



2015 SRS

21st

**Annual SUNY New Paltz
Student Research Symposium**

Abstract Book



New Paltz
STATE UNIVERSITY OF NEW YORK

*21st ANNUAL
SUNY NEW PALTZ
STUDENT RESEARCH SYMPOSIUM*

*Friday, May 1, 2015
SUB MPR
4:00 - 6:30 p.m.*

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Sponsored by:

The SUNY New Paltz Research, Scholarship, and Creative Activities Program

Editor: Maureen Morrow RSCA Director
Cover Design: Michelle Pielli, RSCA secretary
Cover Photograph: Morgan Gwenwald

The 2015 Student Research Symposium

Once again, as the academic year comes to a close, we have this opportunity for scholarly exchange amongst our faculty and students. The 2015 Student Research Symposium includes 52 poster presentations of work performed by 79 students representing 20 departments and 37 faculty mentors. This is an occasion for us to share our accomplishments in a spirit of camaraderie.

The Student Research Symposium is sponsored by the Research, Scholarship and Creative Activities (RSCA) Program. The mission of the RSCA program is to encourage and support student- faculty collaboration in the active participation of scholarly and artistic activities that generate new knowledge or works.

Such activities enable students to gain knowledge, skills, and confidence to contribute as productive members of their professions and contribute to a learning environment which is challenging, student-centered, and personalized.

Acknowledgements

The following people have provided generous support of this event:

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The RSCA Advisory Board:

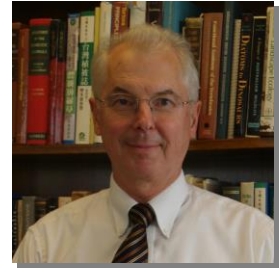
Michael Chuang (Business), Gregory Bynum (Educational Studies),
Vicki Tromanhauser (English), Jo McInnis (Library), Ekatarine Shemyakova (Math),
Maria Montserrat Gimeno (Music), Roberto Velez-Velez (Sociology),
Maureen Morrow (RSCA Director, Biology) Izabela Mlynarska (student representative)

Minds @ Work

1-3:00pm – Honors Thesis Presentations, Honors Center
3-4:30pm - Celebration of Writing, SUB MPR pre-space
4-6:30pm - Student Research Symposium, SUB MPR
4:30-6:30pm - Student Documentaries, SUB 204
5-7pm – Art Studio BFA Thesis Exhibition II, Dorsky Museum

Welcome to the Student Research Symposium

Student research participation is one of several “high-impact” educational practices known to produce especially deep and meaningful learning. These practices require students to devote time and effort to purposeful tasks; make frequent decisions about their work; interact with faculty and sometimes peers about their work; and receive frequent feedback about performance. Such experiences deepen understanding of the substance and methodology of a discipline, and provide opportunities to develop important intellectual capabilities.



Research participation is directly relevant to the education of all students, irrespective of future goals. More than 80% of employers responding to recent national surveys value completion of a research or similar project that demonstrates knowledge in the major along with problem-solving, communication, and analytical skills, including the ability to make **evidence-based** analyses and decisions.

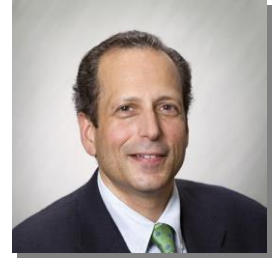
A recent study by Gallup-Purdue of 30,000 college graduates in the U.S. measured factors driving the extent to which graduates are engaged in their work and thriving in their well-being. Included in those factors was having worked on a long-term project beyond the classroom (such as research) and having opportunity to apply their learning. Such findings highlight why we value the Research, Scholarship, and Creative Activities program, and why we encourage students to take part.

Successful undergraduate research programs depend on the dedication, knowledge, and research and scholarly expertise of faculty. I recognize the commitment of time and effort of those who mentor and advise student research and scholarly projects, and am grateful for these important contributions to the education and future of our students. I know that this is a “labor of love,” and how rewarding and long-lasting are the intellectual relationships you build with research advisees. I am deeply grateful to Professor Maureen Morrow, campus-wide coordinator, and the advisory committee for their dedication to managing our funding allocation processes, advising students, organizing events such as this symposium, and many other responsibilities.

I congratulate students and faculty both for your hard work and your success in projects this past year, and wish you continuing success and fulfillment in the future.

Donald Christian
President

I am delighted that you are participating in the 21st annual Student Research Symposium at New Paltz. We take pride in the fact that our students consistently point to the transformative experiences they have here as key elements in their educational success. Foremost among these transformative experiences are undergraduate research, scholarship and creative activities. Over the last decade, a growing body of research has demonstrated that students engaged in undergraduate research make significant strides in cognitive, intellectual and professional growth over their peers who do not participate. Students involved in research and scholarly or creative activities have higher retention and graduation rates, enhanced communication and problem-solving skills, higher graduate-school acceptance rates, and greater success finding positions in their chosen fields. It's no wonder that participation in undergraduate research is considered a "high impact" educational practice!



What you gain most by engaging in undergraduate research, and what is at the heart of a college education, is learning how to learn— becoming someone who can grow intellectually, adapt to change, and engage in critical thinking and analysis. The knowledge and skills you acquire by participating in undergraduate research will help you become those lifelong learners.

The success of undergraduate research depends on close collaboration between our faculty and students. The faculty at New Paltz are true teacher-scholars; that is, they integrate their teaching and scholarship in ways that enhance the educational experience of students beyond the classroom. Our faculty work closely with students on projects and often collaborate with them on paper presentations or publications. I appreciate the commitment of time and effort by faculty who have mentored and advised our students and guided their research projects. I would especially like to recognize the many important contributions of the RSCA Advisory Board and Professor Maureen Morrow, campus-wide coordinator of undergraduate research, for making this symposium a success.

Finally, I want to congratulate students and faculty for your hard work and dedication, which have made today possible. I wish you continued success in your future academic endeavors.

Philip Mauceri

Provost & Vice President for Academic Affairs

On behalf of the Research, Scholarship, and Creative Activities Program Advisory Board, I would like to welcome you to the 2015 Student Research Symposium. Today's event is the 21st consecutive celebration of student-faculty scholarship at SUNY New Paltz.

As you are aware, the process of producing scholarship through research and/or creative activities is both challenging and exciting. I am certain the faculty- student interactions you experienced in this process were unique and stimulating. We know that these types of experiences impart gains in important skills such as critical thinking and communication. We are grateful to the faculty who provide opportunities for our students to study a topic in detail.



Please know that these types of interactions are a particularly fulfilling part of a college professor's job. Do stay in touch after you have graduated. It brings us all great joy and inspiration to hear of your post- New Paltz adventures and successes.

I hope this event brings you fulfillment in presenting the results of your work and inspiration from your fellow students' accomplishments.

Maureen Morrow

RSCA Director and Professor of Biology

Research, Scholarship and Creative Activities Program

Faculty student collaborators may propose projects for support funds through the Summer Undergraduate Research Experience (SURE) and Academic Year Undergraduate Research Experience (AYURE) programs. Both of these programs are competitive and are selected for support by a faculty committee. Students whose work is accepted for presentation at a professional conference are eligible for the RSCA travel awards. Congratulations to all award recipients (see pages 42-47).

SURE

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 devote 35 hours per week to the project. Faculty mentors direct and provide guidance to participating students as they work on a particular aspect of the faculty's research program. As a goal of this program is to encourage ongoing faculty student collaboration, and thus students are encouraged to continue working on the project during subsequent semesters.

ACADEMIC YEAR FUNDS

This program (AYURE) supports student faculty collaborations on projects that span the Disciplines. Projects that generate new knowledge or works are eligible for support. Funds for supplies and support of the research, scholarship or creative activities are provided through this program.

STUDENT CONFERENCE TRAVEL AWARD

The RSCA program supports students to present the results of the collaborative work at professional conferences.

WE ARE ON FACEBOOK

SUNY New Paltz Undergraduate Research, Scholarship and Creative Activities Group
<https://www.facebook.com/group.php?gid=44644830786#!/pages/SUNY-New-Paltz-Research-Scholarship-and-Creative-Activities/43858825348>

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COUNCIL ON UNDERGRADUATE RESEARCH INSTITUTIONAL MEMBERSHIP

CUR provides support for undergraduate research in a variety of way. All faculty, staff, and students are eligible for free membership in CUR. Your membership sends a strong message to lawmakers and provides you with access to the CUR Quarterly Publication and monthly e-newsletters.

Students should consider participating in CUR's Undergraduate Registry. The purpose of this Registry is to facilitate matching between undergraduates and graduate schools seeking high quality students who are well prepared for research.

<http://www.cur.org/ugreg/register.asp>



SUNY NEW PALTZ
IS AN INSTITUTIONAL MEMBER OF THE
COUNCIL ON UNDERGRADUATE RESEARCH

Learning Through Research

Poster Sessions at-a-glance

Poster Session I 4:30-5:10 pm

Phytochemical and Insecticidal Studies on Studies on T.arjuna

John Hoffmann (Biochemistry) Renato Lucio De Carvalho (Chemistry)

Ilana Heckler (Chemistry) Alfonso Garcia (Chemistry)

Faculty Mentors: Preeti Dhar (Chemistry) Aaron Haselton (Biology)

Forest Edge/Interior Effects on Animal Relative Abundance

Matthew Richards (Biology)

Faculty Mentor: Eric Keeling (Biology)

Masting and Acorn Size Trade-offs in Red and White Oak

Yanjing Ma (Biology) Samantha Manno (Biology) Nadia Ouedraogo (Biology)

Faculty Mentor: Eric Keeling (Biology)

Interaction of BHT with BPA in Planaria

Ewa Danisewicz (Biology) Zachary Thom (Biology) Elise Radel (Biology)

Faculty Mentor: Spencer Mass (Biology)

Effects of BPA on the Tubulin Cytoskeleton of Planaria

Izabela Mlynarska (Biology) Josh Johnikutty (Biology)

Faculty Mentor: Spencer Mass (Biology)

Comparative Toxicity Evaluation of Heracleum Maximum and Psoralea corylifolia Extracts

Ilana Heckler (Chemistry) Alfonso Garcia (Chemistry)

Faculty Mentor: Preeti Dhar (Chemistry)

Characterization of Intermediate Steps in Laccase Activity

Maria Ortiz (Chemistry) Michael Carey (Chemistry)

Faculty Mentor: Michael Machczynski (Chemistry)

A Bridge Too Far: NMR and Spin-Coupling in Laccase Catalysis

Jeffrey Babicz (Chemistry)

Faculty Mentor: Michael Machczynski (Chemistry)

Aza-Micheal Reaction; A Micro Scale Green Chemistry Lab

Raul Castillo Castro (Chemistry)

Brittney Rush (Chemistry, University of Pittsburgh at Johnstown, Johnstown PA)

Faculty Mentors: Preeti Dhar (Chemistry) Manisha Nigam (Chemistry, University of Pittsburgh)

The Effects of Reading with Infants: A Dissertation Study

Danielle Lowe (SUNY NP adjunct instructor, William Howard Taft University grad student)

Faculty Mentor: Connie Dodd (Education, Elementary)

The Effects of Curriculum Reform on New York State Public High School Teachers

Jessica Gallagher (Education)

Faculty Mentor: Julie Gorlewski (Education, Secondary)

Teacher Creativity

Rebecca Quinones (Education)

Faculty Mentor: Lindsey Russo (Education, Elementary)

Instructional Time in K-12 Education

Micaela Kayser (Women's, Gender, and Sexuality Studies)

Faculty Mentor: Robin Jacobowitz (CRREO)

The Effects of Age Demographics on Economic Stability

Kristin Mayo (Political Science)

Faculty Mentor: Jonathan Schwartz (Political Science)

Identification of Possible and Impossible Objects in Young Children

Julie Planke (Psychology)

Faculty Mentor: Sarah Shuwairi (Psychology)

Young Children's Conceptual Understanding of Objects

Shay O'Leary (Psychology/Psychobiology)

