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For more information, please visit our web page: [http://www.newpaltz.edu/research/usr.html](http://www.newpaltz.edu/research/usr.html)

You may also contact: Maureen Morrow, RSCA Director

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SUNY New Paltz Undergraduate Research, Scholarship and Creative Activities Group


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Editor: Maureen Morrow, RSCA Director

Cover Design: Michelle Pielli, RSCA secretary

Cover Photograph: Morgan Gwenwald
Welcome and congratulations to all of the SURE participants!

SUNY New Paltz strives to enhance students’ intellectual growth through links to faculty scholarship. One mechanism for encouraging these links is the Summer Undergraduate Research Experience (SURE) program. This program encourages on-going faculty-student collaboration by enabling students to work full-time on a project over an 8-week summer period. SURE students work on a particular aspect of the faculty’s research program under close guidance by the faculty mentors.

The 2017 SURE students are given the opportunity to present the results of their research to the community during the fall semester. It has been my great pleasure to work with these students and their faculty mentors this past summer. Their enthusiasm and dedication are an inspiration. I would like to congratulate the student and mentor SURE Alumni for their accomplishments and wish them luck with their continued efforts on these projects. Thanks to everyone who has joined us today in this celebration of the SURE achievements.

Maureen Morrow
RSCA Director

2017 RSCA Mentor Award

Anca Radulescu (Mathematics) is known to be a highly supportive and motivating mentor. She spends numerous hours working with students on their projects. She is committed to providing each of them with the most complete research experience, from the elaboration of the research project to the dissemination of their results. The outcome of Anca’s undergraduate research projects is remarkable, with most of her projects leading to a publication (quite an achievement in mathematics). Anca is also actively engaged in several student chapters of organizations that seek to engage women in mathematics and science. Ariel Pignatelli (Mechanical Engineering, ’17) wrote: Anca’s approaches new problems and ideas with enthusiasm and dedication, and always made me want to be a better student.
**RSCA (Research, Scholarship and Creative Activities) Program**

Faculty-student collaborators may propose projects for support through the Summer Undergraduate Research Experience (SURE) and Academic Year Funds programs (AYURE). Both of these programs are competitive and are selected for support by a faculty committee. SURE and AYURE awardees are also eligible for the RSCA Conference Travel Award. Congratulations to all of this year’s award recipients.

**SURE (Summer Undergraduate Research Experience)**
The focus of the SURE program is to encourage intensive student participation in an aspect of faculty research. Each student participant is supported with a stipend for the 8-week summer project and is expected to work full-time on the project. Faculty mentors direct and provide guidance to participating students as they work on a particular aspect of the faculty’s research program. Because the goal of this program is to encourage ongoing faculty-student collaboration, the students are encouraged to continue working on the project during subsequent semesters.

**AYURE (Academic Year Undergraduate Research Experience)**
The AYURE program as well as the SURE program, also supports student-faculty collaborations on projects that span the disciplines. Projects that generate new knowledge or works are eligible for support. During the semester, students typically spend approximately 10 hours per week on AYURE projects. Funds for supplies and other support of the research, scholarship or creative activities are provided through this program.

**URETA (Undergraduate Research Experience Travel Award)**
The RSCA program supports SURE and AYURE students to present the results of their collaborative work at professional conferences. Mentors are also supported for travel with the student.

**STA (Student Travel Award)**
The RSCA program provides travel funding to students who have not participated in AYURE or SURE to present the results of their collaborative work at professional conference.

**Acknowledgements**
The following people have provided generous support of this event:
**Aram Agajanian** (Computer Services) for support of the web based abstract submissions;
**Jeff Baker** (Printshop) and the rest of the print shop for guidance with printing options;

**The Fall RSCA Advisory Board:**
Kara Belinsky (Biology), Minghui Ma (Business), Dana Arthur (Communication Disorders), Stella Deen (English), Emma Clausen (Library), Francis Valiquette (Math), Maureen Morrow (RSCA Director, Biology)
2017 SURE Presentation Schedule

