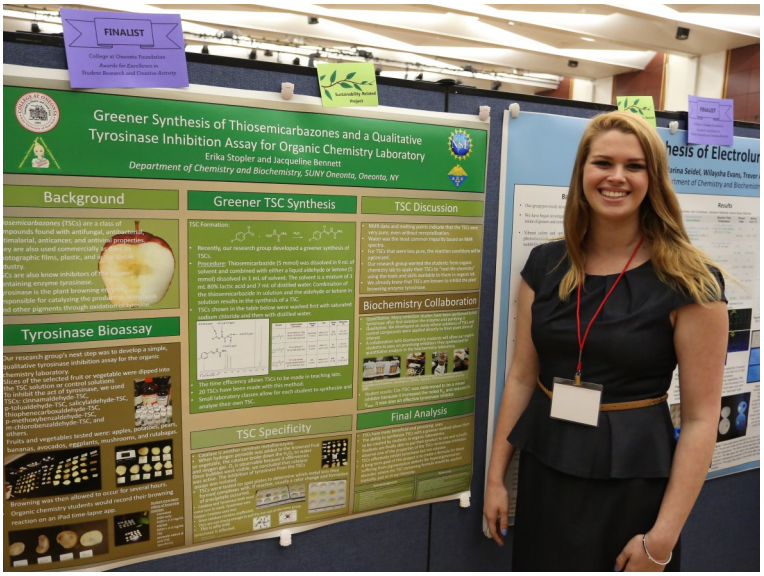
srca

Student Research & Creative Activity Day 2017



WEDNESDAY, APRIL 12
HUNT UNION BALLROOM

SUNY ONEONTA

SUNY ONEONTA

2017 Student Research & Creative Activity Day

April 12, 2017

10:00 AM – 4:30 PM

Hunt College Union

Sponsored by:

College at Oneonta Foundation, Inc.

Grants Development Office

Office of Alumni Engagement

Division of Academic Affairs

2016/17 College Senate Committee on Research

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

srca.oneonta.edu

STUDENT RESEARCH & CREATIVE ACTIVITY DAY 2017

PROGRAM

10:00 AM–4:30 PM in the Hunt Union Ballroom

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

12:00 NOON–1:00 PM in The Waterfront, Hunt Union

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

Dr. John "Jack" Bonamo '72

"Oh, The Places You Can Go"

Dr. Bonamo received his bachelor's degree from SUNY Oneonta, his M.D. from the University of Medicine and Dentistry of New Jersey, and his M.S. in Health Care Management from the Harvard School of Public Health. After practicing Obstetrics & Gynecology for 19 years, he served as President and Chief Medical Officer of Saint Barnabas Medical Center (SBMC), Barnabas Health System's flagship hospital. SBMC is home to the second largest kidney transplant program in the nation, and has a Neonatal Intensive Care Unit that leads the nation in survival rate for very low birth-weight infants. In 2015, Dr. Bonamo assumed the role of Executive VP & Chief Medical Officer for the Robert Wood Johnson-Barnabas Health System, increasing his role to include all twelve system hospitals. In addition to his role with Barnabas Health, Dr. Bonamo is a faculty member for the Beijing University International MBA Program, for which he has traveled to China on numerous occasions to teach hospital executives about healthcare management practices, quality, and safety.

Yuri's Night: A Celebration of the First Human in Space

6:00–7:00 PM: Hands-on Space Exhibits at the Science Discovery Center
7:00–8:00 PM: Planetarium Show – "The Human Place in Space"
8:00 PM–??: Telescope Observing Outside Science 1

~also on Wednesday, April 12~

Annual Student Juried Art Exhibition

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

~on display through May 13~

SUNY Oneonta
2017 Student Research & Creative Activity Day
STUDENT PARTICIPANTS

(G) = Graduate student

FACULTY SPONSORS

NAME (Department or Affiliation) **Page No.**

PRESENTATION SUMMARIES

Key: (G) = Graduate Student

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

★ = Supported by the Student Grant Program for Research and Creative Activity
(*funded by the College at Oneonta Foundation and the SUNY Oneonta Alumni Association; facilitated by the Senate Committee on Research and the Grants Development Office)*

Student: Hailey Ahearn

Faculty Sponsor: Allan Green (Chemistry & Biochemistry)

Glucose Uptake and Lipolysis in Fat Cells ★

High rates of fatty acid release from fat cells contribute to insulin resistance in type 2 diabetes. Our previous studies demonstrated that glucose regulates lipolysis, and thus fatty acid release, by altering cellular concentrations of adipose triacylglycerol lipase (ATGL). This suggests that inhibition of glucose metabolism in adipocytes could decrease expression of ATGL and, hence, decrease fatty acid release from cells. As an approach to this question, we are investigating effects of curcumin, which has been shown to be useful in treating diabetes and to inhibit glucose uptake in adipocytes. We treated rat adipocytes with insulin (25 ng/ml) with or without curcumin (50 µM) and then measured the rate of lactate release from the cells over one hour as a measure of glucose metabolism. Insulin increased the rate of lactate release in the presence of 1 mM and 5 mM glucose, as expected. Surprisingly, curcumin increased the rate of lactate release, suggesting that curcumin increases the rate of anaerobic glucose metabolism despite inhibition of glucose uptake. Further experiments are needed to confirm these preliminary findings and determine whether total glucose utilization is decreased by curcumin, possibly by inhibition of the Krebs cycle, electron transfer, or ATP synthase.

Student: Jonathan Albert

Faculty Sponsor: April Ford (English)

Children of the Hills ☼ ★

Children of the Hills is an exploration of New York State's natural environment and its impact on personal development, presented in poetry, short stories, essays, and visual art. Nature provides all necessary resources to sustain physical growth and development. Nature's impact reaches far into the psychological, spiritual, and emotional realms of development, equally important in the growth of healthy individuals and sustainable communities. Oneonta, known as the "City of the Hills," is a city where students are given the opportunities to experience academic and social educations, explore self, natural, and societal environments, and develop tools to transition into the awaiting stages of life. The surrounding hills, rivers, forests, and proximal Catskill Mountains encourage adventure and an appreciation for nature. Children of the Hills is an exultation of the natural environments in New York State, a reflection of nature in humanity, and the exploration of emotion through the natural environment – not limited to the enchanting lands of Central New York. This collection is the voices of those who have grown up, with nature as a teacher, an inspiration, and a companion – the Children of the Hills.

Student: Kaitlin Alessi

Faculty Sponsor: Fred Zalatan (Biology)

Spices and Their Ability to Inhibit Bacterial Growth

Herbs and spices have long been used for medicinal reasons because of their antibacterial and anti-inflammatory properties. This relates to the fact that spices can act as preservatives in food. Although we know that spices can inhibit bacterial growth, we do not know how much of the spice is needed in most foods to do so. Whether the bacteria has a gram-negative or gram-positive cell wall may determine

how resistant the bacteria is to the spice. The objective of this experiment is to identify one or more everyday spices that inhibit bacterial growth. The common household spices oregano, rosemary, black pepper, cinnamon, and clove were tested. After grinding the various spices into fine particles, we created a solution with sterile water. Filter discs were soaked in each of the solutions before being placed on agar plates inoculated with bacteria. Both *E. coli* (a gram-negative species) and *S. aureus* (a gram-positive species) were tested. We found that rosemary inhibited growth of *S. aureus* and cinnamon inhibited growth of both species.

Student: Claire Anderson

Faculty Sponsor: Jill Fielhaber (Biology)

Measuring Apoptosis in Response to Inflammatory Mediators ★

Programmed cell death (apoptosis) during immune response to infection is important in the inflammation process. Apoptotic defects are associated with chronic inflammation and inability to mount an immune response. Therefore, I am seeking to determine if apoptosis during immune response can be modulated by nutritional factors, specifically amino acids, in respect to a regulatory enzyme, "mammalian target of rapamycin" (mTOR), an important modulator of cellular responses to amino acids. Amino acids could activate mTOR, decreasing apoptosis in response to inflammatory mediators, lipopolysaccharides (LPS), and interferon-beta (IFNβ). To test this, I treated 3T3 fibroblast cells with LPS and IFNβ for 24 hours, then stained the cells with Annexin V and Propidium iodide to analyze apoptosis with flow cytometry. Results showed cells in early and late apoptosis, which is consistent with predictions. However, flow cytometry has not been widely published with 3T3 cells, and I had difficulty discriminating between apoptotic cells and cell debris. I am now using western blot analysis on cells treated 24 hours with LPS/IFNβ in the presence or absence of an mTOR inhibitor to confirm that mTOR regulates apoptosis in response to LPS/IFNβ. After consistent results, I will determine if amino acids alter apoptosis.

Students: Anita Asheley, Amanda Kilbury, Katie Walker, Hannah Dari

Faculty Sponsor: Alexandra Nicolette (Human Ecology)

Whole Wheat Flour Substitution in Blueberry Muffins

Obesity, cardiovascular disease, and diabetes are major health problems in the United States. A diet high in fiber may reduce the risk of developing these diseases. The purpose of this experiment was to investigate the acceptability of using whole wheat flour (WWF) as a white flour substitute in blueberry muffins in order to increase the amount of fiber and other micronutrients in the product. WWF was substituted for 50%, 75%, and 100% of white flour in the muffins. Sensory characteristics including color, texture, shape/integrity, and overall acceptability were then evaluated by 28 college students using a 9 point hedonic scale. The ratings for each category did not differ significantly between the different muffin samples except for the taste rating, which was rated lower for the sample containing 100% WWF. The volumes of each sample were determined to be similar, and color darkened as more WWF was added. According to nutritional analysis, grams of fiber per serving increased as higher amounts of WWF substituted white flour. Substituting WWF at 50% gave the most acceptable muffin. Based on favorable sensory ratings, the study showed that whole wheat flour may be considered an acceptable and healthy substitute for white flour in baked goods.

Student: Nicole Augunas (G)

Faculty Sponsors: Dawn Hamlin, Frank Thornton (Educational Psychology, Counseling & Special Education)

High School to College Transition for Students with Autism

This presentation will explore what it means for students with Autism as they transition from high school to college. This will include challenges and benefits; steps for creating transition plans; supports for parents, students, career and guidance counselors; assessments; and students' experiences. Current research and proven strategies will be highlighted.

Students: Samantha Ayers, Kate Moore

Faculty Sponsor: Keith Brunstad (Earth & Atmospheric Sciences)

Factors Controlling the Emplacement of the 80-km-long Tieton Andesite Lava Flow Field, South-Central Washington ★

The 80 km-long Tieton andesite lava flow erupted ~1 Ma from Goat Rocks Volcano, located in the Cascades of Washington. The Tieton andesite is the world's longest andesitic (59-63% SiO_2) lava flow(s). We document whole-rock and trace element compositional variations along with the crystal size distributions (CSD), viscosity, and morphological changes, and ascribe them to processes that produced the flow. Chemical results suggest two larger and a group of smaller flows. The first flow ranged in SiO_2 from 61-63% and traveled the farthest. The second ranged from 59-61% SiO_2. CSD results show at least two plagioclase populations. Viscosity calculations, based on chemical composition, range from 10-15 Pa s at 1,000°C to 14-20 Pa s at 1,200°C (1-5% H_2O respectively for each). The lava flowed down an ancestral valley(s) of the Tieton River and entered a narrow canyon where it flowed into the wider paleo-Naches valley, subsequently spreading out and stopping. Results indicate the topography influenced the length of the flow lobes. Chemical and CSD data support multiple flows. The high SiO_2 content of the Tieton andesite implies that effusion rates, topography, slow heat loss, heat of crystallization, and tube or channel-fed lava emplacement may explain its 80-km length.

Student: Amanda Barcia

Faculty Sponsors: Dona Siregar, Christine Storrie (Economics, Finance & Accounting)

Effects of Exchange Rates on U.S. GDP and Stock Market

AVAR framework is used to investigate the impact of the strong dollar on output and the financial markets in the U.S. Exchange rates are among the most important prices in an open economy because of their strong influence on the current account and other macroeconomic variables. This study investigates its effect on economic growth and the stock market, as both are significant indicators of the health of the U.S. economy. Various models are examined to assess if there is reciprocity between real exchange rates and economic growth and the stock market, specifically, the effects of real GDP and stock market performance indicators on the real exchange rate. This paper shows how stock market performance influences both nominal and real exchange rates. These findings can be useful to the hedging activities of multinational corporations.

Student: Emily Berezowski (G)

Faculty Sponsor: Jeffrey Heilveil (Biology)

Using Second-generation Sequencing to Investigate Anthropogenic Impacts of NYS Reservoirs ☼ ★

Changes in a landscape as a result of reservoir creation can alter interactions between organisms in surrounding areas. These changes can limit dispersal and gene flow around reservoirs; thereby isolating populations. This research uses an aquatic indicator species, *Nigronia serricornis* (Say) (Megaloptera: Corydalidae), to determine if the creation of the Pepacton reservoir affected gene flow patterns in local populations of the species. If so, other species may be similarly affected and ecosystem services provided by aquatic communities may also be affected. Restriction-Site Associated DNA (RAD) sequencing was used to sequence the DNA of individuals from approximately equidistant populations on tributaries flowing into the Pepacton reservoir and those flowing directly into the Delaware River, unaffected by the reservoir. Initial data analysis revealed a previously unreported genomic sampling bias in the relatively-new RAD sequencing technique. A potential resolution to the bias is currently being tested, by combining techniques from two eras of genetic research.

Student: Sara Bonafine

Faculty Sponsor: Gregory Fulkerson (Sociology)

SOAR Seeks Student Scholars!

The editorial board of SOAR (SUNY Oneonta Academic Research) is seeking student scholars to publish their social science research. We are also looking for students to serve as peer reviewers, helping in the publication process. More information is available at www.oneonta.edu/soar.

Student: Peter Booth

Faculty Sponsor: Trevor Fuller (Geography & Environmental Sustainability)

Locating and Documenting Sub-surface Environmental Hazards ☼

It was common practice in the past to use materials for infrastructure that were unknown at the time to be environmentally hazardous. One example of this can be found on the SUNY Oneonta campus. During the 1950-1970 expansion boom that happened at SUNY Oneonta, many thousands of feet of asbestos wrapped pipes were interred below ground. In the late 1990s through early 2000s many of these were excavated and remediated. Those that could not be mitigated were abandoned in place. This practice only poses a problem when portions of the abandoned line are mistakenly excavated during building projects. Since the soil covering much of the campus is very rich in clay content, the use of ground penetrating radar has been ineffective as a method for locating all of these structures. The purpose of this study has been to approach the problem of locating and documenting said hazards through a combination of research, and contemporary surface modeling techniques using unmanned aerial vehicles. The methods used will be to first create 3D arc GIS models of historical infrastructure as it was claimed to have been built, and then to compare their locations to existing infrastructure which is clearly visible in UAV photogrammetric maps. We will then marry the outcome of all models into one comprehensive GIS model to enable easy identification of potential hazards before site excavation begins, potentially reducing or eliminating future accidental exposure of hazardous material.

