# srca

# Student Research & Creative Activity Day 2016

# WEDNESDAY, APRIL 20
# HUNT UNION BALLROOM

SUNY ONEONTA

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# 2016 Student Research & Creative Activity Day

## April 20, 2016

## 10:00 AM – 4:00 PM

## Hunt College Union

### Sponsored by:

College at Oneonta Foundation, Inc.

Grants Development Office

Office of Alumni Engagement

Division of Academic Affairs

2015/16 College Senate Committee on Research

Thomas Beal (History)
Tracy Betsinger (Anthropology)
Melissa Godek (Earth & Atmospheric Sciences)
Mette Harder, Chair (History)
Florian Reyda (Biology)
Kathy Meeker, *ex officio* (Grants Development Office)

**www.oneonta.edu/a/srd/**

# STUDENT RESEARCH & CREATIVE ACTIVITY DAY 2016

# PROGRAM

**10:00 AM – 4:00 PM**

***Viewing of student posters, computer displays and other exhibits spotlighting student research and creative activity projects from across the disciplines (see abstracts)***

**HUNT UNION BALLROOM**

**Additional Displays**

- SUNY Oneonta Applied Learning Opportunities
- SUNY Oneonta Graduate Studies
- Environmental Science Club
- Spotlight on 50 Years of the Biological Field Station

**12:00 NOON – 1:00 PM**

***Luncheon and Keynote Address*** **(registered guests only)**

**THE WATERFRONT, HUNT UNION**

## Dr. Kenneth R. Carter '85

**"A Journey from Apprentice to Master: Science, Research, and Teaching"**

*Dr. Carter received his B.S. degree in Chemistry from SUNY Oneonta in 1985, and his Ph.D. in Chemistry from the University of Vermont in 1991. He is currently Professor of Polymer Science & Engineering, University of Massachusetts Amherst, where he established and directs the Nanoimprint Lithography Laboratory. He is the author of many publications and patents, and the recipient of numerous grants, honors and awards.*

**3:45 PM –** ***CSSR Student Paper Awards*** **– Hunt Union Ballroom**

As part of its sixth annual student paper competition, the Center for Social Science Research (CSSR) will recognize two students for their award-winning papers on topics of interest in the social sciences. The winning papers will be edited and published on the CSSR website: www.oneonta.edu/academics/ssr/.

**Annual Student Juried Art Exhibition**
**and Collaborative Art Projects Exhibition**

Visit the Martin-Mullen Art Gallery and Project Space in the Fine Arts Building
to view more than 100 works by student artists, featuring
sculpture, ceramics, digital prints, drawings, paintings and video art

*~on display through May 14~*

# SUNY Oneonta
# 2016 Student Research & Creative Activity Day
## STUDENT PARTICIPANTS

# FACULTY SPONSORS

# PRESENTATION SUMMARIES

***Students:*** Hailey Ahearn, Noelle Armstrong, Megan Stoutz, Amanda Reichardt

***Faculty Sponsor:*** Allan Green (Chemistry & Biochemistry)

**Regulation of ATGL by Insulin and Glucose**

This project focuses on expression of the enzyme adipose triglyceride lipase (ATGL) and its regulation by insulin and glucose. ATGL catalyzes the initial, rate-limiting step in the breakdown of triacylglycerol. In a fasting state, the products of triacylglycerol breakdown are used as fuel for cells, and glucose is conserved and used as fuel for the brain. In obese subjects, ATGL activity has been observed in the fed state, providing fatty acids as an alternative cellular fuel source to glucose. With fatty acids fueling the cells, less glucose is utilized leading to elevated blood glucose concentration. Chronic high blood glucose concentration can lead to the development of insulin resistance and Type-2 Diabetes Mellitus (T2DM). We are investigating the concentration of ATGL in adipocytes incubated with no additions or with insulin, glucose or insulin plus glucose for various times up to 24 hours. We are extracting proteins from the adipocytes and measuring the concentration of ATGL using Western blot analysis. Based on previous findings, we hypothesize that the concentration of ATGL in adipocytes will increase when incubated with both glucose and insulin.

***Student:*** Kaylie Allen

***Faculty Sponsor:*** Tracy Allen (Geography & Environmental Sustainability)

**SUNY Oneonta Implements Sustainability Initiatives Campus Wide: Guide and Map** ☼

Sustainable developments have been increasing more and more all around the world. Sustainable development has been defined by the Bruntland Report as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." SUNY Oneonta has been playing an important role in lowering the campus's usage of resources such as energy in order to provide the next generation of students with an improved living environment. This project intends to help increase the awareness of SUNY Oneonta's sustainable initiatives, and how it creates a more environmentally sustainable campus. The information gathered is intended to help educate students, faculty, incoming or interested students, parents, and the public about the sustainable initiatives at SUNY Oneonta. In addition, a comprehensive guide was developed using a Geographic Information System (GIS) that visualizes, describes, and locates sustainable practices.

***Students:*** Jacob Bachor, Nicolas LaScala

***Faculty Sponsor:*** Heike Geisler (Chemistry & Biochemistry)

**Synthesis and Reduction of Graphene Oxide**

The goal of this research is to improve the synthesis of high grade Graphene Oxide from graphite. Following the Hummer's method* graphite was oxidized with a mixture of potassium permanganate (KMnO4) and concentrated sulfuric acid (H2SO4) to graphite oxide. Through this oxidation process the distance between the existing carbon layers is enlarged, and additional exfoliating results in a single-atomic layer of graphene oxide. The surface functionality of graphene oxide is believed to be composed of hydroxyl (-OH), epoxy (-COC) and carboxyl (-COOH), groups directly bound to the graphene layer. The resulting structures changed through the exfoliation process. For this study a variety of washing and exfoliating procedures were performed and systematically compared. The resulting products were characterized with Fourier transform infrared spectroscopy (FTIR). *W. S. Hummers and R. E. Offeman, J. Am. Chem. Soc., 1958, 80, 1339.

***Students:*** John Beach, Bridget Chartrand

***Faculty Sponsor:*** Hugh Gallagher, Jr. (Physics & Astronomy)

**Quantitative Determination of the Breakdown Field of Air from Van de Graaff Generator Discharge ★**

The Van de Graaff generator (VG) is ubiquitous in electrostatic demonstrations because of the large static charge and dramatic sparks that it produces. We have developed a novel technique for determining the breakdown field using the VG. At the instant that a spark occurs, the force of attraction between the VG and a discharge sphere suspended above it is measured by a force sensor (Pasco CI6545). In order to interpret the measured force in terms of the breakdown field, an accurate model of the charge distribution is needed. We use the method of images for a spherical conductor in an iterative fashion to provide an accurate model of the charge distribution. The electric field in the vicinity of the spheres is then calculated from the charge distribution, and its maximum value is the breakdown field. In a preliminary experiment, we determined the breakdown field to be 3.1x106 N/C at a temperature of 24.9 C and 18% relative humidity. We will report our most recent determination of the breakdown field using this method and discuss the validity of the results in terms of accepted values, experimental limitations and sensitivity to the charge distribution model.

***Students:*** Katje Benoit, Michael Schonning

***Faculty Sponsors:*** Sean Robinson, Keith Schillo (Biology)

**Investigating the Potential Role of Bryophytes as a Food Source for Mice**

Little is known about the interaction between bryophytes and animal populations in forest ecosystems. In particular, there is some question as to whether bryophytes could serve as a food source for small mammals, especially when other sources of foods are less abundant. Previous work found that mice will consume gametophyte and sporophyte tissue of bryophytes if given the opportunity. This study investigated whether or not mice would preferentially consume bryophytes if given another choice of food, and whether or not a diet of bryophyte tissue could provide enough nutrition to maintain a healthy body weight in laboratory mice. Six mice, 5 males and 1 female, were each given the option to feed on Mazuri rodent pellets or ground up bryophyte tissue in a series of Techniplast metabolic cages. The mass, in grams, of food pellets and moss consumed each week were calculated to assess how much of each food source was consumed. In addition, mice were weighed before being placed in the cages and once every week during the course of the experiment to determine if a diet composed of bryophyte tissue would provide enough calories to maintain their body weight.

***Student:*** Emily Berezowski (G)

***Faculty Sponsor:*** Jeffrey Heilveil (Biology)

**RAD Tag Sequencing of *Nigronia serricornis* (Say) on and off Reservoirs in New York State ☼★**

Reservoirs are a great asset to humans, but can have several adverse effects on surrounding wildlife. Changes in a landscape as a result of reservoir creation may cause changes in interactions between organisms and, ultimately, change dispersal and gene flow, which can isolate populations. This research will use an aquatic fishfly, *Nigronia serricornis* (Say) (Megaloptera: Corydalidae), to determine if reservoir creation altered gene flow between populations. Restriction-site Associated DNA (RAD) sequencing will be used to sequence the DNA of individuals from equidistant sets of populations on tributaries flowing into the reservoirs and ones flowing directly into the Delaware, unaffected by reservoirs. Differences in gene flow patterns may indicate an anthropogenic effect on local ecosystems. If gene flow patterns for *N. serricornis* have changed, other species that utilize these waterways may also be affected.

***Student:*** Rose Biggerstaff

***Faculty Sponsor:*** Andrew Kahl (Theatre)

**Bare: A Pop Opera ★**

The purpose of this project is to give students a chance to learn how to produce and mount a show in the professional theater world. Implementing the project, including coaching from faculty members, provides a valuable learning experience regarding all aspects of putting on a theater production. Furthermore, the world is experiencing a time where a lack of love and acceptance is causing a vast array of problems. The show *Bare: A Pop Opera* is a musical experience that leaves those who experience it feeling the need to accept people for who they are. *Bare* aims to send a call for acceptance and love out into the world.

***Students:*** Matthew Blanchard, Michael Schonning, Sabrina Conticello, Sara Stuart

***Faculty Sponsor:*** Kelly Gallagher (Chemistry & Biochemistry)

**Structural Investigations of the ER Membrane Complex Subunits 2, 8, and 9**

The endoplasmic reticulum (ER) membrane protein complex (EMC) has been associated with the endoplasmic-reticulum-associated protein degradation (ERAD) network, dengue virus propagation, lipid transport, and conjunction of the ER. Little is known about the role and structure of recently identified EMC subunits 2, 8, and 9. Detailed structural information of EMC2, EMC8, and EMC9 will aid our understanding of how these subunits collaborate with one another and the rest of the EMC complex to facilitate its variety of functions. Further analysis could also provide useful information for the design of therapies for diseases caused by malfunctions in ERAD. This study produced theoretical models of subunits 2, 8, and 9 using the protein structure prediction server RaptorX. After purifying samples of each subunit, circular dichroism (CD) was used to determine the percentage of alpha helices and beta-pleated sheets per subunit. Since the predicted structure of EMC8 was found to be similar to Mov34, which exhibits homodimerism, the oligimerization state of EMC8 and EMC9 were examined.

***Students:*** Bridget Boland, Mark Crosby

***Faculty Sponsor:*** James Ryder (Mathematics, Computer Science & Statistics)

**Communication Therapies with the NAO Robot ★**

SUNY Oneonta has been conducting research with the NAO robot since last fall. NAO is a humanoid robot from Aldebaran standing at 58cm tall and intended for human interaction. It has been primarily used in areas of research and education. The robot has thrived in the area of communication therapy for children with autism. SUNY Oneonta's Computer Science program has been partnering with Broome-Tioga BOCES, Oak Tree to conduct research in this area.

***Student:*** Peter Booth

***Faculty Sponsors:*** Wendy Lascell (Geography & Environmental Sustainability),
Leslie Hasbargen (Earth & Atmospheric Sciences)

**Real Time Kinematic (RTK) Network Integration to Remove Need for Ground Control Points in UAV Survey ★**

Aerial Photography has tremendous value for spatial ecology. The mass proliferation of low-cost consumer drones has introduced a tremendous increase in temporal resolution to the aerial study of change. However, collecting data that is georeferenced remains quite difficult. In order to do so requires establishing a network of surveyed ground control points (GCP) that are both visible from the drone and have their own discrete locations within the geodetic datum. Establishing GCP is not practical for most researchers. In continuation of research conducted between May 26 and August 1, 2015 at the Biological Field Station, the drone belonging to the department of Geography & Environmental Sustainability was outfitted with a real-time kinematic (RTK) GPS network. An RTK network is capable of reducing GPS error from meters to centimeters. This method is used in modern terrestrial surveying to collect data with sub-centimeter accuracy. By increasing the positional accuracy of the drone, the positional accuracy of the data collected using the drone will also be increased. The intention

of this follow-up study is to assess the possibility of removing the need for GCP, enabling survey of remote locations where the placement of GCP is impractical.

***Student:*** Lauren Bracco

***Faculty Sponsor:*** David Ring (Economics, Finance & Accounting)

**The Federal Funds Rate Effect on Mortgage Rates and the Housing Market**

In December of 2015 the Federal Reserve raised the Federal Funds target range by .25 percent. This change in monetary policy has many effects on the current and future United States economy. In 2007, the United States spiraled down into a recession for the first time since March 2001. Beginning in 2006, America suffered a nationwide housing slump. This caused instability within America's financial system. Based on the current economic conditions, will the rise in the Federal Funds target range (normalization of monetary policy) have an effect on mortgage rates around the country? If to the research shows that the Federal Funds target range rate influences mortgage rates, this could help identify future conventional/unconventional monetary policy solutions. Based on the question posed, mortgage rates will not be the only macroeconomic factor that is affected by the Federal Funds rate; other macroeconomic factors can also affect mortgage rates. Quantitative easing policy, large scale asset purchases and zero-lower bound policies will also be examined during this research.

***Student:*** Daniel Bucci

***Faculty Sponsors:*** Fred Zalatan, Tami LaPilusa (Biology)

**Identification of Bacteria in Otsego Lake using the Polymerase Chain Reaction (PCR) Technique ★**

Otsego Lake is located in Cooperstown, NY and is home to the SUNY Oneonta Biological Field Station. The objective of this research is to collect water samples from Otsego Lake during certain times of the year, and identify the bacterial species present by sequencing specific DNA segments. DNA is first extracted from the water samples, and certain segments of DNA are amplified using the polymerase chain reaction (PCR) technique. The segment of DNA used in this study codes for the 16S ribosomal RNA, an essential component of all bacteria. The results may reveal distinct changes in the community of bacteria present from season to season. This technique, known as environmental sequencing, is becoming prominent in such diverse fields as medicine and microbial ecology, and is the preferred method for identifying bacteria that cannot be cultured in a lab.

***Students:*** John Burke, Courtney Walsh

***Faculty Sponsor:*** Sean Robinson (Biology)

**Developing a New Method for Measuring Growth Rates and Patterns of Development in Bryophytes**

Bryophytes are non-vascular land plants that have the ability to grow on a variety of surfaces including manmade structures. It has often been suggested that the size and abundance of bryophytes growing on a structure could be used as a method of establishing a minimum age for structures. Little is known, however, about growth rates and colonization patterns in bryophytes. The objective of this study, therefore, was to develop an accurate method of measuring growth rates and patterns in bryophytes. Eighty-eight individual plants of *Marchantia polymorpha*, a common thalloid liverwort, were grown from gemmae on anti-microbial/fungal agar and photographed once a week over the course of three weeks. Using the program Image-J, we determined the area of growth and growth rates for each plant. In addition, imaged plants were analyzed using backgrounds with different pattern complexities to assess the ability of the program to accurately calculate the area of growth for plants growing on different surfaces.

***Students:*** David Busby, Benjamin Casscles

***Faculty Sponsor:*** Matthew Albright (Biological Field Station)

**Continued Monitoring of the Moe Pond Ecosystem in Conjunction with Biomanipulation** ☼

Moe Pond is a shallow dystrophic upland water body located in Cooperstown, NY with a primarily planktivorous population of Largemouth bass (*Micropterus salmoides*). 2015 saw a continuation of long-term data acquisition from the lacustrine system. Additional biomanipulative management tactics were employed to decrease Largemouth bass abundance. A total of 1,247 Largemouth bass were removed via haul seining and electro-fishing. These management actions increase available forage base, thus increasing Largemouth bass growth rates. Secchi depth increased, at 2.38 m. Nauplius larvae were the most frequently observed zooplankton occupying the water column. Operculum and scale aging of Largemouth bass revealed few fish were greater than three years old, and older fish continued to show impaired growth rates. Pulsed gastric lavage of Largemouth bass stomachs showed the most abundant macro-invertebrates to be daphnia, amphipods, chironomids, and damselfly larvae. The Peterson mark and recapture method was conducted via electro-fishing to assume population estimates of (n= 8,109) in 2015, and (n=6,361) in 2014. The next management strategy is the introduction of Tiger muskellunge (*Esox masquinongy x lucius*) and continued monitoring in order to detect any significant trophic change in ecological processes.

