of the Goddess: Reenvisioning Women in Mesopotamian & Greek Myth

Faculty Advisor: Michael Leong, College of Arts and Sciences, Department of English

Our sociocultural history is entrenched in classical, Western mythology. We identify ourselves and others with archetypes derived from ancient literature. Women are typified by figures of our female forebears in western myth. Women writers respond with mythopoesis to subvert tropes that laden society. The literature borne from revisionism yields the same complexity and vigor present in Mesopotamian mythology. Anthropological research suggests Ancient Near Eastern myth is a foundation upon which epics and deities familiar to us are built. Mesopotamian cultures enjoyed a period of matriarchy, if not egalitarianism. Women were respected figures, often likened to their preeminent goddess, Inanna. Women’s ascendency wanes as societies become patriarchal and myths become those of the “hero’s journey.” Women’s early histories fade into the shadows of epic heroes, and we continue to reestablish our foundations in culture. This hybrid collection of revisionist poetry and critical prose surveys parallels and dichotomies of Mesopotamian and Western mythology to examine developments of women in culture. Evaluation of the heroine’s journey and our sociocultural relationship with language moves to discourse on contemporaneous consequences where mythic themes take shape in modern society. Mythology is transformative, and this project is inspired by transformations of women’s revisionism from the origins of civilization to our present era.

LC 3A: History, Philosophy, and English

Haylee Shepard - Tangled Subjectivities: An Examination of the Japanese Subject from 1868-1912

Faculty Advisor: John Person, College of Arts and Sciences, Department of East Asian Studies

This thesis examines the interplay of forces that contributed to the development of a specific state of subjectivity in Meiji era (1868-1912) Japan. The Meiji period saw a shift from Japan’s 265 years of closed country policies towards a more global presence. Politicians and intellectuals debated the nature of the Japanese people, and the best methods for cultivating a national identity. Politics, intellectual debate, and literature provide examples for examining how the construction of subjectivity relied on different tensions. These tensions included state-building practices, education, morality, the individual, national identity, and what it meant to be Japanese. Subjectivity influences not only individual identity, but the identity of each subject within the context of a larger community. This project analyzes the ways conceptions of “self” and “nation” were both actively and passively constructed towards a certain end. This pattern is applicable not only to Meiji Japan, but to the contemporary moment. The concepts of singularity and multiplicity are important to this question. This project also examines how ideologies that seemed to be “universal” took on unique inflections when they crossed borderers, whether this be internationally or within one nation-state. This thesis utilizes primary source documents from the Meiji State’s political policies, intellectual works from the Meiji Six Society and Takayama Chogyū, and literary works by Mori Ōgai and Natsume Sōseki. These sources are examined as examples of how the same overarching thread of Japanese subjectivity stretched across different arenas. This thesis addresses the intrinsic connection of each of these elements, and how they
relied on both internal and external conflict to define Japanese subjectivity. The Meiji State’s attempts at creating a national identity did not create a singular subjectivity, rather a tangled web of subjectivities that represented the actual state of the Japanese subject during the period.

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Matheson Curry - “Let Our Noble Wrath Boil Over Like a Wave!": Connections Between Soviet Propaganda and Red Army War Crimes During World War II
Faculty Advisor: H. Peter Krosby, College of Arts and Sciences, Department of History
When dealing with the memory of World War II, the Russian Federation, then the Soviet Union, tends to exonerate its own role during the conflict while emphasizing the horrors committed by the German armed forces during the invasion and occupation of Russia. Even though their actions were among the most reprehensible of the past century, the Soviet Union's hands were not clean either. This study will draw on the connections between various forms of Soviet media -- speeches, songs, articles, narratives -- as well as individual firsthand accounts of World War II war crimes by the Red Army toward the end of the war, to show both the direct and the indirect impact of propaganda on an individual’s behavior, but also that in wartime no nation is truly innocent of committing atrocities.

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Johnathan Drayton – A Journey into “The Untold Story of Stealing Art: The Nazi’s Rape of Europe
Faculty Advisor: Camelia Lenart, College of Arts and Sciences, Department of History
My paper is a journey into the story of the survival of Europe’s great art works during the Second World War. Adolf Hitler and his followers from Nazi Germany deprived occupied Europe of its art, stealing from galleries and also from the individuals, in an action known as “The Rape of Europa.” The Nazis developed and used many tactics to destroy European cultures with the aim to strip them of their prized cultural possessions. The response of the people and the societies they lived in was to protect their countries’ cultural heritage, a gesture with rich symbolic means, as it preserved and provided the cultural treasures and identity for the generations which followed. “No one was under the illusion that art was just some harmless pastime. What constituted art in any of its seven forms was of paramount significance to the essence of what made a good German” said the historian Susan Ronald, the author of Hitler’s Art Thief: Hildebrand Gurlitt, the Nazis, and the Looting of Europe’s Treasures. Hitler also considered himself an artistic genius, and at a young age he started off drawing, he visited museums, attended opera, and would sit by the Danube River dreaming of becoming a great artist one day. Besides, his philosophy was that “A strong personality who outshone everything else has the capabilities to do anything he pleased.” All these combined made him add to the atrocities of war started by the Nazi, the one of “cultural rape.” Focusing on this development of the Second World War, my work analyzes the most important moments and outcomes of this tragedy.