Student: Caleb Brah

Faculty Sponsor: Tracy Allen (Geography & Environmental Sustainability)

Bathymetric and Sedimentation Survey of Goodyear Lake ☼ ★

Sedimentation plays a critical role in the evaluation and management of water resources, and is of particular concern for dammed lakes. Suspended material and pollutants trapped by dams accumulate with time, reducing reservoir storage capacity and harming water quality. In Otsego County, New York, the community around Goodyear Lake relies on having adequate reservoir storage for recreation, aesthetics, hydroelectric power, and business. The data collected for this research will be the baseline for future research investigating rates of sedimentation and changes in storage capacity. Goodyear Lake was surveyed along predetermined transects. Using GPS and SONAR, depths and geographic coordinates were logged and imported to ArcGIS to create a digital elevation model and bathymetric map. Initial analysis of fall water samples showed a sharp increase in turbidity with depth, rising from 4.35 NTU at six meters to 31.3 NTU from at 11 meters. Turbidity values of two major tributaries, Springbrook and Susquehanna, were 1.3 NTU and 4.34 NTU respectively. The outlet below Colliersville Dam had turbidity values of 1.15 NTU.

Student: Nicolas Capra

Faculty Sponsor: Jacqueline Bennett (Chemistry & Biochemistry)

Nuclear Magnetic Resonance as a Probe for Effective Water Testing Reagents ☼ ★

The ongoing crisis in Flint, Michigan has demonstrated some of the threats to civilian health posed by dissolved metal contaminants in drinking water. Home-based tests for such contaminants frequently require analysis by a professional laboratory to produce satisfactory results. Aryl aldimines, a class of brightly colored organic molecules, can bind dissolved metals in solution and may have applications in a simple naked-eye test for drinking water contaminants. We have probed imine-metal binding interactions through nuclear magnetic resonance (NMR) experiments to determine the structural features most involved in the bonding and inform future searches for promising testing agents.

Student: Nicolas Capra

Faculty Sponsor: Toke Knudsen (Mathematics, Computer Science & Statistics)

Construction and Operation of a Model Sundial

Sundials have been used to make observations of the date, time, and season since ancient times. Surviving instruments that were constructed for this purpose appear in various forms, including spherical, conical, planar, cylindrical, and analemmatic designs. We have constructed a model horizontal plane sundial, and used it to make observations of the hour and season. Details of the instrument's construction and operation will be provided along with error analysis of the collected measurements.

Student: Jenna Caruso

Faculty Sponsor: James Zians (Psychology)

Key Elements in Public Speaking for an Effective Role Model Story: Dealing with Cancer While Attending College

The use of psychological theories and research findings are helpful tools to establish evidence-based interventions that lead to successful outcomes. When applied with fidelity, "Role Model Stories" are considered evidence-based, high-impact practices that support prosocial desired behaviors, increased resilience, behavior change and risk-reduction efforts related to health-social behavior goals. My independent study project attempts to apply theory and research to create a protocol for a Role Model Story. To achieve this goal, I have conducted research on public speaking and identified certain key elements necessary in a structured protocol for an effective Role Model Story. The particular one presented is actually my personal story, as it includes my own battle with Hodgkin's Lymphoma and my experience with extensive chemotherapy which occurred between my junior and senior years of college. Following evidence-based protocols I have developed a Role Model Story; my goal is to become a peer support group speaker and help other young adults, particularly college students, who may experience a cancer diagnosis. My involvement in this project has been a healing process for me. It is my desire to achieve an effective Role Model Story that helps others who may face their own personal battle with cancer.

Students: Meghan Cassidy, Tabitha McGill, Alanna Magnan

Faculty Sponsor: Toke Knudsen (Mathematics, Computer Science & Statistics)

Student Teacher Observations: 1909, 1911, and 1913

We studied and read through student teacher observation books from the years 1909, 1911, and 1913. We analyzed the structure of observations and comments left by the observing professors and compared them to today's student teacher observations and requirements. In addition, we compared the hometowns, average age of students, and religions of the Oneonta Normal School students with today's SUNY Oneonta students.

Student: Lauren Cestone

Faculty Sponsor: Elizabeth Seale (Sociology)

Does Poverty Cause Addiction? Comparing Experiences with Alcoholism and Substance Abuse by Social Class, Race and Ethnicity

This project investigates how social class plays a role in how an individual may experience alcoholism and substance abuse. Research articles were selected from a variety of databases and analyzed. Results indicate that, although social class may not lead directly to substance abuse, the factors that do contribute are affected by not only one's class but also their race and ethnicity. Such factors include economic constraints, social networks, how medications are prescribed, opportunities for substance abuse treatment, and experience within treatment. Implications for future research include the need for a more detailed look at the connections between social networks and substance abuse, substance abuse in middle and upper classes, differences in treatment episode completion based on social class, race and ethnicity, and how the present opioid epidemic is affecting changes in drug policies.

Student: Alexander Chase (G)

Faculty Sponsor: Jiang Tan (Secondary Education & Educational Technology)

Delta Math: An Investigation of the Impacts of an Online Mathematics Program on Student Self-Concept and Achievement

This research study looks at how a technology application called Delta Math impacts student achievement and self-concept within the math classroom. Over a five-week period, selected students were tasked with using the online application in conjunction with traditional classroom instruction. The study is a mixed methods study and utilizes both qualitative and quantitative data, through pre- and post-tests, surveys, interviews, and observations to gain a better understanding of how the use of technology applications such as Delta Math can impact student growth. The information gathered from this research can give math educators another resource to use to help guide instruction.

Students: Celena Chiu, Dina Rose Cornell, Anthony Santor, Christopher Santana

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

An Empirical Study on Cause Related Marketing and Donation Types

Using data from an online cause-related marketing (CRM) news website, we empirically investigated 335 campaigns in 2015 and identified different types of charitable donation. Specifically, firms can initiate a campaign based on pure philanthropy or pure CRM. This marketing research project answers three important questions: (1) How many CRM campaigns exist across various causes and industries? (2) Are there any differences between public and private firms' choices of the campaign type? (3) How do other factors (e.g., teamed with other firms, continuity, social media usage) affect the relationship?

Students: Sunny Chung, Alexandra Reichert, Joseph LaCourt

Faculty Sponsor: Wendy Lascell (Geography & Environmental Sustainability)

Cultural Immersion in NOLA ☼

During spring 2017, the Disaster Geographies 384 course participated in a service-learning trip to New Orleans. The grassroots organization that the class worked with is called Common Ground Relief. Abandoned lots and homes are plentiful in the Lower 9th Ward. Homeowners leave their phone numbers on their homes so that the government does not demolish them. Some organizations have purchased abandoned lots and are supposed to provide up-keep, yet most of these lots are clearly neglected. An attempt at rebuilding in the Lower 9th Ward includes the "Make-it-Right" homes, which do not assimilate into the character of the neighborhood. In contrast, the Garden District, with its huge trees and mansions, remains looking grand and much more opulent than the rest of the city. Juxtaposed with the Garden District, the Lower 9th Ward still has houses with signs that say "dumpers will be shot." The locals of this area have internalized feelings of how the government neglects them; the fact that residents of the Lower 9th Ward are still living amongst trash and debris that Hurricane Katrina left behind contributes to that perception. Talking and interacting with local people revealed that there are ever-present racial tensions and racism. The service-learning trip over-lapped with Mardi Gras, which celebrates all the traditions that have colored the area for many years. There were continuous parades with varied themes and cultural backgrounds. The foods and architecture, such as po' boys, iron balconies, and the fleur-de-lis, still reflect French and Spanish influence. The ethnic background of New Orleans is primarily African American with French and Spanish influence as well, which heavily influences the culture of the city. Multiple cultures combine to create the identity and character of New Orleans. The class went to the Los Islenos Festival, which showcased a culture combining Spanish and Native American peoples present in this area.

Students: Nicole Clark, Lauren Tomlinson

Faculty Sponsor: Fred Zalatan (Biology)

Involvement of Sec4 Protein in Ty1 Assembly and Replication

Sec4 is a critical vesicle protein that is involved with the fusion of secretory vesicles to target cell membranes. Ty1 is a transposable element in *Saccharomyces cerevisiae* that uses reverse transcriptase in its replication pathway, similar to that of HIV and other retroviruses. The focus of our project is to

determine if Ty1 is associated with vesicles and whether Sec4 is involved. Our goal is to examine the co-localization of Ty1 particles and secretory vesicles using fluorescent microscopy, as well as to observe the effects of a Sec4 mutation on the replication of Ty1.

Student: Alyssa Cohen

Faculty Sponsors: Monica Grau, Kate McMichael (New Student Services)

Transfer Shock at SUNY Oneonta

The current research surrounding transfer students and transition focuses mainly on the phenomenon of transfer shock. Transfer shock is understood to be the decline in academic performance during a student's first semester at a new institution, which is often followed by a recovery period referred to as transfer ecstasy. The underlying cause of transfer shock is not quite clear. The purpose of this study is to identify factors that affect transfer student success at SUNY Oneonta and use that information to better support our transfer students to try to minimize transfer shock. We aim to analyze both social and academic aspects of transfer transition, as well as the specific circumstances surrounding the transfer. Using an anonymous survey, we will collect information from second semester transfer students based on their first semester at SUNY Oneonta. By analyzing the first semester of transfer transition, we expect to find a correlation between social connections and transfer success. We hope to gain more insight on transfer shock at our own institution and use that information to better cater to our transfer students.

Students: Jesse Cohen, Steven Formichelli

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

Creating and Testing the Utility of a Simple Laboratory Method of Quantitatively Measuring Resveratrol Released into the Soil in Thickets of the Invasive Plant Japanese Knotweed ☼

The success of Japanese knotweed (*Fallopia Japonica*) in taking over terrestrial ecosystems is attributed in part to allelopathy or the release of chemicals that inhibit the growth of competitive plant species. The allelopathic chemical released by Japanese Knotweed is resveratrol. To our knowledge, no one has measured the concentration of resveratrol in soils systems as a potential means of explaining how the plant quickly takes over ecosystems by competitively excluding native plants. Therefore, the purpose of this study was twofold: First, we designed an effective method of identifying the concentrations of resveratrol in soils systems using readily available laboratory equipment. Second, we applied the newly developed method in the test of the null hypothesis. There will be no significant difference in the concentration of resveratrol in soils examined from the established middle, newly invaded edge, and soils adjacent to established Japanese Knotweed thickets. Our results, reporting a rejection of the null hypothesis, may help in explaining how Japanese Knotweed prepares soils for invasion within the theoretical framework of the Novel Weapons Hypothesis.

Students: Shannon Crehan, Paula Rebancos

Faculty Sponsor: Kristen Roosa (Biology)

Effect of the Circadian Rhythm on Cyclophosphamide-induced Toxicity in the Urinary System of Mice ★

Patients diagnosed with cancer often undergo therapy with chemotherapeutic drugs, many of which are damaging to non-target tissues such as those of the urinary system. The time of day an individual is exposed to these compounds may influence toxicity because levels of detoxifying enzymes vary throughout the 24-hour day. The effects of circadian rhythm on the sensitivity to drugs toxic to the urinary system have yet to be studied. Our research focuses on how the time of day an animal is exposed influences the sensitivity of the bladder and kidneys to the chemotherapeutic drug cyclophosphamide (CP). Female mice were exposed to a 12 hour light:dark cycle and were given a single intraperitoneal injection of CP at 8AM and 8PM. Control animals received a single injection of vehicle at 8AM. Currently, we are comparing histological sections to observe the degree of CP-induced damage to the urinary system when mice are treated at night versus during the day. Key markers of CP-induced damage include fibrosis and tissue death in the bladder and cell death and structural damage within the

kidney. Any correlation between time of exposure and severity of damage to the urinary system will provide information valuable to a chronotherapy approach to cancer treatment.

Student: Emily Crosby

Faculty Sponsors: Tyra Olstad (Geography & Environmental Sustainability), Nancy Currier (Elementary Education & Reading)

Using "The Oregon Trail" Computer Game for Teaching History

Celebrating its 25th anniversary this year, the popular computer game "The Oregon Trail" allows players to experience the American pioneer's journey across the continent in a covered wagon during the mid-1800s. Could teachers integrate this not-so-modern technology in their classrooms to enrich student learning about the history of westward expansion in the United States? A thorough quantitative and qualitative analysis of gameplay data supports historical accuracy in five key areas: (1) Art and Music – game designers modeled static scenery after real photographs and paintings done by pioneers, and the soundtrack is rich with traditional folksongs. (2) Wildlife Ecology – species distribution reflects plains and mountainous regions of the United States. (3) Health – players can contract the same diseases that pioneers faced during the overland journey. (4) Historical Individuals – a player's high score may be inscribed among the names of famous pioneers on the game's List of Legends. (5) Brief Encyclopedia of Western History – a "Guide" tab on the main interface gives players access to over sixty short articles on topics related to the Oregon Trail. "The Oregon Trail" computer game remains a wealth of historical information. Students can engage in meaningful learning activities via role-playing, decision making, and informal research.

Students: Brenna Crowe, Michael Yanchus

Faculty Sponsor: Andrew Gallup (Psychology)

Yawn Duration Predicts Brain Volumes in *Felidae*

Recently, yawn duration has been shown to be a robust predictor of brain size and complexity across a diverse sample of mammalian species. In particular, mammals with larger brains and more cortical neurons have longer yawns on average. Here, we investigated whether this relationship between yawn duration and brain size, which was previously at the taxonomic rank of class, is also present within a more restricted scale: a family of mammals. Using recent data documenting total and regional brain volumes among 13 field species within the family *Felidae*, we ran correlations with yawn durations obtained from openly accessible videos on the Internet. In total, yawns were identified for 10 of the 13 species. Similar to our previous findings, we show a robust linear relationship between average yawn duration and total endocranial and regional brain volumes among wild cats (r-values < 0.9). These findings provide convergent evidence supporting an important and general neurophysiologic function to yawning, and highlight the utility of measuring yawn duration in comparative research.