***Student:*** Nicholas Byrnes

***Faculty Sponsor:*** Leslie Hasbargen (Earth & Atmospheric Sciences)

**Monitoring Channel and Woody Debris Dam Configurations in Silver Creek** ★

The interplay of sediment movement and large woody debris in streams is a very common interaction in the forested areas of New York. Documentation of the interaction to present, however, has been somewhat limited. We report here the results of total station and structure from motion surveys of a woody debris dam in a low order perennial stream in Otsego County, New York. The surveys were conducted by students in a geological field data collection course at SUNY Oneonta taken over a period of time from 2010 to 2015. Ground control points used in most of the surveys permitted us to tie all of the surveys together in GIS and document decimeter scale changes in ground surface elevation. Longitudinal channel profiles reveal the migration of a knickpoint as the dam began to fail in 2013-2014. Photographs taken since 2007 reveal large changes in the channel character and damming capability of the debris. In 2015, we conducted a photogrammetric structure from motion (SfM) survey to capture more of the changes. Dimensions of the woody debris can be reconstructed, and we anticipate monitoring changes to the dam on a detailed basis moving forward.

***Student:*** Robert Cameron

***Faculty Sponsors:*** Michael McAvoy, Philip Sirianni (Economics, Finance & Accounting)

**How Mass Shootings Affect the Stock Market**

Mass shootings have become an epidemic in America. With shootings due to terrorism, shootings involving mentally unstable people, and shootings due to crimes of passion occurring each month, it seems we are almost accustomed to seeing them on the news. Still, the media plays a large role in how influential each mass shooting will be in relation to the stock market. We investigate how mass shootings may affect the stocks of two major publicly traded gun manufacturers in the U.S., and whether or not the stock market has also become accustomed to these shootings. While there is past evidence indicating that mass shootings cause a decline in stock prices, we further investigate to see if these effects are dwindling or becoming stronger over the years. We resolve this by using an event study of 133 mass shootings from 2009-2015. Findings suggest that the effects of mass shootings are declining over time. While evidence still suggests a significant drop in the 10-day range, 16 basis points from before and after the shooting, the overall significance is almost nonexistent. This data indicates that like the people of the U.S., the stock market has also become accustomed to mass shootings.

***Student:*** Nicolas Capra

***Faculty Sponsor:*** Trudy Thomas-Smith (Chemistry & Biochemistry)

**Determining the Abundance of Triclosan in Silver Creek** ☼

Triclosan is one of the most prevalent antimicrobial agents in use within consumer products. Wastewater treatment processes can reduce triclosan concentrations with over 90% efficacy. However, imperfect treatment strategies combined with the sheer volume of triclosan use in various products have resulted in the presence of μg/L concentrations of triclosan in wastewater effluents. Triclosan is toxic to a number of aquatic organisms, particularly algae, at these concentrations. Previous research shows that triclosan poses an environmental hazard upon photodecomposition, during which it forms trace amounts of the extremely toxic 2-8-dichlorodibenzo-p-dioxin. Furthermore, a 2002 study performed in Sweden demonstrated the ability of triclosan to bioaccumulate, as evidenced by the detection of μg/L triclosan concentrations in human milk. The project goal was to test for the presence and (if detected) the concentration of triclosan in Silver Creek in order to assess its potential for environmental impact. Water samples were gathered from Silver Creek and their organic content was isolated via solid phase extraction (SPE). The organic material was eluted into 5 mL samples of a 50% methanol, 50% acetonitrile solution and stored for analysis via GC-MS and LC-MS instrumentation at another lab. No detectable triclosan was found with LC-MS. The results of LC and GC data will be compared.

***Student:*** Ben Casscles

***Faculty Sponsor:*** Matthew Albright (Biological Field Station)

**Is Lake Trout Recruitment Impacted by Zebra Mussels in Otsego Lake, NY?** ☼

Zebra mussels (*Dreissena polymorpha*) became established in Otsego Lake in 2008 and by 2010 carpeted the lake trout (*Salvelinus namaycush*) spawning shoal at Bissel Point. The literature suggests that the presence of zebra mussels would negatively impact lake trout recruitment because of reduced attractiveness of the substrate and the degradation of interstitial water quality within the substrate. In this study, current lake trout recruitment was examined and compared to recruitment levels observed in 2003-2004 before the zebra mussel invasion. Emergent fry traps were used to capture lake trout fry swimming up from the substrate at the Bissel Point in April–May 2013–2015. Twelve emergent fry traps with a diameter of 81 cm (area=0.52 m2) were set on four linear transects in depths of 30, 60 and 90 cm, across the entire shoal. Fry recruitment between years was variable. Both the highest (4.83 m2/day) and lowest (1.59 fry/m2/day) recruitment levels occurred in the presence of zebra mussels. Fry recruitment was (3.44-3.96 fry/m2/day) in the absence of zebra mussels. Therefore, contrary to expectations from the literature, lake trout fry recruitment in the presence of zebra mussels did not differ significantly from recruitment levels in the absence of zebra mussels.

***Students:*** Geoffrey Chesser, Andrew Mollevik, Henry Hance

***Faculty Sponsor:*** Ron Bishop (Chemistry & Biochemistry)

**Progress in Separating and Identifying Model Hydraulic Fracturing Fluid Components by Gas Chromatography and Mass Spectrometry** ☼

Some petroleum industry operators have been repeatedly accused of allowing their proprietary fluids, including hydraulic fracturing (HF) fluids, to enter underground sources of drinking water, surface streams, and other ecologically sensitive receptors. However, investigators attempting to analyze aquifers suspected of contamination by HF fluids have been unable to evaluate their results due to the complexity of the chemical mixtures involved. The specific aim of our research is to develop an analytical method capable of separating, detecting and identifying HF fluid components in complex mixtures. Using a standard EPA gas chromatography and mass spectrometry (GC/MS) method (Method 8260C) we were able to separate and identify two of the five compounds included in a simplified model HF fluid: glutaraldehyde and 2-butoxyethanol. Altering the chromatographic conditions enabled us to resolve propargyl alcohol as well. However, 2-propanol and ethylene glycol co-eluted with the injection solvent, dichloromethane. Parallel studies were undertaken to determine the extractability of propargyl alcohol, 2-butoxyethanol and glutaraldehyde from water into dichloromethane or diethyl ether

solutions, and the results are being reported. Continuing studies aim to separate more components of HF fluids, and to determine retention times and detection limits for each one by GC/MS.

***Student:*** Allyson Church

***Faculty Sponsor:*** Andrew Gallup (Psychology)

**The Effects of Intranasal Oxytocin on Contagious Yawning** ★

Contagious yawning is thought to represent a basic form of empathy involved in state matching. Despite recent evidence in support of this connection, the neurochemical basis of contagious yawning remains largely unknown. Here, we investigate whether intranasal oxytocin, a hormone and neuropeptide involved in empathic processing, bonding and social affiliation, influences contagious yawning among human participants in a laboratory setting. Using a double blind procedure, 60 male college students received 30 IU of intranasal oxytocin or placebo and were then recorded during exposure to a contagious yawning video stimulus. Contrary to the empathic modeling hypothesis, oxytocin did not increase contagious yawning but rather appeared to modulate its expression in ways indicative of an enhanced awareness of the social stigma associated with this behavior. In particular, individuals in the oxytocin condition were more likely to conceal their yawns and less likely to display overt cues associated with the behavior. Follow-up research could explore how social context and affiliation with the target stimulus alter this response. Gallup, A.C., & Church, A.M. (2015). The effects of intranasal oxytocin on contagious yawning. Neuroscience Letters, 607, 13-16.

***Students:*** Alessia Cipriano, Michael Schonning, Tina Veilson

***Faculty Sponsor:*** Keith Schillo (Biology)

**Effects of Sugar Binging on Circadian Activity in Mice**

Sugar has been implicated as a cause of hyperactivity, but data supporting this claim are inconclusive. We, therefore, tested the hypothesis that consumption of sucrose alters circadian activity. Six adult mice were maintained on a photoperiod of 12L: 12D and given free access to rodent pellets and tap water for one week. They were housed individually in cages equipped with running wheels interfaced with a system to log running activity. Three mice (CON) continued on tap water and rodent pellets for a two-week treatment period. The remaining mice (SUG) were given access to 10% sucrose solution and pellets during this period. During this treatment period, feed consumption remained stable in CON, but decreased in SUG. Water consumption between weeks 1 and 3 decreased from 61 to 53 mL in CON. Consumption of sucrose solution in SUG was 169 mL during week two and 195 mL during week three. Calorie consumptions during the treatment period were 115.9 and 112.5 kcal for CON, and 98.3 and 122.2 kcal for SUG. The elevated calorie intake in SUG is indicative of binging. Despite this effect, activity patterns of SUG were not different from those of CON, suggesting that sugar does not affect circadian activity.

***Student:*** Elizabeth Clifton

***Faculty Sponsor:*** Donna Vogler (Biology)

**Habitat and Prey Density Analysis of Wood Turtles (*Glyptemys insculpta*) in Central New York** ☼

As part of an ongoing study of wood turtles in central New York, we frequently observed multiple individuals with snail remains on their beaks. The high calcium content of snails may be especially valuable to wood turtles. Our study examined the density of snails relative to identified Wood Turtle locations. Replicate cardboard squares (900 cm2) were soaked in water and placed 1 M apart in eight locations on four streams: four were centered at exact sites where turtles were located and four controls were placed in similar habitat where no turtles were found. Squares were left overnight then checked for slugs, snails, and other organisms. The surrounding vegetation was surveyed at each site as was stream width and flow, canopy cover, and distance from the stream, and a rapid stream assessment. Our preliminary analysis shows that vegetation and habitat characters were not significantly different for both known locations of turtles and the control area, suggesting that the turtles may be responding to other habitat characters. The median number of snails per sample appeared greater in the known locations (1.5 vs 1.0 snails per square), but this difference was non-significant (Mann-Whitney test p=

0.396). Additional study of diet and habitat is needed for this vulnerable species of special concern in New York in order to conserve them more effectively.

***Student:*** Elizabeth Clifton

***Faculty Sponsor:*** Matthew Albright (Biological Field Station)

**Preventing Zebra Mussel Veliger (*Dreissena polymorpha*) Attachment Using Potassium Permanganate** ☼

Zebra Mussels are an invasive species that were discovered in Otsego Lake (NY) in 2007. Juveniles of the mussels will attach to rough surfaces using byssal threads to create strong attachments. This has created problems for many water treatment facilities such as the Village of Cooperstown Municipal Water Works, which draws water from Otsego Lake. Adherence by mussels within the pipes at that facility causes clogging and disrupts water filtration. The goal of this study was to prevent the veligers from attaching to the facility's pipes by using potassium permanganate, which is already used by the plant. Ten tanks were set up with about 1000 veligers each after being dosed with 0ppm, 2ppm, 4ppm, 8ppm, or 16ppm of KMnO4 for one hour and then left in their tanks for one month with a plexiglass board to encourage attachment. After one month the water in the tanks was filtered out and anything on the plexiglass was scraped off. The scrapings and filtered matter were viewed under a cross-polarized scope. A chi-squared test showed that there was no difference in the number of attached veligers between tanks ($\chi$=15, df=12, p=0.2414), suggesting that potassium permanganate, at the doses tested, is not effective in preventing mussel attachment.

***Student:*** Jordan Cole

***Faculty Sponsor:*** Sallie Han (Anthropology)

**Observing Politeness in Children** ★

The study of politeness has blossomed over the past half century. Scholars such as Goffman and Brown, and Levinson have provided a solid theoretical framework for understanding how courtesy is used. This study was originally designed to look at the patterns of stance and politeness in children, and it has evolved to include a more general politeness of social conduct and types of storytelling between children. The presentation will include preliminary findings from the field observations. The study took place at a local elementary school. Conversations had by children during their lunch periods were observed. Behaviors and speech that are used to indicate politeness or rudeness were noted. Additionally interactions between children and adults were also noted. This preliminary field work is a good starting point for individuals interested in children's storytelling and manners, or learning more about ethnography in general.

***Student:*** Kaitlynn Connington

***Faculty Sponsor:*** Paul Bischoff (Secondary Education & Education Technology)

**Are there Differences in the Numbers and Diversity of Naked Amoebae in Japanese Knotweed and Non-Invaded Control Sites?** ☼

The purpose of this study was to identify the similarities and differences in the naked amoebae communities in Japanese knotweed and adjacent control site soil systems. Naked amoebae are single celled protozoans that play nutrient cycling roles in most ecosystems. Japanese knotweed plants are successfully invading roadside and riverbank areas in Oneonta and globally. Their prolific success in taking over terrestrial areas previously occupied with diverse annual and perennial plants is due to several factors including a long photosynthetic period, the ability of the plants to multiply via asexual processes, and allelopathy. Allelopathy is the mechanism of the "novel weapon hypothesis" which reduces native species' competition for resources. Preliminary analysis of results show that the naked amoebae communities in Japanese knotweed soils are at least as large and diverse as non-invaded soils, demonstrating no obvious allelopathic effects on the microbial community. In fact, the ability of Japanese knotweed plants to sustain dense and diverse microbial community near its roots may be another reason for its widespread success.

***Students:*** Sabrina Conticello, Sara Stuart, Michael Schonning, Matthew Blanchard

***Faculty Sponsor:*** Kelly Gallagher (Chemistry & Biochemistry)

**In Vitro Examination of the Binding Partners for ER Membrane Complex Subunits 2, 8, and 9**

The endoplasmic reticulum membrane protein complex (EMC) is a multifunctional, multi-subunit protein complex involved with various cellular processes. It plays a role in endoplasmic-reticulum-associated protein degradation (ERAD), which targets improperly processed proteins and degrades them through the use of the proteasome. Some diseases associated with the ERAD pathway include Parkinson's, cystic fibrosis, and viral infections such as HIV and Dengue. EMC2, 8, and 9 are three recently identified subunits of the EMC. Little is known about their functional and structural properties. In vivo experiments have shown that all three are cytoplasmic proteins and exhibit multiple potential binding partners. Both EMC8 and 9 have been shown to bind to EMC2, but little in vitro characterization has been performed on these molecules. To determine whether any of the three proteins express lipid-binding activity and to confirm the protein-protein binding activity observed in vivo, protein-lipid overlay assays and protein-protein binding assays were performed.

***Student:*** Cornelius Corkwell

***Faculty Sponsor:*** April Harper (History)

**Pain in the Middle Ages**

Pain has a huge impact on our everyday lives in the modern era. This research examines the question of whether pain was also a concern in medieval medicine. I will investigate how much of a concern pain was in medieval medicine, whether pain is a physical or cultural experience, what medieval people thought caused pain and how, if at all, they tried to treat pain.

***Student:*** Jansen Costello

***Faculty Sponsor:*** James Ebert (Earth & Atmospheric Sciences)

**Transportation of Microplastics to Terrestrial Dunes from the Shorelines of Lake Ontario and Lake Erie, NY** ☼

Microplastics have been present in the world for many years, however, the study of microplastics is a new field. Microplastics are plastic pollutants that are less than 5 mm in size, commonly in the form of spheres, disks, fragments, and fibers. Biologists have studied the interaction of microplastics on aquatic organisms. However, geological studies of microplastics are in their infancy. This study observed microplastics in terrestrial dune sediments rather than their abundances in lakes, oceans, and on shorelines. Most previous studies have focused on transport of microplastics from land to aquatic systems. There is little to no information on landward transportation of microplastics. Microplastics were observed, collected, and analyzed from multiple locations along the shores of two Great Lakes in New York and Pennsylvania. Samples were collected from terrestrial dunes on the shores of Lake Erie and Lake Ontario. Sixteen samples from five locations were collected along Lake Erie: Sunset Bay, Dunkirk Harbor, Point Gratiot, Presque Isle State Park (PA), and a dune located at the mouth of the Canadaway Creek, Dunkirk, NY. At Sandy Island Beach State Park on Lake Ontario, six samples were taken along three points in the dunes. Two samples were collected from each location: surface samples and shallow sub-surface samples. Standard sieve analyses were performed on each sample. Large microplastics were picked out if visible. Smaller microplastics were separated by density with a dilute lithium metatungstate solution. Microplastics were found in the majority of samples of dune sediment collected. More microplastics were found in the surface samples than the sub-surface dune sand. Fragments and disk-shaped plastics were present in greater abundance than spheres and fibers, suggesting that these shapes are more susceptible to aeolian transport than spheres and fibers. The presence of microplastics in terrestrial dunes suggests an entirely new field of investigation. Although the ecological ramifications of microplastics in lacustrine and marine ecosystems have been investigated, the impact of these pollutants in terrestrial ecosystems is completely unstudied. The widespread presence of microplastics in terrestrial, as well as aquatic systems suggests that these pollutants may be significant markers in the future rock record.

***Student:*** Jaclyn Courter

***Faculty Sponsor:*** Wendy Lascell (Geography & Environmental Sustainability)

**Wetlands Restoration in New Orleans** ☼

Research began on the wetlands of New Orleans, Louisiana, in March 2015 for approximately a week, and picked up again in March 2016. The wetlands restoration project is an ongoing statewide effort along the coastline of Louisiana. My research is focused in and around the city of New Orleans, and outside the city in the Grand Bayou, following the devastation of Hurricane Katrina on August 29, 2005. The wetlands in Louisiana are disappearing at a rate of one football field length every hour. Various federal and state agencies with which we have collaborated have discovered a few response plants that can be used to decrease the rapid deduction of the wetlands. These include bulrush, cypress trees, and other native species. In maintaining and restoring the wetlands another major approach is to remove invasive species in and around the area. This includes hacking the bark and poisoning species such as Chinese Tallow trees. The wetlands restoration efforts took place on two separate service learning trips led by Dr. Wendy A. Lascell. On both trips 12 students were chosen following an application process. Along with another student, I served as a Teaching Assistant during the second trip. These trips were funded by the Domestic Intercultural Immersion Grant, awarded through the College's Strategic Allocation of Resources (StAR) program.