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Sean Johnson - Seduction and Simulation: Politics in the Desert of the Real
Faculty Advisor: Mary Valentis, College of Arts and Sciences, Department of English
The concept of an “alternate reality,” riddled with controvertible facts and illustrated in the political success of “The Apprentice” star and controversial business mogul Donald J. Trump, has suddenly become an unavoidable topic of conversation. This new “alternative” realm is a concerning and possibly dangerous situation for a country that has been so submerged in it, that the real is left untraceable. What is left is simulation, the result of a chain of interactions between a simulated Real and a reality that is rendered inaccessible by the domination of media. As democracy seemingly slips out of our grasp, we are estranged from reality and submerged in a world where parody is impossible, where “truth” has been loosened from its foundations in fact, and psychopathy is normalized. This thesis reads the current political climate through the lenses of Jean Baudrillard’s theory of simulacra and simulation; Kenneth Burke’s rhetorical readings of Mein Kampf; and Roland Barthes’ notions of cultural myth, particularly his essays “In the Ring” and “Myth Today,” both of which offer insight into Trumpian tactics of persuasion and interpellation. In addition, it investigates the impact of portable media, social networking, and so-called “fake” or conspiracy based news on the culture. Ultimately, this thesis addresses theoretically the unprecedented political moment we have found ourselves in. Its aim is to expose the deeply rooted sources of historical disruption and add to the discourse by identifying the unique qualities contributing to this unbelievable situation.
Fernanda Giongo Fernandes - Baskin’s “The Four Mystics”; Identification of the Paper Medium and Analysis of Deterioration

Leonard Baskin was a prolific artist with an impressive repertoire of artwork in various mediums; he was a sculptor, print maker, publisher, writer, and illustrator. When analyzing one of his prints, in this case a copy of *The Four Mystics*, discovering the type of paper the artist used can be challenging. By comparing this copy to other versions made from the same woodcut block, it becomes immediately clear they were each printed on different papers. Each version could have been made years or even decades apart. When attempting to understand how a print is deteriorating over time and how to preserve its aesthetics, identifying the paper it is printed on is crucial. More importantly, the chemical composition of the paper and how it reacts with its environment must be thoroughly understood to prevent further color changes or disintegration. By investigating how the artist created his work through published accounts by scholars, speaking to professionals at institutions that house Leonard Baskin’s work, and by comparing the various versions of *The Four Mystics* to many of his other prints, the identity of the medium is narrowed tremendously. Further analysis of the paper fibers under a microscope, and comparing it to known paper samples, should aid in the identification of the paper the print is on.

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Katy Kukulich - Witchcraft Imagery in Russian 19th Century Artwork

Witchcraft has always been a topic of fascination and mystery. It has always been a source of fantasy and imagination for artists in Europe. While most art historians may recall names like Hans Baldung Grien and Francisco Goya when discussing witchcraft iconography, there have been other lesser-known examples of witchcraft art portrayals in Russia during the nineteenth-century. By this point Russia has evolved culturally and borrowed many elements from western civilization at the start of its Imperial career. It would be prudent to believe that Russian witchcraft also changed to match its western counterpart. After researching paintings depicting witchcraft iconography in Russia and comparing them to European artists (from Italy, Spain, Germany and Flanders (modern day Belgium)) and the common witchcraft stereotypes depicted in their artwork it was becoming clear this project wasn’t going to be simply an observation on cultural differences, but the quest for Russia’s national identity. The topic of witchcraft is only a small percentage compared to other subjects these Russian artists focused on, but it was a small role in an even bigger event taking place among the Russian art world in the nineteenth-century.

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Anda Alexandru - Pioneering Modernism: Dancer Loie Fuller and Queen Marie of Romania's Artistic Collaboration

Throughout history, women were expected to follow tradition when it came to their roles in society, arts, and politics, and this was not an exception at the beginning of the 20th century. My paper is going to analyze the artistic relationship between a pioneer of modern dance with a pioneer of modern women in politics, two significant women that defied these roles: the American modern dancer Loie Fuller, and British born Queen Marie of Romania. Loie Fuller was an American dancer who is best known for putting an original twist on traditional ballet. She was a very good friend of Queen Marie of Romania, who was considered to be the "last romantic and the first modern queen," and who also played an important role in the Romanian political life during and after the First World War. They first met in Romania in 1902, and afterwards they rekindled their friendship in Paris. My work will analyze when, how, and why Queen Marie of Romania became a patron of the arts and also of Loie Fuller. Queen Marie commissioned an Art Nouveau castle in Romania, which was also the artistic movement that Loie Fuller best personified. Based on primary and secondary sources, my research is homage to a great dancer and a modern queen who both loved and pioneered modern arts and politics.

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Simone Rowe - *Rhetorics of Consciousness*
Faculty Advisor: Tamika Carey, College of Arts and Sciences, Department of English
Within my thesis, I analyzed both black men and black women conscious texts and determined how these authors provoked a transformation of consciousness within their readers. Black men and Black women conscious authors are differentiated because they have two different agendas when speaking to and writing for their separate audiences. Black male conscious writers write to white America. Their language and tone is to appease, console, and ask for the understanding of the value of black bodies. I used Black men authors such as James Baldwin and Ta-Nehisi Coates because they write in memoir form which makes their writing more personal. Personal texts permeate the conscious more than impersonal texts. Thus, their writing and tone is different from various texts as they write to appeal to the consciousness and understanding of those that oppress them. Black women on the other hand write to and for themselves, therefore their rhetoric of consciousness is more complicated than black men. Black women do not explain to their audience the trials that they face living in their bodies because their audience, black women, are already versed in these forms of oppression. Through Audre Lorde’s “Zammy”, and bell hooks’s “Talking back: Thinking Feminist Thinking Black” women write to black women in an effort to teach them how to find their authentic voice. Black male and female conscious authors do not provide a concrete formula on how to permeate the conscious of their targeted audiences, but they do provide guidance on attacking the issue of race in this country and liberating the voices of those that have been previously silenced.