Oral Presentations, Wednesday, September 13th

12:15 Introductions

12:30pm Dan Hulseapple, History, ’18 (Mentor: Keely Heuer, Art History)
The First “Empire”: Political Artistic Responses to the Akkadian State

12:50pm Andrea Bialosuknia, English, ’18 (Mentor: Thomas Olsen, English)
Acts of Contrition: Penitence, Performance, and the Ghost of Richard II

1:10pm Carina Kohn, English/Creative Writing, ’18 (Mentor: Cyrus Mulready, English)
The Keeper of the Belt: Exploring Objects, Family, and the Russian Diaspora

1:30pm Megan Stone, Geography, ’18 (Mentor: Melissa Yang Rock, Geography)
Geospatial Insights: Providing a Comprehensive Analysis of Safety on the SUNY New Paltz Campus

1:50 Mary Dellas, Public Relations, ’18 (Mentor: Rachel Somerstein, Digital Media & Journal)
Strangers in a Strange Land: News Photographs of Syrian Refugees in U.S., Canadian, and Lebanese Newspapers

2:10 Ada Bellantoni, Geography, ’18 (Mentor: Scott LaVine, Geography)
Quantitative Content Analysis of Urban Transportation Studies

Oral Presentations, Thursday, September 14th

5:15pm Introductions

5:30pm Lucas Tracy, Physics, ’19 (Mentor: Catherine Herne, Physics and Astronomy)
Determining Elliptical Polarization of Light from Rotation of Calcite Crystals

5:50pm Hailey Springston, Geology, ’18 (Mentor: Shafiul Chowdhury, Geology)
Evaluating the Potential for an On-campus Ground Water Supply Wellfield

6:10pm Jonathon Colon, Mathematics ’17 (Mentor: Francis Valiquette, Mathematics)
Backlund Transformations for Finite Difference Equations
Poster Sessions, Wednesday, September 20th

Introductions: 5:15pm

**Session I - 5:30pm – 6:00pm**

Emily Correia, Environmental Studies, '18 (Mentor: Alex Bartholomew, Geology)
Milankovitch Cyclicility in the Lowe Devonian of the Hudson Valley

Sarah Robinson, Biology, ’19 (Mentor: Kara Belinsky, Biology)
Color Banding Birds to Track Individual Behavior Across a Suburban Campus

Katherine Dobosh, Biology, ‘19 (Mentor: Lydia Bright, Biology)
Sampling the Genetic Diversity of Paramécium in Local Ponds

Nicholas Gonda, EGS, ’17 (Mentor: Megan Ferguson, Chemistry)
Examining the Potential for Disinfection Byproduct Formation in Wallkill River Water

Emily Steward, Mechanical Engineering, ’19 (Mentor: Michael Gayk, Art/Metal)
“And by Sea”

Gregory Krupp, Geography, ’19 (Mentor: Lawrence McGlinn, Geography)
Georeferencing Historical Maps of New Paltz with LIDAR

**Session II – 6:00pm – 6:30pm**

Elizabeth Chase, English; Jewish Studies, German, ’17 (Mentor: Vanessa Plumly, Languages, Literatures & Cultures)
Woman as Ideological Bridge: Assessing Continuities in Weimar and Nazi German Cinema

Heather Wander, Biology, ’19 (Mentor: David Richardson, Biology)
Effect of Predation on Diel Vertical Migration of Lake Zooplankton

Esther Chan, Biochemistry, ’18 (Mentor: Pamela St. John, Chemistry)
Optimizing BPA detection Using HPLC and Studying its Effects Using AFM

Megan Gangewere, Mechanical Engineering, ’18 (Mentor: Rachmadian Wulandana, Engineering)
Small-Scale Tesla Turbine Redesign with Removable Rotor Configuration

Carmina Chloe Taduran, Biology, ’18 (Mentor: Lydia Bright, Biology)
When Holospora Infect: Steps in Invasion of Paramécium Cells
Abstracts (in order of presentation)

The First “Empire”: Political Artistic Responses to the Akkadian State

Daniel Hulseapple (History)
Faculty Mentor: Keely Heuer (Art History)