***Student:*** Danielle Crandall

***Faculty Sponsor:*** Trang Tran (Management, Marketing & Information Systems)

**Personalized Ads on Facebook: An Effective Tool for Online Marketers**

A growing number of researchers have examined the effects of personalized advertising in traditional media; however, little has been known about personalized advertising on Facebook. The primary objectives of this research are threefold: (1) Develop a comprehensive model that captures the effects of perceived personalized ads on Facebook on customer attitudinal and behavioral reactions to the ad (ad credibility, ad avoidance, ad skepticism, ad attitude, and behavioral intention); (2) Test hypothesized relationships using two data sets collected through an online survey; and (3) Develop appropriate customer segments based on personal views of personalized ads on Facebook. The presentation culminates with a conclusion and discussion highlighting managerial and research implications.

***Student:*** Chloe Currie

***Faculty Sponsor:*** Achim Koeddermann (Philosophy)

**Mind vs. Machine**

For years, people have been worried about advancement in artificial intelligence (intelligence stemming from computers) replacing the intelligence of humans. This concern goes so far as to say that machines will eventually be able to fully replicate the intelligence of humans. This project examines the various types of knowledge and functions of the human brain that go beyond the limited knowledge of machines. Combining my knowledge of Philosophy and Psychology, I will defend my position that machine intelligence will be unable to capture all functions of the human mind.

***Students:*** Kimmy Cushman, Bridget Boland, Bridget Chartrand, Erika Corbin, Lyteshia Price

***Faculty Sponsor:*** Sunil Labroo (Physics & Astronomy)

**O-SNAP Outreach Impact on Young Students**

A team of SUNY Oneonta undergraduate physics students has visited middle schools across upstate New York. The project was designed to spark an interest in physics and engineering fields, especially among female and minority students. The "make and take activities" from our program are a powerful way to spark that interest because the students can share them with their parents, their friends, etc. Moreover, having an all-female team is a proven role model approach. In our investigation of whether this personalized outreach has impacted young students, we have found that many students have benefitted from the program.

***Student:*** Eric Davis (G)

***Faculty Sponsor***: Willard Harman (Biology)

**Development of Effective Protocols for the Decontamination of Aquaculture Haul Trucks Exposed to Zebra Mussels without Using Formalin** ☼ ★

The possible spread of zebra mussels via aquaculture practices has led to the development of protocols to disinfect the haul trucks used to transport fish for stocking purposes. These suggested protocols often have two treatment portions, an anesthetic primary treatment and a formalin secondary treatment. Due to formalin's carcinogenic properties, the current study investigated possible chemicals for use as zebra mussel disinfectants without the secondary treatment required. Sodium chloride, potassium chloride, and Virkon Aquatic were found to be effective at decontaminating waters containing zebra mussel veligers at concentrations reported not to harm multiple species of fish. Distilled white vinegar was also effective, but would likely not be safe for fish due to extreme acidity of the treatment waters.

***Student:*** Elsie Dedrick

***Faculty Sponsor***: Florian Reyda (Biology)

**Examination of a New Species of Rhinebothriidean Cestode from *Dasyatis margaritella* (Pearl Stingray)** ★

This study of a new species of rhinebothriidean cestode is part of a world-wide survey of parasites, including cestodes, from elasmobranchs. In this study, a morphologically unique species of tapeworm from a rhinebothriidean genus referred to by Healy et al., 2009 as new genus 3 was collected from several specimens of *Dasyatis margaritella* in Senegal. Characteristics for this species were identified using methods such as light microscopy, line drawings, and scanning electron microscopy (SEM). Using these methods, it was observed that the septa and loculi pattern set the species apart. The new species possesses a single loculus followed by a row of four loculi in the anterior region. Distribution of microtriches also sets the species apart from its congeners. Spinitriches on the distal bothrideal surface are unevenly distributed within the anterior loculi. While filitriches are found on the entirety of the proximal bothridial surface, spinitriches are restricted to a narrow band on the posterior half. The arrangements of septa enable distinction of this new species from one other species known from the Eastern Atlantic. This work, among numerous other studies, further emphasizes the diversity of cestodes that still exist and have yet to be defined in elasmobranchs.

***Student:*** Marie Dowd

***Faculty Sponsor:*** Nancy Bachman, ***Staff Sponsor:*** KelLee Hassman (Biology)

**Mouse Neuronal Cell Culture Model and Response to Heat Shock** ★

All cellular organisms respond to heat stress by producing proteins that prevent further unfolding. This heat shock response occurs in most cell types in multicellular organisms, but to different extents. It is becoming increasingly clear that normal cells, especially those involved with specialized functions, have less engaged heat responses because their proteins are acting in normal functions. However, cancer cells and those in many age-related diseases have compromised proteins and a hyperactive heat shock response. In our recent studies we have been examining the heat shock response in mouse Neuro 2a cells, fast-growing mouse neuroblastoma (brain cancer) cells that can be differentiated by treatment with dibutyrl cyclic adenosine monophosphate (AMP) to act similarly to neurons. This cell line is often used in biological research focusing on brain diseases such as Alzheimer's. We have shown that three heat shock protein genes show reduced gene expression following heat shock of differentiated Neuro 2a cells, displaying 12-43% of levels in undifferentiated cells.

***Student:*** Meagan Edwards

***Faculty Sponsor:*** April Harper (History)

**The Role of the Medieval Church in Mental Medical Healing**

This research explores the ways in which the medieval Catholic Church diagnosed and treated mental illnesses. As most diseases, at least according the medieval church, were thought to be a form of

punishment for sin, the church sought treatment through confession and penance in order to restore the body to its former health.

***Students:*** Michael Engesser, Nicholas Tait, Kimmy Cushman

***Faculty Sponsor:*** Joshua Nollenberg (Physics & Astronomy)

**Methods of Spectral Classification in C++** ★

Stellar spectroscopic classification is most often still done by hand. MOSAIC is a project focused on the collection and classification of astronomical spectra using a computerized algorithm. The code itself attempts to accurately classify stellar spectra according to the broad spectral classes within the Morgan-Keenan system of spectral classification, based on estimated temperature and the relative abundances of certain notable elements (Hydrogen, Helium, etc.) in the stellar atmosphere. The methodology includes calibrating the wavelength for pixels across the image by using Hydrogen Balmer-series emission lines. It then calculates the location of the peak in the star's Planck spectrum in order to roughly classify the star. Fitting the graph to a blackbody curve is the final step for a correct classification. Future work will involve taking a closer look at emission lines and luminosity classes.

***Student:*** Tyler Fedoris

***Faculty Sponsor:*** Robert Sulman (Mathematics, Computer Science & Statistics)

**Computer-Generated Explorations of Orbits under Polynomials of the Units of the Ring of Integers Modulo n**

Let G be the group of units of the ring of Integers Modulo n and suppose that f is a polynomial with integer coefficients. We are interested in exploring the orbits under f, and ask if any algebraic structure is contained in such orbits. In particular: When is the orbit of 1 a cycle? If the orbit of 1 is a cycle, (i) When will the elements of this orbit form a subgroup of G? (ii) What will this orbit look like? (iii) What algebraic structure is seen in this orbit and other orbits? These questions have been examined previously (Robert Sulman, 2012) using no more than a hand calculator to facilitate computations. However, larger groups lead to tedious computations if only a calculator is utilized. Computer programs to determine answers to the above questions lead to additional insights which may suggest a rigorous proof of the results produced by such samples. In this presentation, we explore patterns seen for specific polynomials applied to the groups G noted above for n equal to various powers of 2.

***Student:*** Melissa Fine

***Faculty Sponsor:*** Oscar Oberkircher (Human Ecology)

**FiNEBiTES Granola** ☼ ★

This project was designed to develop the FiNEBiTES Granola product, a 100% natural and nutrient rich granola. The methods used in the product development included market analysis, competitive analysis, blind sampling and surveys. Feedback was collected and analyzed for recipe revisions and granola testing. Cost analysis was completed as well as comparison of bulk ingredient costs. Through networking with various health food stores, connections were established with potential retailers. FiNEBiTES Granola will be displayed and sold at Green Earth health food store in Oneonta, NY where the commercial kitchen was utilized for the granola production. FiNEBiTES Granola logo and labels were professionally designed and will be displayed along with the detailed progression from the initial design to the finished design. A final FiNEBiTES Granola product will also be displayed along with information regarding nutrition content. Granola samples will be provided for tasting and the mission of the brand and the overall development of FiNEBiTES Granola will be displayed on the day of the SRCA event.

***Student:*** Gretchen Flubacher

***Faculty Sponsor:*** Wendy Lascell (Geography & Environmental Sustainability)

**Cultural Immersion in New Orleans, Louisiana** ☼

During spring semester 2015, I participated in a service-learning course that included a trip to New Orleans, Louisiana to work with Common Ground Relief, a grassroots non-profit organization formed

after Hurricane Katrina to help the community with the recovery process. The trip was led by two professors, Drs. Wendy A. Lascell and Anita Levine, who selected the students through a competitive application process. Program costs were funded by the Domestic Intercultural Immersion Grant offered through the StAR program. The experience quickly became much more than I anticipated. We not only helped with wetlands restoration, but were also immersed in the local culture of New Orleans. The large homeless population stood out immediately. Many people are still suffering from the wrath of Hurricane Katrina, ten years later. We encountered several Katrina survivors, which was an eye opening experience for all of us. One woman we met created a documentary during Hurricane Katrina showing the devastation and what she and her family experienced. Katrina changed her life trajectory from a life of crime to an award-winning film-maker. Conversations with Katrina survivors enriched the experience; it is the type of learning that just cannot happen in a classroom.

***Student:*** Samantha Fontaine

***Faculty Sponsor:*** Donna Vogler (Biology)

**Disease Assessment of the Wood Turtle (*Glyptemys insculpta*) in New York State** ☼ ★

The wood turtle (*Glyptemys insculpta*) is classified as a species of special concern by the New York State Department of Environmental Conservation (NYS DEC). To effectively manage this species, all threats to its populations must be known. This includes the presence of infectious disease, an increasingly significant cause of biodiversity loss. Urbanization can increase wildlife disease prevalence because elevated stress levels reduce disease resistance. This study aims to assess disease as a conservation concern in NYS wood turtles. Turtles will be screened for three significant pathogens, Mycoplasma spp., herpesvirus spp., and ranavirus spp. Swab samples will be obtained from three populations following a rural to urban (north to south) gradient through NYS. PCR analysis will determine presence or absence of each disease in each population and prevalence rates will be calculated. Statistical analyses will be performed to test the hypothesis that the most urban population will have the highest disease prevalence.

***Student:*** Kayla Francisco

***Faculty Sponsor:*** April Harper (History)

**Mental Health in the Middle Ages**

This research focuses on what mental illness was thought to be in the Middle Ages – a physical illness, a manifestation of sin, or demonic possession. The project analyzes different approaches to curing and caring for the mentally ill from medical treatment to spiritual care to confinement.

***Student:*** Thomas Franzem

***Faculty Sponsor:*** Dan Stich (Biology)

**Factors Impacting Amphibian Populations in Anthropogenic Vernal Pools** ☼ ★

Vernal pools are small seasonal wetlands constituting vital features of upland ecosystems. The ephemeral nature of the pools means aquatic predators cannot live in them, making them important breeding grounds for many amphibians. Vernal pools don't receive the same level of protection as larger wetlands. As such, these habitats are rapidly disappearing. Anthropogenic vernal pools are, in theory, useful in mitigating habitat loss, but we have limited information on how effective they are. Also, if built incorrectly they can become ecological traps and do more harm than good for the amphibian species that use them. The purpose of this project is to study two sets of anthropogenic vernal pools constructed a decade ago on the Rum Hill property of SUNY Oneonta's Biological Field Station in Cooperstown, New York, and determine effects of ecological factors on species occupancy of pools. We will examine occurrence and detectability of amphibians in 16 vernal pools spread across distinct habitats (upland meadow and northern hardwood forest). We will use these data to relate amphibian occupancy and abundance to environmental variables and site characteristics. This research has applications for future construction of vernal pools, for conservation, and for improved understanding of ecological benefits of human-created vernal pools.

***Student:*** Shawn Gerard

***Faculty Sponsor:*** April Harper (History)

**Battlefield Medicine**

The purpose of this research is to study battlefield medicine in the Middle Ages. The project focuses on changes in technology and methods over time, their relationship to changing battlefield technology, and the cultural differences between battlefield medicine as practiced in Christianity and Islam. Advances to the practice of medicine in war and on the homefront that resulted from conflicts between these two religions on the battlefield will also be considered.

***Student:*** Luke Gervase (G)

***Faculty Sponsor:*** Willard Harman (Biology)

**Millsite Lake: A Case Study of Aquatic Plant Management** ☼

Millsite Lake is an oligotrophic lake located within the town of Theresa, NY in Jefferson County. Established in 1973, the Millsite Lake Property Owners Association (MLPOA) currently faces a number of lake management challenges, such as the growth and expansion of Eurasian watermilfoil (*Myriophyllum spicatum*), unsuitable soils for septic systems, and preserving the current state of the lake. The MLPOA views control of Eurasian watermilfoil (EWM) as the top priority, has treated the lake with different herbicides such as 2,4-D or Triclopyr-based formulae since 1990, and had an aquatic plant survey completed in the summer of 2000. The MLPOA chose not to treat the lake with herbicides in 2015. After 24 years of herbicide treatment each summer, a new plant survey with the same methods from 2000 was conducted in the summer of 2015. The results of the 2015 survey found a stark decrease in EWM abundance and an increase in biodiversity of native macrophytes. Based on these results and anecdotal evidence, the MLPOA has decided to not use any herbicides again in 2016. The data from the 2015 plant survey presents a fascinating case study in aquatic plant management for a long-standing nuisance species.

***Students:*** Lea Giambruno, Christina Tursi, Samantha Ferguson

***Faculty Sponsor:*** Alexandra Nicolette (Human Ecology)

**Healthy Avocado Brownies**

In America today, obesity rates are skyrocketing. One of the factors contributing to this is American consumption of excess saturated fats. Increasing the polyunsaturated and monounsaturated fat content and decreasing saturated fat in the American diet can help lead to a more heart-healthy diet, and decrease health concerns related to obesity and heart disease. Testing must be done to further show this relationship. The purpose of this study was to find a stable fat substitute by replacing butter in brownies with avocados, and lowering the saturated fat while increasing heart-healthy fat content. Avocados have the characteristics of a fat, such as mouth feel and texture. The study substituted avocados at 50%, 75%, and 100% of butter fat in the brownies. These brownies were made with a standardized recipe, which became the control group. The different levels were made and compared using a hedonic scale rating from 1 (most liked) to 4 (least liked). Based on hedonic scale ratings, participants observed significant subjective differences in samples as the percentage of avocado increased. The participants favored the 50% avocado brownies most, with the 100% replacement not liked as well compared to the other samples provided. All of the brownies scored between a 2 and 3 rating for mouth feel and texture, meaning these categories were acceptable to participants. In conclusion, avocados can be used as a reliable replacement for other fats in brownies; however, more research is warranted.

***Student:*** Kristine Glass

***Faculty Sponsor:*** April Harper (History)

**Madness in Medieval Christian and Muslim Medical Thought**

Mania and depression were treated differently in the Middle Ages by different religions, including the treatments used by Islam and Christianity. These two schools of thought believed in religion as an underlying factor. However, while Islam's school of thought was to treat the madness, Christianity believed madness was caused by demonic possession. Islam believed in demonic possession as well,

but not for the common case of mania. Treatments varied from eating well to carving a cross on the forehead of a supposed victim and reciting a prayer. Although mania and depression remain a puzzle in the modern day world of science, as these two schools of thought progressed, they came to understand which treatments were effective.

***Student:*** Leah Gorman (G)

***Faculty Sponsors:*** Willard Harman, Kiyoko Yokota, Dan Stich (Biology)

**DeRuyter Reservoir, Madison County, NY: A Case Study on Invasive Plant Management Strategies and a Look into the Future** ☼

DeRuyter Reservoir, an approximately 550 acre mesotrophic lake located in central New York and used primarily for recreation, has been employing various methods to control their aquatic invasive plant species, primarily *Myrophyllum spicatum* (Eurasian Watermilfoil) and *Potamogeton crispus* (Curly-leaf Pondweed). The current strategy for control of *Potamogeton crispus* involves early season removal with a mechanical harvester, while a study is being conducted on native insects as an agent of biological control for *Myriophyllum spicatum*. As a comprehensive watershed and lake management plan for DeRuyter is developed over a course of two years, I will determine if these strategies are the most effective for this system. Further, management strategies must also consider the forthcoming threat of *Najas guadalupensis* (Southern Naiad) which has already colonized within the lake, as well as the threat of new invasions.