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Seunghyun Shin - *How Documentary Poetry Imagines*
Faculty Advisor: Eric Keenaghan, College of Arts and Sciences, Department of English
As we face the end of the post-modern world at the beginning of the twenty-first century, the preceding decades of postmodernity can be seen to have led to a widespread underappreciation of reading and writing poetry in general. If we want to say that poetry is necessary in the world, how should literary scholars and writers defend its value? The value of reading and writing poetry owes to its socio-political efficacy. This research will highlight how poetry can be political through exploring the works of three documentary poets: Muriel Rukeyser, C.D. Wright, and Claudia Rankine. The goal is to refute the popular denunciation of documentary poetry that it is simply the mimesis of the real world. This denunciation of documentary poetry is derived from a reductive view of its characteristics that it has reproductions of documents or statements not produced by the poet. Drawing upon the imagination that William Carlos Williams conceptualizes in Spring and All and his documentary poetics in Paterson, this thesis will argue that the three poets’ works are located in the tradition of his poetics. Exploring the tradition, this thesis will underline how poetry can be political and how it can collaborate with other media. Through showing how documents and lyrics provide poetic sources of imagination while collaborating with photography and film, this research highlights the socio-political impacts that documentary poetry makes.

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Acacia Larson - *The Yani Enigma: Globalizing Contemporary Chinese Art & Cultivating a Counter-Contemporary*
Faculty Advisor: Bret Benjamin, College of Arts and Sciences, Department of English
This year I have been researching the globalization of the Chinese art markets, specifically in terms of a prodigy who exhibited her work globally in 1989. I have drawn from the research of Chinese art historians such as Professor Wu Hung of the University of Chicago who characterizes modern and contemporary Chinese history as a series of deep ruptures to which the art world was compelled to respond to. The artist I am examining, Wang Yani, embodies the Chinese artistic tradition of process-oriented art production known as Xie-Yi. This tradition is antithetical to westernized modes of product-oriented art production. Her childhood work as well as the progression of her adult work, do not operate in dialogue with contemporary political or cultural phenomena. However, I am not interested in her work as enigma. Rather, I have been cultivating an analysis of her work as that which is emblematic of a counter-contemporary Chinese art — one that has been severed from temporal motivations, and thus ideologically prevented from participating not only in globalized contemporary art theory but the markets as well. At its core, this level of individualism in art production has the potential to liberate artistic practice from capitalist and spectacle driven consumption.

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Jenaisha Memminger - *Feigning Feminism: Gothic Depictions, Shape-Shifting and Mock Heroism in CW’s Supernatural*

Faculty Advisor: James Lilley, College of Arts and Sciences, Department of English

Television cultivates a hegemonic culture of gender disparity and female oppression. Recently, television is progressing towards gender equality by portraying female characters in positions of high power and status. An example of this is the gothic television program, Supernatural, that uses the trope of the shape-shifter to combat fixed gender roles and its boundaries by allowing its characters to have fluid physicality. My project analyzes the show's substantial use of shape-shifting, through Catharine Raudvere's notion that complex shape-shifting can be used for liberation and escape, to argue that it seeks to escape and liberate its characters from fixed gender roles. However, further analysis depicts that despite this progressive step towards feminism, the misogynistic tendencies of the show is still alarmingly blatant. Using Terry Castle's analysis of Henry Fielding's The Female Husband, I argue that the show's liberating potential is diminished by its true goal of satirizing female autonomy and reinforcing misogynistic agendas. Even though the show is portrayed in a world beyond human capacity, human-built gender roles still apply. I argue that the show tries to indoctrinate to its viewers that there is no escape from gender constructs.

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Sonya Herbach - *The Anxieties of the Appearance and Emotions: Empress Elizabeth’s Challenges and Struggles in the Nineteen Century’s Sexist Society*

Faculty Advisor: Camelia Lenart, College of Arts and Sciences, Department of History

Empress Elizabeth of the Austro-Hungarian Empire, also known as Sisi, was best known for her beauty, her fashionable figure, and her long luxurious hair. However, what lay beneath the beautiful exterior was an obsessive, anxiety ridden, and depressed woman who suffered from a range of mental illnesses and acute pressures. Elizabeth had strict rules concerning her appearance and daily routine, spending hours focusing on beauty treatments, and exercise. The stress that came with being a royal had a large impact on Elizabeth’s life, often referred to as the lonely, or reluctant empress Elizabeth lived a large portion of her life away from the court, and her family. Last but not least, Elizabeth paved the way for future pop icons such as Queen Victoria, Diana of Wales, and Jackie Kennedy. Due to explosion of technology the general populous now had access to images, videos, voice recordings, and even brought the royals into their homes.