Faculty Mentor: Sarah Shuwairi (Psychology)

Generational Differences in the Use of Emotional Words

Coreyann Spence (Psychology) Madalena Spero (Psychology)

Faculty Mentor: Maryalice Citera (Psychology)

Poster Session II 5:10-5:50 pm

Examining Bacterial Cell Interactions using Atomic Force Microscopy

Ronald Aucapina (Biology) Nadia Ouedraogo (Biology)

Faculty Mentor: Megan Ferguson (Chemistry)

Determination of Ubiquinone-8 in Formations of Bdellovibrio Bacteriovorus

Joseph Bromley (Chemistry)

Faculty Mentor: Megan Ferguson (Chemistry)

Effects of Chemicals on Phytophthora capsici

Euin Cheong (Biology)

Faculty Mentor: Hon Ho (Biology)

Mapping Campus Trees for Education/Sustainability Benefits

Dakota Snyder (Biology)

Faculty Mentors: Eric Keeling (Biology) Carol Rietsma (Biology) Joshua Simons (CRREO)

Carol Rietsma (Biology) Joshua Simons (CRREO) Lisa Mitten (Office of Campus Sustainability)

3D Comparison of Neotenic and Metamorphosed Axolotls

Scott Kastberg (Biology) Alison Marques (Biology) Caryn Byllott (Biology)
Katherine Wilson (Biology)
Faculty Mentor: Spencer Mass (Biology)

Morphometrics and 3D Modeling Amphibian Skeletal Structures

Meredith Eldridge (Biology) Rachael Cummings (Biology)
Faculty Mentor: Spencer Mass (Biology)

Avian Diversity and Abundance on a Suburban University Campus

Stephanie Hale (Biology) Troy Ellick (Biology)
Faculty Mentor: Kara Belinsky (Biology)

A Quantitative Description of the Veery's Song Repertoire

Lori Dargis (Environmental Geochemical Science)
Faculty Mentor: Kara Belinsky (Biology)

Octopaminergic Neurons in the Brain of Musca domestica

Maddie Wright (Biology)
Faculty Mentor: Aaron Haselton (Biology)

The Role of Anatomy in Hemolymph Sugar Homeostasis in Musca domestica

Michael Khoury (Biology)
Faculty Mentor: Aaron Haselton (Biology)

Green Infrastructure Mitigates Severity of Flooding Events on The State University of New York at (SUNY) New Paltz Campus

Caitlyn Maceli (Environmental Geochemical Science)
Faculty Mentor: David Richardson (Biology)

The Zooplankton and Fish Communities of Lake Minnewaska

Bryan Krebs (Biology) Valerie Stanson (Biology) Bobbetta Davis (Biology)
Matt Farragher (Environmental Geochemical Science) Angela Chen (Environmental
Geochemical Science)
Faculty Mentor: David Richardson (Biology)

Flourescent in Situ Hybridization of Indonesian Live Rock Biofilm

Nicholas Golom (Biology)
Faculty Mentor: Jason Valens (Biology)

The Characterization of DNA in the Presence of a Surfactant

Kathleen Westervelt (Chemistry)
Faculty Mentor: Pamela St. John (Chemistry)

Optical Micromanipulation of Birefringent Objects with Beams with Polarization Singularities

Ann O'Brien (Physics and Astronomy)
Faculty Mentor: Catherine Herne (Physics)

Word Identification in Late and Early Bilinguals
Amanda Lane (Psychology) Maria Talloni (Psychology)
Faculty Mentor: Giordana Grossi (Psychology)

Use of Speaker Information to Compensate for Coarticulation
Ana Bennett (Psychology)
Faculty Mentor: Navin Viswanathan (Psychology)

Poster Session III 5:50-6:30 pm

Characterization of an Antifungal Metabolite
Bethany O'Hara (Biology) Velisha Guillaume (Biology) Stevie White (Biology)
Faculty Mentors: Maureen Morrow (Biology) Hon Ho (Biology)

Who Has Sex Before Entering High School? A Predictive Model
Juan Weissenberg (Business)
Faculty Mentor: Karl Heiner (Business)

Trends in Heroin Use in New York State
Joelle Bracco (Business)
Faculty Mentor: Karl Heiner (Business)

SUNY New Paltz: Trajectory Towards Efficiency
Emily Vanderpool (Economics)
Faculty Mentor: Karl Heiner (Business)

Exercise Testing in Fontan Patients
Rachael Forando (Spanish/Communications)
Faculty Mentor: Karl Heiner (Business)

Classifications of Darboux Transformations for Super KdV (The Intrigue of Non Standard Differential Calculus)
Sean Hill (Mathematics)
Faculty Mentor: Ekaterina Shemyakova (Mathematics)

Complex Dynamics for Symbolic Sequences of Quadratic Maps
Ari Pignatelli (Electrical Engineering)
Faculty Mentor: Anca Radulescu (Mathematics)

Forces on Absorbing Materials Rotating in Optical Traps
Emily Sobel (Physics) Ryan Kropas (Physics)
Faculty Mentor: Catherine Herne (Physics)

Effects of Teen Drinking on Academic and Social Development
Jake Carias (Sociology)
Faculty Mentor: Eve Waltermaurer (Sociology)

Impact of When Major is Declared and Changing Major

Leah Mancini (Psychology)

Faculty Mentor: Eve Waltermaurer (Sociology)

The Possible Relationship Between Violence and Depression

Joseph Russo (Sociology)

Faculty Mentor: Eve Waltermaurer (Sociology)

English Loanwords in Japanese as 'false friends' for English-speaking Learners

Christopher Hoffmann (Asian Studies)

Faculty Mentor: Oksana Laleko (Linguistics)

Interpretation of overt/null forms by Heritage and Second Language Learners of Russian

Anna Lattanzio (Communication Disorders)

Faculty Mentor: Oksana Laleko (Linguistics)

Equivalence of 1-Dimensional Second-Order Linear Finite Difference Operators

Dylan Rose (Mathematics) Bradley Miro (Mathematics)

Faculty Mentor: Francis Valiquette (Mathematics)

Human Rights Violation in the Dominican Republic

Maritza Sanchez (Latin America & Caribbean Studies)

Faculty Mentor: Ligia Aldana (Latin America & Caribbean Studies)

Analysis of a Spark Gap Tesla Coil

Joseph Ruotolo (Mathematics)

Faculty Mentor: Diego Dominici (Mathematics)

Elaboration of BINOL by Electrophilic Aromatic Substitution

Joseph Dunstan (Chemistry)

Faculty Mentor: Frantz Folmer-Andersen (Chemistry)

Abstracts

A Quantitative Description of the Veery's Song Repertoire

Lori Dargis (Environmental Geochemical Science)

Faculty Mentor: Kara Belinsky (Biology)

The veery (*Catharus fuscescens*) is a neo-tropical migratory thrush species with an unusual sounding song. Like many thrushes, their vocalizations are complex; but their song has remained largely unstudied since the 1970s. We have observed that veeries combine notes to modify their songs, which vary in note number, order and composition in ways that have not yet been quantified. In this study, we examined: (1) The number of different notes each male sings and how he uses them, and (2) The extent that these notes are shared among males. We analyzed recordings of natural singing from over 30 veeries recorded at the Cary Institute of Ecosystem Studies from May to August of 2009. To achieve this, we used Raven Pro 1.4 software to visually categorize notes into 22 note types, based on the shape of their sonograms. We then compared the notes using Sound Analysis Pro 2011 to generate an objective percent similarity for each pairwise comparison of notes. Visual analysis showed veeries sing an average of 4 different notes types per song and 6 total notes per song, as some notes repeat. 10 of the 22 note types that we identified were shared among two or more male veeries and 12 notes were considered unique. This study will help us understand more about how veeries communicate, and will invite further studies of the function of both unique and shared song types as males defend their territories and attract their mates.

Avian Diversity and Abundance on a Suburban University Campus

Stephanie Hale (Biology) **Troy Ellick** (Biology)

Faculty Mentors: Kara Belinsky (Biology)

The presence of urbanization can affect the surrounding wildlife, and as overall urbanization has increased so has its effect on the wildlife. In order to understand more about this we asked: how does bird species richness vary across the SUNY New Paltz campus? We observed birds at eight feeders across campus at locations with three different levels of urbanization. The first level is the most urbanized section, called Central feeders to represent the central campus. This area of campus has larger buildings and the most pedestrian traffic. The second level of urbanization is called the Residential feeders, which has dorm buildings, more grassy areas, and trees. The Field and Forest feeders are the least urbanized part of campus located near the playing fields and forest fragments. The feeders were observed once a week for 10 minutes at a time through the fall and spring semesters, nine times in the fall and six in the spring, to determine the species richness at each location. We found that species richness differed between the three levels of urbanization. Invasive species dominated at the more urbanized areas of campus, with a greater majority of house sparrows at two of the three Central feeders and at one of the three Residential feeders. The two other Residential feeders and the one other Central feeder had higher species richness and a lower percentage of house sparrows. If we want to increase species richness maybe taller trees could be planted and the number of grass areas across the campus increased.

The Role of Anatomy in Hemolymph Sugar Homeostasis in Musca domestica

Michael Khoury (Biology)

Faculty Mentor: Aaron Haselton (Biology)

The Dipteran crop is a specialized alimentary tract region that typically stores carbohydrate-rich fluids for later nourishment between nectar meals. In the house fly, *Musca domestica*, it is postulated that the crop plays an essential role in hemolymph glucose and trehalose homeostasis, but substantial evidence for this hypothesis is not currently available. In this experiment, we investigated the time needed for the expulsion of a known volume of sucrose solution from the crop and measured the corresponding levels of glucose in the hemolymph, in vivo. Ultimately, we hope to better understand the physiological mechanisms underlying carbohydrate homeostasis in *M. domestica* and to be able to draw connections between adaptive morphologies and physiological function.

Octopaminergic Neurons in the Brain of Musca Domestica

Maddie Wright (Biology)

Faculty Mentor: Aaron Haselton (Biology)

Octopamine is the invertebrate analog to the vertebrate neuromessenger norepinephrine. Within insects, octopaminergic neural pathways are important mediators of many behavioral and physiological activities that ultimately involve nutrient mobilization (e.g. feeding, aggression, and physical exertion). To better understand the importance of octopamine signaling in insects, a detailed understanding of both unique and shared aspects of octopaminergic neuroarchitecture among insects is required. The purpose of this experiment was to identify and map neurons containing octopamine within the brain of adult female *M. domestica* using immunohistochemical techniques and laser confocal microscopy. Our findings, which are consistent with those from *Drosophila melanogaster*, reveal that octopaminergic neurons are localized within the subesophageal ganglion, around the esophageal foramen, and in the protocerebrum.

Effects of Chemicals on Phytophthora capsici

Euin Cheong (Biology)

Faculty Mentor: Hon Ho (Biology)

Fungal pathogens pose a common threat to farms due to the detrimental effects on vegetable production. In the northeastern states, a soil-borne fungal pathogen: *Phytophthora capsici* has become a serious issue during the past few years. It is responsible for causing diseases in a vast variety of vegetables including cucurbit crops, pepper, eggplant, and tomato. Signs of the fungal pathogen include blighting of the plants as well as rotting of the fruits with annual yield loss of 30% - 100%. The disease is spread by motile zoospores and the highly resistant sexual oospores enable the fungus to survive the cold winter. This project was to study the effects of copper sulfate, sulfur and isothiocyanates on the growth and reproduction of *P. capsici*. The fungus was grown on V8-agar plates incorporated with different concentrations of the chemicals ranging from 1 to 100 ppm, with plain V8 agar plates serving as the control. The fungal growth was tested by measuring the colony diameters on the plates. The sporangia on the plates were counted under the microscope to determine the quantity and sporangia's ability to release zoospores. For sexual reproduction, A1 and A2 mating strains of *P. capsici* were grown in dual cultures and the number of oospores were similarly counted. Results proved that copper sulfate had a dramatic effect on *P. capsici*, with no sporangia or zoospores being formed on 100 ppm plates. On the other hand, sulfur did not appear to be as promising with very little variation between the different concentrations. Thus, copper sulfate could be used to control diseases caused by *P. capsici*. Isothiocyanates, produced naturally by certain brassica crops, have been found to have fungicidal properties. Tests of isothiocyanates on *P. capsici* are in progress.