***Student:*** Anna Graziosi

***Faculty Sponsor:*** June Tyler (Art)

**Ghost Stories** ★

Human beings have strived to understand the supernatural and what happens after life. We tell ghost stories around the fire and speak wistfully about our lost loved ones. We are connected by our desire to believe in something more, something greater than what we know. These practices have existed since the beginning with the Neanderthals, when grave goods were first placed with the dead in the form of flowers, until today, when hills are filled with tombs and stone angels. The purpose of this project is not solely to be an exploration of different cultural beliefs. In this artwork, I hope to show an understanding of how people try to hold on to those they have loved and lost, and how they create their own ghosts. The illustrations I created depict ghostly figures in an environment created for them by the ones that they have left behind. These environments have become safe havens for the spirits, filled with grave goods and homages to the dead. Without showing the living, the works are made with the hopes of depicting the relationship between the living and their lost ones and show how we keep our lost loved ones close.

***Student:*** Taylor Harper

***Faculty Sponsor:*** Tami LaPilusa (Biology)

**Impacts of Reptile Trade on Conservation Efforts and Animal Welfare** ☼

In February 2014, thirteen endangered San Salvador Rock Iguanas were smuggled from The Bahamas into the United Kingdom. The animals were seized at Heathrow Airport and eventually repatriated to The Bahamas, however, one of the animals died during the return transit. This incidence is not an isolated one, as both legal and illegal trade of reptiles continues to climb worldwide. Additionally, declines in numbers of certain reptile populations around the world are compounded by environmental and other factors. For small populations, in particular, such as the San Salvador Iguanas, a decline of thirteen individuals can be devastating. The rise in reptile trade has brought with it many issues regarding population decline and the concern over the continuation of many species. In addition to issues regarding populations, the reptile trade and its practices also jeopardize the welfare of individual animals. The lack of regulations for transport and collection protocols contributes to reptilian health issues and population decline. Poor enforcement of reptilian collection and endangered species laws contribute to over-collection, especially of endangered species. The reptile dealer's lack of concern for reptile health leads to poor health in transport and inadequate veterinary care for exotic animals seized

during trafficking. This project explores critical issues necessary for regulating reptile trade, and maintaining health of individuals both in transit through legal trade and while in quarantine at Animal and Plant Health Inspection Service (APHIS) facilities. While these deficiencies create a grim outlook for the future of the reptile trade and conservation, the combined use of regulations, legislation, and education can combat the increase in reptile trade and issues concerning reptilian health. Regulations for reptile transport and collection procedures will help more animals to survive and keep populations viable. Increased enforcement of laws will aid the effectiveness of those regulations. Educating transport officials, law enforcement, and exotic animal veterinarians will give reptile trade and conservation a brighter future.

***Student:*** Amanda Hartigan

***Faculty Sponsor:*** April Harper (History)

**Contraception and Abortion in the Middle Ages**

This research is concerned with the practice of contraception in the Middle Ages. It explores the contraception that was available to people in the Middle Ages across a wide geographical and religious spectrum, and how medieval men and women tried to control their own fertility and childbearing. It also explores to what extent this was not only a personal concern, but a community concern, and to what extent medieval people followed church or scientific ideals in their practice.

***Students:*** Elaine Herron, Janine Militello

***Faculty Sponsor:*** Andrew Gallup (Psychology)

**Investigating Emotional Contagion in Budgerigars (*Melopsittacus undulatus*)** ★

Emotional contagion, which represents the triggered sharing of an emotional state based on the observation of another, is perhaps the most basic form of empathy. Despite the recognized importance of studying empathy in humans, comparative investigations have received relatively little attention. Here we investigate the empathic capabilities of budgerigars (*Melopsittacus undulatus*), a highly social parrot indigenous to Australia. Building from recent experiments with mice, we tracked the behavioral and physiological responses of paired birds for a period of 40 minutes after observing a researcher's gloved hand for five minutes that was either empty or holding a captured conspecific (repeated-measures design). It was expected that observer birds would show matched stress responses to the captured birds (i.e., increased temperature and yawning). However, results show no differences between conditions for our measures of stress. While these findings do not provide evidence of emotional contagion in this species, this could be due to the small sample size and/or limitations in the experimental design. Future research will explore other methods for testing emotional contagion in budgerigars.

***Student:*** Michael A. Hodges

***Faculty Sponsor:*** Barbara Durkin (Management, Marketing & Information Systems)

**Workplace Bullying: Should Companies, Supervisors and the Bullies Themselves Be Legally Liable?**

Workplace bullying has been defined as repeated, health-harming mistreatment of one or more persons (the targets) by one or more perpetrators. It is abusive conduct that is intentionally threatening, humiliating, or intimidating, and is designed to cause work interference or sabotage. It can take many forms, the most notable being verbal abuse. Much like sexual harassment, the motive for workplace bullying involves the ability of the perpetrator to successfully exercise power or control over the victim. However, unlike sexual harassment, no universal tort exists at the state or federal level to pursue civil litigation. When an incident of workplace bullying occurs, individuals who are victimized have little-to-no legal recourse. This research will explore the recent legal developments worldwide concerning workplace bullying and the proposed legislation in the United States to address this on-going issue.

***Student:*** Abigail Hogan

***Faculty Sponsor:*** Wendy Lascell (Geography & Environmental Sustainability)

**Student Awareness of the Sustainability Initiatives at SUNY Oneonta ☼ ★**

Sustainability is a concept with rising importance for colleges all over the globe. SUNY Oneonta is no exception as they have implemented numerous sustainable initiatives, with many more anticipated. The purpose of this research is to assess the student awareness of sustainability initiatives at SUNY Oneonta, and to explore comparisons with other SUNY schools. One component of the study consists of a student survey of a variety of majors across the disciplines to determine their awareness of campus sustainability initiatives. The authors surmise that only a small number of students outside of the natural sciences/environmental science majors and introductory science classes will be aware of sustainability initiatives. Through interviews with other SUNY schools, more information and ideas on how to spread awareness on each campus and within the SUNY system can be discovered. The information obtained from this study can be of use by the College to assess effectiveness of current initiatives and to find new methods of dispersing relevant information to the student body.

***Students:*** Kendra Hogan, Molly Capito

***Faculty Sponsor:*** Alexandra Nicolette (Human Ecology)

**Low Fat Double Chocolate Chip Cookies**

The epidemic of obesity is a serious issue in the United States, contributing to increased rates of diabetes, cardiovascular disease, hypertension, and stroke. Since there are a variety of complications surrounding the overweight/obesity epidemic, demands for low-fat and fat-free food options are increasing. This experiment used prune puree to replace 50%, 75%, and 100% of the fat (butter) in double chocolate chip cookies. Fourteen SUNY Oneonta food science students were given a 9 point hedonic rating scale survey to evaluate each cookie recipe's color, texture, shape/integrity, taste, and odor; and a 4 point subjective scale to evaluate the flavor, appearance, mouthfeel, and overall rating. Thickness of the samples was also assessed using a standard ruler. There were no significant differences in the panel's preference of flavor, appearance, and mouthfeel of each cookie sample. Of the 14 panelists, the majority chose the control full fat cookie as their preferred cookie, followed by the 75% replacement, then the 100%. The least preferred was the 50% replacement. Prune puree as a fat replacement for butter was shown to be accepted by consumers as a healthy fat replacement.

***Students:*** Kirsten Horstman, Sara Strachan, Edwin Reyes

***Faculty Sponsor:*** Alexandra Nicolette (Human Ecology)

**Healthy Chocolate Chip Cookies**

Obesity has increased among the population worldwide since the 1980s, leading to issues such as diabetes, high cholesterol, and heart disease. Seventeen percent of all deaths in the U.S. pertain to obesity related illnesses (Perry & Swanson, 2007). Foods that contain large amounts of fat, such as cookies, contribute to obesity. Cookies are a popular snack in the U.S. and are consumed on a regular basis. Most cookies are formulated to be about 30-60% fat, 30-75% sugar, and 7-20% water. A typical cookie, such as a chocolate chip cookie, contains 6 g of fat per cookie. A healthy fat replacer such as prune puree decreases the amount of fat in a cookie by replacing butter. Americans tend to prefer a soft, chewy cookie rather than a hard brittle classic European cookie, which is why chocolate chip cookies are consumed so prevalently (Perry & Swanson, 2007). Prune puree was used as a fat replacer in chocolate chip cookies for an experiment in the lab to create a healthier cookie.

***Student:*** Paul Hotaling

***Faculty Sponsor:*** William O'Dea (Economics, Finance & Accounting)

**The Effects of Uber on the Efficiency of the New York City Taxi Cab Market**

This project examines the forces that underlay Uber's entry into the New York City cab market. Uber's profitability is rooted in the inefficiencies of traditional medallion taxi cabs in New York City. There are two inefficiencies: fixed prices and a fixed supply of medallion taxis. Due to the high cost of obtaining a medallion, owners of medallions oppose the creation of more medallions so their medallions

maintain value. During peak hours, taxi cab demand exceeds the supply, creating a shortage. This also creates an inconvenience for riders who must either wait longer for a cab or run the risk of not being able to find a cab at all. We recommend that Uber be allowed to operate, but without the ability to undercut medallion cab prices. This maintains the value of medallions, while also providing a net benefit to society by allowing more people to obtain rides and reducing the inconvenience caused by current policy. We will use a model of the New York City cab market to compute the social benefit from allowing Uber to enter the New York City cab market.

***Student:*** Amanda Howell

***Faculty Sponsor:*** Jill Fielhaber (Biology)

**Using Interferons to Alter Inflammation in *Clostridium difficile* Infected Cells**

*Clostridium difficile* (*C. difficile*) infections are a common cause of antibiotic and hospital-acquired diarrhea, symptoms of which are caused by inflammation and the apoptosis of cells lining the intestine. Initiation of the immune response to *C. difficile* is mediated by recognition of the bacteria by Toll-like receptors (TLR). When TLRs are bound, an inflammatory response is initiated, via MyD88 and NF-kB. These, in turn, induce the expression of inflammatory cytokines. TLRs can also activate TRIF, leading to production of interferons (IFNs), regulators of cell death. IFNs do this through STATs, which control the expression of apoptotic genes. The balance of NF-kB and STAT activation is important for initiation and resolution of the immune response, by balancing inflammation and apoptosis. My goal is to determine how IFNs impact inflammation during immune response to *C. difficile*. Using Western blot, I measured NF-kB and STAT activation in *C. difficile* exposed cells, and found that both pathways are activated. Consistent with activation of NF-kB, the inflammatory gene IL-8 was also upregulated in cells exposed to *C. difficile*. Future work will measure how IFNs alter the balance of NF-kB and STAT activation in cells exposed to *C. difficile*, and how this alters inflammatory gene expression.

***Student:*** Julian Hoyos

***Faculty Sponsor:*** William O'Dea (Economics, Finance & Accounting)

**The High Cost of "Cheap" On-Street Parking in Manhattan: An Application of the Shoup Model** ☼

Finding an on-street parking space can be a challenge in urban areas. In New York City, because curbside parking is priced well below off-street parking, drivers often assume that it is the best alternative. Donald Shoup argues that in equilibrium, the prices for two relatively close substitutes should be approximately the same. If the money prices for the two types of parking are not equal, then something else has to make the prices equivalent. In Shoup's model, that "something else" is that cruising for a space causes inconvenience costs in the form of the length of time the search takes, and the cost of the fuel consumed. In addition to the costs borne by searchers themselves, the search for on-street parking also creates external costs by increasing traffic congestion and the level of pollution emissions such as CO2. This project employs a simple demand and supply model to estimate the total inconvenience costs borne by drivers cruising for parking spaces in Midtown West, Manhattan. Once these costs are determined, we can then estimate the value of time lost, as well as the total external costs. Our results show that "cheap" on-street parking is nothing more than an illusion.

***Student:*** Nathaniel Ingraham

***Faculty Sponsor:*** April Harper (History)

**Family Planning in the Middle Ages**

This project focuses on the ways in which medieval people used contraception and abortion to plan family size. It will analyze when a fetus was considered to be a human and in what ways the Church impacted contraception choices and practice. It will also consider similar ideas in Judaism and Islam.

***Student:*** Shane Irwin

***Faculty Sponsor:*** Philip Sirianni (Economics, Finance & Accounting)

**Robustness of Environmental Kuznets Curve Models which Include a Measure of Income Inequality** ☼

My research tests how well the model provided by Qu and Zhang (2011) holds up when additional environmental factors and measures of income inequality are included. The Environmental Kuznets Curve (EKC) is an economic theory which states that as income per capita rises, environmental degradation rises as well. This continues to happen until a certain level of income is reached; past this level, as income rises we observe a reduction in environmental degradation. It is represented graphically by an upside-down U. I build upon past literature which examines the existence of the EKC for Sulfur Dioxide and Nitrogen Oxides and investigate if the EKC exists for Carbon Dioxide and Particulate Matter which measures less than 2.5 micrometers in scale. My model uses panel data and a fixed effects regression, controlling for income inequality, to empirically support the existence of the EKC for the stated pollutants. I estimate the exact level of income which results in the reduction of environmental degradation. This level of income is the point on the graph where the inverted-U is at its peak. This information can be used to influence public policy to help promote a globally sustainable future.

***Student:*** Alexis Izzo

***Faculty Sponsor:*** April Harper (History)

**Apothecaries and Pharmacology in the Medieval Medical Marketplace**

This project is centered on apothecary and herbal medicine during the Middle Ages. I am examining the early development of apothecaries and how they served the public, the types of products they prescribed, and who went to apothecaries. Since this was one of the earliest forms of medicine, I want to look at how it developed and continued to be used by physicians and patients throughout the Middle Ages. I will also examine some of the most common texts that were circulating at the time related to herbal medicine. Regimens will also be included in my research and how apothecaries played a role in the daily lives of the people.

***Student:*** Miles Jahnke

***Faculty Sponsor:*** April Harper (History)

**Mental Illness in the Middle Ages**

The central premise of this research rests upon an analysis of mental illness during the Middle Ages. First, I examine how the medieval mind understood mental illness and how Western medical practitioners, religious figures, and philosophers differed in their understanding of it. Furthermore, Western and Eastern understandings of mental illness are juxtaposed, thereby comparing and contrasting not only how people understood mental illness from the general perspectives of these two very distinct cultures, but also how each culture sought to treat such ailments. Lastly, I draw comparisons between medieval and contemporary medicine, illustrating both the similarities and differences between the two understandings.

***Student:*** Merlyn Jeanty

***Faculty Sponsor:*** Fred Zalatan (Biology)

**Quantitative Analysis of the Effect of Secretory Mutants on the Yeast Ty1 Retrotransposon**

Transposable elements are comprised of DNA sequences that have the ability to move to new sites in a host cell's genome. Ty1 is a transposable element in the yeast *Saccharomyces cerevisiae* that serves only to replicate and insert itself in the yeast genome. Ty1 replicates through an RNA intermediate and is, therefore, termed a retrotransposon, which has retrovirus-like features. Gene products produced during replication of Ty1 include a group specific antigen called the GAG protein as well as a reverse transcriptase. The Ty1 Gag protein forms complexes with Ty1 RNA, termed retrosomes, which eventually lead to even more complex arrangements referred to as virus-like particles (VLP). Unlike viruses, however, the VLPs never leave the host cell. The VLP enters the nucleus, reverse transcription of the Ty1 RNA occurs, and the resulting Ty1 DNA is then inserted into a new location in the yeast

genome. Various yeast proteins aid in retrotransposon replication, some of which may be involved in the secretory pathway. Our primary focus will be to test whether mutations of the Sec 10 and Sec 15 proteins (which function in secretion as part of the yeast exocyst complex at the cell membrane) affect Ty1 function.

***Student:*** Christian Jenne (G)

***Faculty Sponsor:*** Willard Harman (Biology)

**Truesdale Lake: 50 Years of In-Lake Treatments – A Plan for the Future** ☼

Truesdale Lake, located in Westchester County New York, is a man-made lake created in 1927. It has a 2,000 acre watershed, with 51% in the state of New York and 49% located in Ridgefield, Connecticut. For the past 50 years, the Truesdale Lake Association has been controlling invasive aquatic plants, predominantly Curly Leaf Pondweed (*Potamogeton crispus*) and harmful algal blooms (HABs). Stakeholders have recalled that 30 plus years ago residents around the lake would drag pillow cases stuffed with copper sulfate through the water to attempt to control HABs. Hand pulling of aquatic vegetation dates back even further when swimming and boating became impaired. Since the times of pillow cases, lake management companies have been attempting to control these two issues with algaecides and herbicides, but have seen little positive outcomes. A lake management plan will be comprised of techniques and practices that will reduce the nutrient load coming into Truesdale Lake, as well as complement chemical treatments. The end goal of the plan is to try to limit the amount of chemicals being added into Truesdale Lake.