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Sonya Herbach - *A Study in Tudor Clothing*

Faculty Advisor: Rachel Dressler, College of Arts and Sciences, Department of Art and Art History

A look into the clothing during the fifteenth through early seventeenth centuries. Closely examining all parts of a woman’s ensemble from her pair of bodies up through her dress. The clothing differs based on class; including the layers that make up a woman’s outfit, the material that each piece is made of, and what kind of adornment would go along with everyday wear. Each piece of noble women’s clothing will be recreated using modern means, yet staying historically accurate in design, material, and nature.

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Fazal Hussain - *TNT: Textiles N’ Turmoil*

Faculty Advisor: Richard Fogarty, College of Arts and Sciences, Department of History

When Pakistan gained its independence in 1947, people were optimistic. The majority of South Asian Muslims believed the future would be better than the past—they were liberated from British colonists and Hindu nationalists—and their new government had resources and big plans. Twenty years later, that optimism was gone, and East Pakistan was moving toward independence from West Pakistan. What happened? This paper looks for answers by inspecting Pakistan’s textile industry, and the successive government plans which guided the performance of this essential sector. Textiles were symbolic; they promised modernization. However, rather than helping the industry, the government’s plans exacerbated economic disparity and political division. My essay analyzes the ad hoc planning in the state’s early years, then the First Five-Year Plan (1955–60), the Second Five-Year Plan (1960-65), the Third Five-Year Plan (1965-70), and the Fourth Five-Year Plan (1970-75), and explains how the government understood the challenges that faced Pakistan’s textile industry and why its actions created so many new problems. Circumstances within the period which influenced the textile industry and government economic planning will also be inspected. Understanding the planning process Pakistan had taken with its textile industry since independence in 1947 to its split in 1971 sheds light on the challenges and ambiguities of state building.
Stacie Klinowski - “Finding Nemo”, “Finding Dory”, Finding Ourselves: How and Why We Teach Our Children to Think About Disability

Faculty Advisor: Laura Wilder, College of Arts and Sciences, Department of English

My project, a critical thesis titled “Finding Nemo, Finding Dory, Finding Ourselves: How and Why We Teach Our Children to Think About Disability,” investigates how representations of disability within children’s media transcend these texts and contribute to our society’s construction of disabled subjects. By first looking at historical traits of children’s literature in Grimm’s Fairy Tales and The Trumpet of the Swan, I establish that the didactic function of this genre reproduces the values of the cultures in which they are written while also attempting to install social ideals that will guarantee ‘progress.’ Representations of disability in these texts teach children how to think about disability and, thus, inform how future generations will treat people with disabilities. My project culminates in an examination of the popular contemporary films Finding Nemo and Finding Dory, stories wherein all of the major characters are disabled. In these analyses, I synthesize the fields of cultural, film, literacy, and disability studies to conclude that when children can identify disability in the films, something that is not in itself guaranteed, they do not see wholly progressive portrayals of disabled subjects; instead, these visual narratives continue to dis-able real people by promoting characterizations that teach viewers to understand disabilities as abnormalities that Other people, mark them as different, and require a cure. I argue that, in order to really overcome prejudice, we must become conscious of what our media actually teaches children about disability.

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Oduy Kayed - How Child Maltreatment Gets Under the Skin

Faculty Advisor: Gabriel Schlomber, School of Education, Department of Educational and Counseling Psychology

The purpose of this presentation is to review the literature on the relationship between child maltreatment and methylation and its links to specific behaviors which are present in various forms of psychopathology. Results of this review show a well-established association between childhood maltreatment and psychopathology. Recent epigenetic research revealed evidence for methylation as a possible underlying mechanism for this relationship. Child maltreatment and adverse life experiences have been linked to increased methylation in multiple studies (Mehta et al., 2013; van der Knaap et al., 2015). Site specific methylation patterns influence both gene expression and tissue specific transporter density, which have been known to influence psychopathology and the behaviors associated with many forms of psychopathology. Understanding stable epigenetic effects on behavior could be influential on mental health treatment and identification. For this reason, epigenetic markers may help prevent misdiagnoses or facilitate client assessments, which are both critical topics related to mental health treatment. Methylation poses a possible answer to why maltreatment has been related to some of the behavioral symptoms of mental illness. For example, experimental studies in rats and rhesus monkeys suggest a causal link between maternal behavior and increased methylation, which in turn, influence various types of behavior related to psychopathology (Kinnally et al., 2010; Weaver et al., 2004). This presentation will aim to identify and elucidate both protective and risk factors relevant to psychopathology based on methylation research.

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Danielle Garry - Changes in Body Fatness among Mohawk Youth from 1979 to 1999

Faculty Advisor: Lawrence Schell, College of Arts and Sciences, Department of Anthropology

The research question is: Have the Mohawk people been affected by the obesity epidemic that has occurred in this country and globally? Iroquois Since 1820, by Elisabeth Tooker, describes Mohawk history and culture. The Effect of Urbanization on the Growth of Canadian Native Children, by Susan Pfeiffer and L. Dibblee, is the article which contains the data collected from 1979. Height, Weight, and Body Mass Index among Akwesasne Mohawk Youth, by Dr. Mia Gallo and Dr. Lawrence Schell, describes anthropometric measurements and contains measurements from 1996-2000, which I use in my comparison. My research compares the data on height, weight, and skinfold thicknesses collected by Pfeiffer from Native American youth (10 to 15 years of age) of the Akwesasne tribe, located at St. Regis, on the Canadian side, with similar data later collected by Gallo and Schell, on the United States side. I entered the data collected in 1979, and checked the numbers twice. I received pre-checked data from the 1996-2000 group. I used excel to perform t-tests for the comparison. I then used SPSS to perform additional statistical tests to properly interpret the t-tests. From my results I have found that there is a significant
difference in weight, triceps skinfolds, and subscapular skin folds in all male age groups except for age 13. There are no significant differences in height in any age group. In females, there are almost no significant differences, however, the number of females available for comparison is very small. From these results I have concluded that there is a difference in adipose tissue amounts between the two populations, but only in males. A discussion on why it has affected males more dramatically will be discussed in the paper.