Forest edge/interior effects on animal relative abundance

Matthew Richards (Biology) **Dakota Snyder** (Biology)

Faculty Mentor: Eric Keeling (Biology)

Forest fragmentation is prevalent across the Northeast US and increases the amount of edge versus interior habitat in forest patches. Forest-dwelling animals, especially large carnivores and omnivores, are thought to favor the interior areas of forests and to require relatively large patches of continuous habitat. We were interested in learning which animal species were present in the SUNY New Paltz "Campus Forest" just east of the soccer field, and studying the effect of edge vs interior forest habitat on the relative abundance of animal species. In fall 2014, we set up two passive infrared motion detector cameras, one near the edge of the forest, and one in the interior. Animal species captured in photographs were identified as accurately as possible using a field guide. Over the same comparison period, more animal activity was detected in the edge. However, large omnivores such as black bear and coyote were more active in the interior. Several species were only observed in the interior including black bear and wild turkey, while mink, chipmunk and several songbird species were only observed in the edge. White-tailed deer and grey squirrel were the most active species in both the edge and interior. It is surprising that large animals such as bears, coyotes, foxes, and minks are present in such a small forest fragment. The study also suggests that fragmentation could affect species presence and abundance by creating more edge while decreasing interior habitat.

Masting and Acorn Size Trade-offs in Red and White Oak

Yanjing Ma (Biology) **Samantha Manno** (Biology) **Nadia Ouedraogo** (Biology)
Faculty Mentors: Eric Keeling (Biology)

Oak masting refers to synchronized production of large acorn crops followed by years of little or no production. Oak masting may directly affect oak regeneration and species that depend on acorns for food. It may also affect Lyme disease transmission indirectly, because some mammal hosts of the disease respond to large acorn crops. Oak masting may be related to year-to-year fluctuation in resources or growing conditions, growth-reproduction trade-offs, or an evolutionary response by trees to seed-predator pressure. However, the exact reasons for oak masting remain unknown. As part of a larger, regional study, we initiated a multi-year oak masting study in the “Campus Forest”, adjacent to the soccer field. In addition to studying year-to-year differences in production, we are also interested in differences between oak species, and whether acorns in mast years have unique structural characteristics. Using seed collectors installed under trees, five white oaks were sampled at 2013 and resampled in 2014. Also in 2014, five red oak trees were added to the study. White oak acorn production was significantly higher in 2014 than in 2013 and white oak acorns had thinner shells in 2014 than in 2013. White oak produced more acorns in 2014 than red oak, but red oak acorns were larger, heavier, and had thicker shells than white oak. Our results provide evidence for 2014 being a mast-year, and for trade-offs between acorn size and reproductive output. Further studies in coming years will likely reveal more patterns in acorn production and structural characteristics.

Mapping Campus Trees for Education/Sustainability Benefits

Dakota Snyder (Biology)
Faculty Mentors: Eric Keeling (Biology) Carol Rietsma (Biology) Joshua Simons (CRREO) Lisa Mitten (Office of Campus Sustainability)

There is a growing interest on college campuses in promoting awareness of trees for their educational value and for connections to campus sustainability initiatives. As a first step toward more fully realizing the potential benefits of trees on the SUNY New Paltz campus, we conducted a campus tree survey and recorded species, size class, GPS coordinates, and a photograph for every campus tree. All data was compiled and a geographic database and online, user-searchable map were created. 2514 individual trees were recorded, comprising 44 native and 26 non-native species. The three most abundant species were eastern white pine, sugar maple, and pin oak. The database and map facilitates the use of campus as a “living lab” for educational purposes. For example, results of the survey were used to greatly improve a tree identification activity in our ecology course by designing a tour through campus highlighting important native species. Similarly, in our plant ecophysiology course, the database was used to locate important tree species for class phenology observations. Other potential future benefits include identifying trees of special value, for example particularly large or old trees, informing decisions about future plantings on campus in order to fill gaps in the campus collection of living trees, or studying potential energy savings by improving the shading of buildings by trees in summer.

Interaction of BHT with BPA in Planaria

Ewa Danisewicz (Biology) **Zachary Thom** (Biology) **Elise Radel** (Biology)
Faculty Mentors: Spencer Mass (Biology)

Bisphenol compounds such as BPA are environmental endocrine disruptors that act as xenoestrogens. BPA is commonly used to make certain types of plastics and epoxy resins that are used in food packaging, thermal printing and a variety of other consumer and industrial products. Prior work in our lab has demonstrated that moderate to high doses of BPA adversely affect regeneration in flatworms. Common antioxidants like Butylated-hydroxytoluene (BHT) that are used as preservatives in foods and cosmetics have been coming under renewed scrutiny as potential endocrine disruptors and carcinogens. In this work, we examine the effects of co-administration of BHT with BPA at doses below the LC50 for BPA. Our preliminary results indicate that the combination is more lethal than either compound alone. BHT may be acting as a synergist to BPA.

Morphometrics and 3D Modeling Amphibian Skeletal Structures

Meredith Eldridge (Biology) **Rachael Cummings** (Biology)
Faculty Mentor: Spencer Mass (Biology)

This study analyzes the morphology of long bones and cranial structures in the American bullfrog (*Rana catesbeiana*) and the axolotl salamander (*Ambystoma mexicanum*) using 3D modeling to reproduce anatomically accurate specimens. Digital photography, computerized morphometric measurements and 3D laser scanning were employed to gather data from an extensive collection of *Rana* specimens and a more limited number of axolotl specimens that were all prepared with a Dermestid beetle colony. Measurements of femur length, tibia length, and tympanum diameter were studied, and specimens were rearticulated for educational purposes. These measurements and models are being used to create a database of amphibian skeletal morphometry for research. The 3D models are also being used to create 3D printed replicas for teaching and research.

3D Comparison of Neotenic and Metamorphosed Axolotls

Scott Kastberg (Biology) **Alison Marques** (Biology) **Caryn Bylott** (Biology)
Katherine Wilson (Innovation Center)
Faculty Mentors: Spencer Mass (Biology)

The axolotl has evolved as a neotenic species: it maintains its juvenile form through sexual maturity rather than metamorphosing into an adult, terrestrial form. While most axolotls remain aquatic for their entire lives, there are rare cases in which spontaneous mutations enable them to metamorphose. Metamorphosis within other species of salamanders results in an alteration of body proportions with major changes to the respiratory system, musculoskeletal system, and integument to facilitate terrestrial life. Metamorphosed axolotls allow for the comparison of two adult organisms of the same species with vastly different morphologies. We employed several 3D scanning technologies with CAD and morphometric analysis software to compare the anatomy and analyze the changes between a neotenic wild type and a metamorphosed axolotl.

Effects of BPA on the Tubulin Cytoskeleton of Planaria

Izabela Mlynarska (Biology) **Josh Johnikutty** (Biology)

Faculty Mentor: Spencer Mass (Biology)

Previous studies in our lab have shown that endocrine disrupting xenoestrogens, such as Bisphenol-A (BPA), interfere with planarian regeneration. Our prior work has examined the gross anatomical morphology of regeneration. Evidence from a variety of studies in different systems indicate that BPA can disrupt MTOCs and microtubules potentially affecting cell division and other microtubule mitigated processes. This study examines the histological effects of BPA on the planarian tubulin cytoskeleton using immunofluorescence and confocal microscopy. Preliminary results suggest that BPA may be disrupting planarian microtubules. This could be one of the mechanisms driving the disturbances we have seen in regeneration.

Characterization of an Antifungal Metabolite

Bethany O'Hara (Biology) **Velisha Guillaume** (Biology) **Stevie White** (Biology)

Faculty Mentors: Maureen Morrow (Biology) Hon Ho (Biology)

The fungi in the *Isaria* genus are typically known for their entomopathogenic capabilities. The *Isaria* fungus we have isolated and are working with, produces a metabolite that has antifungal qualities. We are working to characterize this metabolite in preparation for isolation and identification. We take samples of the metabolite and test its ability to inhibit spore growth and quantify this inhibition as the minimal inhibitory concentration (MIC) needed to completely inhibit fungal growth. We culture *Isaria*, which secretes the metabolite into the media. The filtered media containing our metabolite is then used to inhibit spore germination. This inhibition is detected using XTT assays which are then used to determine MIC values. We have obtained a variety of MIC values, varying from fungus to fungus, however there is distinct antifungal activity. With our goal to isolate, identify, and purify this metabolite we have run numerous experiments, determining how different factors will affect the antifungal qualities of the metabolite. In order to determine the optimal *Isaria* growth conditions for metabolite production we compared incubation time to antifungal activity. We've also tested how temperature affects the antifungal properties of the metabolite so that we can determine whether our metabolite is a protein or a non-protein molecule. Our treatments also include pH, and light exposure. Our future studies will continue to work towards our goal of isolation and identification.

The Zooplankton and Fish Communities of Lake Minnewaska

Bryan Krebs (Biology) **Valerie Stanson** (Biology) **Bobbetta Davis** (Biology)
Matt Farragher (EGS) **Angela Chen** (EGS)
Faculty Mentor: David Richardson (Biology)

Lake Minnewaska, located within Minnewaska State Park, New York, is a historically clear, acidic, fishless lake. In 2008, a minnow species, *Notemigonus crysoleucas*, was introduced into the lake and has caused a trophic cascade. *N. crysoleucas* have been feeding on the zooplankton, who in turn feed on the phytoplankton found in the lake. With decreased predation, phytoplankton numbers have increased, increasing the opaqueness of the lake. In 2012, *Micropterus salmoides* (Largemouth Bass) was unintentionally introduced. Over the past two summers (2013 and 2014), we measured fish population size mark and recapture techniques. We examined the change in fish populations, zooplankton size and density, and chlorophyll *a* as a proxy for algal biomass. Both zooplankton densities and chlorophyll concentrations were also recorded in neighboring lakes, Awosting and Mohonk, to serve as controls. Following the introduction of *N. crysoleucas*, phytoplankton biomass in Minnewaska has been more than three times that of the fishless Awosting, likely due to the suppression of zooplankton populations. Over the two years sampled, *N. crysoleucas* populations went from an estimate of 15,000 in 2013 to zero in 2014. The extirpation of *N. crysoleucas* was likely due to predation by *M. salmoides*. Across all lakes, the density per liter of zooplankton has decreased from 2013 to 2014. However, in Minnewaska only, the average size of zooplankton has increased due to the loss of the *N. crysoleucas* population.

Green Infrastructure Mitigates Severity of Flooding Events on the New Paltz Campus

Caitlyn Maceli (Environmental Geochemical Science)
Faculty Mentor: David Richardson (Biology)

Increased frequency and severity of storms due to climate change will directly affect biogeochemical cycles within aquatic ecosystems in the eastern US. Anthropogenically impacted watersheds, like the Saw Mill Brook watershed in New York, are highly susceptible to large storms. Promoting infiltration on our campus will allow our watershed to be more resilient. Our team of researchers sought to investigate water quality changes within our sub-watershed to the Hudson Valley by monitoring water quality. Throughout the summers of 2013 and 2014, we implemented water quality and quantity monitoring to determine how an ecosystem comprised of a series of ponds on our campus responded to storm events. Our monitoring occurred at several temporal scales including traditional weekly and storm sampling for biological and chemical parameters. A buoy equipped with environmental sensors was installed in the largest pond to take high frequency measurements of dissolved oxygen, conductivity, and turbidity. Additionally, in the summer of 2013 copper sulfate was sprayed twice, acting as an herbicide to sink algal biomass to the bottom of the ponds for aesthetic reasons. The consequent summer no copper sulfate was sprayed but rather algal biomass was composted. Our team of researchers included hydrology, GIS, water quality and computer scientists found that storms do have an impact on the water quality in the Gunks.