***Students:*** Toni Koval, Taylor Lee

***Faculty Sponsor:*** April Harper (History)

**Growing Up and Growing Old in the Middle Ages: Lifecycle and Medieval Medicine**

This project is a comparative analysis of childhood and old age medical care during the Middle Ages, focusing on what the specialized care at each end of the lifecycle says about medieval ideas of youth as a distinctly different body than that of an adult, and the transgendering effect of old age.

***Students:*** Emily LaLonde, Autumn Smith

***Faculty Sponsor:*** Theresa Loomis (Human Ecology)

**Understanding the Barriers to Registered Dietitians Practicing in the Neonatal Intensive Care Unit** ★

**Purpose:** To determine the barriers to dietitians practicing in the neonatal intensive care unit (NICU). **Subjects:** 262 Registered Dietitians (RDs) voluntarily completed the online questionnaire regarding their knowledge, comfort level and experience working with preterm infants. **Design:** 2500 researcher developed surveys were emailed to RDs across the United States. Two hundred and forty eight surveys were returned so additional requests to complete the survey were administered via social media. This resulted in 24 more responses. **Methods:** The electronic survey consisted of 24 open-ended questions. The survey was single blinded and all of the responses remained confidential. IRB approval was obtained prior to the administration of the survey from the State University of New York at Oneonta. Descriptive statistics were used to analyze the data. **Results:** Less than half of the respondents had experience working with premature infants (40.6%). Of the RDs who were not comfortable working in the NICU 55.2% responded that it was due to insufficient knowledge regarding neonatal nutrition. Continuing education was cited as the most desirable mode of obtaining education on working with this population (79.2%). **Conclusion:** An increase in continuing education opportunities for RDs on nutrition for preterm infants is paramount.

***Student:*** Ryan Leigh

***Faculty Sponsor:*** April Harper (History)

**Battlefield Medicine**

This project explores the practices of medicine on the battlefield during the Middle Ages. This includes common battlefield surgeries such as arrow removal and wound stitching, and the progression of these

surgeries through history with the invention of different weapons. It explores different practitioners and surgeons who practiced on the battlefield, such as Henry IV's surgeon, John Bradmore. Also, it examines inventions the doctors used on the battlefield to help save soldiers' lives, including Bradmore's arrow removal device and the hooked needle used for stitching.

***Student:*** Jenna Leskovec (G)

***Faculty Sponsor:*** Willard Harman (Biology)

**Exploring Management Options for Aquatic Plants in Windover Lake** ☼

Windover Lake is a 100-acre, cold-monomictic lake located in Johnsburg, NY, in Warren County. This location places it within the 6-million acre Adirondack Park, an area under increased regulatory protection by both state and private agencies. First dammed in 1916, the lake is man-made, very shallow, and prone to extensive nuisance aquatic plant growth. The main management goal for Windover Lake is to reduce aquatic plant growth by the most effective and least expensive means. Methods available for use in the Adirondack Park are explored, in terms of feasibility and cost.

***Student:*** Stefanie Lewis

***Faculty Sponsor:*** Keith Brunstad (Earth & Atmospheric Sciences)

**Crystallization History of the 1 Ma Tieton Andesite Lava Flow, Washington State, USA** ★

Over 1 Ma, Goat Rocks Volcano in the Cascade Range, WA, produced one of the longest andesitic lava flows, nearly 80 km in length, with a volume of at least 2 km3 and a thickness of up to 60 m. The flow extends from Goat Rocks Volcano down the broad ancestral Tieton River valley through a narrow canyon pooling in the Naches Valley at the outskirts of Yakima, WA. The goal of this study is to document any compositional variations and crystal size distribution within the Tieton andesite lava flow to determine the processes that produced this lava flow field. Samples were taken stratigraphically from near the source on Pinegrass Ridge to its terminus near Yakima. The samples were analyzed in hand sample and thin section using a petrographic microscope, and chemically using X-Ray Fluorescence and Inductively Coupled Plasma Mass Spectrometry. Initial conclusions about the Tieton andesite flow include: (1) the length of the flow appears to have been controlled by heat loss, effusion rates, and topography; (2) the eruption was driven by more mafic magma injection into the Tieton andesite magma chamber; and (3) multiple smaller volume lava flows erupted during the declining stage of the eruption.

***Students:*** Joshua Louden, Patrick Wilson

***Faculty Sponsor:*** Joshua Nollenberg (Physics & Astronomy)

**Searching the Outer Solar System for Trans-Neptunian Objects** ★

The objects of the Kuiper Belt can be detected, photographed, and cataloged with proper observational technique, even though they are extremely dim and approximately three billion miles from the sun. With telescopes and imaging equipment from the Physics & Astronomy Department at SUNY Oneonta, as well as the principles of astrophotography and the physical properties of the Kuiper belt, an observer can determine and implement an appropriate method of detection for these objects. This includes, but is not limited to, required exposure times, probable location in the night sky, probability of detection based on distance from Earth, and the spatial distribution with respect to the ecliptic plane. Observation of these objects can result in the classification to one of the four major groups of Kuiper Belt objects (KBO) and, from this, approximate age, mass, period, and speed can be determined. This project is designed to locate objects brighter than magnitude 25, although some professional surveys reach magnitude 30. Using SUNY Oneonta's observatory, these objects will be studied in further detail to provide insight to the structure and evolution of the solar system.

***Student:*** Kathleen Marean (G)

***Faculty Sponsor:*** Willard Harman (Biology)

**Sixberry Lake: Protecting an Oligotrophic Lake from Anthropogenic Eutrophication** ☼

Sixberry Lake is located in Jefferson County, NY, approximately 13km from the St. Lawrence River. The lake is part of the Indian River Lakes region, a network of 18 natural lakes and the Indian River. While the Conservancy owns multiple properties in the area and is active in working to protect the collective watershed, the Sixberry Lake Association is responsible for its own lake management plan. The lake is ~27m deep, cold, and oligotrophic with much of the incoming water believed to be from ground water sources. It has a mean depth of 14m and a surface area of 51.8ha. The most recent study of water quality data was undertaken in the summer of 2004. Based on observational reports collected in a survey of watershed residents, there has been an increase in algae; and, from the first noted occurrence of an algal bloom in September 2014, it appears the lake may be transitioning into a mesotrophic state. Watershed characteristics will be studied, and chlorophyll α, total phosphorus and nitrogen, and water clarity data will be collected through 2016 to shed light on the underlying causes of the observed apparent shift in trophic status.

***Student:*** John Marino

***Faculty Sponsor:*** Fan Chen (Economics, Finance & Accounting)

**The Wealth Effects of Mergers and Acquisitions on Bondholders: New Evidence from the Over-the-Counter Markets**

Using the over-the-counter bond transaction data from TRACE, we investigate daily bond market reactions to merger and acquisition announcements. We find that acquirer (target) bonds experience negative (positive) and statistically significant abnormal standardized returns over a two-day event window while speculative rated bonds experience more negative returns than investment grade rated bonds. Acquirer bondholders' losses are positively correlated with the deal size. In addition, whether cash is used to make acquisitions plays a more important role in determining acquirer bondholders' losses than other deal characteristics. For cash deals, acquirer bondholders suffer more when bonds are speculative rated, are long-term bonds, and when acquirer bonds' maturity is longer than target bonds' maturity. Consistent with the prediction that the gains to target bondholders differ when the acquirer is a private firm, target bonds earn negative returns when the acquirer is a private firm, but experience positive returns when the acquirer is a public firm. Lastly, consistent with a loss (gain) to acquirer (target) bondholders, acquirer (target) bonds are more likely to be downgraded (upgraded) than upgraded (downgraded) following the announcement of a merger or acquisition.

***Student:*** Christopher Martorell

***Faculty Sponsor***: April Harper (History)

**Epidemics in the Middle Ages**

This research project focuses on epidemics in the Middle Ages. The Plague of Justinian, which affected the Byzantine Empire during the early Middle Ages, and the epidemic known as the "Black Death" in the late Middle Ages are contrasted. The effects that the plagues had on the population, economy, and social classes are examined. What medieval authorities thought caused the epidemics and why the 14th century plague spread so rapidly throughout Europe are also analyzed.

***Students:*** Valerie Matedero, Sabrina Conticello, Brett Schleiser

***Faculty Sponsor:*** Keith Schillo (Biology)

**Metabolic Responses to High-Intensity and Low-Intensity Workouts** ★

We tested the hypothesis that metabolic responses associated with a fast (4 min) high-intensity workout (HI) are comparable to those of a slow (30 min) low-intensity workout (LI). Four subjects completed both HI and LI in randomized order with a 48-h recovery between workouts. HI included a series of eight bouts of stationary cycling. Each bout consisted of 20 s of intense pedaling at high resistance, followed by 10 s of slow pedaling at low resistance. LI included 30 min of moderately paced pedaling at an intermediate resistance. Variables reflecting metabolic status were monitored throughout the 30-

min LI, between the start of and 26 min after the end of the HI, and 90, 120 and 150 min after the start of exercise. Calorie expenditure during the 30-min period encompassing the workouts was slightly higher during HI than in LI. Following exercise, HI subjects exhibited a more sustained elevation in blood lactate concentrations, lower blood oxygen saturation compared to LI. Respiratory exchange ratios decreased after exercise indicating that metabolism of fats increased after both workouts. We conclude that the metabolic costs associated with 4 min of HI are comparable to those of a 30-min LI.

***Student:*** Kelsey McKeighan

***Faculty Sponsor:*** Tracy Allen (Geography & Environmental Sustainability)

**Lake Atitlán: Securing Water, Sustaining Development** ☼ ★

The purpose of this project is to review and develop water resources sustainability within the Lake Atitlán watershed by analyzing water quality data, evaluating current water-related sustainable projects, and recommending future sustainable initiatives. Lake Atitlán is the most valuable natural resource in Guatemala and is considered to be one of the most beautiful lakes in the world. Unfortunately, water pollution and the general environmental decline of the region have led to a number of threats to water resources. Deforestation, soil erosion, invasive species, fertilizers, solid waste, and raw sewage are major problems throughout the watershed. Significant increases in nitrate and phosphate concentrations from sewage and fertilizers are particularly concerning. Nutrient loading causes eutrophication, hypoxia, and toxic algal blooms. Promising water quality solutions already in place include: gravity fed waste water treatment plants, gray water and treated waste water irrigation, nutrient loading reduction by plants, sustainable agricultural practices, and small-scale tilapia ponds. Two further initiatives that could be successful and beneficial in the Lake Atitlán watershed include banana circles and constructed wetlands.

***Student:*** Kalif McMikle

***Faculty Sponsor:*** April Harper (History)

**Veterinary Medicine in the Middle Ages**

Veterinary medicine in the Middle Ages played an important part in the social and economic functioning of society. This project examines how animals were often associated with social class and to what extent we can use the abundance of veterinary texts to better understand animals' role in signifying social class. It will also look at the differences in veterinary care in the Christian West and Muslim East and how religion influenced the care and role of animals in society.

***Students:*** Janine Militello, Elaine Herron

***Faculty Sponsor:*** Andrew Gallup (Psychology)

**The Effect of Oxytocin on Contagious Yawning in Budgerigars (*Melopsittacus undulatus*)** ★

Experimental evidence of contagious yawning has been documented in budgerigars (*Melopsittacus undulatus*), as well as in four mammalian species. However, the neurochemical basis for this social behavior is still largely unknown. Oxytocin and mesotocin, the avian equivalent, are hormones and neuropeptides that facilitate positive social interaction. In particular, oxytocin has been implicated in empathic processing in humans, and contagious yawning has previously been considered a behavioral marker of empathy. Since oxytocin and mesotocin vary by only one amino acid, and oxytocin activates mesoctocin receptors in the avian brain, this study investigated the potential link between oxytocin and contagious yawning in budgerigars. A total of 13 male budgerigars were given intramuscular injections (10ul) of oxytocin (0.1IU) or saline solution and displayed videos of yawns or matched control behaviors recorded from birds within the same population (2x2 repeated measures design). Overall, we replicated earlier evidence of contagious yawning in this species, but failed to show an effect of oxytocin on this response. These findings are consistent with recent research on humans; however, further research is needed to explore varied doses and methods of administering oxytocin or mesotocin in this species.

***Student:*** Jade Mitchell

***Faculty Sponsor:*** April Harper (History)

**When "Women's Health was Women's Business"**

This project centers on women's medicine in the medieval time period. I will be focusing specifically on gynecology, including menstruation, pregnancy, and contraception. Women's medicine during medieval times was very different than it is today. The practice of women's medicine was often dictated by the church and propriety, so many doctors avoided this field of medicine. During this time, women's medicine was mainly practiced by midwives and older women in the communities. Women's medicine suffered because it was not really studied, and most of the practices were ineffectual or even hazardous.

***Students:*** Elliot Moore, Hannah Olds, Andreas Stolzer, Hayley Lovett, Melissa Marry, Eian Trenkle

***Faculty Sponsors:*** Paul French, Jane Simpson (Physics & Astronomy)

**Topological Irregularity in Projectile Experiments**

In high schools across the United States, the introductory physics curriculum typically includes the two-dimensional projectile motion problem. In the lab setting, this problem is usually presented as ideal, so students can learn physics principles using simple calculations. In practice, however, non-ideal lab conditions can interfere with the results of this experiment. For example, a floor with a 2 degree slope from horizontal can cause a three percent error in students' velocity calculations. Our objective in this project is to minimize the error in calculations for initial velocity caused by a sloped floor. Initially, we focused on the case where the launch angle is horizontal and the floor slope is known, allowing us to calculate the initial velocity with good precision. We then developed two additional methods for finding an accurate initial velocity. In the case of a small slope, we model the final horizontal position as an exponential function of floor slope. More generally, where floor slope is unknown, we compare the final horizontal positions for two launches with different (but known) launch angles to determine the initial velocity and floor slope.

***Student:*** Meagan Moore

***Faculty Sponsor:*** April Harper (Sociology)

**Medieval Misogyny and Madness**

This project examines the relationship between doctors and patients in the Middle Ages, particularly women. The consequences of imposing values on the humoural system allowed misogyny to fester in doctor-patient relations, and it is seen that even though we think of our modern ideas as progressive, even modern psychologists (Freud, specifically) have clung to some of these ideas. For example, pompous attitudes toward female patients, sex as a cure to mental illness, and attitudes toward virginity and mental illness in general are eerily similar in both practices. The rise in universities may have attributed to some of these attitudes, and the Church may have influenced others.

***Student:*** Alyssa Moran

***Faculty Sponsor:*** Jonathan Brown (Mathematics, Computer Science & Statistics)

**Mathematical Discovery in Elementary School Classrooms**

With the combined efforts of Dr. Jonathan Brown and SUNY Oneonta sophomore Alyssa Moran, a unique lesson plan was created. Taking the concepts of Euler Characteristic, which are introduced in college level mathematics, the authors refined their vocabulary in order to teach the lesson to second graders. Students were given the opportunity to explore and make their own discoveries from this math lesson. This spy-themed math lesson had students calculating the Euler Characteristic of the letters in their names, tree diagrams, box, and triangle diagrams. Students were engaged and excited to learn more about the mysteries in math.

***Student:*** Nicholas Muehlbauer

***Faculty Sponsor:*** Donna Vogler (Biology)

**Pollen Tube Growth on a Windy Day**

It has been demonstrated that gravity and environmental conditions affect plant growth patterns. Pollen tubes offer an ideal way to test, in vitro, how plant growth is affected by environmental stimuli, specifically movement. My experiment was designed to determine if or how movement by wind affects pollen tube growth. Pollen grains of lily were evenly distributed onto microscope slides and left to germinate in a Brewbaker Kwack solution. Half were left to germinate in a stationary table top environment, and replicates were placed on a shaker to simulate movement of the flower under windy conditions. Image analysis was used to track germination percentage and length of pollen tubes. This experiment examines effect of wind and movement during the time of pollen tube growth.

***Students:*** Sarah Newtown, Alejandro Reyes (G)

***Faculty Sponsor:*** Kiyoko Yokota (Biology)

**Survey of Brant Lake's Zooplankton Assemblage and Early Detection of AIS** ☼ ★

Zooplankton, which are located in the middle of most aquatic food chains, provide a critical energy pathway for higher trophic levels while also being able to exert grazing pressure on primary producers, limiting algae growth. A balanced zooplankton population is often associated with a balanced ecosystem. In addition, looking at the zooplankton of a lake is a good way to detect aquatic invasive species (AIS) at low abundances. Larval and some adult stages of prominent AIS in the northeast (*Dreissena spp*., *Corbicula fluminea*, and *Bythotrephes longimanus*) are planktonic and can be observed by the same sampling techniques for zooplankton. We sampled zooplankton during the open water season of Brant Lake, NY (April to October). No larval stages of AIS were detected throughout sampling. Fifteen different zooplankton taxa were observed, representing seven families. The majority of individuals were observed in early June, with rotifers being the dominant group (*Keratella cochlearis*, *Kellicottia longiseta* and *Polyarthra major*) followed by unknown juvenile copepods and nauplii. The dominance of small-bodied zooplankton in our samples may be due to predation by *Chaoborus spp* and *Osmerus mordax*, however, more sampling and spatial coverage is needed to determine if this is so.