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September Johnson and Rachel Eager - Bridging the Gaps in Human Rights Law in the Middle East through Enhancing Health Law Capacity
Faculty Advisor: Kamiar Alaei, Rockefeller College of Public Affairs & Policy, Department of Public Administration and Policy
The incorporation of the right to health into civil law and governmental policy is necessary for the accessibility, quality, coverage and acceptability of health care. Within the Middle East, information and training regarding the right to health and Economic, Social and Cultural Rights (ESCRs) is controversial. This project incorporates the work of experts to provide an international context on the right to health and ESCRs into a specific curriculum for Middle Eastern countries. These rights are of importance for understanding internationally recognized legal rights and good governance practices in the Middle East as they relate to the rights that are essential for development and most related to daily needs. Students admitted to the course complete an 18-week training consisting of live sessions, case studies, and group discussions to increase their knowledge surrounding health law and international ESCRs. This project introduces and reinforces internationally recognized legal rights in the Middle East and good governance measures by focusing on health law. Health law fulfills the program’s objectives by empowering legal and civil society in the Middle East to effectively understand and advocate for the rights of vulnerable groups. Focusing on basics in global health and policy, international law, mechanisms and implementation and mentorship, this multifaceted project hopes to not only provide students with knowledge regarding international health law but also the ability for application in their practices and for the training of their peers.

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Gertrude Morgan Dadzie - Healthcare Accessibility for Syrian Refugees: Understanding Trends, Host Countries’ Responses and Impacts on Refugee Health
Faculty Advisor: Kamiar Alaei, Rockefeller College of Public Affairs & Policy, Department of Public Administration and Policy
The Syrian civil war, now in its 6th year is the biggest refugee and humanitarian crisis in present times. Since March 2011, over 11 million Syrians have fled out of their country to neighboring countries, Europe and other parts of the world. Associated with refugee movement is the movement and spread of communicable and non-communicable diseases among Syrian refugees and beyond. The war also continues to affect the psychosocial and emotional states of Syrian refugees, especially young people and children. This paper seeks to identify trends in health conditions among Syrian refugees and those who are internally displaced within the country. It focuses on Syrian refugee mothers and children (0-5 years old), who are most vulnerable to the Syrian crisis. The research paper is divided into 4 parts. The first part explores population trends, health conditions and diseases among globally displaced persons, including refugees. The second part of the paper dives into the health status and conditions of internally displaced Syrians. The third part explores the prevalence of certain health conditions among Syrian refugees and responses of host countries—Turkey, Lebanon and Jordan — to refugees and their healthcare. The last section discusses main findings and attempts to outline some recommendations to mitigate the challenges of healthcare access to Syrians, both internally displaced and refugees.

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**LC 23: Biology and Psychology**

**Michelle Raissa Kobou Wafu** - *Pomegranate Ellagitannins- Potential Dietary Agent for Breast Cancer*

Faculty Advisor: Martin Tenniswood, School of Public Health, Department of Biomedical Science

Although a vast array of chemotherapies has been developed to eradicate cancer, chemotherapies are still followed by unwelcome side effects and disease may recur. Therefore, numerous researchers are now focusing their interest on potential chemopreventive agents, which land them to pomegranate fruits. Pomegranates are the richest source of bioactive polyphenols, ellagitannins which are widely known for their potent antioxidant, antiproliferative, anti-inflammatory and anti-vascular properties. Meanwhile, cancer development and progression are known to depend on uncontrolled cell growth, angiogenesis and, frequently, inflammation. By conducting in vitro cell culture experiments using human breast cancer MCF-7 cell line, I evaluated the effects of pomegranate extracts (with a high concentration of ellagitannins) on growth inhibition in MCF7 cells. As per previous expectation, I found out that ellagitannin phytochemicals had an inhibitory effect of MCF7 breast cancer cells.

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**Vincent LaMantia** - *Controllable and Sequential Activation of Cancer Nanootherapy for Enhanced Synergistic Effect*

Faculty Advisor: Mehmet Yigit, College of Arts and Sciences, Department of Chemistry

The treatment of numerous disease states has become increasingly more complex and challenging, even as we come out with new pharmacological and technological advancements. It is well known that cancer is not one disease, but many diseases that progress and present new challenges with each patient. With this we present a novel new design to use biorthogonal chemistry and magnetic nanoparticles (MNP’s) to design a drug delivery system with the capability to deliver two drugs that are released at two different time frames under the direction of a single trigger. This innovative combination of multiple advancements will allow for the treatment of normally resistant cancer phenotypes by rewiring the cell with one treatment, and then inducing apoptosis with the next, sequentially killing the targeted cell. Our system allows for a controllable, finely tuned delivery that can be targeted and imaged using MRI with our active MNP’s. The system has been tested with release kinetics using two fluorescent probes, and then later in vitro to confirm efficient delivery of the payload. This simple, non-invasive treatment allows for a much easier, and effective dual drug delivery system. It was shown using triple negative breast cancer cell lines to be more effective than current therapeutic treatments and enhance the efficiency of the drugs, when used synergistically.