Flourescent in Situ Hybridization of Indonesian Live Rock Biofilm

Nicholas Golom (Biology)

Faculty Mentor: Jason Valens (Biology)

Understanding the complexities of micro environments remains crucial to determining the role our ocean environments play in biochemical cycling. Although current protocols for FISH analysis exist, they vary widely in their methods depending on the specific composition of the biofilm. Using 16S rRNA-targeted oligonucleotides specific for both Archaea and Bacteria, novel FISH protocols were established for fixation and hybridization of marine biofilms endogenous to an Indonesian coral reef ecosystem. Initial results from pilot experiments on samples obtained over an 8-week timecourse revealed changes in spatial arrangements that changed over time as a consequence of growth. We hope to extend these studies to include analysis of organisms of the domain Eukarya and higher resolution visualization of microbial spatial relationships within a native biofilm.

Trends in Heroin Use in New York State

Joelle Bracco (Business)

Faculty Mentor: Karl Heiner (Business)

It has been hypothesized that the use of heroin has been increasing in the past years and this trend is negatively correlated with the use of cocaine. Possible causes have been speculated, primarily decline in gross income. Available data seems to show that the use of heroin has been increasing as the use of cocaine has been decreasing, feasibly caused by the relative street value of these drugs. Working with publicly available data we will address these hypothesize using parametric and non parametric statistical tests and by fitting time series forecasting models. These models will be fit using the R programing language, in which various models maybe compared using bootstrap, a widely applicable and statistical tool used in statistical learning methods.

Exercise Testing in Fontan Patients

Rachael Forando (Spanish/Communications)

Faculty Mentor: Karl Heiner (Business)

An anatomically normal heart has a right and left ventricle and atrium, and two main arteries, the pulmonary artery and the aorta. The right ventricle pumps deoxygenated blood to the lungs, while the left ventricle pumps oxygenated blood to the rest of the body. A congenital heart defect that requires the Fontan surgery has just one working ventricle, while the other may be underdeveloped or missing completely. The Fontan Surgery is palliative, rather than curative, providing the patient with a functional heart, without repairing or replacing the underdeveloped or missing ventricle. The surgery was first performed in 1975 and the oldest living patients are middle aged. The purpose of this study is to understand factors that contribute to a Fontan patient's ability to complete a standard exercise task and to develop models that allow us to predict whether any individual patient would complete this task. We will use logistic regression for its simplicity in interpretation. This is the technique most used by medical researchers. We will also explore using classification trees and nearest neighbor techniques for developing the prediction model. These techniques are more likely to develop better prediction models, but they are less useful in describing how the predictors influence the response. We will use multiple trials and a trainer set to make our result more accurate. Data for this research is provided by the Pediatric Heart Network.

SUNY New Paltz: Trajectory Towards Efficiency

Emily Vanderpool (Economics)

Faculty Mentor: Karl Heiner (Business)

In 2012, Governor Cuomo issued executive order 88, mandating that by 2020, state entities improve energy efficiency of government buildings by 20% (Executive order 88, 2012). SUNY New Paltz has been embarking on the journey to energy efficiency since 2011 with the renovation of Old Main Building, which received a LEED Silver rating. Crispell Hall followed in 2012 with a LEED gold rating. In order to answer the question “Are LEED silver rating buildings on campus more energy efficient the others?”, the buildings that have received LEED certification will be compared to uncertified counterparts. Here we compare Old Main Building to Vandenburg Hall and Crispell Hall to Deyo Hall. Upon initial observation of the submeter readings from each of these buildings, we find a disconcerting trend. Equalized for square footage, Old Main seems to use almost twice the amount of electricity than Vandenburg from August 2014 to February 2015. In the case of Crispell and Deyo, the former used marginally less electricity than Deyo in 2013, but has rapidly began to consume more over 2014 and into 2015, where it consumes up to 30% more per square foot. To understand what is causing these efficiency problems, we will be using techniques such as analysis of variance and time series analysis. There will also be further investigation into the infrastructure and technology used in each building. Using these findings, we will predict the probability of meeting Cuomo’s 2020 standards. In this study, we use various statistical methods to observe SUNY New Paltz's path towards efficiency.

Who Has Sex Before Entering High School? A Predictive Model

Juan Weissenberg (Business)

Faculty Mentor: Karl Heiner (Business)

The purpose of this study was to build a predictive model of which young people have sexual intercourse before they enter high school. Early pregnancy is the single most common reason for high school dropout among females in the United States and American youth have the highest teen pregnancy rate of any developed nation. The consequences of school dropout are limited job opportunities and low income potential for both the young parents and their offspring. However, predicting early sex may help prevention programs to target those most at risk of these behaviors. The data for this study include 860 students in three cohorts of 9th graders in a mostly minority, low income neighborhood in South Florida who were enrolling in a program designed to prevent early pregnancy. Students were surveyed before the program began and were asked about their behaviors during 8th grade and whether they had ever had sex. A regression model was used to understand the predictors of having had sex before high school. Sexual activity was more likely among males, those who had previously failed courses, those who had been suspended, and those who had cut classes in the 8th grade. These findings suggest that early sexual experience is only one of many risk behaviors that characterize these young people. Programs intended to prevent teen pregnancy need to recognize that there are other indicators of risk among these youth and that a comprehensive youth development approach may be required.

Comparative Toxicity Evaluation of *Heracleum Maximum* and *Psoralea corylifolia* Extracts

Ilana Heckler (Chemistry) **Alfonso Garcia** (Chemistry)

Faculty Mentor: Preeti Dhar (Chemistry)

Psoralea corylifolia (PC), a plant native to India, and *Heracleum maximum* (HM), a local North American plant, are known to contain furanocoumarins. Prior research from our lab has found HM to have potent melanogenetic properties, however only PC has been used in traditional medicine to treat the skin condition, vitiligo. Prior research has shown the crude ethanolic HM extract to be particularly toxic (*Artemia salina* bioassay). Powdered seeds of HM were sequentially extracted with hexane, ether, ethyl acetate, and ethanol and separately with water using soxhlet extraction. These extracts were evaluated for their toxicity (concentrations ranging from 57.1-171 $\mu\text{g/mL}$) using a 96 well plate. Two identical plates were made with one being placed in the dark and another under long wave UV light (365 nm). All extracts of HM were found to be phototoxic excluding the aqueous extract and only the hexane extract was found to be toxic with 40.6% mortality at 57.1 $\mu\text{g/mL}$. Mortality plot analysis of HM showed the crude ethanolic extract to be much more toxic than PC extract. However, the sequential ethanolic extracts for both the plants were non toxic. Our research shows that sequential ethanolic extract of HM can probably be used to treat vitiligo.

Phytochemical and Insecticidal Studies on T. arjuna

John Hoffmann (Biochemistry) **Renato Lúcio De Carvalho** (Chemistry)

Ilana Heckler (Chemistry) **Alfonso Garcia** (Chemistry)

Faculty Mentors: Preeti Dhar (Chemistry) Aaron Haselton (Biology)

Plants have co-evolved with insects, developing sophisticated mechanisms to defend themselves. Plants synthesize a wide range of compounds called secondary metabolites that are not directly related to plant metabolism but help the plants defend themselves against pests. Terminalia arjuna (TA) is a tree that belongs to the family Combretaceae and is found in abundance throughout India, Burma, Sri Lanka and Mauritius. The bark and fruits from this tree have been used in Ayurveda (the ancient Indian medicine system) for various ailments. Previous studies from our lab have shown the crude ethanolic extract of TA (bark) to show growth inhibition and pupation delay in third instar of *Drosophila melanogaster*. In the current investigation, we have extracted the TA bark sequentially with hexane, ether, ethyl acetate and ethanol and have looked at the sequentially obtained ethanolic extract and its effects on the growth inhibition and pupation delay in larvae of *D. melanogaster*. Phytochemical analysis on the ethanolic extract of TA shows the presence of saponins, flavonoids, and carbohydrates. Results of the bioassays as well as phytochemical analysis will be presented.

Aza-Michael Reaction; A Micro scale Green Chemistry Lab

Raul Castillo Castro (Chemistry) **Brittney Rush** (Chemistry, University of Pittsburgh at Johnstown, Johnstown PA)

Faculty Mentors: Preeti Dhar (Chemistry) Manisha Nigam (Chemistry, University of Pittsburgh)

Green Chemistry is the design of chemical products and processes that reduce or eliminate the use and generation of hazardous substances. Although it is a challenge to practice micro scale chemistry, it has several advantages over traditional large scale experiments. Micro scale chemistry is based on the principle of 3 R's (reduce, reclaim and recycle). By doing reactions on a micro scale, the costs for chemical purchase and disposal are minimized, and the risks of working with chemicals, reduced. Other benefits include decreased need for storage space, improved lab safety, improved air quality, and shorter reaction times. In short, micro scale chemistry embraces many of the green chemistry principles.

Examining Bacterial Cell Interactions Using Atomic Force Microscopy

Ronald Aucapina (Biology) **Nadia Ouedraogo** (Biology)
Faculty Mentor: Megan Ferguson (Chemistry)

Given the prevalence of bacterial biofilms in both native and engineered environments, our understanding of their interactions with both other bacteria and abiotic surfaces is quite limited. In this research we use AFM to analyze the interactions of bacteria such as *E. coli* and a saprophytic, biofilm-forming variant of *B. bacteriovorus* with other bacteria and chemically characterized surfaces. Tipless AFM cantilevers were left unmodified (Si₃N₄) or coated with a monolayer of *E. coli*. These cantilevers were then used to collect force curves on biofilms of saprophytic *B. bacteriovorus* and *E. coli* as well as on chemically characterized surfaces such as mica, silicon, and poly-L-lysine-coated glass. The greater the cantilever's contact time with the surface, the more force was required to retract from the surface. *E. coli*-coated cantilevers had more adhesion to *B. bacteriovorus* biofilms than to *E. coli* biofilms, but even *E. coli* – *B. bacteriovorus* interaction paled in comparison to adhesion between *E. coli* films and abiotic surfaces. Further results probing biofilms with cantilevers that have been chemically modified with acid or amine groups will be presented.

Determination of Ubiquinone-8 in Formations of Bdellovibrio Bacteriovorus

Joseph Bromley (Chemistry)
Faculty Mentor: Megan Ferguson (Chemistry)

Bdellovibrio bacteriovorus is a Gram-negative bacterium that can appear in two forms: Host Dependent (HD), in which *B. bacteriovorus* attack prey cells and multiply in their periplasm, and Host Independent (HI), in which cells grow on rich media. Moreover, when a suspension of HD *B. bacteriovorus* and a few remaining prey cells is pipetted onto an LB agar plate, a film resembling a 'fried egg' forms, and both the yellow inner region and off-white outer region contain primarily *B. bacteriovorus* with a small fraction of *E. coli*. The goal of this project was to quantify and compare the concentrations of UQ8 in various samples of *B. bacteriovorus* grown under these different conditions to elucidate the role of UQ8 in the cell. Cells were collected, dried, extracted, and analyzed for UQ8 using mass spectrometry and HPLC. Although HD and HI *B. bacteriovorus* did not show marked differences in UQ8 levels, the inner regions of the "fried egg" films had about 10 times more UQ8 than the outer regions. This suggests that a major role of UQ8 in *B. bacteriovorus* involves production of a proton-motive force to enable cell gliding motility.