***Student:*** Madelyn Nicolini

***Faculty Sponsor:*** Thomas Beal (History)

**The Fork Less Traveled: The Decline of Farming and Rise of Wineries on Long Island's North Fork** ☼ ★

Located 75 miles east of the New York City metropolitan area, the North Fork of Long Island had, up until the last three decades, existed as a quiet potato farming community. The last three decades have seen the region transformed through the thirty-six wineries that have opened on the thirty mile stretch of land that borders the Long Island Sound, attracting over one million visitors each year. This project has focused on the concept of "alcohol tourism," in which the compelling reason for tourism is the presence of alcohol-producing establishments. Though research has been devoted to the history of the North Fork as a traditional agricultural region, no research has been devoted to tourism related to alcohol on the North Fork. Research at historical societies yielded newspaper articles from local publications and agricultural studies, and studies which documented the growth of the national wine industry. The study of local businesses revealed the economic prosperity that alcohol tourism has had upon the region, at the expense of infrastructure failings and community division. Though a wine region still in its infancy, the North Fork region has transformed from a rural farming community to a preeminent tourism destination.

***Student:*** Elise North-Kirkman

***Faculty Sponsor:*** April Harper (History)

**The Aged in the Middle Ages**

This project focuses on aging in the Middle Ages. Social factors associated with growing older are examined, such as how one was treated as an elder and whether this varied by class. Were there nursing homes in the Middle Ages where the elderly could go to be cared for, or would they be forced to care for themselves or rely on family members to assist them? Did religion have an impact? What were the differences in the treatment of the elderly particularly in Islam, Judaism, and Christianity? How the elderly were treated, both medically and socially, and what influenced those treatments are examined. At what age was one considered "old" and would doctors pay extra attention to the elderly citizens of their communities or would they neglect them? Would social class play a role in their treatment and medication?

***Student:*** Blair O'Brien

***Faculty Sponsor:*** April Harper (History)

**Magic or Medicine?**

This research focuses on the reality of herbal remedies used in Anglo Saxon medicine. Today people are becoming more and more holistic with their health care even given the great advances in medicine. Sometimes it even feels as if we are going backwards in time and using what nature gives us to treat our bodies, as was done in the beginning of the medieval times. Before there was surgery and drugs there were just plants and herbs from Mother Nature to fix the problem. In the book *Anglo Saxon Medicine,* Max Carson looks at what in historical writings seems like bogus "charms" or "spells" in order to cure pain, and identifies what works scientifically.

***Student:*** William O'Connell

***Faculty Sponsor:*** Donna Vogler (Biology)

**Wood Turtle (*Glyptemys insculpta*) Annual Ring Comparative to Growth** ☼

Wood turtles (*Glyptemys insculpta*) are species of special concern in New York State; studies on the current populations in New York will be important to assess their status. One way to assess growth is the use of annual growth rings of their carapace scales (scutes). As a reference data set, we used 20 preserved turtles from a large collection (~300) at SUNY Oneonta to count annual rings and compared these to overall carapace size to determine the relationship between ring number and size. We used linear regression to correlate size of the turtles with the occurrence of rings. We also applied some descriptive statistics to a t-test to see which scutes have the most viable ring data, and if growth is constant throughout the shell. This test shows that there should be equal growth between adjacent scutes. The relationship between ring count and carapace measurements shows that annual rings are suitable to age wood turtles.

***Student:*** Matthew Oesch

***Faculty Sponsor:*** Achim Koeddermann (Philosophy)

**Healthy Farms, Healthy Communities** ☼

"Abstraction of one man's skill and means of production from another's completes and makes necessary everywhere the dependence of men on one another and their reciprocal relation in the satisfaction of their needs." *Hegel*. Question: What happens when one of the dependents is removed from the community, i.e. the dairy farm? The remaining dependents have lost a thread from the communal tapestry; the loss of which causes all remaining threads to become loosened, as they spread to fill the void. The community then tries to stop the loss by importing 'commercial milk.' 'Commercial milk' fulfills the bodily need for milk while failing to address the reciprocal community relations previously in place. The creameries, local milk tanker trucks, agricultural feed and equipment stores have now lost their reciprocal dependent (the local dairy farm). As a result their threads become frayed, putting further strain on the communal tapestry. As the threads at the center of the agricultural community unravel they take with them the outer threads: doctors, teachers, professionals, main street

businesses and veterinarians. The loss of so many threads finally reduces the communal tapestry to common cloth: an existence in place of an art. "Each man in earning, producing and enjoying on his own account is eo ipso producing and earning for the enjoyment of everyone else. The compulsion which brings this about is rooted in the complex interdependence of each on all." *Hegel*. Therefore: Healthy Farms, Healthy Communities.

***Student:*** Jerrad P. Pacatte

***Faculty Sponsor:*** Thomas Beal, Susan Goodier, Omar H. Dphrepaulezz (History)

**A Peculiar "Picnic": Revisiting the April 1878 Spectacle Execution of Samuel Steenburgh ★**

It is a tale entangled in race, crime, booze, and an American admiration for violence. Described by the *New York Times* as a "picnic," on April 19, 1878, in the presence of over fifteen thousand white spectators, Samuel Steenburgh dropped from the gallows; the weight of his own body brought Steenburgh's life of crime to a screeching and theatrical end. Sam lived and died his life on the fringe of the law, and his taste for whiskey often landed "Sam Sam the Gallow's Bird" in serious trouble. His execution drew New Yorkers far and wide to celebrate the affair, as specially chartered trains arrived from locales across the state in order to allow white New Yorkers the opportunity to witness Sam's final rendezvous with the gallows. But Steenburgh's death inflamed the myth, north and south, of blacks as "insolent and drunken negroes" prone to commit crime. White New Yorkers capitalized on the affair, I argue, in order to craft the scapegoat they needed to mask the true nature of race and crime in New York State and to justify Steenburgh's theatrical execution. His hanging warrants an analysis of capital punishment, its relationship to race, and spectacle lynchings – affairs in which whites assembled to uphold the sacred principles of northern white supremacy.

***Student:*** Colleen Parker (G)

***Faculty Sponsor:*** Kiyoko Yokota (Biology)

**Monitoring of Mercury in Catskill Region Fish ☼ ★**

A 2008 study of strategic monitoring of mercury in New York State fish addressed concerns of high levels of mercury in fish tissue, raising potential concerns for consumption and human health. Adirondack lakes and the Catskill region were most noted for their high mercury levels; further investigation of these waters is vital. In collaboration with Syracuse University (SU), we are conducting a study to re-evaluate and address the state of health of these water bodies as part of the statewide monitoring program commissioned by the New York State Energy Research and Development Authority (NYSERDA). Using SUNY Oneonta's Biological Field Station as the survey hub for the Adirondack and Catskill regions, we will sample 13 water bodies for mercury in fish tissue, targeting a total of 30 individuals of either Walleye, Yellow Perch, Smallmouth Bass or Largemouth Bass per site. Water chemistry data will also be collected to identify if chemical parameters correlate with mercury accumulation in these waters. Goodyear Lake, one of the thirteen waterbodies, was sampled in May 2014, and results showed elevated levels of mercury in fish tissue. The twelve remaining sites will be sampled into summer of 2016. Our results for the Adirondack and Catskill sites will augment the existing statewide database of mercury levels in the environment, and help authorities determine appropriate actions to be taken (such as fish consumption advisories) to protect public health and improve the statewide monitoring program into the future.

***Students:*** Anthony Pelegrino, Michael Schonning, Brenna Crowe, Michael Yanchus, Kaleigh Engert, Joshua Heeder

***Faculty Sponsor:*** Andrew Gallup (Psychology)

**Does Altering the Temperature of the Carotid Artery Influence the Expression of Contagious Yawning?**

The physiological function of yawning has remained elusive for centuries, though growing evidence within the last 10 years supports a role in brain cooling. Here, we test this hypothesis by modifying the temperature of the carotid artery of human subjects prior to and during exposure to a contagious yawning stimulus. Participants were randomly assigned to hold one of three temperature compresses

(4°C, 21°C, 46°C) just over the carotid artery for a period of five minutes. Thermal images were taken at the bridge of the nose and the cavernous sinus (via the superior ophthalmic vein) before and after the five-minute period to assess accompanying changes in skull temperature. Following this, participants were instructed to continue holding the compress to their neck while they watched a 170-sec contagious yawning video stimulus. Yawning was measured through video recordings and self-report. Data collection and analysis are ongoing, but preliminary data show an increase in yawning for participants using warm compresses and a decrease for those using cold compresses. These findings are consistent with the brain cooling hypothesis and provide further evidence that non-social variables can alter the expression of yawn contagion.

***Student:*** Aaron Phillips

***Faculty Sponsor:*** Jill Fielhaber (Biology)

**Assessing the Link between Inducible Nitric Oxide Synthase and *C. Difficile* Infection ★**

*Clostridium difficile* (*C. difficile*) is a bacteria that is commonly responsible for diarrhea and colitis. Exposure to the bacteria, through a combination of bacterial components and immune responses, triggers inflammation and cell death, resulting in damage to the large intestine. Nitric oxide has antimicrobial functions and immunoregulatory properties. In addition, Nitric oxide can also trigger cell death. Nitric oxide is generated by nitric oxide synthases, most notable of which is inducible nitric oxide synthase (iNOS). iNOS is expressed by cells in response to microbial components and inflammatory mediators. One such inflammatory mediator that regulates iNOS expression is interferons (IFN). Findings thus far indicate an increase in the inflammatory mediator interferon beta (IFNβ) in correlation with the immune response to *C. difficile*. This study seeks to determine if iNOS expression is expressed as part of the immune response *C. difficile*, if iNOS has an effect on the expression of IFNβ, and how this may contribute to cell death. By exposing 3T3 murine fibroblast cells to *C. Difficile*, expression of correlating genes can be measured in the presence or absence of an iNOS inhibitor (L-NMMA). From this a relationship between such inflammatory mediators and *C. difficile* infection can be determined.

***Student:*** Daniel Prince

***Faculty Sponsor:*** Jonathan Brown (Mathematics, Computer Science & Statistics)

**3D Educational Video Games in non-Euclidean Spaces**

We exist in what is apparently 3-dimensional Euclidean space. In mathematics, there are a variety of 3-dimensional non-Euclidean spaces. Physicists do not know the topology of the universe. For example, if the universe is Euclidean, then a spaceship could travel in a straight line forever, always moving further from its starting point. However, if the universe has the topology of a 3-dimensional sphere, then a spaceship traveling in a straight line would eventually get back to the point at which it started. In order to help mathematicians and physicists get a better intuition for these non-Euclidean spaces, we plan on writing a variety of computer games which take place in these exotic spaces. We will implement these games using the programming language C++ and OpenGL, an application programming interface for rendering 3D graphics.

***Student:*** Hunter Reed

***Faculty Sponsor:*** April Harper (History)

**Chivalric Medicine: The Medical Experience of Upper Class Soldiers during the Middle Ages**

Medical practice during the Middle Ages varied tremendously between social classes, genders, and locations. This presentation focuses on the experience of knights (upper class men) and how medicine affected their lives. Men had specific regimens that were written for their highly active lifestyle. They also experienced battlefield medicine and many early emergency surgeries during war time. Medieval men also experienced many of the same ailments as today's males, including hernias, anal fistulas, and strangulated testicles. Many of today's lifesaving surgeries for these ailments were pioneered on knights during the Middle Ages. Men's medicine in the Middle Ages has many parallels with today's practices, but it is important to examine these within their formative context.

***Student:*** Emilie Richard

***Faculty Sponsor:*** Tsitsi McPherson (Biology)

**SUNY Oneonta Ecological Footprint Assessment Survey for 2016** ☼ ★

The objective of ecological footprint assessments (EFA) is to measure the environmental impact of the actions of individuals. While surveys exist that allow homeowners and non-students to assess their environmental impact, a survey tool that allows for an assessment of university students is not widely available. Student perception of their impact on the environment can be assessed and environmentally beneficial behaviors proposed. We report on the development of a student-centric EFA for SUNY Oneonta. The objective of the footprint assessment was to measure the environmental impact of each student for three resource categories. We assessed average student electricity usage, garbage production, and carbon emissions from commuting via the SUNY Oneonta Public Transit bus. In addition, the survey sought to validate and utilize the results from a previously conducted commuter survey, which measured the campus population's "willingness-to-pay" to offset the carbon emissions of their commute. Preliminary results from the spring 2015 survey suggest that many students are unaware of their environmental impact. This survey builds on responses from the spring 2015 survey, expanding on garbage production assessment and introducing commuter carbon assessment.

***Student:*** Alexander Robillard (G)

***Faculty Sponsor:*** Donna Vogler (Biology)

**Genetic Landscape of the Wood Turtle (*Glyptemys insculpta*) in New York State** ☼ ★

For wood turtle conservation, the John G. New legacy collection (a set of roughly 300 dried turtles dating back to the late 1950s) has proven to be a rallying point for turtle biologists across the northeast. Collected by Dr. New, former SUNY Oneonta Biology Department chair, the assemblage serves as a rare genetic treasure trove which has garnered attention from the scientific community. As a piece of a larger Master's degree thesis, we have used this rare data set to begin to identify temporal changes in wood turtle populations across New York State. By using modern genetic techniques in conjunction with cutting edge statistical software, we can accurately address the criteria required for listing the wood turtle. Our goal remains to address these criteria in an informative report to the NYS Department of Environmental Conservation and recommend the most appropriate course of management for maintaining the wood turtle in New York State.

***Student:*** Alexandria Robison

***Faculty Sponsor:*** April Harper (History)

**The Friars and Medicine**

This project examines the church reaction to the Black Death, specifically in regard to friars and their involvement as medical providers during this time. The friars' reaction to the Plague and why it differed from the overall church reaction and that of other religious groups is a focus of the research, which also examines what the friars were actively doing in the towns to help the infected, and what role faith played in this beyond the simple association to the Catholic Church.

***Students:*** Neil Rosenfeld, Marina Seidel, Wilaysha Evans, Trevor Ambrose

***Faculty Sponsor:*** Jacqueline Bennett (Chemistry & Biochemistry)

**Greener Synthesis of Electroluminescent Compounds and Metal Ion Detection in Water Samples** ☼

Organic light emitting diodes (O-LEDs) are common in modern electronics, especially in flat screen monitors. The compounds that emit light in these devices resemble those for which our research group has patented a greener synthesis. Our group recently extended this method to known electroluminescent compounds and their precursors. One synthesis in particular was improved from a 78% (literature) yield to a >99% yield with excellent purity. We also synthesized a compound used in the literature to construct an O-LED that has no published synthetic method, and recorded a >99% yield, again with excellent purity. Our group has also produced preliminary results suggesting that some of our compounds can complex with cations dissolved in water to provide a sensitive visual test for their

presence. With further development, this has the potential to develop into a series of simple, inexpensive tests for detection of metal ion contaminants in water sources.

***Student:*** Gabrielle Ruf, Paul Rus, Elizabeth Freer, Victoria Macri, Taylor Mackin, Dan Mayer

***Faculty Sponsor:*** James Zians (Psychology)

**Parental Attitudes and Concerns about Youth Risk Behaviors in a Rural County in Upstate New York (Otsego County)**

Youth and their families who live in rural areas of the U.S. face unique challenges and circumstances regarding youth risk behaviors such as alcohol/drug abuse, youth violence, vandalism, youth mental illness and suicide. In general, rural areas have higher rates of poverty that impact children and adolescents, and a higher probability of adverse childhood experiences than urban areas. Problem behaviors that may be higher in rural areas include bullying, and being socially disruptive. In rural America there are disproportionate rates of mental illness for children, teens and adults, and often mental illnesses are of greater severity compared to non-rural areas and with disproportionately poor outcomes. Additionally, adults and young teens in rural areas tend to abuse drugs and alcohol at the same rate as those in larger metropolitan areas. Empirical research also shows that youth who live in rural areas and feel more connected to and engaged with their communities are at less risk for problem behaviors such as mental illness, suicide risk, truancy, vandalism, alcohol or drug use problems, juvenile delinquency and other conduct problems, as well as problems involving legal issues and local court systems. While the prevalence rates of drug and alcohol abuse are almost equivalent, smaller communities have very limited resources to deal with these problems. Given that Oneonta, NY is a college town with many social venues that appeal to college students (high density of bars, alcohol venue establishments), parents are presented with additional challenges and concerns. This two-phase study focused on youth risk behaviors in Otsego County. Phase One consisted of a youth-risk questionnaire completed by parents age 18 or older residing with their child/children in Otsego County. Phase Two involved the collection of archival data on youth arrests and youth risk behaviors that included police involvement during the past two years, provided by the Oneonta Police Department (part of the public record). In Phase One, the parenting survey, 303 parents residing in Otsego County having a child age 17 or younger were recruited at the Southside Mall in Oneonta, NY. Each participant received a five-dollar gift card for their participation, which was anonymous. Of the completed surveys, 89.1% were completed by one parent, and 10.9% were completed by parent dyads answering questions together. The average age of the parents was 37.7 years and the average number of children per family was 2.05. Of the one-parent respondents 78.2% were mothers and 26.8% were fathers. The six-page survey asked parent respondents to rate levels of risk and concern for youth in Otsego County on domains of interest such as: alcohol problems, drug abuse, community vandalism, bullying, tobacco use, school problems, and knowledge about local community services targeting youth for treatment of mental illness. Parents were asked their opinion of topics related to living in a college town (e.g., Do you think marijuana should be legalized? Do you think the legal drinking age should be lowered?). Of particular interest are some of the differences in attitudes and concern ratings based on the age of one's children. The survey also asked parent respondents to compare their attitudes and concerns to other parents (e.g., Do you think that your rating of youth risk for drug abuse is higher or lower compared to ratings by other parents?). Next, parent respondents gave ratings about their own sense of "community connectedness" and how they perceived their child/children's "community connectedness." Finally, parent respondents were asked to give personal ratings on a parenting efficacy questionnaire. Analyses were conducted on several dependent variables of interest looking for difference about three parent groups: 1) parents with only younger children age 11 and younger; 2) parents with only older teenage children age 12 to 17; and 3) parents with both younger children and older teenage children.