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**Sean Smith** - *Alzheimer’s Disease as Type 3 Diabetes: The Intimate Link Between Brain Bloodflow & Metabolism*

Faculty Advisor: Ewan McNay, College of Arts and Sciences, Department of Psychology

There is a similarity between many of the pathologies seen in Type II Diabetes (T2DM) and Alzheimer’s Disease (AD). Both diseases have been demonstrated to develop in the context of high fat and high sugar diets. Similarly, both diseases characteristically show impairments to bloodflow if not properly treated, and symptoms of both diseases can be effectively treated by exercise. Vascular dementia, marked by bloodflow impairment, has been linked to AD through similar observed impairments in glucose metabolism such as those seen in T2DM. Researchers in the past have argued that AD and vascular dementia are similar pathologies, linked together through insulin resistance. AD pathology occurs primarily in the hippocampus and is integral for spatial working memory. Previous research under Ewan McNay has demonstrated that hippocampal memory processes are modulated by insulin and glucose, and hippocampal cognitive processes can be impaired in the context of induced insulin resistance. AD has been more recently been characterized as “Type III Diabetes,” given the defined role of impaired glucose metabolism in AD pathology. This includes impaired Glut4 transport and impaired insulin receptor signaling via IRS-1pser. These molecular markers and the insulin receptor itself share close ties with molecules important for bloodflow and cognition, including VEGF and eNOS. Thus, insulin resistance in the brain concurrently disrupts several pathways integral to vascular integrity as well as glucose metabolism. These pathologies are both classically observed in T2DM patients and in the brains of AD patients. This presentation outlines potential metabolic pathways which could contribute to sporadic AD onset through insulin insensitivity, and potentially VEGF insensitivity. It also highlights our current experimental work in T2DM rat models as well as future directions for our experiments. We aim to support this developing hypothesis which describes the concurrent impairments in bloodflow and glucose metabolism seen in AD.

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Hasina Noory - *Synthesis of a Bifunctional Macrocycle*

Faculty Advisor: Maksim Royzen, College of Arts and Sciences, Department of Chemistry

Macrocycles are important organic ligands for encapsulating metal ions. This work describes the first step of a synthesis to create a bifunctional macrocyclic ligand suitable for NMR studies. Cyclen is an organic macrocycle, which contains twelve atoms total, with four nitrogen atoms incorporated into the cyclic backbone. Cyclen is known to coordinate metal ions with its donor nitrogens and additional carboxylate arms. For this synthesis, three of the four nitrogens are carefully functionalized methyl bromoacetate leaving the fourth nitrogen free for other types of additions.

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LC 24: Biochemistry and Molecular Biology

Adam Stabell - *Identifying the Molecular Mechanisms of Isoform-Specific Actions of Retinoic Acid Receptors on K5 Positive Progenitors*

Faculty Advisor: Kara DeSantis, College of Arts and Sciences, Department of Biology

Retinoic acid signaling has been shown to be important for the development of the submandibular salivary gland. Research in our laboratory has demonstrated that isoform specific retinoic acid signaling can manipulate basal cell progenitor populations in the developing mouse submandibular salivary gland. Basal cell progenitors are important for organogenesis and tissue regeneration. During development, we have identified that retinoic acid receptor (RAR) isoform specific signaling leads to changes in cell cycle of the K5+ progenitor cell population. We hypothesize that the molecular pathways identified during development may be recapitulated during regeneration allowing manipulation of RAR isoforms to enhance regeneration through progenitor enrichment. In order to study salivary tissue regeneration, our lab has developed an in vivo regeneration model using the mouse submandibular salivary gland. In this model, we resect a portion of the left submandibular gland and allow it to regenerate over time. Using this model we have incorporated molecular manipulation of retinoic acid signaling using specific RAR isoform selective pharmacological agents to increase regeneration. Our goal is to identify downstream targets of RAR signaling during regeneration using quantitative PCR (qPCR) and compare these targets to downstream targets identified during development. By measuring the levels of mRNA of potential downstream targets we expect to see changes in expression of cell cycle regulatory genes and progenitor markers, based on our previous data.

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Molly MacIsaac - *Sensitive One-Step miRNA Detection with DNA Nanoswitches*

Faculty Advisor: Ken Halvorsen, The RNA Institute, Senior Research Scientist

MicroRNAs play important roles in gene regulation, and differential expression of specific microRNAs have been correlated with a wide range of diseases. Sensitive and selective detection of microRNAs is thus important for enabling their use as biomarkers, drugs, or drug targets. Current detection techniques such as northern blotting and quantitative real-time PCR require skilled personnel and expensive equipment to execute complex and time consuming assays. Here we develop and validate a one-step, non-enzymatic microRNA detection assay using DNA nanoswitches programmed to recognize and bind a specific microRNA. Binding induces a loop in the structure, allowing the target microRNA to be unambiguously detected on a standard agarose gel. We demonstrate microRNA detection with addition of a single reagent in a room temperature reaction. Our technique has single nucleotide specificity, a sub-attomole limit of detection, and a sensitivity range spanning six orders of magnitude in concentration. The utility of the technique is illustrated by biological detection from total RNA extracted from differentiating muscle cells. Among several microRNA implicated in skeletal muscle differentiation, we found significant changes in expression levels that are consistent with previous literature. The simplicity, low cost, and competitive performance of this microRNA detection assay suggests that it is well poised to find widespread use in the biomedical sciences.