Ancient Mesopotamia’s designation as the cradle of civilization typically refers to the agricultural, literary, and architectural practices, which first developed in the region during the fourth millennium BCE. All these aspects of Mesopotamian civilization however, are in many ways subordinate to a generally underappreciated aspect of the region: politics. Around 2334 BCE, the Akkadian dynasty established a century-long state that can arguably be called the first empire in world history. In founding and maintaining their pan-Mesopotamian state, the Akkadians effectively created a new prevailing political practice in most subsequent periods of Near Eastern and Mediterranean history and down to the modern era. Given imperialism’s longevity and its continued use of political tactics developed by the Akkadians, an exploration of Akkadian politicking and the adoption of their strategies by their most immediate successors in lower Mesopotamia is long overdue. One particular Akkadian innovation is the use of visual culture to solidify and increase political capital, often borrowing and adapting earlier Sumerian imagery in the process. This project examines honorific representations of rulers in conjunction with contemporary texts produced in the Akkadian empire and the succeeding Neo-Sumerian and Old Babylonian periods to explore ancient Near Eastern concepts of kingship and government, focusing upon how cultures reacted to well-established visual traditions to fit their own political ends.

Acts of Contrition: Penitence, Performance, and the Ghost of Richard II

Andrea Bialosuknia (English)
Faculty Mentor: Thomas Olsen (English)

William Shakespeare's four-part dramatization of the reigns of England's 15th-century kings is commonly referred to as “the Henriad,” in reference to its culmination in the reign of the widely-revered King Henry V. By the time scholarly discussion reaches this fascinating final monarch's namesake play, critical focus often shifts away from the character who began the tetralogy: Richard II, an anointed King of England by hereditary right. However, out of the three monarchs represented, it is Richard II--overthrown by the future Henry IV and murdered by the end of the first play--who casts the longest shadow in the Henriad, shaping the narrative through conspicuous absence and haunting the consciences and conquests of his successors. Richard leaves his usurpers with a legacy stained by the blasphemous violation of the divine right of kings, the load-bearing pillar of medieval English political and religious ideology. My paper asserts the significance of Richard II long past his deposition by examining the motivations and methods used by Shakespeare's Henry IV and Henry V in their respective efforts to scour this stain from their names. Using my own close reading of the Henriad and the support of existing critical analysis, I argue that the characterizations of both kings, each so thematically rooted in guilt, shame, and the need for redemption, depend integrally on the ways in which they are haunted by Richard's “ghost.”
The Keeper of the Belt: Exploring Objects, Family, and the Russian Diaspora

Carina Kohn (English)
Faculty Mentor: Cyrus Mulready (English)

Our project consists of five original short stories which explore the close relationship people can have with objects through the lens of the Russian diaspora. Each of these pieces give voice to real Russian immigrants who have experienced what it feels like to uproot one’s entire life and leave everything behind in the hopes of a happier, and more secure future. In preparation to tell these stories, I examined historical texts and memoirs discussing the cultural and political structure of the Soviet Union, and interviewed a series of Russian family members and friends, who will be represented as the protagonists in their respective stories. Throughout the interviews, it became evident that these individuals had a deep emotional attachment to the items presented, as well as a reserve of associated memories. If a photograph is known to speak a thousand words, then how many can a saved candy wrapper say, or a loved one’s wallet?

Geospatial Insights: Providing a Comprehensive Analysis of Safety on the SUNY New Paltz Campus

Meagen Stone (Geography)
Faculty Mentor: Melissa Yang Rock (Geography)