Elaboration of BINOL by Electrophilic Aromatic Substitution

Joseph Dunstan (Chemistry)

Faculty Mentor: Frantz Folmer-Andersen (Chemistry)

1,1'-Bi-2-naphthol (BINOL) is an axially chiral polycyclic aromatic compound which, in recent decades, has become widely incorporated into stereoselective methods for the preparation and analysis of organic substances. We have been repeating literature procedures for the functionalization of BINOL through electrophilic aromatic substitution. These reactions rely on the electron-donating resonance effects of the -OH groups to direct reaction to the 6,6' positions. Our efforts to brominate BINOL by the method of Cram were successful, producing (*R*)-6,6'-dibromo-BINOL in > 90% yield on gram-scale. However, our initial attempts at nitration of BINOL with 99% nitric acid as reported by Chen were problematic: we observed mixtures of products, while the literature reports a byproduct-free reaction. We have successfully isolated the desired (*R*)-6,6'-dinitro-BINOL in low yield (~ 20% vs. 70% reported) by column chromatography, and are presently focused on methylating the hydroxyl groups of this compound to obtain 2,2'-dimethoxy-6,6'-dinitro-binaphthalene. In the future, we hope to reduce the nitro groups of the latter compound to amino groups, and to incorporate this molecule and other 6,6'-disubstituted-BINOL derivatives into new chiral macrocycles which may be useful as stereoselective sensors and catalysts.

A Bridge Too Far: NMR and Spin-Coupling in Laccase Catalysis

Jeffrey Babicz (Chemistry)

Faculty Mentor: Michael Machczynski (Chemistry)

Small LACcase (SLAC) belongs to the enzyme class known as the multicopper oxidases. These enzymes rapidly perform the four e- reduction of O₂ to water, offering great promise in application to fuel cell technologies. The active site consists of a Type-1 copper, which shuttles electrons from the substrate to the trinuclear copper cluster, where reduction of oxygen to water takes place. Similar copper enzymes are amenable to paramagnetic NMR (pNMR), and this holds true for SLAC; however, in contrast to other pNMR laccase studies, we have isolated and characterized two catalytic species: the resting state and native intermediate. In this system, pNMR is all about the hyperfine coupling between nuclei and unpaired electrons. This interaction is valuable because it is local, i.e. ligands directly coordinating the metal center. Thus, we are effectively probing active site nuclei which would otherwise be indistinguishable from the thousands of chemically similar protons. The hyperfine shift is difficult to predict, therefore traditional NMR spectral assignment techniques are no longer applicable and instead our methods include: measurement of various copper-depleted mutants, H/D exchange, and determining magnetic properties of the resonances as a function of temperature. Additionally, assignments are supported by spectroscopy and kinetic assays.

Characterization of Intermediate steps In Laccase Activity

Maria Ortiz (Biology) **Michael Carey** (Chemistry)
Faculty Mentor: Michael Machczynski (Chemistry)

Fuel cells represent a significant improvement over the currently popular internal combustion engines because they can be three times more efficient. The limiting factor in fuel cell efficiency result from the current catalyst used to catalyze the oxygen-reduction reaction (ORR). Our research focuses on SLAC, a small laccase. Laccase enzymes are the most active known catalysts of the ORR and there is much interest in their development. The purpose of this research is to develop and characterize mutations of this enzyme, which have potential to enhance the catalytic activity of the enzyme in order to identify the genotype with the most industrious phenotype. The enzyme's catalytic activity is monitored through kinetic analysis using UV-Vis spectroscopy. For each mutation, we are determining the rate constants of the intermediate steps in the enzyme-catalyzed ORR. Our results show that both the rate of substrate oxidation and the intramolecular electron transfer follows the semiclassical electron transfer theory.

The Characterization of DNA in the Presence of a Surfactant

Kathleen Westervelt (Chemistry)
Faculty Mentor: Pamela St. John (Chemistry)

Oligonucleotides or short strands of synthetic DNA, were combined with a surfactant, cetyl trimethylammonium bromide (CTAB), to form aggregates in which the CTAB appears to help condense the DNA strands and partially neutralize the negative phosphate backbone making it an ideal candidate for facilitating DNA transport through the lipid bilayer of a cell membrane. A fluorescent single-stranded DNA stain was used to detect DNA-CTAB aggregates. Results showed that DNA aggregates gave rise to much higher fluorescence intensities compared to control samples of DNA without surfactant present and DNA solutions containing micron size silica beads, which were used to test for non-specific binding of the stain. Fluorescence polarization was used to understand the nature of binding between the DNA strands and the CTAB molecules using a fluorescein derivative that was covalently attached to each strand of DNA. The dissociation curve for the DNA-CTAB aggregate was sigmoidal in shape implying that the binding between CTAB and DNA was cooperative or that the binding of one CTAB molecule affects the binding of other CTAB molecules on the same nucleotide.

The Effects of Reading with Infant : A Dissertation Study

Danielle Lowe (SUNY NP adjunct instructor, William Howard Taft University graduate student)

Faculty Mentor: Connie Dodd (Education, Elementary)

This study investigates the effects of reading to one-hundred infants daily for a period of twenty-eight consecutive days. Participants from all economic and ethnic backgrounds are included from throughout the world, including infants under twenty-eight months old from the United States, the United Kingdom, Singapore, Malaysia, Canada, and Finland. After a brief training video regarding the procedures for reading to infants, mothers/caregivers will read and video record a read-aloud session on the first, fourteenth, and twenty-eight day. Infants in the control group will only read on recording days during the twenty-eight day period, while intervention infants will have daily interactive read-aloud sessions with the caregiver. The researcher will analyze the three videos to determine if there is a difference in attention span, as a result of the intervention. Using the Literacy Behavior Analysis Assessment, the evaluator will track each infant's eye movement, engagement, interactive movements, vocal participation, etc. The researcher will evaluate prior reading engagement, caregiver's educational level, socioeconomic status, ethnic background, and birth order through statistical analysis.

The Effects of Curriculum Reform on New York State Public High School Teachers

Jessica Gallagher (Education)

Faculty Mentor: Julie Gorlewski (Education, Secondary)

The objective of this research is to provide an opportunity for high school teachers to share perspectives that the press and commercial media have not focused on. This study is imperative because mainstream reporters tend to emphasize the views of policymakers, unintentionally excluding the experiences and expertise of teachers. This means that the public has access to only part of the current educational reality. Researchers collected information from New York State teachers regarding how instruction, assessment, and school working conditions (which are also students' learning conditions) have changed as a result of recent school reform movements. The era of emphasis includes the time period from 2000 to the present, which encompasses the federal programs No Child Left Behind and Race to the Top. Investigators developed a survey asking a series of ten questions inquiring about teachers' experiences in their classrooms from their early careers to the present. After interviewing New York State public high school teachers, researchers constructed an oral history collection and used grounded theory to identify relevant patterns and themes. This ongoing project reveals how teachers perceive and narrate the effects of curriculum reform on teaching and learning. Examples of these effects include high levels of anxiety on teachers and students due to standardized testing, as well as deprofessionalization related to the implementation of the Common Core Standards. The study has uncovered evidence that teachers feel voiceless in the New York State education reform process. In addition, although interviewed teachers expressed the necessity for improvements in the education system, they described current reforms as more detrimental than helpful. Through this study, educators, policymakers, and historians of the future will have a record of a collective viewpoint that may help guide future plans.

Teacher Creativity

Rebecca Quinones (Education)

Faculty Mentor: Lindsey Russo (Education, Elementary)

It is a well-known fact that, throughout childhood, there is an abundance of creativity and imagination often lacking in adults. Plenty of research discusses ways to nurture this creativity and harness it for educational purposes in various subjects or sometimes just for the sake of being creative. While this research is valid and extremely useful for teachers, what is there to be said about the creativity of adults—or more specifically, the teachers of these children? In this century, teachers are always going to be faced with a wide range of diversity within every classroom. In order to construct lessons that are engaging, meaningful, and inquiry-based for the various cultures, languages, and learning styles present, teachers must tap into this very creativity to that may have been otherwise diminished after being exposed to the rigors of the adult world. It is well known that a creative teacher is an effective teacher, but what isn't discussed often enough is how teachers can enhance their creative abilities, or rather, exercise their otherwise neglected creative muscle. However, for a teacher, we always have access to true insight on innovation—we are surrounded by children. In my proposed study, I will be researching how exactly teachers can learn from students' creativity and use them as resources for their own creative betterment. I'd like to examine how this dynamic of teachers teaching students and students teaching teachers can form a cycle in which students help teachers unlock their inner creativity, so that teachers can construct higher-quality lessons

Human Rights Violation in the Dominican Republic

Maritza Sanchez (Latin America & Caribbean Studies)

Faculty Mentor: Ligia Aldana (Latin America & Caribbean Studies)

Maritza Sanchez (Spanish and Latin America & Caribbean Studies) Faculty Mentor: Ligia Aldana (Latin America & Caribbean Studies) For many years, violations of human rights of Dominican-Haitians in the Dominican Republic have been rampant. Lately, the number of abuses has continued to rise drastically and now things have escalated to be deemed genocides. In this independent study, I aim to research the origins and types of violations that have occurred, and the response and actions that are taken by the government to resolve such matters. I will examine closely the Haitian presence in the country, since they have been the largest group affected by mistreatment and discrimination. In my conclusion, I hope to demonstrate how abuses of human rights in the Dominican Republic are fueled by historical and political elements, as much as by institutionalized negrophobia. To give more currency to my research, my paper will include information collected in my Study Abroad experience, my personal experience as a Dominican citizen, and the knowledge acquired in my courses at New Paltz.

English Loanwords in Japanese as 'false friends' for English-speaking Learners

Christopher Hoffmann (Asian Studies)

Faculty mentor: Oksana Laleko (Linguistics)

Previous research has shown that second language (L2) learners rely on their first language (L1) lexical knowledge in the acquisition of vocabulary. For example, studies have documented that English words borrowed into the Japanese language act as a “built-in lexicon” for English speakers who are learning Japanese as an L2. These learners are “transferring” their knowledge of English into Japanese. This is an example of a positive cross-linguistic transfer, whereby the learner’s L1 directly facilitates the acquisition of an L2. However, lexical transfer is not always reciprocal. Loanwords for concepts that already exist in the host language often exhibit semantic narrowing (i.e., a change in meaning whereby the meaning becomes more specific in the recipient language), and Japanese is no exception. For example, the word *tsuna* (‘tuna’) in Japanese (derived from English *tuna*) has a much more restricted distribution in Japanese: it refers only to canned tuna. The native Japanese word *maguro* is used in other contexts. These words are commonly referred to as “false friends” by Japanese language teachers as they tend to slip up learners from an English background. Only a few empirical studies to date have addressed the role of negative transfer in L2 vocabulary acquisition. This study, using scaled acceptability judgment tasks, examines the intuitions held by learners from different L1s about acceptable use of English loanwords in Japanese. Native Japanese speakers are used as controls. Results are compared using the L1, experience with English, and experience with Japanese of each participant. The results suggest that while native English speakers acquire the loanwords earlier than non-native English learners of Japanese, they are more likely to overextend their meanings for a period before mastering their Japanese use. This has implications for a more nuanced view of lexical transfer, with simultaneous positive and negative effects in the same area.

Analysis of a Spark Gap Tesla Coil

Joseph Ruotolo (Mathematics)

Faculty Mentor: Diego Dominici (Mathematics)

The Tesla coil is a high frequency resonant transformer that uses two tuned circuits to deliver a high voltage output. A mathematical model of the voltage gain in the circuit will be presented. We will relate the theory to measurements and results gathered from our spark gap Tesla coil. We will also demonstrate some of the features of the Tesla coil in our presentation.