Students: Kimmy Cushman, Hannah Olds, Andreas Stolzer, Steven Bradley, Kevin Knox, Elliot Moore, Hayley Lovett, Adriana Perretta

Faculty Sponsor: Sunil Labroo (Physics & Astronomy)

O-SNAP: Oneonta Sparking New Attitudes in Physics

O-SNAP (Oneonta Sparking New Attitudes in Physics) is a volunteer outreach program aimed at middle to junior high school students. Each month, a team travels to local school districts to give presentations with the goal of spreading and inspiring interest, demonstrating and promoting approachability, and motivating pursuit of the sciences, specifically physics. Our intentions are to demonstrate perceivable everyday phenomena and show the physics behind them in an understandable and engaging manner. The presentations have been focused on the physics of light, and include hands-on experiments with infrared goggles, diffraction glasses, and polarized lenses. At the end of every presentation we give the students a questionnaire with questions including how intimidated they are by science and whether the presentation influenced how they feel about pursuing physics in the future.

Student: Kimmy Cushman

Faculty Sponsor: Joshua Nollenberg (Physics & Astronomy)

Particle Transport in the Alcubierre Metric

A warp drive intended to allow for faster-than-light travel has been theorized using the ADM formulation of General Relativity by Alcubierre. It is uncertain whether the energy requirements for this warp drive are physically possible. However, if such a metric space configuration is physically possible, the energy scale necessary to create a warp drive would potentially render them detectable in the coming generation of radio telescopes. We are building a computational model of the gravitational field around a warp drive to describe its effects on material in its path through space. Understanding the acceleration of affected charged particles in the Interstellar Medium will allow us to calculate the electromagnetic spectrum that results from the energy deposition of the warp drive into surrounding space. We present a Lagrangian formulation of the Alcubierre Metric, modeled geodesics for test particles, and order of magnitude estimates for emitted electromagnetic power.

Student: Kimmy Cushman

Faculty Sponsor: Michael Faux (Physics & Astronomy)

Laser Polarimetry for the Cosmic Axion Spin Precession Experiment Magnetometry ★

The Cosmic Axion Spin Precession Experiments (CASPEr) searches for the dark matter particle candidates, axions and axion-like particles, using nuclear magnetic resonance (NMR) techniques. If axions exist, they may couple to nuclear spins, inducing a precession of a polarized sample. The signal of this precession is a transverse magnetization proportional to the polarization and density of the spins. Therefore, we are using hyperpolarized 129Xe (HP-Xe) to maximize sensitivity. Optimization of the spin exchange optical pumping apparatus requires a sensitive means of measuring the polarization in real time. We are working to implement a sensitive spin exchange relaxation free (SERF) magnetometer for this purpose. By using a photoelastic modulator and lock-in camera, we hope to add extra functionality: real-time magnetic field imaging. While being an important step toward the success of the CASPEr project in the detection of axion spin couplings, this work will be useful in other applications such as noise rejection in zero to ultra-low field NMR, or homogeneity analysis of pulsed magnetic fields.

Student: Christa Decker

Faculty Sponsor: Ronald Bishop (Chemistry & Biochemistry)

Chemical Interactions between Propane and Petroleum Processing Compounds ☼

Despite ongoing technological advancements made by the natural gas industry, gas field workers and residents near gas wells and pipeline compressor stations continue to be exposed to toxic chemicals and noxious microbes in air, water and soil. These exposures appear to be responsible for significant health issues, such as "down-winder's syndrome" and cancer. Chemical components used in drilling, hydraulic fracturing and product processing mixtures, which have been used for decades, have only been evaluated for health risks on an individual basis. A comprehensive analysis of chemical interactions among additives and with naturally occurring compounds is needed for scientists and regulators to assess – and potentially mitigate – the scope of anticipated health impacts. The specific aim of this research is to investigate chemical interactions between propane, used as a methane substitute, and selected chemical mixtures encountered in the natural gas industry.

Student: Shane Digan

Faculty Sponsors: Gina Keel (Political Science), Keith Brunstad (Earth & Atmospheric Sciences)

The End of Life Dam Problem: Local and Global ☼

In Otsego County, there are 173 known dams. As dams age they accumulate sediment in their reservoirs and lose water storage capability. Dams prevent sediment from reaching downstream, which can have negative impacts on ecosystem quality and can impact fisheries and water supplies. As dams age, their usefulness to provide power or store water amounts in a reservoir decreases. Local populations at risk from dam removal or failure, people living upstream who may lose access to reservoirs, people that

depend on or use hydroelectric power provided by dams, and everyone that pays taxes should have a voice in what happens to these dams. Local groups and government must take action to push New York State to provide funding. Three options include dam removal, flushing, and dredging. Removal would be best where there would be limited negative impacts or flooding to populations, where the sediment doesn't contain harmful material, and/or where there is limited historical significance of the dam or nearby structures. Otherwise, flushing is the better option if flood gates exist. These dams need to be addressed one by one to avoid excess sediment moving towards the Lower Susquehanna region, which would negatively impact people there and in the Chesapeake Bay.

Student: Maggie Doolin (G)

Faculty Sponsor: Florian Reyda (Biology)

Bringing Neoechinorhynchus into the 21st Century: A Two-pronged Systematic Investigation ★

Neoechinorhynchus is an acanthocephalan genus with 115 valid species that are found worldwide, and 33 North American species that parasitize freshwater fishes. Until now, there has been no molecular investigation of species that infect U.S. fishes to explore species diversity or to corroborate the validity of morphological characters used to identify species. This presentation addresses preliminary findings of a combined molecular and morphological study into these topics. To date, molecular results include a preliminary phylogeny (i.e. hypothesized evolutionary history), based on the nuclear gene 28S, of 84 individuals collected from hosts in 4 fish families from 22 states (work funded by Spring 2016 Student Research Grant). Morphological observations are drawn from light microscope investigations of 75 specimens from a variety of hosts and geographic regions. The final goal of this work is a 3-gene (28S, ITS, and COI) consensus phylogeny for individuals from a diverse set of hosts and localities that will clarify species diversity within Neoechinorhynchus and, in conjunction with morphological data, validate the utility of different characters in the descriptions and identification of all species within the genus. This work will constitute part of the presenter's Master's degree thesis.

Students: Monica Dore, Stephen Bretscher, Tara Litvin, Steven Haight

Faculty Sponsor: Sean Robinson (Biology)

The SUNY Virtual Herbarium Network: Increasing Access and Improving Botanical Education ☼

Collections of preserved plant specimens are vital to taxonomic and systematic studies, and to studying a region's biodiversity. SUNY Oneonta's Jewell and Arline Moss Settle Herbarium has over 14,000 specimens including algae, bryophytes, and vascular plants. Each entry in the herbarium consists of a dried, pressed plant and information on the organism's classification, where the collection occurred, who collected the specimen, and its habitat. Currently, a team of undergraduate assistant curators has been making this information available to the public through the Consortium of Northeastern Herbaria website. So far, approximately 3,000 specimens have been databased. Logging these collections into this online database makes them available for study by students and researchers both inside and outside of our institution. Plant specimens in the collection are also being photographed and drawn by an art student to be used in the development of web-based interactive learning modules that will be accessible to schools across the state. These modules will improve students' understanding of botany in introductory courses, and advanced art and botany courses. This project has provided training to the employed undergraduate students in various aspects of botanical work such as plant collection management, and proper field collection procedures.

Students: Kyle Dudgeon, Marc Hadley

Faculty Sponsor: Tyra Olstad (Geography & Environmental Sustainability)

Otsego County Predator-Scavenger Analysis ☼

Predator populations are necessary for the functioning of ecosystems. Without predatory species such as coyotes and eagles, prey populations become detrimentally large. During the harsh winter seasons, predators resort to different tactics than they use during the warmer months, relying on alternative sources of food to survive. Most notably, they move to new areas and scavenge for anything they can consume. For our project, we have expanded on the U.S. Geological Survey's Eastern Golden Eagle

Camera Trapping study to include research on: all detectable predator species present in Otsego County, the roles these species play in the temperate deciduous forest ecosystem in winter, and their typical behaviors in other seasons. In doing so, we hope to inform the community of the incredible animals that reside in our region, as well as the importance of conserving these species to allow natural ecosystems to flourish, at home and around the globe.

Student: Andrew Edwards

Faculty Sponsor: Elizabeth Seale (Sociology)

The Impact of Gender, Race, and Class on Networking ★

This study analyzes the quality of networking experiences, how many networking experiences people received, and the opportunities for networking they were provided based on gender, race, and class. For this project, "networking" is confined to formal opportunities such as internships, conferences and job shadowing. We surveyed current SUNY Oneonta undergraduate students on the number of networking experiences they had, who provided them, and how they felt they were treated, among other questions. It was determined that African Americans were the most likely to have negative networking experiences, and that working-class students were more likely to have negative networking experiences than middle- and upper-class participants. Women received more networking experiences than men, on average, and were slightly more likely to have more positive networking experiences. African Americans and lower class participants were more likely to have more previous networking experiences. Based on the results, women undergraduates seem to succeed as much as men in their networking experiences, but networking opportunities and the quality of experiences may differ systematically by race and class background. Overall, the findings suggest that more steps need to be taken to address the issue of certain groups who may be at a disadvantage when it comes to networking.

Student: Ryan Elliott (G)

Faculty Sponsor: Daniel Stich (Biology)

Social Dimensions of Lake Management: A Case Study on Lake of the Woods, New York ☼

Aquatic resource management is improved through the collection of data from three realms – ecological, biological, and social. However, due to funding limitations, decisions are often made without lake-specific information relating to one or all of these types of data. When management strategies are undertaken without adequate prior knowledge, resources may be allocated inefficiently, causing the implementation of the plan to fail. Even when biological and ecological data are incorporated into a plan, the potential for displeased watershed residents still exists if their opinions are not taken into account ahead of time. The purpose of this study is to compile historical data and contemporary information about the changing state of Lake of the Woods, New York. This will include the collection of ecological and limnological data to establish baselines against which the success of management strategies may be measured, in addition to the documentation of concerns about and desired uses for Lake of the Woods, indicated by watershed residents in a stakeholder survey I identify and discuss current stakeholder concerns and potential management strategies related to algal blooms, aquatic plant growth, aquatic invasive species, potability, loss of fish habitat, and implications of septic system failure.

Student: Brandon Emerson (G)

Faculty Sponsor: William Walker (Cooperstown Graduate Program)

Integrating Global Concepts of Cultural and Social Entrepreneurship: Fundación ABLE as a Case Study ☼ ★

The purpose of this project is to demonstrate the lessons that can be learned from the systems of social entrepreneurship in Colombia and the systems of cultural entrepreneurship in the United States. It is important to emphasize the link between cultural and social entrepreneurship and how that link can lead to meaningful change in society, rather than maintaining the current system of dependency in societies throughout the world. Social entrepreneurship has taken hold throughout the world as a means of identifying underutilized resources to satisfy unmet social needs. Cultural entrepreneurship is a newer

concept that instead focuses on the long term stability of the organizations created to address those social needs. Social entrepreneurs can only work as long as they have the financial support and resources necessary to achieve their goals. One organization that embodies social entrepreneurship is Fundación ABLE located in Siloé, Santiago de Cali, Colombia, although they have not yet embraced the concepts of cultural entrepreneurship as a means of sustainability. Cultural entrepreneurship is mainly present in the United States, but its global influence is growing. Fundación ABLE will benefit most through the combination of their social entrepreneurship and the US model of cultural entrepreneurship.

Student: Michael Engesser

Faculty Sponsor: Joshua Nollenberg (Physics & Astronomy)

A Data Archive for College Camp Observatory

SUNY Oneonta's College Camp Observatory is beginning a series of upgrades which will improve its versatility as a student and research observatory. With changes such as mounting our 1-meter reflector in a permanent enclosure and replacement of smaller telescopes, the observatory will soon have the ability to perform a large number of simultaneous observations of objects across the sky, which will generate up to ~100 GB of data per night. To allow for the storage of current student-run sky survey work, as well as to allow the data to act as a resource for serendipitous studies by future students, we are building a database to collect and archive photographic and spectroscopic observations made with the suite of instruments in use at College Camp. We expect that this database will greatly impact the breadth of research conducted using College Camp Observatory, not only by allowing for temporal studies of objects, but also by providing future SUNY Oneonta students with access to observational data that can complement their own studies.

Student: Wilaysha Evans

Faculty Sponsor: Maurice Odago (Chemistry & Biochemistry)

Synthesis of Amido(thio)urea Based rhenium (I) tricarbonyl Complexes

Amido(thio)urea based rhenium (I) tricarbonyl complexes containing various diimine and 1,10-phenanthroline moieties have been synthesized. These amido(thio)urea ligands were incorporated in both mononuclear and binuclear rhenium (I) tricarbonyl complexes. Such complexes have been shown to have rich luminescent properties. They have also been shown to exhibit various fluorescence quenching and/or enhancement upon molecular guest-host interactions, especially in anion sensing. The effects of various electron withdrawing and electron donating groups on the diimine ligands were investigated using both IR and NMR. Luminescence anion sensing studies of these complexes using spectrofluorometric titrations as well as their catalytic studies using cyclic voltammetry will be presented.

Students: Wilaysha Evans, Trevor Ambrose

Faculty Sponsor: Jacqueline Bennett (Chemistry & Biochemistry)

Green Synthesis of Novel Fluorescent and Photochromic Aryl Aldimines ☼

Aryl aldimines are a group of compounds that show promise as sensors and candidates for organic light-emitting diodes (OLEDs) due to their fluorescent and photochromic properties. Traditionally, aryl aldimines have been synthesized using harsh methods, where environmentally unfriendly solvents are used and boiled extensively. In our research group, aryl aldimines have been synthesized using a greener method, where an environmentally benign mixture of ethyl lactate and water is used as solvent, no boiling is required, and product formation typically occurs in under ten minutes. Our research efforts are to synthesize aryl aldimines that have not yet been synthesized by green methods. A total of 15 aryl aldimines were synthesized through these green methods, with 90-98% yields and 85-95% purity. They were analyzed by NMR and IR spectroscopy and tested for fluorescence and photochromism using UV light exposure. Our hope is to use such novel fluorescent and photochromic aryl aldimines in further chemical sensing and organic light-emitting diode studies.

Students: Haley Fallon, Nicole Cajo

Faculty Sponsor: María Montoya (Foreign Languages & Literatures)

Colombian Healthcare: A Citizen's Perspective ★

Colombia is a middle-to-low income country, with a population of which nearly half of the people identify as poor. Before 1987, the healthcare system was characterized by high out-of-pocket spending, huge health-related risk factors and low efficiency according to *From Few to Many: Ten Years of Health Expansion in Colombia*. However, in 1993, the government decided to take on more responsibilities including health care management. Today, approximately 97% of citizens have some form of healthcare, whether it is through private or public institutions. Colombia now boasts having one of the best national healthcare systems in South America. While this sounds like a very positive change, the World Health Organization reports that there is still extreme inequity in the quality of care, especially in remote parts of the country where it is hard to access a hospital or any type of health care. The goal of this research was to gain a citizen's perspective on the quality of care received in Colombia. Throughout this research, we hope to contribute to a better understanding of the current system and policies and to help the citizens of Colombia voice their concerns or appraisals of the current conditions.

Students: Katrina Fandrich, Dustin Pennington

Faculty Sponsor: Melissa Godek (Earth & Atmospheric Sciences)

Examining Hurricane Stage Durations from 1980-2015 ☼

Each year, hurricanes, tropical storms, and tropical depressions impact thousands of people worldwide. Current research indicates a correlation between the intensity and frequency of hurricanes and the changing climate. However, little is known about how hurricane stages have changed with time. This research aims to examine changes in hurricane stage durations for all storms that reached Category 2–5 from 1980–2015. Based on evident ocean warming, it is hypothesized that a general decrease in stage duration with time will be detected, meaning that modern hurricanes and their stages are intensifying more quickly than past hurricanes. Using NOAA's National Ocean Service Hurricane Reanalysis dataset, 319 storms are identified. These storms are then graphically and statistically analyzed by category for temporal duration changes. Preliminary results indicate that most stage durations, across all categories, are decreasing through time. These findings show that modern hurricanes are developing more slowly in the early stages and then intensifying more quickly for the rest of their life cycle than storms of past decades. The overall results of this research could be used to improve temporal hurricane stage forecasting and provide information on possible effects of climate change on tropical systems and the tropical environment.

Student: Lyndsey Farrar

Faculty Sponsor: Leigh Fall (Earth & Atmospheric Sciences)

How Does Body Size of Trilobites Change Along a Water Depth Gradient in the Trenton Group (Middle Ordovician) of Central New York? ★

Body size of organisms is a significant characteristic associated with metabolic rate, extinction, and other ecological and evolutionary traits. Body size has also been linked to species abundance; the number of individuals supported by an environment is limited due to resource allocation. The Middle Ordovician Trenton Group located in central New York represents deposition of shallow-shelf carbonates to deep-water shales within the Taconic foreland basin. Cisne and Rabe (1978) determined that the Trenton Group fossil communities were distributed along a water depth gradient. Other environmental factors change in conjunction with water depth and influence the distribution of fauna that live along the sea floor. The trilobite Flexicalymene is found throughout the Trenton Group, but is restricted to shallower water relative to Triarthrus, a deep-water genus (Cisne et al., 1980, 1982). It is unknown whether there is a difference in body size along the gradient. In order to investigate if trilobite body-size distribution changes along the gradient, we will test the hypothesis that the larger-bodied trilobite species are present in shallow water, while the smaller-bodied trilobite species are present on the deeper part of the Taconic Basin.

Students: Stacey Franco, Jasmin Espinal, Dalton Gates, Kailey Nuccio

Faculty Sponsor: Fred Zalatan (Biology)

Possible Involvement of the Secretory Pathway in Ty-1 Transposon Replication in Yeast

The secretory pathway in eukaryotic cells promotes vesicle-mediated transport between the endoplasm reticulum, golgi apparatus, and the cell membrane. Previous studies have suggested that the secretory pathway is involved in the replication of the Ty-1 retrotransposon in baker's yeast (*Saccharomyces cerevisiae*). To test this proposal, we used yeast strains that have mutations in components of the secretory pathway to determine whether these mutations affect Ty-1 replication. Specifically, we are using strains with mutations in the genes coding for the Sec 10, Sec 14, and Sec 15 proteins. Sec 10 and Sec 15 are found in the yeast exocyst complex involved in vesicle fusion at the cell membrane, while Sec 14 is involved in the formation of vesicles budding from the golgi apparatus.

Student: Thomas Franzem

Faculty Sponsor: Dan Stich (Biology)

Factors Impacting Amphibian Abundance in Anthropogenic Vernal Pools ☼★

Vernal pools are small ephemeral wetlands that constitute a critical feature of upland ecosystems. Seasonal drying prevents fish from establishing in these pools, which allows amphibians to take advantage of this predator-free environment. Among other functions, vernal pools are vital breeding grounds for amphibian species. Vernal pools are not widely studied; lack of adequate knowledge and protection has led to their disappearance from ecosystems. Anthropogenic vernal pools have been implemented in some locations to offset losses and promote conservation of pool-breeding amphibians. While anthropogenic vernal pools have the potential to serve as a conservation tool, they also have the potential to act as ecological traps if not properly sited and constructed. The goal of this study is to investigate factors influencing the use of anthropogenic vernal pools by amphibians in an upland habitat in Cooperstown, New York. Starting in Spring 2016 and continuing through Spring 2017, we conducted surveys during the amphibian breeding season, and used these data to relate amphibian occupancy and abundance to environmental variables over the breeding season through the use of multi-species occupancy models. This research will be useful in assessing ecological benefits of these human-created pools, and will have implications for future construction of vernal pools.

Students: Michaela Gartman, Kristen Wells

Faculty Sponsors: Tami LaPilusa, Alyssa Rothfuss, Jeffrey Heilveil (Biology)

Mitochondrial DNA Sequences Enhance Resolution of Gene Flow for the Land Crab, *Cardisoma Guanhumi*, Fishery Management in The Bahamas ☼

Students conducted a laboratory module designed to bring current research into the laboratory of the Fall 2016 Genetics course. Procedures focused on standard molecular genetics techniques utilized to generate gene sequence data for use in an ongoing conservation genetics research project studying the land crab, *Cardisoma guanhumi*, in The Bahamas. *Cardisoma guanhumi* is found throughout the Atlantic coastal sub-tropic and tropic estuarine areas from Florida to Brazil, where it is considered an economically and culturally important fishery species. Our study provides additional data for enhanced resolution in genetic connectivity between populations across its range as a means of better understanding the evolutionary history of *Cardisoma guanhumi* and to provide data necessary for science-based management of this economically important species.

Student: Joseph Goebel

Faculty Sponsor: Jill Fielhaber (Biology)

Caffeine and Growth

Caffeine is one of the most overused drug throughout the world. Many recent studies have focused on the ever increasing use of caffeine among younger age groups, and the adverse side effects that can arise from caffeine use. This study aimed to determine if caffeine consumption alters growth and development of prepubescent mice. To address this issue, prepubescent mice were provided with free access to normal tap water or tap water supplemented with caffeine in a concentration of 0.5 mg/mL

and with 0.52 mg/mL of sucrose for one week. To determine the effects on growth within these mice, several growth factors, IGF-1, the IGF-1 receptor, MyoD, LEP and LIPE genes, will be measured for expression. These growth factors affect cell growth and differentiation in various tissues. The adipose, liver, muscle, and pancreas tissues are the tissues of interest for this study. At this point, the first tissue of interest, the adipose tissue, has shown inconclusive results. The tissue showed interesting results during RNA isolation, which may be the reason for the inconclusive results. Issues with the homogenization of the adipose tissue are most likely the cause for these results.

Student: Sara Goldenbaum

Faculty Sponsor: Leslie Hasbargen (Earth & Atmospheric Sciences)

Modeling Sediment Transport on Mars

Martian impact craters have rims that have been modified by surface processes. The purpose of this experiment was to create a numerical model in Excel that would mimic the change in crater rims by implementing a diffusivity type model where we are looking at sediment transport. We are assuming that sediment transport happens on a slope and the transport rate is determined by the steepness of the slope. The mathematical model evolves through time based on spatial changes of sediment transport rate. The model has eight variables that must be specified including initial elevation and boundary conditions. After creating the model, we performed sensitivity tests in order to see how each variable affected the mathematical profile. Then we compared our model to Marian crater profiles. The craters on Mars drastically vary in age as well as size and degree of degradation. If our model is similar to the crater profiles then we know that the sediment transport is slope-based. This is a work in progress; preliminary results are presented here.

Student: Leah Gorman (G)

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

DeRuyter Reservoir: A Case Study on Aquatic Macrophyte Management as a Component of Long-term Lake and Watershed Management ☼

Stakeholders of DeRuyter Reservoir, a primarily recreational lake in rural central New York, have been managing *Myriophyllum spicatum* and *Potamogetan crispus* invasions on an annual basis as these plants impede lake use. Mechanical harvesting of both species as needed has been used consistently with no long-term avail. In recent years, biological control by herbivorous insects including the milfoil weevil (*Euhrychiopsis lecontei*), the milfoil midge (*Cricotopus myriophylli*), the long-horned caddisfly (family Leptoceridae), and a recent discovery of the aquatic macrophyte moth (*Acentria ephemerella*) is being studied as research-based *M. spicatum* management. Walleye are stocked annually to facilitate a trophic cascade by reducing the sunfish population that preys on the insects, in turn, naturally increasing the insect population. Additionally, large quantities of *Nitellopsis obtusa* were observed in the lake for the first time during the 2016 growing season. Management strategies have been implemented, with conflicting stakeholder goals of long-term ecological sustainability and seasonal impediment of lake use. Addressing macrophyte management as a piece of the puzzle for a long-term lake and watershed management plan will help to establish goals that will satisfy stakeholders and contribute to long-term resilience for the DeRuyter Reservoir ecosystem.

Student: Anna Graziosi

Faculty Sponsor: June Tyler (Art)

Ghost Stories ★

No matter what culture or historical time period, the only inevitable truth is that life is finite. Comfort is found with either the formation of religious or philosophical belief systems that establish certain, held standards for life and death. While this project covers many different isolated points of history, all of which give a different answer to what comes after death, it was not created to provide an answer to this question. It was also not intended to present a certain culture as having correct or mistaken views on the happenings of death and after. Rather, the goal has been to bring light to the different cultural perspectives and practices that exist outside of the popular Western canon.

Student: Kristen Guastella

Faculty Sponsor: Wesley Bernard (Art)

Future of Farms ☼★

This past spring semester, using a black and white film camera, I have been photographing functioning and deserted (sometimes completely destroyed) farms around SUNY Oneonta. Here, I will be presenting recent prints of the early efforts of my "Future of Farms" project. I am photographing these farms with film for a number of reasons. I want to portray a symbolic meaning in my prints. The old feel of the black and white film paired with the decaying farms are a perfect match. Black and white photography is a beautiful and distinctive method that will not be around forever, along with certain farms. The hands-on work I perform in the darkroom reflect that of life on a farm as well, and I want to bring work on a farm to life in a different aspect. I also want to shed light on the beauty of both farming and film photography and create images that will open the Oneonta community's eyes to these fading crafts. I am excited to show the Oneonta community what beautiful structures surround them.

Student: Eric Hanss (G)

Faculty Sponsor: Willard Harman (Biology)

Development of a Lake Management Plan for Crooked, Song, and Tully Lakes ☼

The goal of writing a state of the lake report and comprehensive management plan is to help stakeholders in a watershed set goals and methods for management of the ecological, biological, and social aspects of their lake and its watershed. Objectives can range from minimizing nutrient inputs to a lake, protection from invasive species, or controlling development around a pristine lake. Factors like watershed geology, anthropogenic impacts, reference conditions, water chemistry, lake basin characteristics, and species present in the lake all must be taken into consideration when a state of the lake report and comprehensive management plan are written. For Crooked, Song, and Tully Lakes in New York State, these factors and their potential goals are hard to define. This group of glacial lakes lies in two counties, three towns, and two different watersheds. In this report, I will be discussing the challenges that each lake presents to a lake manager, and how gathering data from historical records and from the field aids in decision making.

Student: Lynne Haynes (G)

Faculty Sponsor: Jeffrey Heilveil (Biology)

***Polydrusus* Weevils in Franklin County, NY** ★

Curculionidae (weevils) are one of the families of beetles that have been brought into the United States and have caused a significant amount of damage to the native trees and plants on which they live (Coyle et al. 2010). *Polydrusus* weevils, a European genus, are commonly transported. Three unintentionally introduced species within the genus are *Polydrusus impressifrons* (Gyllenhal), also known as the pale green leaf weevil, *Polydrusus cervinus* (Linnaeus) and *Polydrusus formosus* (Mayer 1779), also known as the green immigrant leaf weevil. Little is known about the distribution of *P. impressifrons*, *P. cervinus* and *P. formosus* in the United States. More specifically, the locations in New York that *Polydrusus* can be found are still unknown. Primary research has shown that *P. cervinus* was not previously recorded in New York State. By generating a map of the distribution of *P. cervinus*, *P. impressifrons* and *P. formosus*, we will have a better understanding of how far these weevils move and how many populations are present. The goal of this research is to provide further information on the species within the genus and their distribution within Franklin County, New York.

Student: Elaine Herron

Faculty Sponsor: Andrew Gallup (Psychology)

Yawn Duration Predicts Brain Size and Neuron Count across Avian Species ★

The motor action pattern of yawning appears to function in promoting cortical arousal and state change through enhanced intracranial circulation and brain cooling. Consistent with this view, recent comparative research has shown a robust correlation between yawn duration and brain weight and cortical neuron number across a diverse and representative sample of mammalian taxa. Here, we

investigated whether a similar relationship is present for avian species. Using recently published data documenting brain mass, and total and pallium neuron counts across a range of parrots and songbirds, we took to the Internet to find videos of these species yawning in order to document relative yawn durations. Data collection is ongoing, but thus far we identified yawns from 28 species with available neurological data. Preliminary results show that yawn duration is significantly correlated with all three neurological parameters, while there is no relationship between yawn duration and overall body size across species. Although preliminary in nature, these findings represent a nice replication of the mammalian findings and provide convergent support for an important and general neurophysiological function to yawning across different species.

Student: Elise Iwanyckyj
Faculty Sponsor: Florian Reyda (Biology)

Analysis of a New Species of Tapeworm from *Fontitrygon margarita* (Daisy Stingray)

This study describes a new species of tapeworm that is morphologically unique from other known species of its group (Order Rhinebothriidea) that parasitize stingrays. This effort is part of a world-wide survey of parasites found in elasmobranchs. The new species is a member of the genus *Stillabothrium* and was found in several host specimens of *Fontitrygon margarita* in Senegal. Identification of the unique characters in this species was achieved through light microscopy, line drawings, and scanning electron microscopy (SEM). With these methods, observations showed that the orientation and pattern of the septa (i.e., muscle bundles) set this species apart from other rhinebothriidean cestodes. This species possesses a scolex with four units called bothridia, each of which possesses a single anterior loculus followed by two adjacent loculi with 4-5 marginal loculi on both sides of the bothridia. This new species can also be found in *Fontitrygon margaritella*, a host in which one other species from the rhinebothriidean genus *Stillabothrium* is common. The arrangement of septa is useful in distinguishing the two *Stillabothrium* species from one another and from other species of *Stillabothrium.* Along with many other studies, this one further expresses the diversity of cestodes, both described and undescribed.