Campus safety is a top priority for college campuses across the country. If students do not feel safe attending, or if parents do not feel comfortable sending their children to a particular campus, the university’s student enrollment decreases and its mission to educate is compromised. This quest for a safe and welcoming campus can be hard to achieve for a number of reasons; the administration and police departments must balance privacy with protection, and freedom of speech and expression while trying to ensure and inviting, diverse and inclusive campus environment, to name a few. This research case study investigates the State University of New York (SUNY) at New Paltz, and its safety protocols through a comprehensive geospatial lens. Research methods include mapping the campus blue light emergency phones, conducting informal interviews with personnel from the office of student development, Title IX, telecommunications as well as the university police. Mapping the frequency, placement and accessibility of emergency resources on campus, as well as reviewing the unique insights provided by participants, shed light on the campus resources and education regarding student, faculty and staff safety. This study reveals that there are numerous avenues towards creating a safe and welcoming campus, and that at any one time these multiple and overlapping processes are both complex and complementary--and are necessarily responsive to the shifting local, statewide and national hot-button issues that are brought to campuses across the US.
Strangers in a Strange Land: News Photographs of Syrian Refugees in U.S., Canadian, and Lebanese Newspapers

Mary Dellas (Public Relations)
Faculty Mentor: Rachel Somerstein (Journalism)

Although news photographs of refugees are often perceived as objective representations of reality, they are actually the product of subjective decisions made by photographers and editors. These subjective realities are reinforced by captions when they are published in newspapers. Using a quantitative content analysis method, this study aims to understand how Syrian refugees were framed visually and lexically in the online editions of national newspapers from the United States, Canada and Lebanon from 1 September 2015 to 1 March 2017. Photographs, accompanying captions and headlines were collected from *The New York Times* (United States), *The Globe and Mail* (Canada) and *Annahar* (Lebanon). Twenty variables were designed and adapted from previous research to code the sample. The results of this study complement previous research on framing of the current refugee crisis, much of which focuses on European newspapers. Moreover, this paper provides valuable insight into how representation of Syrian refugees in Anglophonic newspapers compares to that of Lebanese newspapers.

Quantitative Content Analysis of Urban Transportation Studies

Ada Bellantoni (Geography)
Faculty Mentor: Scott Le Vine (Geography)

The Federal-Aid Highway Act of 1962 required all urbanized areas in the U.S. to create Metropolitan Planning Organizations (MPOs); today there are 408 MPOs. Each MPO is required to create a Long-Range Transportation Plan (LRTP) which outlines the region’s vision for its transportation network for 20 years. In 1991, the U.S. adopted the Intermodal Surface Transportation Efficiency Act (ISTEA). ISTEA was the first piece of legislature which allowed highway funds to be used for activities which enhanced the environment (bike/ped projects, highway beautification, etc.). The objective of this research was to identify how LRTP documents have evolved since the passage of ISTEA in 1991. We first developed a stratified-sampling protocol based on population size and Census region to select a sample of 24 MPOs. The initial task was to identify all sentences, or “tokens”, which refer to altering or planning to alter the public right-of-way. We selected 25 tokens per document, then identified whether token related to cars, bicycles, rail, etc. To compare the document sentiments, we utilized three natural language processing softwares. Current trends favor non-motorized forms of transportation including recommendations which call for the creation of bicycle lanes and pedestrian only streetscapes. We predict the tokens from the documents in the 1990’s will have more references to issues of lane expansion, traffic management systems and single occupancy vehicle use. Current documents are predicted to have more tokens which relate to bicycling and eliminating environmental impacts.
**Determining elliptical polarization of light from rotation of calcite crystals.**

**Lucas Tracy** (Physics)
Faculty Mentor: Catherine Herne (Physics and Astronomy)

In optical micromanipulation, focused laser beams are used to hold, translate, and rotate tiny objects. These manipulation techniques are often applied to learn about these micron-scale systems. This research takes the reverse approach in that it attempts to learn about the laser beam from the behavior of such systems. Polarization is an aspect of the laser that we are interested in because it is difficult to measure at the focus, and the process of measuring typically destroys the polarization. We introduce a new technique for measuring the polarization of light by observing the rotation of birefringent calcite crystals. Models we created in Matlab indicate that certain behavior should be exhibited by the calcite dependent upon the ellipticity of the polarization. When this specific behavior was observed it could be concluded that the light had a specific polarization. A 670 nm (red) laser was passed through a quarter wave plate which set the ellipticity of the polarization of the light. This beam was then used to trap and rotate calcite particles in the 1-10 \( \mu \)m size range. Position and rotation data was recorded through software written in LabVIEW via a camera and a quadrant photodiode sensor. In this presentation we will describe our experimental setup and the development of our modeling and measurement software for polarization analysis. The comparisons of our models to the data, typically showing a result within 5% of the actual polarization, will also be discussed.