Interpretation of overt/null forms by Heritage and Second Language Learners of Russian

Anna Lattanzio (Communication Disorders)

Faculty Mentor: Oksana Laleko (Linguistics)

Russian is one of the ten most commonly spoken languages within the United States (Laleko, 2013). Heritage speakers (HS) are individuals who acquired a minority language in early childhood and slowly became more dominant in the majority language of the society in which they live. HSs can range in proficiency from “over-hearers” to near natives. Typically, Russian does not survive after the second generation in the U.S. (Kagan & Dillon, 2010). However, some heritage speakers continue practice or relearn the language later in life. This paper will examine specific instances of grammatical restructuring unique to Russian HS and the influence of L1 language transfer on second language (L2) learners. Heritage and second language learners of Russian enrolled in various levels of Russian language courses will complete a comprehension survey, which will include acceptability judgments of grammatical forms including overt/null nouns, word order variance, and gender agreement. This paper will address two main questions: (i) Will the level and time of instruction in Russian language courses minimize over-generalization of overt/null forms? (ii) Will second language learners of Russian perform similarly in determining grammaticality as heritage speakers? (i) I predict that the explicit knowledge and metalinguistic awareness gained from longer exposure to language instruction will likely aid the speakers in minimizing the overgeneralization of overt forms common among HS. Research by Polinsky (2006) shows that HSs tend to engage in a higher level of over marking, or the overgeneralization of linguistics forms than native speakers. HS exhibit a greater advantage in regards to phonological and lexical knowledge than morphosyntactic or discourse structure knowledge (Polinsky & Kagan, 2007). However, previous research shows HS can achieve near-native capabilities with proper motivation and they have an advantage over L2 learners in relearning the language. (ii) I predict that L2 speakers of Russian will not perform as well as heritage or native speakers of Russian in determining appropriate use of the overt/null forms. According to research done with L2 Spanish speakers, non native L2 speakers are not able to fully accept the null subject parameter due to L1 transfer and typically restructure the syntax of the universal grammar to target the second language (Klein & Martohard-Jono, 2000). Second language speakers will likely express an advanced understanding yet unequal to that of heritage speakers.

Complex Dynamics for Symbolic Sequences of Quadratic Maps

Ari Pignatelli (Electrical Engineering)

Faculty Mentor: Anca Radulescu (Mathematics)

The behavior of orbits for iterated maps has been widely studied since the dawn of discrete dynamics as a research field. One family of functions of particular interest has been the quadratic complex family. However, little is known about orbit behavior if the map changes along with the iterations. We investigate how the theory of Julia and Mandelbrot, developed for quadratic maps, changes if the dynamic scheme involves two distinct quadratic functions, iterated according to a prescribed binary sequence (which we call "symbolic template"). In particular, we study the effects of changing the symbolic template on the structure of the resulting Julia set, and we define the "template Mandelbrot" set. This direction is of potential interest to a variety of applications (including genetic and neural coding), since it investigates how an occasional or a reoccurring error in a replication or learning algorithm may affect the outcome.

Classifications of Darboux Transformations for Super KdV (The Intrigue of Non Standard Differential Calculus)

Sean Hill (Mathematics)

Faculty Mentor: Ekaterina Shemyakova (Mathematics)

Darboux transformations are a method of solution of partial differential equations. The goal of the project is to extend them to partial differential equations which may depend on another kind of variables known as fermionic as they model the behavior of elementary particles fermions (the standard variables then represent elementary particles bosons). These differential equations appear in the scope of String Theory. Specifically, we consider the super KdV (Korteweg-de Vries) equation and the Darboux transformation of the KdV. We have shown all Darboux Transformations of order one are only of a specific form, reminiscent to the classical case. Previously, Liu et al (95,97) found a family of solutions of this form to the super KdV but it was not shown that they were the only possible solutions. Our current work is on Darboux Transformations of order two with hopes to generalize for order n . In this talk, we start by presenting the peculiarities of non-standard calculus of the super case. We demonstrate some examples of such in comparison to standard calculus. Finally, we conclude with our new result and goals for the future.

Equivalence of 1-Dimensional Second-Order Linear Finite Difference Operators

Dylan Rose (Mathematics) **Bradley Miro** (Mathematics)
Faculty Mentor: Francis Valiquette (Mathematics)

In biology, chemistry, physics, and engineering, many phenomena are modeled by differential equations that govern the rate of change of physical quantities. For example, in quantum mechanics the evolution of sub-atomic particles is governed by Schrödinger's equation which is a second-order linear differential equation. In an effort to unify general relativity and quantum mechanics, it has been suggested that space-time should be discrete rather than continuous. Under this assumption, the Schrödinger operator is replaced by a second-order linear finite difference operator. In our project, we proceed to the classification of all 1-dimensional second-order linear finite difference operators, up to direct, gauge, and projective transformations. This is achieved by constructing invariants through the geometric method of moving frames.

The Effects of Age Demographics on Economic Stability

Kristin Mayo (Political Science)
Faculty Mentor: Jonathan Schwartz (Political Science)

Until the 1980s, dominant economic theories disregarded age demographics as a factor in market stability. In recent decades, authors Bloom and Canning found that when controlling for age distribution, East Asian cases previously termed miraculous followed regular growth patterns. Their econometric analysis concludes that as much as one third of the expansion that took place in Asian markets during the miracle years was due to demographic factors. To supplement their research, I analyzed data for several East Asian countries in the late 20th century and found that countries with the best economic performance were also those with the highest labor force growth. The world has reached a population level so great that a fraction of a percent change in growth rates represents millions of people. What does that mean for the economy? Children are net consumers, adults are net producers, and most lifetime savings occurs between the ages of 40 and 65; the microeconomic impact of individuals varies by age. The distribution of a population across age groups, each with unique economic contributions, influences overall performance. I studied the effects of age distribution on economic stability in order to better understand why some countries fall into crisis during global recession and others are less susceptible to such fluctuations. Ultimately, I found that separating the population into age groups yields unexpected results: population growth does matter.

Generational Differences in the Use of Emotional Words

Coreyann Spence (Psychology) **Madalena Spero** (Psychology)
Faculty Mentor: Maryalice Citera (Psychology)

Culture plays an important role in the interpretation of emotions. The Sapir-Whorf hypothesis suggests that the use of emotion words and their meaning would depend on a group's shared worldview. Generational differences represent one aspect of shared culture. This study examined emotion word use and meaning across 5 different U.S. generations: Digital Natives (1995-present), Millennials (1984-1994), Gen X (1965-1984), Baby Boomers (1950-1964), and the Silent Generation (1930-1946). One hundred four participants representing these 5 generations were asked to describe slang words they used to express the six basic emotions: happiness, sadness, fear, disgust, surprise, and anger. Interview responses were qualitatively coded and themes across generations were extracted. Major themes included: 1) the Silent Generation reported using the least slang words and more positive words, 2) Baby Boomers used profanity and shortened phrases more extensively, 3) Gen X used more adjectives (putrid, livid), 4) Millennials used normal words in different connotations (salty for anger), 5) Digital Natives and Millennials used more acronyms and non-words, 6) popular culture (e.g., TV shows and music) influenced emotion slang, and 7) across the generations there was an increase in religious profanity such as "god damn." These results suggest that generational experiences lead to variations in emotional expression and may provide insight into how emotion regulation may vary across generations.

Word Identification in Late and Early Bilinguals

Amanda Lane (Psychology) **Maria Talloni** (Psychology)
Faculty Mentor: Giordana Grossi (Psychology)

Psycholinguists have asked how words from different languages are organized in the bilingual lexicon and whether words from one language are unconsciously activated when bilinguals read in the other language. This seems to be the case. For example, in late bilinguals, the time required to identify a word was negatively affected by how many words looked similar in the other language. These words are known as "cross-language neighbors" (e.g., English "sugar" and Spanish "jugar"). This interfering effect was stronger when participants read in their second language (L2) compared to when they read in their first language (L1). That is, L1 words were activated when participants read L2 words and interfered with their processing. The reversed effect was much smaller. Work with late bilinguals in which brain activity was recorded replicated this pattern; however, early bilinguals (who learned both languages early in life) did not show the typical marker of cross-language activation. It is therefore possible that these participants were able to block interference from the other language during reading. We tested this hypothesis by comparing the performance of late and early English-Spanish bilinguals in a word identification task. We failed to replicate the original effect and found that, for both groups of bilinguals, interference was larger when participants read English words. We are currently exploring reasons for this unexpected pattern.

Young Children's Conceptual Understanding of Objects

Shay O'Leary (Psychology/Psychobiology)

Faculty Mentor: Sarah Shuwairi (Psychology)

Young Children's Conceptual Understanding of Objects Shay O'Leary Mentor: Sarah Shuwairi, Ph.D. Major: Psychology; concentration in psychobiology Mentor Affiliation: Psychology Department at SUNY New Paltz Abstract It was recently discovered that young infants respond similarly to adults to pictures of impossible figures with increased looking, oculomotor activity and manual exploration. Past research has demonstrated discrepancies between stimuli containing novel impossible figures suggesting that this increased attention could be associated with other perceptual properties such as symmetry or complexity, rather than inherent knowledge of global incoherence. The goal of this study is to evaluate the nature of children's conceptual knowledge of the global properties of real 3D objects and to clarify how and when young children achieve an understanding of the various perceptual dimensions of objects, such as complexity, symmetry and coherence. Stimuli consisted of four sets of line drawings, presented one set at a time that varied along the three perceptual dimensions, with an addition of typicality. Children were instructed to look at all the shapes and sort them into two groups based on what seemed most natural. After "free-sorting", children were given a brief tutorial on particular aspects of shape geometry (e.g., symmetry; impossibility) and instructed to sort the figures by that perceptual dimension. Curiously few children sorted by impossibility, even after extensive training. In the symmetry task, most free-sorted accordingly, and few more did so after butterfly instructions. When free-sorting by complexity, the majority of children sorted by the intended dimension.

Identification of Possible and Impossible Objects in Young Children

Julie Planke (Psychology)

Faculty Mentor: Sarah Shuwairi (Psychology)

Impossible figures are an ideal model for examining the development of local and global object processing mechanisms. Previous studies found that infants can perceive impossibility, i.e., infants gazed at impossible cubes for longer periods of time than possible cubes (Shuwairi et al., 2007; Shuwairi & Johnson, 2013). Questions remain as to when and how young children arrive at a conceptual understanding of object possibility or global coherence in three dimensions. This study examined how children perceived global coherence and demonstrated their inherent knowledge of the pertinent structural properties found in depicted (2D) and real (3D) objects. Children completed a series of tasks beginning with building a block tower, then a 2D-3D matching task, an implicit knowledge structure-function task, and an explicit sorting task. A majority of children demonstrated an ability to distinguish possible from impossible figures. The paired sorting task included a vignette that provided the child with information about the nature of impossibility, followed by a sequential presentation of structurally matched pairs of possible and impossible figures. Each child was asked to determine which figure was "silly". After explicit guidance, children performed with fewer errors. Results suggest that children accurately register and encode critical properties of objects and distinguish between possible and impossible object displays, at least on a perceptual level. Formal instruction or informal exposure may be necessary for children to form a concept of global coherence and the notion of structural impossibility. These findings offer an initial probe into children's conceptual understanding of object coherence and structural possibility.

Use of Speaker Information to Compensate for Coarticulation

Ana Bennett (Psychology)

Faculty Mentor: Navin Viswanathan (Psychology)

The ease with which human listeners perceive speech disguises the complexity of underlying processes. For example, when speech sounds are produced in succession (e.g. to form a word) the production of any sound is dependent on neighboring sounds. Consequently, listeners must demonstrate context-specific perception. Compatibly, Mann (1980) revealed that listeners altered perception in different coarticulatory contexts. One explanation assumes listeners attune to vocal tract gestures; an alternative explanation assumes listeners experience frequency contrast. Lotto and Kluender (1998) demonstrated that listeners compensated for coarticulation despite a change in speaker midway through an utterance. This suggests that gestural information is not tracked during speech production. In our study, we reevaluated these findings because compensating for improbable coarticulation appears maladaptive. In experiment one we replicated the results of Lotto and Kluender. In experiment two we found that phonetic information is not processed before speaker information. It is possible listeners mistakenly compensate because they are unaware the speaker changes. In one proposed study, we plan to represent infeasible instances of coarticulation to implicitly alert the listener to a change in speaker. In the next study, we will explicitly alert the listener by implementing a speaker-change identification task. These studies explore if speaker awareness affects compensation patterns.