***Student:*** Debra Savino

***Faculty Sponsor:*** April Harper (History)

**Women's Medicine in the Middle Ages**

This research project is concerned with the practice of women's medicine in the Middle Ages, the anatomy of women, and common treatments during this time period. It examines what these ideas and treatments reveal about the view and status of women during this time period.

***Student:*** Michael Schonning

***Faculty Sponsor:*** Andrew Gallup (Psychology)

**Comparison of the Winner-Loser Effect in Collegiate Baseball and Softball Double-Headers**

Competition can be observed in animals for a variety of reasons, ranging from fights over mates to territory protection. Within such contests, growing evidence shows that the winner is more likely to win the subsequent events, while the loser is more likely to lose a following event. This response is in part due to increased testosterone levels among winners and decreased testosterone and increased glucocorticoid levels in losers. This response, known as the winner-loser effect, has recently been demonstrated in MLB double-headers, whereby sweeps are significantly more common than splits when teams play two games in the same day (Gallup and Eldakar, 2015). Here, we examined this effect among collegiate baseball and softball players by comparing the percentage of double-headers resulting in sweeps versus splits observed in the Big East Conference from 2010-2014. In total, 504 double-headers were analyzed (126 baseball, 378 softball). Consistent with previously collected data, sweeps occurred most frequently: i.e., roughly 70% of the time for both baseball and softball. Both results drastically deviate from chance levels ($p < 0.000001$). The degree of similarity between men and women suggests that differences in baseline testosterone do not significantly alter this response.

***Student:*** Michael Schonning

***Faculty Sponsor:*** Kelly Gallagher (Chemistry & Biochemistry)

**Determination of the Oligomerization State of Endoplasmic Reticulum Membrane Protein Complex Subunit 8 (EMC8)** ★

The endoplasmic reticulum membrane complex (EMC) is thought to be involved in the endoplasmic reticulum associated protein degradation (ERAD) network, the propagation of dengue virus, lipid transport, and the conjunction of the endoplasmic reticulum (ER). The endoplasmic reticulum membrane protein complex subunit 8 (EMC8) is a subunit of the EMC that has an uncharacterized structure and function. Knowledge of the molecular structure of EMC8 can provide important clues to the biological role of EMC8. This information is crucial to obtaining a full understanding of the function of the EMC and ERAD. Once such an understanding is established, it could be used to develop potential therapies to alleviate the dengue virus movement, HIV virus transport, and more. This examined the oligomerization state of EMC8 using protein analysis techniques including affinity chromatography, western blot analysis, native gel electrophoresis, and size-exclusion chromatography to determine if EMC8 exists as a monomer or homodimer in solution.

***Student:*** Derek Smith

***Faculty Sponsor:*** Paul Bauer (Economics, Finance & Accounting)

**Steering the Federal Funds Rate Pre-Recession vs. Post Liftoff**

The Federal Reserve has set the federal funds rate at the zero lower bound for close to a decade, and recently has finally decided to increase the target range from 0-.25% to .25-.5%. However, because of the large scale asset purchases conducted by the Fed after the 2007 recession, many analysts are wondering whether or not the Federal Reserve will be able to efficiently maintain this increase and future increases in the federal funds rate. This project intends to evaluate the effectiveness of the Federal Reserve by comparing pre-recession variations from the federal funds target and post liftoff variations, in an effort to support the confidence in the Federal Reserve in their ability to maintain the federal funds rate within the target range. We find that the variations from the target has decreased over the years, and will likely be the same between the zero lower bound and any future increases.

***Student:*** Anna Solak

***Faculty Sponsor:*** Betty Wambui (Africana & Latino Studies)

**The Assumed Biological Justifications of Discrimination against Women in Law Enforcement**

As a woman who has always wanted to go into law enforcement, I have always been met with similar responses. Most people seem to assume that all jobs in my chosen field are too dangerous. I always wondered why, so I decided to research what I believe to be the most prominent reason, which is that society assumes that women are weaker and therefore cannot perform the same jobs as men. It is widely believed that women cannot protect themselves in dangerous situations because they are not as physically strong as men. I found that these beliefs are completely unfounded, despite the assumed biological justifications for these prejudices. However, the beliefs persist even as the information disproving these ways of thinking become more widespread. All of the information I found proves that simple muscle mass is not a key contributing factor to how effectively someone can perform the duties of a law enforcement officer, even though that is how most people in the United States and other western countries define strength. Through this research and my continued pursuit of a career in law enforcement, I plan to contribute to the breaking down of the stereotypes about women not being as physically capable as men.

***Student:*** Michael Spinelli

***Faculty Sponsor:*** Fan Chen (Economics, Finance & Accounting)

**Stock Market Returns and Crude Oil Prices**

Using monthly data from Jan.1989–Feb. 2016, I examine how the U.S. stock market reacts to the change in crude oil spot and futures price after controlling for other macro-economic indicators, such as unemployment rates and interest rates. Given the extant evidence that oil and gas industry returns also react asymmetrically to changes in oil prices, I also investigate whether a crude oil price increase has a greater impact than a decrease in prices. Furthermore, I examine whether the relationship between crude oil prices and stock market returns differs before and after the financial crisis.

***Students:*** Kieran Stack, Brian Arkin, Anthony Santor

***Faculty Sponsor:*** Chien-Wei Lin (Management, Marketing & Information Systems)

**When and With Whom to Ally: An Empirical Study on Cause Marketing Alliance**

Cause marketing (CM) has been viewed as an important marketing program to link a firm's products or services to fundraising for the benefit of a social cause. As shown in a recent IEG Sponsorship Report (2015), U.S. CM spending reached $1.85 billion in 2014, representing a 3.9 percent increase from the prior year, and a 125 percent increase from 2002. Many companies across different industries, such as consumer packaged goods, retailing, insurance, or restaurant, have implemented CM campaigns in support of various charities or causes. Recently, it is increasingly common to find firms involved in strategic alliances with other firms to execute the CM campaign/CM alliance. Using data from an online CM news website, we empirically investigated firms' announcements of CM and CM alliance campaigns. The results of 247 CM campaigns show that both within-industry (27%) and cross-industry (45%) alliances are popular for both public and private firms. CM alliance also interacts with program continuity. Finally, public and private firms differ on CM executions including Non-Governmental Organization (NGO) cooperation, donation form, and social media use.

***Student:*** Matt Stein

***Faculty Sponsor:*** Wendy Lascell (Geography & Environmental Sustainability)

**Using Remote Sensing to Monitor Rebuilding of the Lower 9th Ward, New Orleans** ☼

Hurricane Katrina struck the city of New Orleans on August 29, 2005, flooding 80% of the city. The Lower 9th Ward neighborhood was devastated as flood waters poured through a levee breach pushing homes off their foundations and altering the geographic landscape dramatically. Recovery and rebuilding has been slow. The neighborhood went from a population of 8,501 (2000 census) to 128 (2010 census). As of 2016, the population is still extremely low and much of the neighborhood remains empty. Aerial photography and satellite imagery is used to analyze the effects of Hurricane Katrina on

the housing in the Lower 9th Ward. Satellite imagery from 2003 (pre-Katrina) is compared to Post-Katrina imagery from 2005, 2007, and 2014. Aerial photographs from flights taken by the author along with Dr. Wendy Lascell dated 2006 and 2015 are also used in the analysis. Rebuilding and recovery has been slow. Two non-profits have been responsible for the bulk of the rebuilding: Common Ground Relief is a grassroots non-profit formed immediately after the flood event, and Make It Right is a national non-profit led by Brad Pitt. This analysis examines the rebuilding efforts of both non-profits in the Lower 9th Ward using Remote Sensing techniques.

***Student:*** Emily Stephenson

***Faculty Sponsor:*** April Harper (History)

**Pain Management in the Middle Ages**

The purpose of this project is to explore methods of pain management in medieval medicine. For example, how did practitioners and their patients view pain? It is important to also look at the significance of religion and spirituality in regards to how people dealt with pain. Many religious groups celebrated suffering pain, such as Christians, as pain played a vital role in their own religious salvation, bringing them closer to their God. Through medical texts and discussions from schools of art and medicine, the evolution of pain and pain management can be observed through time, flowing into modern medicine.

***Student:*** Erika Stopler

***Faculty Sponsor:*** Jacqueline Bennett (Chemistry & Biochemistry)

**Greener Synthesis of Thiosemicarbazones and the Development of a Qualitative Tyrosinase Inhibition Assay** ☼

Thiosemicarbazones (TSCs) are a class of compounds with antibacterial, antifungal, and antiviral properties. Our research group has recently developed a greener synthesis for TSCs. Compared to traditional methods, our greener method uses aqueous lactic acid for the solvent, requires no reflux, completes in less than 15 minutes, and results in good to excellent purities and yields without purification. A total of 18 TSCs have been made thus far using this method. This synthesis was then brought to the organic chemistry teaching laboratory. Because TSCs are known inhibitors of plant browning enzyme, tyrosinase, we also wanted to develop a simple, qualitative tyrosinase inhibition assay for the organic chemistry laboratory. We successfully developed an assay where solutions of TSCs and control compounds were applied directly to fresh plant slices, allowing for a simple analysis of inhibitory activity against tyrosinase in an organic laboratory setting. A collaboration with biochemistry students allowed for quantitative analysis. TSC solutions were shown to inhibit tyrosinase and could perhaps be used to treat hyperpigmentation disorders in humans in the future.

***Student:*** Sara Stuart

***Faculty Sponsor:*** Jill Fielhaber (Biology)

**The Role of IFNβ: Measuring the Combined Effects of *C. difficile* and IFNβ** ★

*Clostridium difficile* (*C. difficile*) is the most common cause of hospital-acquired diarrhea and colitis. After infection, tissue injury disrupts the barrier provided by epithelial cells in the intestine. This damage is caused by cell death, which is primarily a result of necrosis or apoptosis. Necrosis and apoptosis are important immune responses and are controlled, in part, by signaling molecules, such as Interferons (IFNs), made by the immune system. Recent work suggests that *C. difficile* infection causes the expression of IFNβ in the intestine of infected mice, however the role of IFNβ during infection is unknown. We hypothesized that *C. difficile* induces cell death through apoptosis and/or necrosis, and the combined effect of *C. difficile* infection and IFNβ exposure will increase cell death. NIH 3T3 cells were used as a model and incubated with different multiplicities of infection (MOI) of *C. difficile* and units of IFNβ to determine optimal concentrations for the experiment. Cell death was measured using a crystal violet assay at separate time points using an optimal density measurement via spectrophotometry. Optimal concentrations for measuring cell death were determined as 10 MOI of *C. difficile* and 250U/mL of IFNβ 24 hours after infection. In a future experiment, cells will be treated in the following groups: mock treatment, *C. difficile* treatment, IFNβ treatment, and combined *C. difficile*

and IFNβ. Levels of cell death will be measured in each treatment using an Annexin V and propidium iodide staining technique analyzed with flow cytometry. This will address the combined effects of *C. difficile* and IFNβ on cell death.

***Students:*** Mark Sweatlock, Rachel Caterisano

***Faculty Sponsor:*** Keith Jones (Mathematics, Computer Science & Statistics

**Mathematical Cryptography**

This presentation will provide a brief history of mathematical cryptography and how it is implemented. Cryptography is the methodology of concealing the content of messages. It is an essential part of our daily lives. We will start with an overview of different types of simple substitution ciphers. There will also be an overview of some essential background pieces needed for understanding cryptography. We will then discuss the discrete logarithm problem. The discrete logarithm problem will be a critical component in the discussion of the Diffie-Hellman key exchange and El Gamal public-key cryptosystem. Our presentation will then lead into the RSA cryptosystem. Using the Python computer language, we will discuss and demonstrate codes that were created based on the cryptosystems previously mentioned. These functions will be available on a computer for demonstration.

***Student:*** Tiffany Taylor

***Faculty Sponsor:*** Fred Zalatan (Biology)

**Quantitative Analysis of Yeast Ty1 Retrotransposon Activity in Clathrin Mutants** ★

Transposable elements are comprised of DNA sequences that have the ability to replicate and move to new sites in a host cell's genome. Ty1 is a transposable element in the yeast *Saccharomyces cerevisiae*. Some aspects of Ty1 replication are functionally related to retroviruses, such as the Human Immunodeficiency Virus (HIV). Ty1 makes use of several host proteins during replication, some of which normally function in vesicle transport and fusion (these processes occur during important cellular events such as protein localization within a cell, or secretion at the cell membrane). Clathrin is a protein complex that has been implicated in Ty1 replication. Clathrin functions in the sorting of cell membrane receptors, as well as in the formation and budding of vesicles during cellular uptake (a process known as endocytosis). In this study, two yeast strains, each containing a deletion of either the *CLC1* gene (coding for the Clathrin light chain) or the *CHC1* gene (coding for the Clathrin heavy chain), were utilized. DNA segments containing these deletions were introduced into a wild-type yeast strain (JC3212), which will allow the quantitative determination of whether a Clathrin gene deletion affects Ty1 replication and mobility.

***Student:*** Gwendolyn Temple

***Faculty Sponsor:*** Tyra Olstad (Geography & Environmental Sustainability)

**Influence of Shintoism on Environmental Management and Perceptions of Lake Biwa, Japan** ☼

Throughout history, Japan has been heavily influenced by one major religious philosophy: Shintoism. It is a philosophy centered on animism – the belief that all things, animate and inanimate, house a soul. What influence does Shintoism have on environmental management and perceptions? This research attempts to answer this question as it relates to Lake Biwa, Japan's largest freshwater lake. Lake Biwa supplies millions of individuals throughout Shiga Prefecture with freshwater. Home to hundreds of endemic species, the lake also serves as a hotspot of biodiversity. However, many different factors including invasive species and urbanization are currently threatening the water body. Using literature review and first-hand observations, this research attempts to explore the way Shintoism affects people's perceptions of Lake Biwa as they relate to sense of place, the Soap Movement of the 1970s, the Mother Lake 21 Plan, and management of invasive species such as the largemouth bass and great cormorant. In exploring the complex relationship between Shintoism and environmental management in Lake Biwa, this research helps add more dimensions to the influence Shintoism has had on people's perceptions surrounding Lake Biwa and open avenues for future research.

***Student:*** Patrick Tidings

***Faculty Sponsor:*** Heike Geisler (Chemistry & Biochemistry)

**Investigation into the Catalytic Reactivity of Platinum and Titanium Dioxide Atomic Layers in Fuel Cells**

Platinum is a widely used catalyst for a large range of industrial and consumer applications. The high cost of the metal prevents the development of low cost products even though only the surface layers of the platinum contribute to its catalytic reactivity. In this study, atom thick layers of platinum are deposited on a substrate of titanium dioxide. With cyclic voltammetry the effect of the growth morphology of the platinum on the dissociation of oxygen and hydrogen is investigated.

***Student:*** Kim-Lien Trotta

***Faculty Sponsor:*** April Harper (History)

**Women Practitioners in the Middle Ages**

This project examines the role of female medical practitioners in the Middle Ages and to what extent their medical practice was limited to the care of other women.

***Student:*** Jessica Tyler

***Faculty Sponsor:*** Sven Anderson (Art)

**The Art of the Poster** ★

The Art of the Poster is about displaying how concert posters are not only a form of promotion, but a form of fine art. The posters are created through a process called silk screening, or screen printing. This entails photographically transferring an image onto a mesh screen and blocking out certain portions of the screen, leaving others porous. This screen is then used as a stencil for the design. Ink is placed on the screen and pulled across using a squeegee, transferring the color through the mesh screen onto the poster. Each color requires a new screen, which is why many posters use a limited number of colors. The art of silk screening has been in use from as early as 1910, however Andy Warhol is generally credited with popularizing it in the 1960s. Although most concert posters are not silk-screened, the ones that are often are associated with advertisement and promotion rather than fine art. The goal of this project is to not only develop an understanding of the often-commercialized art of silk screening, but to also highlight the fine art of a concert poster and showcase the dual-nature of these beautiful yet practical designs.