Students: Elise Iwanyckyj, Timothy Banas, Cristina Santos Carvalho, Amanda Rhodes
Faculty Sponsor: Donna Vogler (Biology)

Annual Rings of Wood Turtle (*Glyptemys insculpta*) Comparative to Growth

The status of the wood turtle (*Glyptemys insculpta*), a species of concern in New York State, can be assessed through studies of its current and historic populations. Wood turtles have qualities that make them ideal candidates for collection studies; they continuously grow through their life time, and never shed their shells. This allows us to use annual growth rings of their carapace (top half of shell) scales (scutes) to assess their growth. Our study uses over 150 specimens and expands upon a previous study of 20 preserved wood turtle carapaces from a collection at SUNY Oneonta collected in central New York throughout the 1960s. We counted rings on the three scutes of each turtle shell shown to be most reliable for analysis. The preliminary analysis comparing carapace length to ring count numbers showed a positive correlation ($R2 = 0.65$), and no significant difference between scute ring counts (p-value = 0.50). Our current analyses and descriptive statistics on these turtle carapaces will better enable us to reveal the relationship between growth variables in preserved specimens, which will improve age estimates in field studies of this vulnerable species.

Students: Nathan Laing, Monica Dore
Faculty Sponsor: Sean Robinson (Biology)

SUNY Oneonta Tree Mapping ☼

We have been mapping all trees on our campus through the use of ArcMap in order to provide an inventory of the species present, and to guide future planting and management practices. This has been accomplished by conducting ground surveys of the campus using maps originally produced by the Spring 2016 BIOL 238: Dendrology class and records provided by the Department of Facilities and Safety. These data will provide a valuable resource for the instruction of botany classes on our campus. Information from this work could also be used to raise environmental awareness among members of

our campus community and visitors. In addition, the maps produced by this project will provide a foundation for the development of a campus arboretum.

Student: Tiffany Lane (G)

Faculty Sponsors: Dawn Hamlin, Frank Thornton (Educational Psychology, Counseling & Special Education)

Teaching Tolerance in Early Childhood Education

With curriculum to support the acceptance of all children, exceptional children are less likely to be rejected by their peers in early childhood settings. Children are more likely to develop feelings of acceptance towards all peers if they have direct experiences with exceptional children (i.e. free play), if they share indirect experiences with exceptional children (i.e. literature), and if their primary social group accepts exceptional individuals (i.e. family). According to Thomas Moore, "Socially competent children are more successful in life." As young children develop into adulthood, they must be equipped with the skills to be respectful, supportive, and empathetic. Classrooms that practice tolerance create safe spaces, respectful learning environments, diverse environments special to each child, anti-biased classrooms, children who feel empowered, and children who value and respect others. Children of classrooms that practice tolerance gain skills in peer relations, sharing, active listening, and conflict resolution. In addition, they learn about creating positive peer relationships, bullying prevention, community building, and meaningful conflict resolution. This study reveals strategies for educators to implement as they facilitate the positive growth of young children; strategies include the use of music, art, children's literature, discussion questions, play-based experiences, and connecting with families.

Students: Heather Launt, Gabriela Rodrigues, Peter Richardson

Faculty Sponsors: Katherine Lau (Psychology), Moira Riley (Bassett Research Institute), Matthew Aalsma (Indiana University School of Medicine)

Testing the Utility of the Brief Peer Conflict Scale

Aggression is the intent to harm or threaten the wellbeing of another person. Aggression has two functions (reactive, proactive), and two forms (overt, relational). Reactive aggression is a reaction to frustration or provocation, and proactive aggression is an instrumental means to gain a reward (Dodge & Coie, 1987). Overt aggression is used to damage a person's physical health (Berkowitz, 1993), and relational aggression is used to damage a person's social relationships (Crick & Grotpeter, 1995). Simultaneous assessment of the forms and functions of aggression is important in increasing knowledge of its etiology and association with psychopathology. For this study, we explored the utility of a brief 20-item version of the Peer Conflict Scale (PCS-20, Scott, Lapré, Marsee, & Weems, 2013), and whether it demonstrated similar associations with externalizing and internalizing variables as found with the original 40-item PCS (Marsee et al., 2011) that was designed to assess the forms and functions of aggression in youth. Overall, results suggest that the PCS-20 and its four factors have good internal consistency. The total PCS and its four factors were also correlated with expected externalizing and internalizing variables. However, the ability of the four factors to show independent associations with externalizing and internalizing psychopathology is weak. Limitations are discussed.

Student: Stephanie LeClerc (G)

Faculty Sponsor: Jiang Tan (Secondary Education & Educational Technology)

eReaders and Literacy Development

This study seeks to examine the effect that eReading technologies have on students with deficient literacy skills according to the 8th grade New York State English Language Arts testing data. Current practices in academic intervention services do not appear to have a significant impact on student literacy development and are not demonstrating adequate improvement among students. Modern Kindle eReaders will be examined to determine if technology-enhanced reading instruction is more effective for struggling readers. Student development in reading comprehension, vocabulary skills, and motivation will be analyzed through collection of surveys, interviews, worksheets, and pre- and post-

tests. Implications for future remedial reading instruction is provided in addition to a discussion of how to properly incorporate eReading instruction into the classroom.

Student: Anna Lin

Faculty Sponsors: Dona Siregar, Kai Chen (Economics, Finance & Accounting)

Auditor Reputation and the Underpricing of IPOs

The objective of this study is to determine the relationship between auditor reputation and underpricing of initial public offerings (IPOs). Investors rely on auditors' expertise to verify the credibility of financial statements of companies going public. As the quality of auditors' work positively correlates with their reputations, it is in the best interest of the companies to appoint an auditor who will provide high quality services to attract investors. An auditor's reputation may reduce asymmetric information that exists between companies and the external investors. This study explores whether the reputation of an auditor relates to the underpricing of IPOs which, in turn, affects the net amount of funds the going-public companies raise. Multi-variable regression analysis of a sample consisting of companies that went public during the period of 2001-2003 is performed to test the hypothesis. In particular, this study investigates whether the enactment of the Sarbane Oxley Act (SOX) on July 30, 2002 has had an impact on the importance of auditor reputation in determining the underpricing of IPOs.

Students: Taylor Litwin, Blair O'Brien

Faculty Sponsor: Wendy Lascell (Geography & Environmental Sustainability)

Post-Katrina Environmental Issues: The Lower 9th Ward and the Greater New Orleans Area ☼

New Orleans is known for Mardi Gras, one of the largest cultural celebrations in the country. On the other hand, it is also known for one of the largest natural disasters to ever strike a coastal region of the U.S., Hurricane Katrina. Eleven years later, New Orleans has restored its traditional Mardi Gras spirit, but continues to suffer from countless environmental issues stemming from Katrina's impacts and the carnival season. Our research will further explain the most pressing issues since Hurricane Katrina, including the collapse of fisheries and wetlands in Coastal Louisiana, dumping of toxic debris on abandoned lots, and extensive littering and plastic waste of Mardi Gras festivities.

Students: Christian Lopez, Christopher Santana, Meaghan Kincaid

Faculty Sponsors: Kai Chen (Economics, Finance & Accounting), Chien-Wei Lin (Management, Marketing & Information Systems)

Financial Motivations of Cause Related Marketing Campaigns

This project investigates the financial motivations of cause-related marketing (CRM) campaigns of U.S. public firms. Specifically, we documented 250 CRM campaigns in 2015 and compared them with the industry benchmark to identify the key financial antecedents (e.g., asset, sales profitability, and advertisement expense) of CRM. We found that: i) bigger firms have an increased likelihood of executing CRM campaigns, ii) the firm's growing sales and income levels will affect its CRM decision positively, and iii) a firm's CRM complements its advertisements.

Student: Joshua Louden

Faculty Sponsor: Joshua Nollenberg (Physics & Astronomy)

Narrowing the Search for Planet Nine

Recent analyses of the orientations of the outermost objects in the Solar System and the anomalous axial tilt of the Sun relative to the orbital planes of the Solar System have resulted in the speculation that there may be a large, undiscovered object lurking in the outskirts of the Solar System, which has been dubbed "Planet Nine." The object may have more than ten times the mass of the Earth, but it is expected to be very faint due to its extremely large distance from the Sun. We report on our use of Monte Carlo techniques to model the distribution of likely orbits for Planet Nine in order to find portions of the sky with the highest likelihood for finding the object. These areas will become target regions for our current search for new Kuiper Belt Objects at SUNY Oneonta's College Camp Observatory.

Student: Sisina Macchiarelli

Faculty Sponsor: Florian Reyda (Biology)

Problematic Identification of Azygia Species in New York Freshwater Fishes ☼

During nine years of surveying Otsego and Canadarago Lake, more than twenty species of parasites were encountered in 27 species of fish. These fish were collected via seining, electrofishing, angling or gill netting. They were then anesthetized and dissected under a dissecting scope. Parasites encountered were extracted from the fish and preserved appropriately for further examination. Among the parasites found in the stomachs of chain pickerel, yellow perch, and rock bass were species of trematode of genus Azygia. By using light microscopy, I was able to tentatively identify three species of Azygia, however there were some contradictions in the data. Although the worms I encountered in chain pickerel were relatively similar to previously recorded Azygia longa, in terms of morphological features, the DNA sequencing of my specimens from chain pickerel do not match the species recorded from other hosts, such as muskellunge. Specimens of Azygia from yellow perch mostly, but not entirely, match the morphological traits recorded in previous literature. A third species of Azygia found in rock bass could potentially be a previously known species or a new species of Azygia. This poster contains the highlights of the morphologies of these worms and the ongoing issues with their identification.

Students: Grace Maecker, Kyle Dudgeon

Faculty Sponsor: Wendy Lascell (Geography & Environmental Sustainability)

Louisiana Coastal Zone Management ☼

The wetlands of coastal Louisiana are deteriorating at an astounding rate due to anthropogenic changes made to the natural landscape. The construction of levees and urban sprawl open the door for storm damage and other events that threaten local communities and ecosystems. Healthy wetlands act as a barrier to natural disasters and sea level rise, a home for both migratory and native species of wildlife, and a hotspot for economic growth. This presentation showcases the importance of the wetlands, as well as the need to sustain what remains and restore what has been lost. Material gathered throughout our experiences in southern Louisiana while volunteering for Common Ground Relief, as well as scientific information from the organizations working so hard to save this region, will be displayed.

Students: Emily Marcellin, Kasey Fields, Maria Favaron, Rose Alexander

Faculty Sponsor: Alexandra Nicolette (Human Ecology)

Modified Fettucine Alfredo Recipe

The elderly population is at an increased risk for developing cardiovascular disease and protein energy malnutrition due to high fat and low protein diets. Foods high in protein and low in fat are beneficial to this population as it lowers their risk for developing these conditions. Fettuccine Alfredo was prepared using cannellini beans as a fat replacement for butter. Fat was replaced at 50%, 75%, and 100% ratios for this recipe. There were changes between the samples in the categories of texture, flavor and mouth feel. A line-spread test was conducted to determine the thickness of each sauce with the 100% fat replacement sauce being the thickest. As the percentage of beans to butter increased, the calories and fat decreased. The control recipe contained 52 grams of fat while the 100% replacement contained 22 grams. Saturated fat content decreased from 32 grams to 13 grams as well. All samples received acceptable ratings other than the 100% replacement sauce, and the 50% replacement sauce was most acceptable. Overall, cannellini beans are an acceptable fat replacer for butter in fettuccine alfredo.

Student: Joe Matzel

Faculty Sponsor: Christine Storrie (Economics, Finance & Accounting)

The Obama Administration's Impact on the Gender Wage Gap

As of 2016, the average woman makes 79 cents compared to the average man's dollar. After the 1963 Equal Pay Act passed, this gap ideally should have been eliminated. It is concerning as to why this problem persists in today's society. This study focuses on President Obama's efforts to shrink this gap through legislation and executive orders. Using data from the March supplement of the Current

Population Survey from 2003-2014, I estimate a fixed-effect model to estimate earnings for men and women. Even when controlling for individual worker characteristics the gender gap is still evident.

Students: Leah McCormick, Peter Wegrzyn

Faculty Sponsor: Elizabeth Bastiaans (Biology)

The Effect of Water Availability on Ejaculate Size and Oviposition in Bean Beetles *(Callosobruchus maculatus)*

Individuals are expected to alter their reproductive tactics in response to variation in available resources. The bean beetle, *Callosobruchus maculatus*, is a pest of stored legumes that has been introduced worldwide. This species is an ideal model for understanding the effects of variation in resource availability on reproductive behavior because adult beetles typically do not eat or drink after pupation but will consume water if given the opportunity. In addition, male bean beetles have barbed intromittent organs that cause internal damage to females during mating. Despite this cost, female bean beetles have been observed to mate multiply, even when males are prevented from harassing them. Previous work suggested that females may derive hydration benefits from male ejaculate transferred during mating, because females given access to water mated less frequently than females not given access to water. In our study, we tested whether males given access to water transferred larger ejaculates than males not given access to water. We also report on differences in oviposition behavior and in larval survival between females mated to each category of male.

Students: Thomas McNamee, Elliot Moore, Hayley Lovett

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

Teaching Physics Concepts with Smartphones with Tracker Software

Many different laboratory activities in schools include the use of technology as a tool for completing the activity. This research explored ways to apply 'Tracker' software and smartphone video of a Frisbee to teach physics concepts. Researchers explored and identified numerous mechanics concepts, mathematical computational and data analysis skills that can be readily taught in high school physics classrooms. As an outcome, the researchers believe that encouraging high school physics students to use their smartphones in 'smart ways' such as quantitative analysis of the flight of a Frisbee may have positive motivational and academic outcomes.