Optical Micromanipulation of Birefringent Objects with Beams with Polarization Singularities

Ann O'Brien (Physics and Astronomy)

Faculty Mentor: Catherine Herne (Physics)

In experiments of optical micromanipulation of birefringent objects a circularly or elliptically polarized beam passes through a micron sized birefringent object. Because of the difference between two indices of refraction in the object, there is a transfer of angular momentum from the beam to the object creating optical torque and causing the object to rotate. This phenomenon has applications in micro machines and microfluids research. The focus of this project is to control the rotation of an array of birefringent objects using a beam with a polarization singularity, where the state of polarization varies across the transverse profile of the beam. Using a spatial light modulator the beam can be programmed to have different polarization profiles. When this light is focused on the grid of birefringent crystals it is predicted that each will move in a different way, and the movements can be controlled with the polarization of the beam. Currently data is being taken using calcite crystals, a material with very high birefringence. The crystals are obtained in two ways, either by crushing a larger crystals with a mortar and pestle or growing them in solution. In addition, our work with calcite shows promise for beam polarization diagnostics.

Forces on Absorbing Materials Rotating in Optical Traps

Emily Sobel (Physics/Astronomy) **Ryan Kropas** (Physics)

Faculty Mentor: Catherine Herne (Physics)

Quantifying Forces on Strongly Absorbing Materials Rotating in Optical Traps Emily Sobel and Ryan Kropas, Physics/Astronomy majors Catherine Herne, Physics Department, faculty mentor Optical trapping or “tweezing” is a laser-based method of micron-scale material manipulation, exploiting the forces produced by light refracting through small particles to capture them within a particular area (the trap). Biologists and chemists use this technology to handle large molecules, mix small volumes of liquids, and even build cell-scale machinery. In this research project, we use Laguerre-Gauss modes to create the trap and rotate the particles. Generating the Laguerre-Gauss modes is achieved through programming a spatial light modulator (SLM) with a holographic phase pattern. We work with several different combinations of particles (polystyrene latex, silica, mica, graphite, and vermiculite) and solutions (deionized water, SDS) to conduct experimental tests of the effective trapping and rotation of strongly absorbing materials. When a particle is sufficiently trapped, we apply an alternating current to a piezoelectric to oscillate the solution and quantify the trapping force that is present. We also perform theoretical calculations of trapping forces in laser modes carrying orbital angular momentum (OAM). Here, we present the results of our measurements and calculations and show the forces acting on the particles.

Effects of Teen Drinking on Academic and Social Development

Jake Carias (Sociology)

Faculty Mentor: Eve Waltermaurer (Sociology)

According to the Center for Disease Control (CDC), Alcohol use amongst minors (under the age of 21) is a “major health problem.” While it is illegal to purchase or consume alcohol under the age of 21, persons aged 12-20 represent 11% of alcohol consumption in the United States. Adolescents’ engagement in drinking can be both the cause and/or result of multiple social factors in a student’s life. Students who use alcohol regularly or binge drink are more likely to experience problems in their academic, sexual, social development and put their health at higher risk than students who abstain from alcohol use. Our research focuses on how underage drinking relates to social development and academic achievement of secondary school students (grades 7-12). A 2014-2015 quantitative Youth Development Survey provides data from a two suburban/rural counties in upstate New York; reporting on students’ alcohol use and behaviors as well as investigating academic and social development. Utilizing quantitative analysis software, SPSS 21, we analyzed the typical alcohol use of our sample (n=6,931) and the relationship to academic achievement and engagement. Furthermore, we sought to understand the perception of risk and social influence of alcohol use in the high school setting.

Impact of When Major is Declared and Changing Major

Leah Mancini (Psychology)

Faculty Mentor: Eve Waltermaurer (Sociology)

Leah Mancini (Psychology, undergraduate) Faculty Mentor: Eve Waltermaurer (Sociology)

Institutional research is the collection, analysis, and reporting of different aspects of a college or university. For example, an institutional researcher may report statistics on a university's student body or typical admission requirements. Our research deals with how long it takes SUNY New Paltz students to graduate, and the different factors contributing these graduation rates. My research question asks how the academic year a student declares their major, and how many times they change their major, impacts academic success such as retention, graduation, and GPA. The required information for this research was provided by SUNY New Paltz's internal registration data, and will be analyzed with the statistical software SPSS. The results will explore student academic success depending on how late or early they declare their major, and how many times they change their major.

The Possible Relationship between Violence and Depression

Joseph Russo (Sociology)

Faculty Mentor: Eve Waltermaurer (Sociology)

Using a study on youth development conducted among 7th- 12th grade students in one county this study explores the relationship between violent behaviors and student depression. Students in the 7th-12th grade were given surveys containing questions about their lives, activities, involvements, and behaviors. Student responses on questions regarding depression indicate that about 35% of students said they felt depressed most days in this past year. About 25% of students said that sometimes they feel that life is not worth it. Survey responses in regards to violent behaviors indicate that about 20% of students have bullied someone. Approximately 40% of students claimed that they feel it would be alright to beat someone up if the other person started the fight. About 9% of students claimed that they have attacked someone with the intent of harming them. Survey responses indicate that about 6% of 12th graders have carried a handgun to school. Around 70% of students surveyed claimed that they know what to do if someone is at risk of hurting others.

Instructional Time in K-12 Education

Micaela Kayser (Women's, Gender, and Sexuality Studies)

Faculty Mentor: Robin Jacobowitz (CRREO)

Time in school has long been considered one of the most important factors in student learning. While countless publications have called for an increase in instructional time, there are still widely misconceived notions about the amount of time students spend in school and how much of that time is truly dedicated to engaged student learning. Through an extensive literature review, analysis of bell schedules, school calendars, and teachers contracts in five school districts in the Hudson Valley region of New York, as well as interviews with school personnel in our sample district, this research compares the amount of time students are required to spend in school by federal and state law to the time students spend learning and quantifies the difference. Each departure from the schools' primary mission may be considered important, but it is crucial to adopt a systemic perspective of school time and view the whole picture when determining the schedule of district and school-based activities. By examining daily events and activities that inhibit student learning when school is in session as well as the institutional factors that deter education before it has a chance to begin, this research estimates the amount of instructional time students lose annually, as well as explores the reasoning behind the loss of time.

Publication Opportunities for Undergraduates

Stanford Undergraduate Research Journal is an annual peer-reviewed publication of research articles written primarily by Stanford undergraduates, but also well-qualified students at other institutions, from all academic fields. <http://surj.stanford.edu>

Pittsburgh Undergraduate Review PUR is a multidisciplinary journal that accepts papers from around the world <http://www.pur.honorscollege.pitt.edu/>

Undergraduate Economic Review aimed at promoting high quality undergraduate research <http://titan.iwu.edu/%7Eecon/uer/index.html>

Undergraduate Journal for Global Business and Community, offers undergraduate students a venue for publishing works <http://jgbc.fiu.edu/index.php?journal=JGBC>

The Dialectics Undergraduate Journal of Leadership, Politics, and Society aim is to promote undergraduate discourse and scholarship and to encourage students to pursue and engage in thoughtful discourses on topics of societal importance. <http://www.abington.psu.edu/dialectics/>

Pi Sigma Alpha Undergraduate Journal of Politics built a reputation for publishing outstanding research by undergraduate students. <http://web.ics.purdue.edu/~psalpha/journal/call.html>

Issues in Political Economy is committed to supporting and encouraging quality undergraduate research in all areas of economics. <http://www.elon.edu/e-web/students/ipe/journalinfo.xhtml>

Critique provides a forum for graduate and undergraduate students of politics to express and exchange diverse ideas and to imagine new possibilities for democracy and justice <https://about.illinoisstate.edu/critique/Pages/default.aspx>

Michigan Journal of Political Science The Michigan Journal of Political Science (MJPS) is one of the premier undergraduate political science journals in the country. <http://sitemaker.umich.edu/mjps/home>

Journal of Science and Health at the University of Alabama - JOSHUA includes topics with societal or ethical implications, emerging methodologies or fields, et cetera. <http://www.bama.ua.edu/~joshua/index.htm>

The Penn Bioethics Journal is the nation's premier peer-reviewed undergraduate bioethics journal. <http://bioethicsjournal.com/about/>

BIOS to publish their undergraduate biology work <http://www.tri-beta.org/publish.html>

IMPULSE is the first international, online neuroscience journal for undergraduate publications. <http://impulse.appstate.edu/>

Undergraduate Research Journal for the Human Sciences The URC Undergraduate Research Journal is an annual online national, reviewed journal dedicated to the publication of undergraduate student research. The twofold purpose of the journal is to foster and reward the scholarly efforts of undergraduate human sciences students as well as to provide a valuable learning experience.

http://www.kon.org/CFP/cfp_urjhs.html

The Caltech Undergraduate Research Journal (CURJ) publishes the best undergraduate research submissions from around the world in the form of science news and feature articles.

http://www.topgrad.com/caltech_undergraduate_research_journal.htm

National Undergraduate Research Clearinghouse accepts any scientific manuscript. They can be empirical studies or literature reviews. <http://www.webclearinghouse.net/help.php>

American Journal of Undergraduate Research A refereed journal for undergraduate research in the pure and applied sciences, mathematics, engineering, technology, and related areas in education.

<http://www.ajur.uni.edu/>

Catalyst: Rice Undergraduate Science and Engineering Review <http://catalyst.rice.edu/> Submissions for reviews will be accepted from undergraduate students who have performed science or engineering research at any international university or research institution laboratory.

Journal of Psychological Inquiry We are proud to be one of the few journals to accept contributions exclusively from undergraduate students. <http://www.fhsu.edu/psych/jpi/>

The Undergraduate Psychology Journal (UPJ) at the University of California Los Angeles is a publication which features outstanding research work performed by undergraduate students at UCLA and around the country <http://www.studentgroups.ucla.edu/psychjournal/>

The Yale Review of Undergraduate Research in Psychology is an annual journal that showcases the best and most original research in psychology conducted by undergraduates from around the world.

<http://www.yale.edu/yrurp/>

Psi Chi Journal of Undergraduate Research a national, fully reviewed, quarterly journal dedicated to the publication of undergraduate psychology student research. <http://www.psichi.org>

Journal of Young Investigators JYI's web journal (which is also called JYI) is dedicated to the presentation of undergraduate research in science, mathematics, and engineering.

<http://www.jyi.org/about/>

Morehead Journal of Applicable Mathematics MEJAM accepts papers which are outside the realm of the typical undergraduate curriculum and which emphasize the applicability of mathematics while maintaining significant mathematical interest. <http://www.moreheadstate.edu/mejam/>

Rose-Hulman Undergraduate Mathematics Journal is devoted entirely to papers written by undergraduates on topics related to mathematics

<http://www.rose-hulman.edu/mathjournal/index.php>

Journal of Undergraduate Chemistry Research is a new peer review journal that will be published quarterly with papers of original research performed by undergraduates.

http://www.vmi.edu/show.aspx?tid=36955&id=2214&ekmense1=8f9c37c3_156_160_2214_3

Journal of Undergraduate Research in Physics is a peer-reviewed journal of the Society of Physics Students (SPS) for archiving research conducted by undergraduate physicists. <http://www.jurp.org>

The Allegheny Review is one of America's few nationwide literary magazines dedicated exclusively to undergraduate works of poetry, fiction, creative nonfiction, and art

<http://alleghenyreview.wordpress.com/>

The Oswald Review An International Journal of Undergraduate Research and Criticism in the Discipline of English <http://scholarcommons.sc.edu/tor/>

Young Scholars in Writing: Undergraduate Research Young Scholars in Writing: Undergraduate Research in Writing and Rhetoric, a peer-reviewed journal for undergraduates. <http://cas.umkc.edu/english/publications/youngscholarsinwriting/index3.html>

Undergraduate Journal of Service Learning and Community-Based Research

<http://www.bk.psu.edu/Academics/33679.htm>.

History Matters: An Undergraduate Journal of Historical Research.