***Students:*** Sam VanDemark, Elise Iwanyckyj, Maggie Doolin (G), Jill Darpino, Sisina Macchiarelli, Zach Piper

***Faculty Sponsor:*** Florian Reyda (Biology)

**A Survey of the Parasites of Yellow Perch from Two Lakes in Central NY** ☼

Yellow perch are freshwater fish, widespread and ubiquitous in the lakes of central New York. They commonly carry heavy parasite loads that include several parasitic taxa because of the fish's generalist eating habits. We performed full necropsies on 12 yellow perch from Canadarago Lake and 13 from Otsego Lake caught by ice fishing during January 2016 and February 2016, respectively. During the necropsies, we examined every organ for signs of parasite life stages and found representatives of six distinct parasitic groups, with few organs remaining uninfected. We found differences between parasite communities of each lake in this study, and differences in comparison to previous research conducted on Otsego Lake yellow perch in Dr. Reyda's lab. We present background information on yellow perch parasite communities and the results from our two fish groups' dissections. Necropsy work was done at the SUNY Oneonta Biological Field Station in Cooperstown, NY.

***Student:*** Jenna Vecchio

***Faculty Sponsor:*** Kevin Gray (Art)

**The Artist's Creation Myth ★**

Traditionally, the concept of arts and sciences in the mind is that they are opposite and separate from each other. The idea that what we create and what naturally exists are so removed from each other is a particularly pervasive idea through history and our culture. However, with a proper lens, we see that this is not true. Art and science have everything to do with each other and are far more intertwined in their essences than we are led to believe. When one examines the two at their most essential and elemental level, it becomes clear how the two interact and rely on each other to exist as they do in our world today.

***Student:*** Maxine Verteramo (G)

***Faculty Sponsor:*** Willard Harman (Biology)

**Building a Comprehensive Management Plan for a Three Lake System ☼**

Emerald Green Property Owners Association (EGPOA) is a 1400 ac. community located in Rock Hill, New York. The private community encompasses a diverse three lake system. Each lake is unique in its ecological functions and resource use. Louise Marie, the largest of the three lakes at 224 ac., serves as the community water supply. The most adamant responsibility of the governing EGPOA is building invasive aquatic species awareness in order to preserve their reservoir. Treasure Lake, totaling 66 ac., has year round floating bog mats and 29 ac. of Class II DEC protected wetlands. Surprisingly, it is the deepest lake of the three lakes, although boating to the open water is a challenge. Both Louise Marie and Treasure drain into Davis Lake, along with the community waste water treatment plant effluent. Currently, Davis has high phosphorus and nitrogen levels feeding an over productive algal and plant community. The goal of this research project is to create a cohesive plan that will address each lake's distinctive characteristics while also managing them as a collective watershed.

***Student:*** Jake Vreeland

***Faculty Sponsor:*** April Harper (History)

**Caring of Soldiers**

Military technological advancement began to come into its own during the medieval time period. Armor was thicker, steel was stronger, bows could reach farther, and arrows could punch deeper. With warfare becoming crueler, the surgery that addressed it, in part, matched its cruelty. However, it did bear positive results. As a result of this changing landscape of medieval warfare, the reality of battlefield wounds created challenging new problems; how does one treat these wounds? Though there are few written records of soldiers carrying on from battle wounds, the archeological evidence helps expose the reality of their situation. New medical tools and devices, as well as a better understanding of the body, would need to be adapted in order to save the lives of soldiers and knights. Further, how did one function after returning from war? How would soldiers come back home and function within society with injuries or disfigurement? Finally, the problem of knights and soldiers dealing with post-traumatic stress disorder was a reality and is not solely linked to modern warfare, but is rather a shared condition of soldiers throughout the ages.

***Student:*** Taylor Waldrop

***Faculty Sponsor:*** Tami LaPilusa (Biology)

**Current Status of Management Regulations for the Land Crab (*Cardisoma guanhumi*) Fishery in the Caribbean, Central, and South American Regions ☼**

The land crab (*Cardisoma guanhumi*) is an economically important fishery resource throughout its Caribbean, Central, and South American range. Decades-long overharvest and habitat decline has necessitated management regulations restricting not only the harvest season, but also the sex and size of harvested land crabs in many of these countries. For example, Brazil limits *C. guanhumi* harvest to only males of carapace length greater than 8 centimeters. The Islands of The Bahamas are home to a bountiful land crab harvest during the spring spawn, with Andros Island being celebrated as "the bank"

with annual harvest estimates of $20M. Currently, no land crab harvest regulations exist in The Bahamas, though harvest of females is discouraged. Few formal studies provide catch data for the fishery, and the most recent habitat assessment was conducted in the early 1980s, which compounds the task of compiling meaningful fishery data with which to determine if the land crab harvest can be sustained at current levels, especially since current fishery data is limited to counting the land crab sacks being shipped to Nassau or counting crabs in harvesters' pens. This project involved surveying primary literature and government fisheries databases throughout the range of *C. guanhumi* to provide a summary of established management regulations and implementation constraints. The aim of this summary is to provide a framework for ongoing discussion and collaboration within the land crab stakeholder community in The Bahamas, and to highlight the need for future work to include an updated habitat assessment on Andros Island and large-scale collection of fishery catch data.

***Student:*** Zachary Ward

***Faculty Sponsor:*** Marius Munteanu (Mathematics, Computer Science & Statistics)

**Inversions, Art, and Their Applications**

Inversions are a fundamental method of transformation within the field of mathematics. An inversion is a transformation in a circle of a specific radius, where certain infinite collections of points such as lines and segments can be transformed by the inversion relation. This study consists of an analysis of how inversions can be applied to specific points and objects. First, an analysis of the construction of an inversion of a point and the proof of inversions will be investigated. Next, inversions of points and segments and objects such as polygons and artistic images will be investigated. Then, specific proofs such as the Ptolemy-Euler inequality and similarity relationships will be analyzed. Lastly, the classical physical application, specifically the Peaucellier-Lipkin Linkage Problem, will be investigated as well.

***Student:*** Justin Warner

***Faculty Sponsor:*** Maurice Odago (Chemistry & Biochemistry)

**Anion Sensing Studies of Isoniazid-derived Ligands and their Rhenium (I) Complexes**

Various ligands bearing urea and thiourea groups have been reported as colorimetric anion sensors when attached to p-nitrophenyl moieties. The colorimetric sensing capabilities occur through intramolecular charge transfer (ICT) mechanisms resulting from deprotonation and concomitant resonance. Many of the reported (thio)urea based ligands have shown varied colorimetric and luminescent responses upon interaction with common anions such as CN-, AcO-, F-, Cl-, Br-, I-, BzO-, H2PO4-, HSO4-, ClO4-, N3- and SCN-. This study focuses on the synthesis and application of amido-(thio)urea based ligands derived from isoniazid. Their interactions with various anions, both as free ligands and when attached to rhenium (I) tricarbonyl complexes will be discussed. The thiourea-based nitrophenyl receptors have shown selectivity to cyanide with distinct color change from yellow to red. Comparative analysis of the anion recognition of their amido-(thio)urea derivatives will be presented.

***Student:*** Britney Wells

***Faculty Sponsors:*** Matthew Albright, Holly Waterfield (Biological Field Station)

**Monitoring the Otsego Lake Watershed** ☼

Water quality monitoring of the northern watershed of Otsego Lake continued in the summer of 2015. The primary purpose of this study was to evaluate water quality by measuring nutrient concentrations and collecting physiochemical data in the five tributaries that flow into the Lake. White Creek, Cripple Creek, Hayden Creek, Shadow Brook, and a stream that ran off Mount Wellington provide about 70% of inflow to Otsego Lake. Increasing eutrophication rates, indicated by limnological monitoring of Otsego Lake, were attributed to nutrient loading from nonpoint sources such as wastewater treatment systems, agricultural runoff, and residential land use. Best Management Practices (BMPs) were implemented near the tributaries to achieve sustainable water quality. In 2015, high volumes of precipitation promoted a concurrent nitrogen influx into highly disturbed tributaries. However, since loading at stream outlets is a function of volume and concentration, the amount discharged into the lake

varied. The tributaries displayed cooler temperatures and more highly oxygenated waters in comparison to previous years. In a long-term analysis, phosphorus levels decreased and nitrate + nitrite levels fluctuated. Nutrient analyses potentially indicated that the BMPs, in part, were effective in reducing the export of nutrients from land to the tributaries, thereby improving local water quality.

***Student:*** Emily Wentworth

***Faculty Sponsor:*** April Harper (History)

**History of Dissection in England**

This research project is focused on the development of dissection in England from the Middle Ages to the 18th century. It examines why dissection was initially illegal, the first groups who were permitted to perform dissections, and how/why dissection became legal for all doctors, medical instructors and students, rather than just surgeons.

***Student:*** Craig Wert

***Faculty Sponsor:*** Florian Reyda (Biology)

**Investigation of a New Freshwater Trematode, Otsego Lake, New York**

This is a study of an extremely small digenetic trematode that was found parasitizing chain pickerel (*Esox niger*) in Otsego Lake, New York during the winters of 2014 and 2015. Preliminary observations suggested that this worm was part of the trematode family Cryptogonimidae, of genus Caecincola. It differs from all other species in the genus in its unique size; it is approximately half the size of other known species. Trematodes can vary greatly in size due to their flexible soft bodies; however, the species in this study does not overlap in size ranges with any previously described species. Further, ongoing efforts to study this worm include morphological and molecular work. Specimens of similar species of Caecincola will be borrowed from research collections at the Smithsonian National Museum of Natural History and compared to the specimens from Otsego Lake. At the same time, five specimens from Otsego Lake will be subjected to DNA analysis in order to obtain DNA sequence data for the Cytochrome oxidase I mitochondrial gene, with the aid of Dr. Fred Zalatan, SUNY Oneonta Biology Department. If either the morphological and/or molecular work determine that the Caecincola from Otsego Lake is new, it will be described using morphological measurements, drawings, scanning electron micrographs, and DNA sequence data.

***Student:*** Angela Willert

***Faculty Sponsor:*** Jill Fielhaber (Biology)

**Temporal Expression of IFNβ in Mice during *C. difficile* Infection**

*Clostridium difficile* infection is the result of a disruption of the normal microflora, usually due to antibiotics, with symptoms presenting as abdominal pain, fever, and diarrhea. These symptoms are due to mechanisms of the body's inflammatory response which is mediated by several different proteins and their functions, including the Interferon (IFN) family of cytokines. IFNs, specifically IFNβ are important for the activation of genes that control cell death, inflammation, and the production of antibacterial peptides. Antimicrobial peptides, such as β and β-defensins disrupt the bacterial cell membrane, resulting in lysis of the infectious agent. This project seeks to determine if *C. difficile* infection leads to IFNβ expression, and how IFNβ might impact the expression of these antibacterial peptides. RT-PCR was used to quantify any IFNβ expression during *C. difficile* infection in the cecum and colon of mice. IFNβ is most expressed 24 and 48 hours following infection in the colon and cecum, respectively. I am currently working to determine if *C. difficile* induces expression of β and β-defensins in infected mice and in an in vitro cell culture model. From there, I will use this model to determine how IFNs might impact *C. difficile* induction of defensin peptides.

***Student:*** Jessica Williams

***Faculty Sponsor:*** Nancy Bachman, ***Staff Sponsor:*** KelLee Hassman (Biology)

**Construction of Nuclear Localization Signal Mutants of Mouse HSF1 Beta and Gamma ★**

Heat shock causes proteins to denature or unfold, which alters their function in the cell. Heat shock transcription factor 1 (HSF1) is responsible for the transcriptional response to protect cells from induced stress. In order to carry out distinct cell functions, HSF1 must be imported from the cytoplasm into the nucleus via nuclear localization sequences (NLS), and exported from the nucleus to the cytoplasm via nuclear exporting sequences (NES). The goal of this research is to discover and compare the localization patterns of the HSF1 beta and gamma isoforms to NLS mutants of beta and gamma. The experimental approach involved cloning NLS mutants of the HSF1 isoforms and then viewing and imaging the cells with fluorescence microscopy. Localization of HSF1 beta was mostly in the nucleus before and after heat shock, while an HSF1 beta NLS mutant had more nuclear than cytoplasmic staining, but a significantly higher amount of cytoplasmic staining than HSF1 beta. An HSF1 gamma NLS mutant was more localized in the cytoplasm than wild type, with slight redistribution to the nucleus after heat shock. Mutation of a constitutive NLS has a greater effect on localization of the HSF1 beta isoform as compared to the HSF1 gamma isoform.

***Student:*** Patrick Wright

***Faculty Sponsor:*** Yun-Jung Choi (Human Ecology)

**'Art Saves the World' – A Business Plan for the Entrepreneurial Venture**

*Art Saves the World* is a business that is not only centered on philanthropy, but is also a venture that is concerned with the success of dedicated artists and musicians in the world. The company is focused on saving the arts in schools and supporting organizations that help the greater good. The clothing features pieces of art from musicians and artists who have chosen a charity to receive a percentage of the proceeds. *Art Saves the World* focuses on children, young adults, and parents who have a passion for saving the arts in schools and giving back to the community. The company will sell all products online until it gains enough revenue to open a brick and mortar store in New York City. The main competitors are fast fashion companies that offer cheaper and trendier products. *Art Saves the World* possesses a distinguished competitive advantage with a philanthropic and sustainable approach. It will make an impact on art, music, and the environment and will be looked at it in an influential way from consumers and the world.

***Student:*** Emily Yntema

***Faculty Sponsor:*** Keith Brunstad (Earth & Atmospheric Sciences)

**The Physical Volcanology of the Tieton Andesite Lava Flow: Lava Flow Lengths and Compositional Variations**

Over 1 million years ago, Goat Rocks Volcano in the Cascade Range of Washington State produced one of the longest andesitic lava flows, nearly 80 km in length, with a minimum volume of at least 2 km3 and a thickness of up to 60 m. The flow was mapped by Warren (1941) as the Tieton andesite lava and extends from Goat Rocks Volcano down the broad ancestral Tieton River valley through a narrow canyon until it pooled in the Naches valley at the outskirts of Yakima, WA. The goal of this study is to document any compositional variations within the Tieton andesite lava flow and attempt to ascribe them to processes that produced this lava flow field. A related question is why a highly evolved (andesitic) lava flow of presumably high viscosity flowed ~80 km from its source vent while all other reported cases of andesitic lavas flowed <10 km. Stratigraphic sections were sampled through the lava flow, bottom to top, from near the source on Pinegrass Ridge to its terminus near Yakima. The samples were analyzed in hand sample and thin section using a petrographic microscope, and chemically using X-Ray Fluorescence and Inductively Coupled Plasma Mass Spectrometry. Initial results show the highest silica content (61-63% SiO2) in the lava flow is down valley near Yakima and the lowest silica content (59-61% SiO2) is up valley closest to the source area. There are two outliers with silica content of ~55% SiO2 found on Pinegrass Ridge. Overall crystal content appears to also vary depending on location with higher crystal percentages distally than at proximal localities. Phenocrysts of plagioclase,

pyroxene, hypersthene and magnetite comprise on average 25–35% and reside in a glassy groundmass. Initial conclusions about the Tieton andesite flow include: (1) the length of the flow appears to have been controlled by heat loss, effusion rates, and topography; (2) the distribution of the rock chemistry implies the eruption as driven by more mafic magma injection into the Tieton andesite magma chamber; and (3) multiple smaller volume lava flows erupted during the waning stage of the eruption.

***Students:*** Xiaoyi Zeng, Joanne Wong

***Faculty Sponsor:*** Jian Cui (Art)

**The Little Monk Animation** ★

The animation world has become more and more digitized, and a majority of animations that we come across in daily life are computer-generated. Hand-drawn animation is slowly losing its audience and appreciation in the current era due to advancing technological programs. Although 3-D animation provides viewers with a visually satisfying effect through its sense of reality, the traditional animation will be long-lasting because many animations that we came to know and love all evolved from a single drawing. Students Joanne Wong and Xiaoyi Zeng seek to create an inspiring animation, experimenting with Chinese traditional ink painting techniques to explore the limitless possibility of 2-D animation. The animation, revolving around a little monk, will be approximately three minutes long.

***Student:*** Faith Fordjour

***Faculty Sponsor:*** Donna Vogler (Biology)

**Allelopathy in Thistles: How *Cirsium palustre* Dominate Other Plants**

There has been much research done on the weed Canada thistle, *Cirsium arvense,* but little is known about its cousin *Cirsium palustre,* marsh thistle. Both species are invasive, and tend to dominate in the habitats where they are found and outcompete native plants. It is known that *C. arvense* uses allelopathy to suppress or inhibit other plant's growth. Both species possess trichomes (leaf hairs) that may be the source of allelopatic compound. I will test leaf extracts of both *C. palustre* and *C. arvense* to determine if *C. palustre* inhibits seed germination to the same degree as *C. arvense*. Native Indian grass seed will be used as a target species as well as several common pasture plants. A t-test will be used to detect difference in seed germination rates in the leaf extracts compared to water control.

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Key: (G) = Graduate Student

☼ = Designated as sustainability-related by the President's Advisory Council on Sustainability

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