Student: Ambar Melendez

Faculty Sponsor: Yun-Jung Choi (Human Ecology)

Visual Merchandising: Promotional and Innovative Design for Oneonta Local Apparel Stores

Visual merchandising is an art of selling, which requires a combination of various attributes including creativity, artistic knowledge, and understanding of consumer behavior. In today's competitive business environment, visual merchandising becomes important to attract customers, increase store traffic, and improve retail sales. This project seeks to understand the process of visual merchandising in the fashion business arena. I examined the role of creativity, innovation, and sustainability in today's world of visual merchandising by working with two local apparel stores, Monkey Barrel Toys and The Artisans' Guild in Oneonta, New York. I developed a visual merchandising plan and created themes and settings for windows and interiors to communicate and attract local fashion consumers in Oneonta. Working on this project was a very positive learning experience, and helpful in my aspiration to one day own a business. I was able to learn that visual merchandising is a key strategy at each step of the promotional process, and inspired communications with consumers are vital to the success of a company and a store, especially a brick-and-mortar store, in the fashion merchandising environment.

Student: Lexi Milano

Faculty Sponsor: Ronald Bishop (Chemistry & Biochemistry)

Base-Catalyzed Cyanoethylation of Ethylene Glycol: Survey of Conditions ☼

Despite ongoing technological advancements made by the petroleum industry, oil and gas field workers and residents near petroleum wells continue to be exposed to toxic chemicals and noxious microbes in

air, water, and soil. Some of these advancements, such as polymer coatings applied to proppant particles, may themselves be responsible for exposures to compounds which arise from chemical interactions among additives used in drilling, hydraulic fracturing and product processing. A comprehensive analysis of chemical interactions among additives and with naturally occurring compounds is needed for scientists and regulators to assess – and potentially mitigate – the scope of anticipated health impacts from petroleum production activities. The goal of our research is to investigate the source of acrylonitrile that has been detected in streams and underground aquifers near petroleum production operations, possibly via interactions between thermoplastic polymers and ethylene glycol, which are common industry additives. The specific aim of this study is to carry out a survey of conditions for base-catalyzed cyanoethylation of ethylene glycol.

Student: Kate Moore

Faculty Sponsor: Keith Brunstad (Earth & Atmospheric Sciences)

Chemical and Mineralogical Control on Two Goat Rocks Volcano Lava Flow Volumes, Effusion Rates, and Lengths, South-Central Cascade Range, Washington ☼ ★

Goat Rock volcano is located along the Cascade Mountains, 30 km north of Mount Adams, Washington, USA. The Goat Rock volcano erupted one million years ago (Ma), producing multiple lava flows. The most predominate lava flow is the tieton andesite flow, which reached ~80 km long, 60m thick, and has a volume of 2km2 on the east side of the arc, making it the longest known andesite flow on Earth (Wood and Kienle). This project seeks to determine if the west arc lava flow of Goat Rock volcano is the same lava flow as the east tieton andesite. In earlier research, we have established the rate of eruption and rate of effusion for the east lava flow on the volcanic arc. We are determining the effusion rate because it relates to the length of lava flow; a high rate results in a simple type made of a single flow unit, and low rates result in a compound lava which is composed of multiple flow units (G.P.L. Walker). Using this information we can compare the west and east flow to determine if they occurred at the same time and if they were the same lava flow.

Student: Amber Morey

Faculty Sponsor: Donna Vogler (Biology)

Pollen Tube Visualization of the Hawaiian Endemic *Hibiscus waimeae* ☼

Hawaiian species are frequently endangered by a lack of pollinators or inbreeding, both of which may be evaluated by the degree of pollination and pollen tube growth. The goal of this project was to determine if the success of pollination can be determined by visualization of pollen tubes using fluorescent microscopy. Sixteen pistils, the female reproductive structure of flowers, were hand pollinated with self or outcross pollen at the National Tropical Botanical Gardens in Hawaii, allowed to develop two days, and harvested. The styles were stored in ethanol and shipped to Oneonta, where they were stained with aniline dye and examined under fluorescent microscopy. Our study reveals that selfed flowers show limited pollen tube growth indicative of self-incompatibility or inbreeding depression, whereas outcross pollinated styles show greater success in pollen tubes. Further work will be directed towards improved assessments of pollen tube number and attrition of the style in different regions.

Student: Lea Moscatello

Faculty Sponsor: Andrew Gallup (Psychology)

The Relationship between Yawn Duration and Brain Weight in Domesticated Dogs

Evidence suggests that yawns function to promote state change and cortical arousal through enhanced intracranial circulation and brain cooling. Since the neurophysiologic effects from yawns are likely tied to the magnitude of this response, it was recently hypothesized that animals with larger and more complex brains would have longer yawns. Consistent with this view, we have previously shown that yawn duration is a robust predictor of brain size and cortical neuron number across a diverse sample of mammalian taxa. Here, we explored whether differences in yawn duration predict differences in brain size within a single species, *Canis lupus*. Given the wide variability in size and neuroanatomy across

dog breeds, and the availability of data on yawning among pets, this species served as a good model for such an investigation. Using previously published data on average brain weights across dog breeds, we reviewed openly accessible videos posted online to obtain average yawn durations. Data collection is ongoing, but thus far we have identified over 200 yawns across 26 breeds with available neurological data. In particular, we hypothesize that, similar to larger comparative analyses, average yawn duration will be positively correlated with brain weight within this species.

Student: Kayonga Denis Muganza

Faculty Sponsor: Joseph Pignato (Music)

Multilingual Hip Hop ★

The purpose of this project is to create a musical narrative told from the perspective of a Rwandan living in the United States. Mainstream media, including music, often reflects Western values and ideas. Marginalization of underrepresented groups occurs when such populations lack opportunities to be heard. This project is a music video of my new multilingual song *Igisabo* (traditional Rwandan calabash). In order to turn the *Igisabo* concept into a reality, I wrote and performed the vocals on the recording and I acted in the music video. I worked with two music producers, a videographer, an actress and scriptwriter, and a director, each of whom assisted with the technical aspects of the project. My hope is that this video helps viewers learn to be more open-minded to alternative perspectives regardless of how foreign or unfamiliar they might seem and that the work challenges viewers to go out and discover different music and art from different cultures, which might help create a deeper awareness and understanding of humankind.

Students: Alexandria Muller, Jolie Widawsky, Helen Kaufman, Stacey Sullivan

Faculty Sponsor: Alexandra Nicolette (Human Ecology)

Cauliflower Puree as a Fat Replacement in Macaroni and Cheese

Obesity and its related conditions are among the leading causes of death in the United States. In this experiment, cauliflower was used as a fat replacement in the cheese sauce used in a macaroni and cheese recipe in order to reduce the amount of saturated fat and caloric content. Cheddar cheese in the recipe was replaced at values of 25%, 50%, and 75% with cauliflower puree. A control recipe with no cauliflower puree was also prepared and evaluated. Through nutrient analysis, it was confirmed that this recipe replacement is an effective way to reduce saturated fat content of a cheddar cheese sauce. Total fat was reduced from 30g to 17g, and saturated fat was reduced from 19g to 10g from the original recipe to the 75% replacement. Total calories were reduced from 592 kcal to 437 kcal, indicating this is an effective replacement for calorie reduction as well. After evaluation of the recipes by 30 student and faculty participants from SUNY Oneonta, it was concluded that the 50% cauliflower puree replacement was the most acceptable of the three replacements.

Student: Sarah Newtown (G)

Faculty Sponsor: Jeffrey Heilveil (Biology)

Distribution of Meiofauna in Oneonta Creek, Oneonta, NY ★

Meiofauna are tiny organisms that live between sediment grains in freshwater, the most prevalent of which are rotifers, gastrotrichs, and nematodes. Their distribution is affected by abiotic factors such as groundwater flow, sediment type, and water chemistry. In order to learn more about the organisms found locally, I conducted a series of surveys in Oneonta Creek above and below Lower Reservoir. Pipe wells were installed to access the groundwater for chemical analyses (pH, salinity, conductivity, dissolved oxygen, and temperature). These wells house remote water-level data loggers that continuously record groundwater levels. The purpose of this project is to provide more information about which meiofauna can be found locally, and to provide information on the chemistry and stability of the water table in Oneonta Creek.

Student: Jeffrey O'Neil

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

Mathematical Inequalities

Mathematical inequalities play an important role in describing modern mathematics. Knowing when a variable quantity achieves a minimum or maximum value can be seen as the basis for a better understanding of the process described by the quantity. Finding the minimum or maximum value can sometimes be achieved by applying some classical inequalities. In this presentation, we investigate two of these inequalities and describe both algebraic and geometric methods for proving them.

Student: Joseph O'Reilly (G)

Faculty Sponsor: Daniel Stich (Biology)

Cassadaga Lake: A Multi-basin Approach to Lake Management ☼

Cassadaga Lake is located in Chautauqua County, NY. The lake is composed of three separate basins, with 7 sub-basins within them connected by channels. The main concerns of the Cassadaga Lake Association are excessive macrophyte growth and the threat of zebra mussels, although a variety of other concerns exist. As a part of the Lake Management program at SUNY Oneonta, a comprehensive Lake Management Plan for Cassadaga Lake will be developed. This comprehensive plan, as well as a State of the Lake Report, will include a compilation of background and current condition information on the lake, with options to address concerns and contingencies. Additional efforts will be made to statistically determine which sub-basins are closely related in order to help make sampling methods more efficient.

Student: Colleen Parker (G)

Faculty Sponsor: Kiyoko Yokota (Biology)

Monitoring of Mercury in Catskill Region Fishes ☼★

An early 2000s study to understand mercury levels across New York State (NYS) suggests the Catskills region is a "biological hotspot" for mercury. We are conducting a study to re-evaluate the potential health risk of consuming mercury-contaminated fish from water bodies within the Catskills region. This project is conducted in collaboration with Syracuse University and the NYS Department of Environmental Conservation (NYS DEC) as part of the statewide monitoring program commissioned by the NYS Energy Research and Development Authority (NYSERDA). Thirteen waterbodies were sampled from May to November 2016, targeting a total of 30 individuals of either *Sander vitreus* (walleye), *Perca flavescens* (yellow perch), *Micropterus dolomieu* (smallmouth bass) or *Micropterus salmoides* (largemouth bass) per water body. Results of this study will further our understanding of mercury levels in fish within the Catskills region, give insight to specific lake characteristics as predictors for mercury, and augment existing statewide data across New York State.

Students: Fernando Peralta, Laura Melendez

Faculty Sponsor: Junryo Watanabe (Biology)

M1 and M2 Genes in *Drosophila melanogastor* Plasmatocytes: What Are They Doing? ★

Macrophages are professional phagocytes of the mammalian immune system, and they adjust their surface receptors as well as their secreted products in response to environmental cues and local stimuli. Classically activated macrophages, or M1macrophages, perform anti-microbial functions and secrete proinflammatory cytokines. In contrast, alternatively activated macrophages, or M2 macrophages, are involved in mechanisms such as tissue regeneration and release anti-inflammatory cytokines. Macrophage-mediated clearance of apoptotic debris is crucial for regeneration of the peripheral nervous system after injury. It is hypothesized that M2 macrophages are mediating this clearance much in the same way M2 macrophages aid in the repair and regeneration of muscle and liver organs. In *Drosophila melanogastor*, plasmatocytes act as professional phagocytes, and they are responsible for disposal of all apoptotic and pathogenic microorganisms. The mechanism by which plasmatocytes recognize and engulf apoptotic debris is poorly understood, and whether a similar or parallel M1/M2 phenotype exists in fly plasmatocytes is currently unknown. However, several genes, such as draper and croquemort

(crq), have been identified as required for phagocytosis of apoptotic cells. CRQ is a member of CD36 family of scavenger receptors and, interestingly, M2 macrophages upregulate mammalian CD36 expression. Thus, it is hypothesized that plasmatocytes from M2 deficient flies can phagocytose pathogens but not apoptotic debris; the reverse should hold for M1 gene deficient plasmatocytes. Here we investigate similarities and differences between signaling in mammalian M1 macrophages and plasmatocytes exposed to *Escherichia coli* using genomic and in vitro systems.

Students: Byron Peregrim, Jessica Schoeck, Heidi Gorton, Kerianne Engesser, Victoria Pigott

Faculty Sponsor: Florian Reyda (Biology)

Parasite Party: Full Necropsies of Yellow Perch from Canadarago Lake

Parasites are commonly found in a wide range of animals. Yellow perch (*Perca flavescens*), a fish found in freshwater throughout New York State, are frequent hosts for a variety of parasite species including those from the protistan phyla Myxozoa and Ciliata, and from the animal phyla Annelida, Acanthocephala, and Nematoda, with the most diversity encountered from the phylum Platyhelminthes, represented by a diversity of monogenes, trematodes, and cestodes. Full necropsies revealed representatives of these parasite groups within thirty-two yellow perch obtained from Canadarago Lake in Otsego County, New York through ice fishing between the dates of January 16 and February 18, 2017. Organs, the body cavity, and external surfaces were extensively searched during the full necropsies. Parasites were extracted, preserved, and processed for further examination on slides. Upon light microscope examination, approximately thirteen parasite species were identified. All of these procedures were conducted at the SUNY Oneonta Biological Field Station in Cooperstown, NY. The presented research will show extensive data displaying our results.

Student: Joseph Perry

Faculty Sponsors: Matthew Albright (Biological Field Station), Daniel Stich (Biology)

Efficacy of a Potassium Peroxymonosulfate-based Disinfectant (VirkonTM) against Zebra Mussel (*Dreissena polymorpha*) Adults and Veliger Larvae ☼

In the United States alone, the economic impact of zebra mussel proliferation is as much as $1 billion annually, including costs stemming from the fouling of intake pipes and materials. In addition to economic impacts, zebra mussels are considered to be ecological engineers, drastically and negatively affecting ecosystem structure upon introduction. Zebra mussels are most often introduced to new water bodies as a result of human activity, with adults being transported overland on buoys, chains, or watercraft, and larvae by means of live wells, fishing nets, or any damp, porous material. Virkon, a broad-spectrum potassium peroxymonosulfate-based disinfectant was evaluated for use against nearly 10,000 veliger larvae and 1,500 adult zebra mussels during the summer and fall of 2016. Veliger larvae exhibited 100% mortality when exposed to 3% and 2% treatment solutions for 15 minutes or longer, or a 1% treatment solution for 30 minutes or longer, while adults exhibited 100% mortality when exposed to 1%, 0.5%, 0.25%, and 0.1% treatments after 48 hours. Due to its complex action mechanism, low toxicity, biodegradability, and success in producing 100% mortality in two life-stages of zebra mussels, Virkon may be a useful tool for disinfecting materials moving between zebra mussel-infested water bodies.

Student: David Pfuhler (G)

Faculty Sponsor: Daniel Stich (Biology)

Finding a Balance: A Case Study on the Management of Crumhorn Lake ☼

Developing a comprehensive management plan relies on working with stakeholders to identify common issues surrounding the intended uses of the lake. After these issues are identified the goal is to find long-term solutions that are agreeable to the stakeholders and also develop a culture of environmental conservation around the system. This includes not only collections of biophysical characteristics but also information on social dynamics, and local and natural history. Crumhorn Lake is a small, quiet lake in Milford, New York on Crumhorn Mountain in Otsego County. The lake hosts about 20 small cottages of mostly part-time residents and the 630-acre Henderson Boy Scout Camp. They enforce a

strict no motor regulation on the lake with the primary activities on the water being fishing and small craft boating. The comprehensive management plan must accommodate the desire for environmental conservation by the members of the Lake Association and allow for the camp to provide a full "camp experience" to its visitors.

Student: Cheyenne Pommelle

Faculty Sponsor: Florian Reyda (Biology)

Discovery of the Asian Fish Tapeworm in New York

Shizocotyle acheilognathi (formerly *Bothriochephalus acheilognathi*), infamously known as the invasive Asian fish tapeworm (AFT), is of concern to fishermen and other leisure lake users alike. The AFT has previously been identified in over 10 states across the United States. The success of AFT in North America is most likely due to its low host specificity, allowing it to use any species within the family Cyprinidae (i.e., minnows) as a host. In the United States, AFT has been reported in the emerald, spot-tail, mimic and golden shiners, and in fathead minnows. Translocation of infected grass carp from Asia is a widely accepted hypothesis on how AFT was introduced to the United States (Hoffman 1999). Infection spread in regions like the Great Lakes where fishermen used or released live and, in some cases, dead baitfish (Choudhury et. al. 2006). Other sources of spread include the translocation of fish to different hatcheries for spawning purposes (Choudhury et. al. 2006). In our study of AFT, over 700 fish were collected via traditional hook and line fishing, seine, or backpack electrofisher, and over 50 were believed to be infected with *S. acheilognathi*. From those specimens, mostly golden shiner and yellow perch, samples of worms were prepared on slides for further investigation, and identified as *S. acheilognathi* based on morphological features specific to *S. acheilognathi*. This study is the first record of the invasive AFT in New York State and the mid-Atlantic region.

Student: Leslie Reitz

Faculty Sponsor: Dawn Sohns (Communication & Media)

The Persuasive Impact of Apple's "Distractingly Good" Campaign

The purpose of this research is to determine the persuasive strategies used in Apple Music's "Distractingly Good" campaign. The research also delves into the impact that this campaign has had on society. Apple Music calls their unique technique of advertising "clubhouse" which welcomes different popular artists to be the headline of their campaigns. By identifying the persuasive strategies and tactics used by a multi-million dollar company we can become more critical consumers of information.

Student: Jonelle Reyes

Faculty Sponsors: Tsitsi McPherson (Biology), Philip Sirianni (Economics, Finance & Accounting)

How Big Are Your Resource Feet?: An Ecological Footprint Assessment of SUNY Oneonta ☼★

Ecological footprint assessments are used to quantify the environmental impact of an individual's actions and decisions. These decisions influence the degree of a person's impact, which can then be attributed to environmental effects on a larger scale. We report on the development of a student-centered ecological footprint assessment survey for the State University of New York (SUNY) College at Oneonta. SUNY Oneonta strives to reduce their ecological footprint by improving the energy efficiency of their buildings on campus. Despite these efforts, the college's ecological footprint cannot be significantly reduced without student awareness of resource use. The objective of this footprint assessment was to measure the environmental impact for each student. We assessed the average student water consumption, garbage and recycling production, electricity usage, and carbon emissions from commuter behavior. Through an online survey, students were asked about their perceived use of a resource. This information was used to compare each student against the typical student in their residence. In addition, the survey measured the college population's "willingness-to-pay" to offset the environmental impact of their resource consuming behavior, while assessing their initial perception on the concepts of climate change, global warming, and sustainability. The campus climate on sustainability at SUNY Oneonta, while significantly strong, pertains to students of a few majors. There is a need to expand this concept to more majors on campus.

Student: Amanda Rhodes

Faculty Sponsor: Elizabeth Bastiaans (Biology)

Fluctuating Asymmetry in Plastron Scutes in a Historical Population of Wood Turtles (*Glyptemys insculpta*) ☼

Fluctuating asymmetry in bilaterally symmetrical organisms is a marker of developmental instability and may result from inbreeding, toxins, disease, or other stressors often associated with anthropogenic declines. We used a collection of approximately 300 preserved Wood Turtles (*Glyptemys insculpta*) collected in central New York the 1960s and 1970s to collect baseline data on fluctuating asymmetry in a turtle species that is now endangered. We compared fluctuating asymmetry in multiple plastron scutes within individuals as well as between sexes, between turtles of different body sizes, and between populations. These data will provide a basis for comparison with contemporary populations, to shed light on factors that may have contributed to population declines in this species.

Student: Amanda Rhodes

Faculty Sponsor: Elizabeth Bastiaans (Biology)

Jumping the Fence: Population Genetics of an Introduced Fence Lizard on Staten Island ☼★

My research takes advantage of the introduction of the eastern fence lizard, *Sceloporus undulatus*, to Staten Island, New York. Unlike many introductions that have been well studied, this introduction occurred close to native populations of the species, but at the very northern edge of the species' latitudinal range. Thus, it represents a unique opportunity to investigate the roles of genetic and environmental factors in limiting species distributions. We use population genetic tools to test the anecdotal story behind the lizards' introduction and determine their population of origin and rates of gene flow with nearby populations. We have been amplifying 17 microsatellite loci for at least 20 lizards per population for the four populations from New Jersey, Staten Island, the Hudson Valley, and Pennsylvania. Collaborators from Dr. Russell Burke's laboratory at Hofstra University have already sent us samples from New Jersey and they will continue to send us further tissue samples as they obtain them. Another (former) student, Marina Brown, has optimized PCR conditions for multiplex reactions; her data has been integrated into this project allowing for more efficient reactions.

Student: Phillip Riccobono

Faculty Sponsor: Wendy Lascell (Geography & Environmental Sustainability)

Demographic Changes in Post-Katrina New Orleans ☼

Hurricane Katrina had a profound effect on the demographics of New Orleans, with an estimated loss of about 181,000 people, 40% of the city's population, between July 2005 and July 2007. The population has been increasing, but remains significantly less than it was pre-Katrina. Tens of thousands of people were displaced from their homes, and many have not returned, whether by choice or lack of resources. People predicted that the city, which was 67% black pre-Katrina, would see a rise in the percentage of white and Hispanic residents as a result of this displacement. While white people did return to the city quicker than African-Americans, the percentage of African-Americans in the city has been shifting closer to the pre-Katrina rate. The Hispanic population in New Orleans has risen slightly in the years following Hurricane Katrina (14,826 in 2000 vs 21,849 in 2015) but remains significantly below the national average. However, a noticeable change is a rise in certain Hispanic groups – specifically an influx of people of Central American (e.g. Honduran) heritage, rather than Mexicans, as had previously been the largest Hispanic group in the city. Changes didn't happen as predicted, but still impact New Orleans, a city recovering, but with an uncertain future.

Student: Emilie Richard

Faculty Sponsor: Keith Brunstad (Earth & Atmospheric Sciences)

Environmental Baseline Study for Managed Sediment Release from the Lower Reservoir, Oneonta Creek, Oneonta, NY ☼★

The Lower Reservoir in Oneonta, NY is one of the city's main sources of drinking water. Storage capacity of the reservoir has decreased significantly over the years due to the increasing sediment infill

behind the dam. City management is considering flushing sediment downstream to restore the storage capacity of the reservoir. The goals of this study are to generate a comprehensive baseline data set for the conditions of the stream prior to sediment release, and predict the potential impacts associated with this practice. Sedimentology, geomorphology, water chemistry, and biology of the stream were analyzed at sample sites above and below the reservoir using standard methods. Pebble counts reaffirmed that the streambed and bar deposits contain primarily small boulders to fine gravels. Stream pH remains fairly consistent at all sites (5.7 – 6.15). Electrical conductivity and total suspended solid concentrations increase downstream. Aquatic insect taxa data suggests greater species richness above the reservoir. The Lower Reservoir represents a common problem of many small reservoirs across the country. Abruptly flushing large amounts of sediment accumulated behind the dams could cause an unexpected response in the river ecosystem. Thus, long-term studies are needed to understand the potential consequences of this reservoir management practice.

Students: Gabriela Rodrigues, Heather Launt, Peter Richardson

Faculty Sponsors: Moira Riley (Bassett Research Institute), Katherine Lau (Psychology), Matthew Aalsma (Indiana University School of Medicine)

The Influence of Parental Psychological Control on Youth Relational Aggression

Using social learning theory (Bandura, 1978), children may model aggressive behaviors they observe in their parents. Research examining harsh parenting styles supports this view, showing a positive association between psychological control and children's relational aggression (Kawabata et al., 2011, Lau, Marsee, Lapré, & Halmos, 2016). However, the cross-sectional nature of these prior studies has been a major limitation, with the inability to infer directionality. In a sample of 94 community youth, this study examined the association between parental psychological control (PC) and child relational aggression (RA) over a six–month period. We tested the longitudinal relationship between psychological control and relational aggression. The results of the analyses showed that PC measured at three months significantly predicted increases in RA at six months. This suggests that as youth perceive more parental PC, there is also an increase in their RA. However, this finding was not consistent throughout the model, as baseline PC did not predict three-month RA. Interestingly, RA did not predict increases in parental PC at any time points. Overall, the study found support for a link between parental PC and child RA. Interventions for child RA should focus on harsh parenting styles, as well as the child's own relationally aggressive behaviors.

Students: Rebecca Rogers, Daniel Murphy, Vincent Tesoriero

Faculty Sponsor: Wendy Lascell (Geography & Environmental Sustainability)

Disaster Geographies Service-Learning Trip ☼

A video to be presented was created to document the service-learning aspect of the Disaster Geographies course. The video highlights both the wetland restoration and the cultural immersion facets of the trip. The students, led by Dr. Wendy Lascell and Linda Drake, travelled to New Orleans, Louisiana to work with Common Ground Relief, a grassroots organization focused on restoring New Orleans to pre-Katrina conditions. Students volunteered, working to restore wetlands at Bayou Sauvage and Jean Lafitte Nature Preserve. At Bayou Sauvage, students planted California Bulrush to restore wetland loss. At Jean Lafitte Nature Preserve, over 340 Cypress trees were planted to fortify the existing wetlands. In addition to volunteering, another important aspect of this trip was cultural immersion. Students stayed in the Lower 9th Ward, which is the poorest neighborhood in New Orleans. It was also the most heavily affected by Hurricane Katrina. Students had the opportunity to speak with New Orleans natives, learning about their personal experiences with the storm and the rebuilding process. Students were able to experience the cultural tradition of Mardi Gras by viewing parades throughout the end of the carnival season.

Students: Neil Rosenfeld, Marina Seidel, Adam Gaynor

Faculty Sponsor: Jacqueline Bennett (Chemistry & Biochemistry)

Evaluation of Imines as Cation Sensors in Water Samples ☼★

Lead contaminated drinking water has been in the news a great deal over the past several months. Because many household plumbing systems contain lead pipes, corrosion of these pipes can cause lead poisoning and symptoms such as stunted growth, learning disabilities, and possibly death. Currently, to reliably screen a home's water for lead contamination, a water sample must be collected and sent to a certified laboratory for testing. This process is time-consuming and expensive. We have found that some compounds made by our group change color and/or fluoresce in the presence of aqueous metal cations. We are currently screening a library of these compounds for visible interaction with a variety of metal ions, including lead and mercury ions, with the goal of developing a rapid, inexpensive, and accurate water-testing kit. We will report our progress thus far in screening compounds for color and fluorescence changes.

Student: Jacqlyn Rossi (G)

Faculty Sponsor: Jiang Tan (Secondary Education & Educational Technology)

Does i-Ready Mathematics Affect Student Achievement within the First Grade?

This study investigates whether the implementation of i-Ready, a technology-based educational computer program, will effectively enhance students' motivation, engagement, and achievement within the first grade. Research supports the idea that exposure to educational technology increases motivation and achievement for elementary age students. Technologically advanced skills allow for enhanced communication, increased student achievement, and engaged collaboration with peers, all of which are essential in 21st century learning. The purpose of this research is to identify traditional teaching strategies that could be adapted for the 21st century learner. The society of 21st Century Learning teaches the importance of ways "technology can be a lever to improve previously defined learning outcomes." (Warschauer, 2011, pg. 10) The results of this study are based on student interviews, observational notes, student surveys, and pre- and post-assessment data that measures student motivation while students are participating in a first grade mathematics class using i-Ready. The results show how these environments affect the students' growth and motivation. We found that the longer students use i-Ready as a mathematical intervention program, student achievement and student motivation increased for the bottom third percent of students who participated.

Student: Alyssa Rothfuss (G)

Faculty Sponsor: Jeffrey Heilveil (Biology)

Sisyridae and Sponges: A Genetic Analysis ★

Otsego Lake has many surrounding tributaries, in which freshwater sponges (Haplosclerida, Spongillidae) and aquatic insects known as spongillaflies (Neuroptera, Sisyridae) reside. Little is known about which species are present in Otsego County, or even the population structures of these organisms, and there are few distribution records available for the region. The main focus of this project is to provide some insight into the species of both sponges and spongillaflies present in Otsego County and the population structures of each. Distribution records for both sponges and spongillaflies will be created for the Otsego Lake watershed. The molecular markers cytochrome oxidase I (COI) and wingless (Wnt) will be used to identify any gene flow that may exist between distinct populations for each of the species encountered.

Student: Jaclyn Ruhl

Faculty Sponsors: Fred Zalatan, Paul Lord (Biology)

The Effect of Emerald Ash Borer Exposure on Fungal Decay of Ash Wood ☼★

The emerald ash borer (EAB) is an invasive species of insect that causes widespread infestation and mortality of ash wood. This infestation can harm the ecosystem, including the quality of air in some regions. One possible secondary issue that can affect ash mortality is the facilitation of wood decay by fungi. Previous studies have shown that a fungal species of brown wood rot, *Postia placenta*, has

hydrolytic and oxidative enzymes that ease the decay of the wood. Our current experiment tests the effect of emerald ash borer exposure on the decay of individual blocks of ash wood by *P. placenta*. We will treat groups of ash wood (either exposed to EAB or no exposure) with either fungus (*P. placenta*) or no fungus. We will measure the decay of the wood by percentage of weight loss over several weeks to analyze whether the presence of the fungus facilitates decay, and whether decay is increased in EAB-exposed wood.

Student: Genna Schlicht

Faculty Sponsor: Maurice Odago (Chemistry & Biochemistry)

New Approaches to the Synthesis of N-heterocyclic Carbenes

N-heterocyclic carbenes have been shown to be versatile and robust ligands that form very stable coordination compounds with metals. These properties have made N-Heterocyclic carbenes a very useful class of ligands in homogenous catalysis. Since their structures are readily modified, they have also been examined as important sources of chiral ligands for asymmetric catalysis involving many transition metals. Towards this end, we have focused on ways to synthesize imidazolinium based salts, which are excellent precursors for N-Heterocyclic carbenes. The syntheses of these salts are achieved by a series of reactions starting with the formation of diimines, which are then reduced to diamines, and lastly followed by ring closure to form the desired imidazolinium salts. Imidazolinium salts are stable and, when treated with strong bases such as potassium tert-butoxide, they generate their respective carbenes. Most of the reported ring-closing procedures require extreme moisture and air free environments. However, we sought to synthesize these compounds under different conditions that were simpler, cheaper, and milder.

Students: Michelle Siegelwax, Sabrina Conticello, Valerie Matedero

Faculty Sponsor: Keith Schillo (Biology)

Use of a Holter Monitor and an Ambulatory Sphygmomanometer to Monitor Diurnal Changes in Cardiovascular Function

Advances in clinical medical equipment have made it possible to continually monitor vital signs in ambulatory subjects. We used a Cardioline Clickholter monitor and Riester ri-cardio blood pressure monitor to characterize changes in the electrocardiogram (ECG) and blood pressure in a 20-year-old female subject over a 24-hour period. These variables were continually monitored during the following intervals: 1300-1800 h (Awake I), 2300-0800h (Sleep I), 0845-1210h (Awake II). Mean systolic blood pressure, diastolic blood pressure, and pulse rates were lowest during the sleep I compared to the awake intervals. We failed to detect any atypical ECG patterns. These results demonstrate that this equipment can be used to reliably monitor cardiovascular function for extended periods of time and could therefore be used effectively in undergraduate courses to enhance understanding of cardiovascular physiology.

Student: Randi Sisco

Faculty Sponsor: Elizabeth Seale (Sociology)

Parenting in Economically Impoverished Neighborhoods

This analysis of previous studies investigates parenting styles in disadvantaged neighborhoods and their effect on children's educational and mental health outcomes. More specifically, this analysis examines these outcomes for pre-adolescents in 5th grade because of the associations this particular year of academic achievement has with future outcomes in terms of education and mental health. Living in more disadvantaged neighborhoods is associated with lower academic achievement and more aggressive behaviors among children. However, children living in disadvantaged neighborhoods who were raised by parents who implemented more education-oriented practices in the home often have more positive academic and behavioral outcomes than children living in the same neighborhood who did not have education-oriented practices implemented in the home.

Student: Sara Stathopoulos

Faculty Sponsors: Philip Sirianni, Charlene Foley-Deno (Economics, Finance & Accounting)

The Feasibility of Micro Hydropower: A Cost-Benefit Analysis of the Silver Creek Basin ☼

This project is a feasibility study and cost benefit analysis of installing a micro hydropower plant on SUNY Oneonta's campus. The idea is to use water from Silver Creek, flowing along West Street and through campus, to power a micro hydropower facility that would feed into the campus' power grid. Micro hydro can provide alternative renewable energy sources especially in areas with small rivers. However, our research and analysis concludes that a micro hydropower facility would not be cost effective. In most cases, for a scenario to be cost effective there needs to be a two-to-one ratio of two horizontal feet for every vertical foot (head). The site in question along Silver Creek only has about 50 feet of head over a 2,000-foot distance, which makes this project infeasible at the proposed site. We not only considered monetary values, but also intangible values including students being able to use the site for learning purposes and making SUNY Oneonta's campus more ecofriendly.

Students: Erika Stopler, Neil Rosenfeld

Faculty Sponsor: Jacqueline Bennett (Chemistry & Biochemistry)

Greener Synthesis of Phenylsemicarbazones and Phenylthiosemicarbazones ☼

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 more benign solvents, requires no boiling, is faster, and gives equal or better purities and yields. We are extending our method to related classes of compounds known as phenylcarbazones (PSCs) and phenylthiosemicarbazones (PTSCs). We will report our success making several of these compounds using greener methods.

Student: Keri Surita

Faculty Sponsor: Wendy Lascell (Geography & Environmental Sustainability)

Assessing Emergency Management Strategies of New Orleans, Louisiana ☼

On August 29, 2005, New Orleans, Louisiana was devastatingly transformed. Hurricane Katrina altered the city in such a way that its effects can still be seen clearly and felt by residents today. When discussing this natural disaster and its impacts, the poor quality of emergency response and disaster relief is often the first point to be mentioned. The magnitude of this storm clearly exceeded everyone's initial expectations and left state, local, and federal officials struggling to respond adequately and in a timely manner. Was it a lack of coordination between these administrations that led to such an infamous failure? Or was it the poor quality of emergency preparedness plans that had been in place?

Student: Tristin Tait

Faculty Sponsor: Elizabeth Bastiaans (Biology)

Variation in Dorsal Patterns among Populations of a Montane Mexican Lizard Species

The mesquite lizard, *Sceloporus grammicus*, lives in a variety of habitats in the mountains and high plains of northern and central Mexico. The dorsal patterns of these lizards vary greatly, suggesting localized adaptations by different populations to better suit their habitat. It has been found in other species of this family that dorsal patterns differ between the sexes and correlate with habitat use. In this study we compare the dorsal patterns among habitats and between the sexes in *S. grammicus*. Approximately 2,000 pictures showing the dorsal patterns of lizards captured from 2007-2011 were scored for number of chevron-shaped pattern elements and ranked on a scale of most striped to most barred. These data will highlight habitat-specific adaptations that may be relevant to the conservation of this and other montane species.

Student: Luke Thomas

Faculty Sponsor: Sen Zhang (Mathematics, Computer Science & Statistics)

An Implementation of Computerized Go Game

After taking an Artificial Intelligence (AI) course in 2016, when I had successfully implemented an alpha-beta pruning enhanced minimax AI to play Connect4 in C#, I became interested in understanding how to implement AI for the game "Go." Mastering Go is still a long-standing challenge to the AI field. This project is the first step in helping me understand the challenges of writing a full-fledged Go AI. This is an implementation-based project written in Java. Swing and 2D graphics application program interfaces (APIs) are used for the Graphical User Interface. The current implementation supports the most basic rules. For auto-capturing, a recursive flood-fill algorithm was implemented. For a game-state scoring function, captured pieces and alive pieces are recorded and potential territories are estimated. For the AI algorithm, minimax was attempted in a brute-force manner to reveal that the traditional two-player, zero-sum game AI is inefficient due to the exponential growth rate of the search graph. In the future, we plan to investigate the state-of-the-art Go game algorithms, including more accurate scoring functions, deep-learning pattern recognition, and Monte Carlo Tree Search based AI algorithms. There is also potential to enhance my current Go AI from an engineering perspective, i.e. by using high-performance and parallel computing techniques/strategies.

Student: Alexa Tumbarello (G)

Faculty Sponsor: Daniel Stich (Biology)

Developing a Comprehensive Management Plan for Adirondack Lakes ☼

Paradox Lake is a New York State (NYS) Department of Environmental Conservation (DEC) class AA lake in Essex County, NY. The residents of Paradox Lake and the Paradox Lake Association (PLA) are deeply concerned for the immediate and long-term stability of their lake. Like many lake associations in NYS, the PLA is challenged with the task of managing their freshwater system in a science-based, economically, and legally feasible way. Specifically, the presence of invasive macrophytes like *Myriophyllum spicatum* (Eurasian watermilfoil), more frequent algal blooms, and increasing boat traffic through the public boat launch threaten the well-being of Paradox Lake. In order to manage these issues, the PLA has partnered with the SUNY Oneonta Lake Management graduate program to produce a chemical, physical, and biological summary of the Paradox Lake system, and to create a comprehensive lake management plan. The purpose of this project is to establish baseline parameters for management objectives. Specifically, we will address (1) the lake and watershed characteristics, (2) physical and chemical limnology, and (3) biota.

Student: Anthony Vecere

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

The Impact of Banking Regulations and Deregulations on the Stock Market

The November 8, 2016 election results have boosted stock market performance due to possible upcoming policy changes. The likelihood for even more gains exists because of plans to increase government spending, cut corporate taxes, and deregulate the banking sector. By looking at the regulations from 1995 to 2017, this project studies how investors react to the regulations and deregulations of the banking sector. In doing so, I will be able to assess the relative level of danger associated with the simultaneous deregulations and rising stock market. This study is especially important given that there is much debate about whether the government should repeal the Dodd-Frank act since Donald Trump's election victory.

Students: Benjamin Weir, Andrew Schlottman, Elliot Moore, Brian Mead

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

Characterization of the Magnus and Drag Forces on a Spinning Projectile

Projectile motion is the flight of an object through a medium. In examining projectile motion there are three forces that act on the object: Magnus force, drag force, and gravitational force. The Magnus force arises from the spin of a ball. Objects with backspin can rise, while objects with topspin will curve

downward more quickly than predicted. The drag force opposes the velocity vector and also has an effect on the shape of the trajectory. Our goal is to find the coefficients of the Magnus and drag forces. Using a modern iPhone and the program Tracker, which extracts data from a video, we have found a method to find the coefficients. In this presentation, we will introduce our experimental set-up, methodology, and preliminary results.

Student: Alana White (G)

Faculty Sponsor: Jiang Tan (Secondary Education & Educational Technology)

The Effect of High-Tech versus Low-Tech Makerspaces on Fourth Grade Science Students

This study investigates the effects of makerspaces as an instructional platform in the fourth grade science curriculum on student achievement, motivation, and engagement. Makerspaces, or "content-creation spaces," are physical locations within a community location such as a library or classroom that are implemented with the intent to allow people to come together and create. Makerspaces, aligned with constructionist theory, allow users to become active participants in the learning process through building and creating, as opposed to simply consuming content as a passive learner (Slatter & Howard, 2013, p. 272). However, makerspaces can take many forms, ranging from spaces equipped with traditional crafting supplies such as cardboard and scissors, to technology-enhanced spaces housing robotics and 3D printing equipment. Specifically, this study focuses on the difference in the effects of different types of makerspaces, technology enhanced (high-tech) versus non-technology enhanced (low-tech) makerspaces on student learning and development of 21st century skills.

Student: Patrick Wilson

Faculty Sponsor: Joshua Nollenberg (Physics & Astronomy)

Photography of Celestial Objects within our Solar System ★

We present high resolution images of the Solar System taken at SUNY Oneonta's College Camp Observatory. These images have been corrected for the effects of atmospheric seeing. Astronomical images are often blurred due to turbulence combined with temperature differences in the atmosphere. The effects from the turbulence and temperature is called "scintillation" and can be viewed with the naked eye as the twinkling of distant stars and nearby planets. To mitigate this problem we took our data in the form of video files. Doing so allows for stacking individual video frames to increase the signal to noise ratio of the resulting image. The resulting co-added image is sharpened and denoised using a variety of image filtering techniques. Our final co-added images tend to have a resolution that is now doubled.

Student: Sonja Wixom (G)

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

Koinonia: An Educational Goldmine

Lake associations often hire lake managers or consultants to take samples and analyze their water body in order to identify important concerns and develop potential management strategies. Major impediments to the implementation of management plans can include lack of stakeholder involvement in the process, incomplete understanding of the process, and/or lack of stakeholder representation in the development of long-term management goals. Education is necessary for understanding stakeholder concerns, geological history, lake ecosystems, management risks and benefits, and overall potential for management success. Though often designed for younger audiences, strong educational material can benefit lake associations and residents by building stronger connections within the social and ecological communities to which users are tied, and by promoting environmental stewardship. Developing these materials may seem daunting at first, but the benefits of community involvement in the development of management goals can promote their successful implementation later. Koinonia, a Lutheran camp located in the foothills of the Catskills, is seeking a management plan from SUNY Oneonta's Lake Management program. This plan will focus on ecological conservation of their property through outdoor education and use of hands-on educational tools. The ultimate objective is to instill more

understanding of the natural functioning ecosystem and mitigate the negative ideology associated with plant growth for stakeholders, as well as guests.

Student: Emmanuel Woolard

Faculty Sponsor: Marita Gilbert (Gender & Sexuality Resource Center)

Seeing Toxic Masculinity

Black men face numerous challenges that are connected to unhealthy images of masculinity. These challenges often constrict the ways in which black men see themselves, limiting the possibilities for masculinity that connects blackness, queerness, and sexuality. In this presentation, I will reflect on the film *Moonlight* as a framework for understanding toxic masculinity within the black community and the practical implications for black men carving out their own identities. I will also re-image masculinities to broaden the possibilities of black manhood.

Student: Crystal Wyllie

Faculty Sponsor: Tyra Olstad (Geography & Environmental Sustainability)

Mapping Invasive Japanese Knotweed around Goodyear Lake ☼

Japanese knotweed is an aggressive invasive species that can outcompete native plants and contribute to soil erosion in areas that it infests. This project focuses on Goodyear Lake (Milford, NY), where it is already established. This project will discuss the negative impacts that Japanese knotweed has on Goodyear Lake ecosystems and residents. For this project, I am surveying the perimeter of the lake to determine the location of Japanese knotweed colonies along the shoreline, and will then create growth models to show where it is likely to spread over the next decade. Ultimately, this project will provide mitigation strategies and make recommendations to the Goodyear Lake Association to prevent the spread of Japanese knotweed.

Student: Anna Zoodsma

Faculty Sponsor: Tyra Olstad (Geography & Environmental Sustainability)

Biomimicry: A Conscious Approach to Modern Agriculture ☼

Modern industrial agriculture practices are unsustainable in that they destroy soil, have low levels of resilience, and are heavily dependent on fossil fuels. Continuing these practices will have serious long-term consequences. One alternative approach to conventional agriculture is through the lens of biomimicry – the imitation of life. This research uses a qualitative analysis of relevant literature to explore how biomimicry is applicable to agriculture. Some examples of this application are planting according to climate zone, planting perennials, anticipating change and succession with time, and working with the benefits and constraints of the land. Natural ecosystems possess millions of years' worth of evolutionary wisdom. By recognizing this wisdom as valuable, we humans can consciously and intentionally make prudent decisions regarding agricultural practices. Mimicking nature enables us to cultivate entire ecosystems instead of singular crops, and to cultivate a sustainable future instead of just food for a year.

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