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Heather Sabo - Chronic Arsenic Exposure in Nanomolar Concentration Accelerates Senescent Phenotypes in Vitro
Faculty Advisor: Andre Melendez, College of Nanoscale Science and Engineering
Arsenic is recognized as an environmental carcinogen, in which over 100 million individuals worldwide experience chronic exposure through contaminated drinking water. Arsenic exposure is linked to several health conditions such as, cancer, diabetes, skin lesions, immune dysfunction, and cardiovascular disease. Here, we are specifically looking at the effects of chronic arsenic exposure at the nanomolar concentration on young Homo Sapien (IMR-90) diploid fibroblasts. The cell line is cultured in vitro using concentrations of 130nM and 330nM arsenic supplemented media. Over the course of forty days, we expect to see a progressive increase in the transcription levels of our selected senescent cytokines. This leads to our proposal that, toxicants such as arsenic, accelerate senescent phenotypes and disease pathology. Weekly RNA samples were extracted from IMR-90 cells and RTPCR was conducted. Arsenic exposed IMR-90 cells were tested for increases in Interleukin-6, Interleukin-8, Interleukin-alpha and the cyclin-dependent kinase inhibitor protein p16. Conclusive results indicate that there is a direct relationship between the duration of toxicant stress, and the increased transcription level of senescent proteins. The goal of this experiment was to mimic the arsenic exposure experienced by contaminated drinking water, and test whether or not the upregulation of senescent proteins is accelerated by the toxicant. In addition, we wanted to know whether or not this toxicant induced senescence is connected to tissue sensitivity and renal injury. We hypothesize that senescent cells serve as regulators of environmental toxicants through their ability to engage mitochondrial-cellular signaling, and create a cellular niche that is permissive to disease progression.

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Tyler Pocchiari - RNA Helicases Involved In Ribosome Biogenesis Are Necessary For Germline Maintenance
Faculty Advisor: Prashanth Rangan, College of Arts and Sciences, Department of Biology
Germline stem cells (GSCs) are able to both self-renew as well as differentiate into gametes. Upon fertilization, gametes give rise to a zygote, which creates a complete adult organism, including the germ line which launches the subsequent generation. The germ line relies heavily on RNA regulators such as small RNAs, RNA binding proteins (RBPs) and RNA helicases to maintain this cycle. The role of RBPs in the germ line have been well characterized, yet the variety of roles of RNA regulators in translation control are not fully known. To assess the role of RNA helicases in the germ line, we conducted a forward genetic screen, targeting RNA helicase genes for depletion using RNA interference (RNAi). Our data reveals crucial, non-redundant roles of 21 RNA helicases in maintaining the germ line. Specifically, three of these helicases are known through homology to be involved in biogenesis of the small 40S ribosomal subunit. We find that these conserved helicases are required for germline development, maintenance and surprisingly, proper differentiation of GSCs. RNAi depletion of these helicases disrupts the GSC differentiation and halts the cell cycle at the G1/S checkpoint, leading to an accumulation of undifferentiated cells and a characteristic GSC abscission defect. Through ribosome biogenesis, these RNA helicases promote progression of the cell cycle, ensuring the completion of cytokinesis after cell division in the germ line. We plan to fully describe the downstream targets of these helicases, rescue this phenotype by modulating cell cycle proteins and show the distinct role of these helicases in ribosome processing.

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David Bunn - Determination of the Rate of PRP8 Intein Splicing Kinetics
Faculty Advisor: Marlene Belfort, College of Arts and Sciences, Department of Biology
Inteins are interrupting self-splicing elements within polypeptides. Proteins that contain an intein are rendered non-functional. In order to become functional, the intein auto-catalytically excises from the host polypeptide, and ligates the remaining outlying sequences, known as exteins. The intein found in PRP8, a critical component of the spliceosome, is of unique interest, because it is found in pathogenic fungi, such as Cryptococcus neoformans. A fluorescent resonance energy transmission (FRET) assay was utilized through the insertion of the PRP8 intein between cyan fluorescence protein (CFP) and yellow fluorescent protein (YFP). The FRET assay provides a readout of intein splicing, allowing rates to be determined. The PRP8 FRET constructs were tested and optimized under the conditions of time, temperature, and nucleophile to determine the best conditions for measuring intein cleavage. Following optimization, a baseline for the rate of splicing was determined, and libraries were screened to determine inhibitors of PRP8 intein splicing in search of novel antifungals.

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LC 25: Chemistry, Computer Engineering, and Computer Science

Mathew Boll - Differentiation of Hair Using ATR FT-IR Spectroscopy: A Statistical Classification of Dyed and Non-Dyed Hairs

Faculty Advisor: Igor Lednev, College of Arts and Sciences, Department of Chemistry

Although hair is one of the most common and abundant types of evidence found at a crime scene, the current forensic analyses employed underutilize its full potential evidentiary value. Microscopy is the fundamental technique used to analyze forensic hair evidence, but even this routine and well-accepted method has limitations. In this study, non-dyed and dyed hairs from individuals varying in race, biological sex, and age, were analyzed using attenuated total reflection Fourier transform-infrared (ATR FT-IR) spectroscopy. Through the incorporation of multivariate statistical analysis, spectra collected from dyed and non-dyed hairs were differentiated with high accuracy. After hair spectra were determined to be dyed or non-dyed, dyed hair spectra were successfully differentiated amongst themselves based on brand (or manufacturer) and dye color. The methodology developed here allowed for predicting whether an individual used a permanent hair dye, and then the brand and color of hair dye used, with at least 90% confidence. The high accuracy shown in this study illustrates the ease and robustness of coupling ATR FT-IR spectroscopy and multivariate statistics for forensic hair analysis, specifically for the analysis of dyed hairs. The use of spectroscopy for forensic hair analysis, as demonstrated by this proof of concept study, would advance the field of trace evidence as a whole, and can potentially be utilized to confirm conclusions drawn from methodologies employed currently, in turn leading towards individualization.

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Allix Coon - Locard's Lube: The Identification of Condom Residues Using DART-MS

Faculty Advisor: Rabi Musah, College of Arts and Sciences, Department of Chemistry

With increasing frequency, perpetrators of sexual assaults use condoms in order to avoid leaving behind incriminating DNA evidence. This has increased the value of condom lubricant evidence, as it may be one of the only materials that can be used to corroborate a victim's story, or even exonerate the innocent. It is therefore imperative that methods which can be used to connect a given condom residue to brand information be developed. Towards this goal, this study investigated the chemical features of the lubricants used in various brands of condoms to determine if they could be correlated to brand information. Condom lubricant chemical profiles were assessed using Direct Analysis in Real Time Mass Spectrometry (DART-MS). One hundred and ten different types of condoms representing several U.S. and international brands were studied. It was found that most of the condoms of the same brand have the same base lubricant formula, even when the physical characteristics of the rubber differed. However, condoms with chemical components designed to elicit various additional sensory features, such as flavors or warming agents, had distinctive characteristics when compared to the base formula. It was also observed that the mass spectra differed as a function of brand. A database of condom chemical profiles was then generated and tested for its ability to enable identification of lubricant unknowns. Using the database, condom brands were correctly identified from condom lubricant chemical profiles. The positive identification of unknown condom lubricants implies that the database could serve as a tool to assist crime labs in prosecuting sexual assault cases.

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Dong Woo Yoo - Affective Viewer Analysis: Analyzing Facial Activities of Viewers Based on Videos and Multiple Choices

Faculty Advisor: Yelin Kim, College of Engineering and Applied Sciences, Department of Computer Engineering

Emotion plays an important role in viewers’ preference of videos. Automatic recognition of viewers’ emotions can greatly benefit video selection and recommendation systems. In this talk, we present a framework that can capture facial movements and self-reported emotion of viewers who watch affective video content. The facial movements of the viewers are recorded using a frontal faced webcam camera and the users annotate their emotions after watching each video. The participants also provide their demographic information prior to the experiments for further analysis. We will demonstrate our preliminary experiments using the LIRIS-ACCEDE dataset.

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**Stuti Misra - Dynamic Spectrum Characterization with a Low-Cost Sensor**
Faculty Advisor: Mariya Zheleva, College of Engineering and Applied Sciences, Department of Computer Science

Mobile wireless networks are becoming a critical modern-day technology. A key resource for the proliferation of this technology is the available radio spectrum resource, however, as the user base of mobile wireless networks increases, the available spectrum quickly becomes saturated. This results in poor user experience and high prices for limited monthly subscription. And while mobile wireless bands are congested, other bands such as TV broadcast or military are underutilized. Hence, a paradigm called Dynamic Spectrum Access (DSA) arises. DSA enables opportunistic access of this underutilized spectrum. DSA requires analysis of spectrum across time, space, and frequency to inform spectrum availability and quality. However, most current spectrum analyzers are high cost and thus measurements cannot scale to many locations. Our project introduces a low-cost alternative, using a RTL-SDR and Raspberry Pi, which is orders of magnitude cheaper and more mobile than a higher cost alternative. A typical issue with low cost sensors is that the scans from the low-cost sensor are much sparser than the scans from a higher-cost alternative. In our project, we compare the scans from low-cost and high cost sensors. Our goal is to understand the limitations of low-cost sensors and develop strategies to mitigate these limitations. We conduct granularity, sensitivity, transmitter pattern, and mobility experiments to compare the scans of the two sensors in different scenarios. From our current observations, we see that the USRP performs better than the RTL in terms of sensitivity and is thus able to detect transmitters in close proximity. At the same time, the RTL’s capability to detect temporal and frequency properties of transmitters is comparable to that of the more expensive sensor.

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**Elaine Huang - Visible Light Communications and Ranging with Organic Light Emitting Diodes**
Faculty Advisor: Hany Elgala, College of Engineering and Applied Sciences, Department of Computer Engineering

Visible light communications (VLC) uses modulated light sources, generally light emitting diodes (LED), to be demodulated by a receiver, often times a photodiode. Vehicular visible light communications (V2LC) is an application of VLC for communications between infrastructure-to-vehicle or vehicle-to-vehicle. One use of this application is ranging, determining distance between two vehicles. Organic light emitting diode (OLED) is a type of LED fabricated from organic molecules. One of their well-known applications are screens for electronic devices such as televisions and laptops. Recently, OLEDs are being considered for indoor illumination and in the automotive industry. Compared to traditional LEDs, OLEDs can illuminate larger areas and be transparent or reflective when they are off. In our project, OLED panels will be modulated for communication and ranging as a proof of concept to be deployed in future applications.

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