**Evaluating the Potential for an On-campus Ground Water Supply Wellfield**

**Haley Springston** (Geology)
Faculty Mentor: Shafiul Chowdhury (Geology)

The Catskill Aqueduct, the primary water supplier for the Village of New Paltz will be temporarily shut down for a period of 20 weeks during 2018-2019. The SUNY New Paltz campus uses approximately 908 cubic meters/day from this Catskill Aqueduct supply. The objective of this study is to analyze the sustainability of developing an on-campus wellfield in order to fulfill the temporary water needs. Regional groundwater data was collected from hydrogeologic investigation reports, topographic maps, and environmental impact assessments. Geographic Information System (GIS) as well as aquifer tests were utilized for data analysis. Based on 8 drillers’ logs of nearby localities, the average groundwater yield of this aquifer system is 200 cubic meters/day. Based on the specific capacity of each of the 8 wells, drilled approximately 1 kilometer southeast of the New Paltz campus, the average transmissivity is 1.36 square meters/day. However, the aquifer transmissivity needed to fulfill the water needs for the campus is estimated to be 7 square meters/day. Assuming that the SUNY New Paltz campus contains the same aquifer system, we concluded that this transmissivity will not fulfill the water needs. We expect the storage coefficient of this aquifer system to be very low because groundwater is stored in secondary pore spaces in a fractured shale system. Further research is needed by drilling multiple groundwater wells in the study area to calculate the safe yield from this aquifer system.
**Backlund Transformations for Finite Difference Equations**

**Jonathan Colon** (Mathematics)  
Faculty Mentor: Francis Valiquette (Mathematics)

A Backlund transformation is a transformation between two partial differential equations consisting of relations between the solutions and their derivatives. In my talk I will introduce the well-known Backlund transformation between the wave and Liouville equations, PDEs of order two. I will then introduce the notion of finite difference equations, the discrete analogue of PDEs, and construct the discrete Backlund transformation between the discrete wave equation and the discrete algebraic Liouville equation. This will be done using symmetries and moving frames.

**Milankovitch Cyclicity in the Lower Devonian of the Hudson Valley**

**Emily Correia** (Adolescence Education: Earth Science/Geology)  
Faculty Mentor: Alexander Bartholomew (Geology)

The Devonian Period (417-365 mya) was a dynamic time during Earth’s history. One interval of interest within the Devonian is the Early Devonian Emsian Stage, an interval that is well exposed in the Esopus and Schoharie formations in the Hudson Valley. The goal of this project is to aid in the determination of the duration of the Emsian Stage. One way in which this will performed is via astrochronology, which is a dating method that involves analysis of sedimentary rocks as they relate to orbital cycles. We experience small-scale orbital variations all the time, such as days/nights and changing seasons. However, there are also larger-scale orbital variations that impact the Earth and its climate, such as changes in the eccentricity of Earth’s orbit, the angle of tilt of the Earth’s axis, and where the Earth’s axis points in space. Known as Milankovitch cycles, each has a known duration over which they fluctuate. Because these cycles affect climate, they also affect sedimentation rates. The wetness or dryness of the climate impacts the amount of iron and other minerals that are present in the rocks and those quantities can be measured with a magnetic susceptibility bridge. These mineral patterns can then be correlated to already known Milankovitch cycles and the duration of an interval can be calculated. Samples were taken along NY Rt. 199 near Kingston in 2 centimeter increments along 38 meters of bedding through most of the Schoharie Formation, so as to obtain a continuous, detailed section for analysis. This technique is particularly useful, as it is inexpensive and non-destructive to samples. Initial results of a pilot study conducted last summer indicate our samples should produce further useful results.
**Color Banding Birds to Track Individual Behavior Across a Suburban Campus**

Sarah Robinson (Biology)
Faculty Mentor: Kara Belinsky (Biology)

Abstract not available

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**Sampling the Genetic Diversity of Paramecium in Local Ponds**

Katherine Dobosh (Biology)
Faculty Mentor: Lydia Bright (Biology)

*Paramecia* are unicellular ciliates that live in aquatic environments, typically ponds. There are numerous species of *Paramecia* that vary morphologically and genetically, however, there has not been much research done on species distribution. The purpose of this project was to determine how related *Paramecum* species are in nearby ponds in Ulster County and to determine whether there are seasonal differences in *Paramecium* species in local ponds. Five local ponds were sampled and *Paramecium* cells were collected from 4 out of the 5 ponds. Single cells were isolated, and approximately 7 lines of culture were created and allowed to grow to high density from each collected sample. Then DNA was extracted, and specific genes from the samples were amplified and sent off for sequencing. In order to determine the species, the new sequences were compared to sequences of know *Paramecium* species. Additionally, the *Paramecia* of the different samples were stained to visualize the nuclei and looked at under the confocal microscope in order to compare their morphologies. One of the sampled ponds contained the *Paramecium caudatum* species; lines from the other ponds are still being sequenced. The five ponds will be sampled every three months in order to determine the local species distribution as well as seasonal differences.
A Qualitative and Quantitative Analysis of the Formation of Disinfection Byproducts in the Wallkill River

Nicholas Gonda (Environmental Geochemical Sciences)
Faculty Mentor: Megan Ferguson (Chemistry)

Due to maintenance on the aqueduct system, the Village of New Paltz will have to find an alternative source of water. A proposed water source is the local Wallkill River. Typically drinking water sources need to be disinfected; chlorine is the most common disinfectant chosen by municipalities. If chlorine is used and the water has a high organic content there is a chance carcinogenic byproducts known as trihalomethanes (THM’s) and haloacetic acids (HAA’s) will form. The purpose of this research is to qualitatively and quantitatively assess the formation of these disinfection byproducts (DBP’s) if the Wallkill River water is chlorinated for drinking purposes. This was achieved by chlorinating Wallkill River samples, then analyzing them using UV-Visible light spectroscopy and gas chromatography mass spectrometry. Following the analyses, DBP’s formed in every case. Resulting concentrations of chloroform, a THM, were consistently above EPA's maximum contaminant level (MCL). On the other hand, Trichloroacetic acid, a HAA, was difficult to quantify but seemingly fell below the MCL.

Design in the 21st Century: Utilizing Modern Technology to Reinterpret the Design and Manufacturing Process

Emily Steward (Mechanical Engineering)
Faculty Mentor: Michael Gayk (Art/Metal)

Necessary for food, trade, and transportation, building a boat has traditionally been a time consuming and labor-intensive process. This study seeks to utilize modern digital technology to reinterpret traditional boat construction. By streamlining the manufacture of a lap strake canoe with the help of computer aided design (CAD) software, virtual reality software, and a computer numerical control (CNC) machine, we can explore how contemporary technology influences the design process, from material selection to labor to cost. Designing the boat form using CAD software allowed for more intelligent and more efficient design decisions - decisions that could then be evaluated on a true-to-size virtual boat, enabling the designer to examine and evaluate the life-size structure before any wood had been cut. Once the form was finalized, the CNC machine provided speed and a high degree of accuracy when cutting the wood. With the help of modern technology, we were effectively able to create a lap strake canoe without using nails, ribs, or pre-built supports; the only materials used were two pieces of marine-grade plywood and epoxy. The ability to interact with the boat form on a computer and in a virtual reality simulation allowed for crucial judgements and design decisions to be made dynamically, while the CNC machine significantly reduced the manufacturing time. As technology continues to evolve and develop at a rapid pace, this study seeks to reinterpret traditional design and manufacturing processes in hopes of creating a more economical and productive approach.

Georeferencing Historical Maps of New Paltz with LIDAR
Gregory Krupp (Geography)
Faculty Mentor: Lawrence McGlinn (Geography)

Many of the maps of New York that date back to the 1700’s lack a proper coordinate system, making it impossible to accurately determine where these historic land divisions were situated with respect to the current geography. With this project, we georeferenced a collection of historical maps of the town of New Paltz in order to overlay them with modern maps. Additionally, we created maps of historical divisions that only exist as text, with no formal map of these divisions on file within Ulster County. The majority of the original land divisions were bounded by stone walls that still exist. In order to identify these, we used LIDAR data which strips away vegetation and shows high-resolution surface elevation and features. We accurately georeferenced the historical maps by cross-referencing the LIDAR data with historical texts regarding the land divisions. We found this method to be the most relevant given New Paltz’s history and landscape, and this methodology can be applied in similar areas that are not highly developed and were originally surveyed predominantly with stone walls. In accurately georeferencing these maps, we can now provide historians and cartographers with data to contribute toward a greater understanding of the history of New Paltz.

Women as Ideological Bridge: Assessing continuities in Weimar and Nazi German Cinema

Elizabeth Chase (English, Jewish Studies, German)
Faculty Mentor: Vanessa Plumly (Languages, Literature and Culture)

During the Weimar period from 1919-1933, German film flourished- from Nosferatu (1922) and Pandora’s Box (1929) to genre defining films such as The Cabinet of Dr. Caligari (1920). In this era, an evolution in both entertainment and media took place that centered around the portrayal of women as seductresses and sexual parasites. In 1933, a new government came to rise in Germany under Adolf Hitler-the infamous Nazi regime or the Third Reich that influenced the historical, artistic, and political motivations in film and the progression of its corresponding ideology. Joseph Goebbels was appointed in 1934 to the position of Reich Minister of Propaganda, and his focus was on film and artwork that conveyed the messages of the Nazi regime. The home and the nuclear family were a main target of the regime, whose goals were achieved through the influence of propaganda films like Triumph des Willens (1935), which prompted the flow of young soldiers to the front and Jud Süss (1940), which promoted the racial purity of hearth and home in German families. Studying and researching Nazi cinema and its predecessor, Weimar Cinema, reveals small and hidden truths behind a much larger question: how do women serve as an ideological bridge across these historically, politically, and culturally defined eras? To explore hidden and often coded messages shared between the film epochs, I closely analyzed both Weimar and Nazi films that place women front and center. In Weimar cinema, they are depicted as a sexualized threat to masculinity. In Nazi propaganda and entertainment films, they are the good mother who structures and supports her husband (and in some cases, her son’s) masculinity. Both film epochs, nevertheless, present representations of the dangers of female sexual promiscuity that can lead to destruction of the conjugal family and, by proxy, the German nation and German national identity.

Effect of Predation on Diel Vertical Migration of Lake Zooplankton
Heather Wander (Biology)
Faculty Mentor: David Richardson (Biology)

Lake Minnewaska, a lake on the Shawangunk Ridge, has undergone drastic changes to its ecosystem in the past decade. In 2008, Golden Shiners (GS) were introduced into this fishless lake without park management knowledge. Largemouth Bass (LMB) were introduced in 2012 and in 2014, the GS had disappeared due to predation by the LMB. These changes to the ecosystem have affected the food web, especially the zooplankton community. Diel vertical migration (DVM) behavior has not been studied in this lake, but can explain the vertical distribution of zooplankton community. Zooplankton were sampled from different depths in Minnewaska, Lake Awosting (fishless), and Mohonk Lake (stocked with fish). Zooplankton communities were collected at 4 depths in each lake and were analyzed for density, diversity, and size. Zooplankton in Awosting exhibited the least DVM behavior due to the lack of vertebrate predation. DVM is present in Minnewaska but suppressed due to the disappearance of GS ~3 years ago. The presence of LMB-direct predators of zooplankton as juveniles resulted in the observed zooplankton migration. Larger zooplankton travel below 8m in Minnewaska to avoid predation during the day. DVM behavior is greatest in Mohonk due to the presence of planktivorous fish. Larger zooplankton travel the greatest distance to minimize the deleterious effects of visual predation. This research has implications for understanding the effects of the addition or loss of fish on the lake food web.

Optimizing BPA detection using HPLC and studying its effects using AFM

Esther Chan (Biochemistry)
Faculty Mentor: Pamela St.John (Chemistry)

Bisphenol A is an organic compound used to manufacture common materials such as plastics. Previous studies have proven that BPA is an endocrine disruptor, as it binds to estrogen receptors and mimics hormone. We have used a variety of instruments to study the rate of polymerization of tubulin in the presence of BPA, to explore the effects of BPA on microtubule formation, and to optimize the quantification of BPA present in biological samples. We optimized methods for quantification of BPA with high performance liquid chromatography by exploring a range of different HPLC separation columns and mobile phase gradient methods to determine the best conditions that yielded the highest resolution and adequate retention factors. Atomic force microscopy was used to study the topography and physical characteristics of the microtubule surface. It was found that microtubules formed in the presence of BPA were more stable than those formed without BPA and that they more closely resembled the microtubule structure formed in the presence of paclitaxel, a drug that is known to stabilize these structures. In addition, the rate of formation of microtubules with and without BPA was monitored spectrophotometrically as a function of time. Microtubules formed in the presence of BPA show faster rates with kinetic curves that more closely resembled those obtained from microtubule formation in the presence of paclitaxel implying that there may be some similarities in the interactions of tubulin and either BPA or paclitaxel.

Small-Scale Tesla Turbine Redesign with Removable Rotor
**Configuration**

**Megan Gangewere** (Mechanical Engineering)
Faculty Mentor: Rachmadian Wulandana (Mechanical Engineering)

The main feature of Tesla turbines invented by Nikola Tesla in 1913 is the arrangement of parallel discs that function as a rotor. Unlike other conventional turbines with impinging fluids on the blades, this ‘bladeless’ Tesla turbine extracts kinetic energy from the working fluid through the boundary layer effects between the fluid and disc surfaces. The gap size between discs and nozzle configurations have been identified as crucial features for high efficiency and power generation. The objective of this research is to design and manufacture Tesla turbines with a removable rotor. This removable mechanism allows for quick study of multi-varying configuration of parts. In order to focus on the design and experimentation, parts will be 3D printed at the Hudson Valley Advanced Manufacturing Center on SUNY New Paltz campus. The design process includes conceptual development, Computer Aided Design using SOLIDWORKS, assembly and CFD (Computational Fluid Dynamics) modeling using COMSOL Multiphysics of the fluid flow inside the turbine. Experimentation using air completes the process and allows for a better understanding of how the rotor and nozzle configuration affect the efficiency of the turbine. The final product includes three casing designs with different nozzle configurations and two designs of rotors resulting in six different turbine configurations. The CFD study indicates that the larger the diverge area of the converging-diverging nozzle concept, the larger the pressure difference and therefore flow rate. As expected, flow is fully developed with a larger pressure difference when entering the rotor casing tangentially.

**When Holospora infect: steps in invasion of Paramecium cells**

**Carmina Taduran** (Cellular & Molecular Biology)
Faculty Mentor: Lydia Bright (Biology)

*Holospora undulata* is a gram-negative, highly infectious, micronucleus-specific symbiont of the ciliate *Paramecium caudatum*, that invades the host cell via the oral apparatus, occupying the micronucleus through two morphologically distinct forms, the infectious and reproductive form. Previous studies done by Masahiro Fujishima in 1985 have shown that endosymbiotic pairings of different strains of *Paramecium caudatum* with different strains of *Holospora undulata* have exhibited varying degrees of infection. Determining what genes are involved in the establishment of *Holospora infection* in *P. caudatum*, how they are different from strain to strain, and how this relates to the degree of infectivity a particular strain shows to the bacteria will be sought after in future studies. To begin to address these questions, the current study will utilize distinct strains of live naïve *P. caudatum* cells mixed with the lysate of infected cells with *Holospora*, at specific time points to track the infection microscopically. We will use this data to determine the stage of infection, and score the maintenance of infection over a week with a +/- (presence/absence) system. Later, we will be able to correlate infectivity of a specific strain with the expressed genes in the strain. This will hopefully shed light on genetic determinants of infection and immunity on a universal level.