<http://www.historymatters.appstate.edu/>

AnthroJournal is an open source journal of outstanding scholarly research papers and reports

authored primarily by undergraduate and graduate college students. <http://www.anthrojournal.com/>

Valley Humanities Review <http://www.lvc.edu/vhr>

Discussions, The Undergraduate Research Journal of Case Western Reserve University will be accepting submissions for our Spring 2015 issue. The submission deadline is January 23, 2015. Information about *Discussions* can be found at: <http://case.edu/discussions/>

2014 SURE Award Recipients

Jake Carias, Sociology, '15 (Mentor: Benjamin Junge, Anthropology)
Generational Differences: Monogamy, Marriage, and Sexual Norms Within the Gay/Bisexual Community

Briana Dabroski, BFA Sculpture, '15 (Mentor: Emily Puthoff, Art)
STEM to STEAM Curriculum / Tinkering and Making with Accessible Technology

Izabella Mlynarska, Biology, '15, and **Josh Johnikutty**, Biology, '17 (Mentor: Spencer Mass, Biology)
Does BPA alter the regenerating planarian nervous system

Emily Rouse, Biochemistry, '14 (Mentors: Jeffrey Reinking, Biology and Spencer Mass, Biology)
Investigating the cross-reactivity of compounds that effect both ion-channels and the human Estrogen Receptor

Valerie Stanson, Biology/Black Studies, '15 (Mentor: David Richardson, Biology)
The mystery unveiled: Effects of ecosystem wide changes in Lake Minnewaska on the rare deep water bryophyte, *Sphagnum trinitense*

Adam Noach, Chemistry, '16 (Mentor: Frantz Folmer-Andersen, Chemistry)
Synthesis of new BINOL-containing macrocycles for enantiomeric discrimination

Jeffrey Babicz, Chemistry ACS, '14 (Mentor: Michael Machczynski, Chemistry)
NMR Investigation of Laccase Catalysis

Brandon Bera, Environmental Geochemical Science, '16 (Mentor: Kevin Shanley, Elect. & Comp. Engineering)
An Open Source Approach to Numerical Simulations of Fluid Flow through Rock Fractures with Application to Large Scale Advanced Geothermal Energy Systems

Alexandra Hobby, Mathematics (Physics), '15 (Mentor: David Hobby, Mathematics)
Continued fractions with common tails

Ali Immel, Mathematics, '15 (Mentor: Francis Valiquette, Mathematics)
Numerical Investigation of the Group Foliation Method

Ana Bennet, Psychology, '15 (Mentor: Navin Viswanathan, Psychology)
The interaction between phonetic and speaker information in speech

Christina Covington, Psychology, '14 (Mentor: Maryalice Citera, Psychology)
Evidence Based Medicine: Validating the Multi Systemic Infectious Diseases Syndrome (MSIDS) Questionnaire

Fall 2014 AYURE Award Recipients

Ronald Aucapina, Biology, '16

(Mentor: Megan Ferguson, Chemistry)

Predicting Adhesion between AFM Cantilevers and Bacterial Surfaces

Jessica Gallagher, English/Secondary English Education, '15

(Mentor: Julie Gorlewski, Secondary Education)

Revealing the Hidden Curriculum: Teacher Voices in an Era of Standardized Reform

Nicholas Golom, Biology, '15

(Mentor: Jason Valens, Biology)

Optimization of FISH for Visualization of Microbes within a Marine Biofilm

Josh Johnikutty, Biology/Chemistry, '17

(Mentor: Spencer Mass, Biology)

An Examination of the Actin Cytoskeleton in Planaria Exposed to BPA

Kimberly Lane, Biology, '15

(Mentor: Maureen Morrow, Biology)

Caspase Activation by Ru Based Compounds

Jennifer McGreevey, Journalism/ Evolutionary Studies/ Philosophy, '14

(Mentor: Victor DeMunck, Anthropology)

Is Romantic Love a Cultural Universal? A Cross Cultural Analysis

Izabela Mlynarska, Biology/Evolutionary Studies, '15

(Mentor: Spencer Mass, Biology)

Further Investigation of Microtubules in Planaria Exposed to BPA

Joseph Ruotolo, Mathematics, '15

(Mentor: Diego Dominici, Mathematics)

Analysis of Wireless Power Transmission from a Tesla Coil

Dylan Sheppard, Art/Computer Science, '16

(Mentor: Bryan Czibesz, Art)

Experiments in Wearable 3D Printing: Processes, Materials, and Desktop Manufacturing

James Tompkins, Physics, '16

(Mentor: Pamela St. John, Chemistry)

Force Microscopy of Mixed SAM Surfaces and DNA Aggregates

Stevie White, Biology, '15, and **Velisha Guillaume**, Biology, '15

(Mentors: Maureen Morrow, Biology, Frantz Folmer-Anderson, Chemistry)

Purification and characterization of an Antifungal Metabolite

Spring 2015 AYURE Award Recipients

Joseph Dunstan, Chemistry, '17
(Mentor: Frantz Folmer-Anderson, Chemistry)
Elaboration of BINOL by Electrophilic Aromatic Substitution

Joseph Ruotolo, Mathematics, '15
(Mentor: Diego Dominici, Mathematics)
High Voltage Measurement Techniques Applied to a Tesla Coil

Euin Cheong, Cell/Molecular Biology, '16
(Mentor: Hon Ho, Biology)
The Effect of Fungicides on the Growth, Sporulation and Sexual Reproduction of *Phytophthora capsici*

Ewa Danisewicz, Biology, '15 and **Zachary Thom**, Biology/History, '16
(Mentor: Spencer Mass, Biology)
Determination of LC50 in Planaria for BPA and BPS with and without Tamoxifen

Valerie Stanson, Biology, '15 and **Bryan Krebs**, Biology, '15
(Mentor: David Richardson, Biology)
Linking Dynamics of Lake Minnewaska Across Seasons

Sean Hill, Mathematics, '15
(Mentor: Ekaterina Shemyakova, Mathematics)
Supersymmetric Extension of Laplace Transformations

Shay O'Leary, Psychology/Psychobiology, '15
(Mentor: Sarah Shuwairi, Psychology)
Young Children's Conceptual Understanding of Objects (Assessment of Categorical Knowledge)

Julie Planke, Psychology/Psychobiology, '16
(Mentor: Sarah Shuwairi, Psychology)
Young Children's Understanding of Real and Depicted Objects (Assessment of 2D-3D Perception)

Bradley Miro, Mathematics/Computer Science, '15 and **Dylan Rose**, Mathematics/Astronomy, '16
(Mentor: Francis Valiquette, Mathematics)
Equivalence of Linear Second-Order Finite Difference Operators

Student Travel Award Recipients

Recipients of the Undergraduate Research Experience Travel Award (URETA)

-conference travel funding provided to students who participated in AYURE or SURE

Erich Stern '14 (Biology) Presented the results of his research at the Joint Aquatic Sciences Meeting in Portland, OR.

Blair Dawson '14 (Psychology/Disaster Studies) Traveled to the International Conference on Motivation in Helsinki, Finland, to present her research.

Michael Carey '14 (Biochemistry) Presented the results of his research at the Frontiers in Metallobiochemistry III in State College, PA.

Ana Bennett '15 (Psychology) Traveled to Long Beach, CA, to present her research for the Psychonomics Society 55^t Annual Meeting.

Izabela Mlynarska '15 (Biology/ Evolutionary Studies) Presented her research at The Society for Integrative and Comparative Biology in West Palm Beach, FL.

Ronald Aucapina '16 (Psychology/Disaster Studies) Traveled to the 59th Annual Biophysical Society Meeting in Baltimore, MD, to present his research.

Elizabeth Reid '14 (Theatre Arts) Presented her research at the USITT and Stage Expo in Fortworth, TX.

Julie Planke '16 and **Shay O'Leary '15** (both Psychology/Psychobiology) Presented their research at the 27th Annual Association for Psychological Science Convention in NYC.

Student Travel Award Recipients

Recipients of the Student Travel Award (STA)

-conference travel funding provided to students who have not participated in AYURE or SURE

Caitlyn Maceli '15 (Environmental Geochemical Science) and **Valerie Stanson '15**, (Biology/Black Studies) Traveled to Portland, OR, to present their research at the Joint Aquatic Sciences Meeting.

Jeffery Babicz '14 (Chemistry) Presented his research at the Frontiers in Metallobiochemistry III in State College, PA.

Iilana Heckler '15 (Chemistry) Presented her research at he Annual Meeting of he America Society of Pharmacognosy in Oxford, PA.

Catherine Attanasio '15 (Psychology) Traveled to Long Beach, CA to present her research for the Psychonomics Society 55th Annual Meeting.

Ariel Pignatelli '17 (Mechanical Engineering) Traveled to Lincoln, NE, to present her research at the Conference for Undergraduate Women in Mathematics.

Juliana Wintrop '15 (Sociology/Asian Studies) Presented her research at the Eastern Sociological Society Conference in NYC.

Julian Mostachetti '15 (Political Science/History) Traveled to Plattsburgh, NY, to present his research at the NYS Political Science Association 2015 Annual Convention.

NCUR

Six New Paltz students were accepted to present the results of their faculty mentored research projects at the **National Conference on Undergraduate Research (NCUR)** at Eastern Washington University. The conference was held April 16-18, 2015. NCUR is very competitive and New Paltz students had a 100 percent acceptance rate!

- **Christopher Hoffmann '15**, Asian Studies (mentor: Oksana Laleko, Linguistics)
The Effects of English Loanwords in Japanese on Semantic Overextension in English L1s
- **Anna Lattanzio '14**, Communication Disorders (mentor: Oksana Laleko, Linguistics)
Overt/Null Comprehension in Heritage and Second Language Learners of Russian
- **Ali Matthews '16**, Education/Spanish (mentor: Oksana Laleko, Linguistics)
Past Tense Morphology Formation in Bilingual Spanish Heritage Speakers and L2 Learners of Spanish
- **Ari Pignatelli '17**, Electrical Engineering (mentor: Anca Radulescu, Mathematics)
Complex Dynamics for Symbolic Sequences of Quadratic Maps
- **Julian Mostachetti '15**, History/Political Science (mentor: Jeff Miller, Political Science)
Inexorable Doom: The State of the State of Exception
- **Sophia Apkarian '15**, Sociology (mentor: Irwin Sperber, Sociology)
The Power Elite

SURC

Eleven New Paltz students presented the results of their faculty mentored research projects at the first annual **SUNY Undergraduate Research Conference (SURC)** at SUNY Brockport. The conference was held on April 10, 2015. <http://digitalcommons.brockport.edu/surc/>



(from left to right)

Laura Kopczynski '15, Psychology, **Emily Smith '15**, Psychology, **Julie Planke '16**, Psychology, **Velisha Guillaume '15**, Biology, **Shay O'Leary '15**, Psychology, **Jessica Gallagher '15**, Education, **Anne E. O'Brien '15**, Physics, **Gabrielle Bouissou '15**, Music Therapy, **Julia Wintrob '15**, Sociology
Ryan Kropas '15, Physics and **Emily Sobel '15**, Physics (not pictured)

Student Documentaries

Students will discuss and show recent documentaries produced as class or SURE funded projects. Documentaries will take place in the SUB 204 from 4:30 to 6:30pm.

The Superman Letters

A film that offers a new view on the lawsuit between Superman creators' estate and DC Comics. By Miriam Ward, Maxwelle Reide, Stephen Siriani, Allaura Pagano, Alexandria Fontanez. Miriam Ward is an award winning multimedia producer, two time winner of New York Women in Communications Foundation scholarships, and recipient of a national scholarship from the Broadcast Education Association.

This film received 3rd Place, Documentary at the Annual Broadcast Education Association Festival of Media Arts in Las Vegas, Nevada.

Let it Bee

This film focuses on the bee population in the Hudson Valley, NY, and the issues surrounding colony collapse.

By Michelle Dopiro, Nina Gioia, Megan O'Dwyer, Pam Ricklin and Giancarlo Camacho

Better than the Weatherman

A short documentary about Adam Bernstein, a psychic medium who uses science and intuition to predict the weather. Adam reveals the strange life-altering events that resulted in his remarkable abilities.

By Samantha Morello, Kelsey Hillerud, Angelica Diaz, Austin Collins, and Taylor Hayes

Notes: