

2014 SRS

20th

**Annual SUNY New Paltz  
Student Research Symposium**

**Abstract Book**



**New Paltz**  
STATE UNIVERSITY OF NEW YORK

*20<sup>th</sup> ANNUAL  
SUNY NEW PALTZ  
STUDENT RESEARCH SYMPOSIUM*

*Friday, May 2, 2014  
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 2014 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 2014 Student Research Symposium includes 55 poster presentations of work performed by 120 students representing 17 departments and 41 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:

**Aram Agajanian** (Computer Services) for support of the web based abstract submissions;  
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**Michelle Pielli** (RSCA) for abstract book preparation, cover design and additional support.

### *The RSCA Advisory Board:*

Kenneth Nystrom (Anthropology), Michael Chuang (Business), Frantz Andersen (Chemistry),  
Gregory Bynum (Educational Studies), Vicki Tromanhauser (English), Morgan Gwenwald  
(Library), Maria Montserrat Gimeno (Music), Rachel Silverbloom (Student Representative,  
Philosophy), Maureen Morrow (RSCA Director, Biology)

## **Minds @ Work**

**1-3pm** – Honors Thesis Presentations, Honors Center  
**3-4:30pm** - Celebration of Writing, SUB MPR pre-space  
**4-7pm** - Student Research Symposium, SUB MPR  
**4-6pm** – Foundation Art Exhibition, Fine Art Building Rotunda  
**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. Such practices require that students 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 refine and demonstrate problem-solving, analytical, and communication skills. Overcoming the challenges inherent in many successful research projects yields a healthy combination of meaningful confidence and appropriate humility.



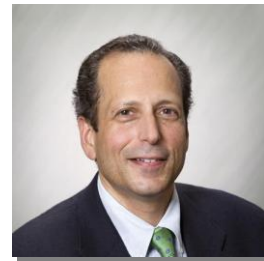
Research participation is certainly valuable (indeed, essential) for students considering graduate education and research careers. These experiences also are directly relevant in the education of all students, irrespective of future goals. Recent surveys sought employer opinions about the kinds of experiences they find valuable in producing the knowledge and capability they seek in college-educated new employees. Over 80% value completion of a research or similar project that demonstrates knowledge in the major along with analytical, problem-solving, and communication capability. Over 80% value experiences that help students develop skills to research questions in their field and to develop evidence-based analyses. The capabilities and perspectives gained through research are broadly transferrable, and are in demand both within and outside of academia.

Successful undergraduate research programs like ours depend on the dedication, disciplinary knowledge, and research and scholarly expertise of faculty. I recognize the commitment of time and effort by faculty who have mentored and advised student research and scholarly projects, and I am grateful for your important contributions. I know that in many ways this is a “labor of love,” and how rewarding and long-lasting are the intellectual relationships you build with research advisees. I also acknowledge the many important contributions of the advisory committee and campus-wide coordinator (Professor Maureen Morrow) in managing our funding-allocation processes, advising students, organizing events such as this symposium, and many other responsibilities.

Finally, 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 20th 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 2014 Student Research Symposium. Today's event is the 20th 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



***In memoriam***

The RSCA Program fondly remembers former Dean of the School of Science and Engineering, John Harrington. John was a great supporter of undergraduate research. As Dean of the School of Science and Engineering, John oversaw the creation of the Summer Undergraduate Research Experience program in 2004. He continued to mentor undergraduate student research projects into his retirement. John's influence will always be a part of undergraduate research at New Paltz.

## *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**

#### ***Changing HIV Identity With Prep as A New Method of Safe Sex***

Andrew Morgan (Anthropology)

Faculty Mentor: Benjamin Junge (Anthropology)

#### ***"Gray Area" and Acceptable Discourse in Abortion Activism***

Brenna Mccaffrey (Anthropology; Women's, Gender, and Sexuality Studies)

Faculty Mentors: Meg Devlin O'Sullivan (Women's, Gender, and Sexuality Studies; History)

Benjamin Junge (Anthropology)

#### ***Natural Dyes***

Ryan Murray (Art)

Faculty Mentor: Jill Parisi (Art)

#### ***Confocal Imaging of Planarian Neuroanatomy***

Izabela Mlynarska (Biology) Hannah Miller (Biology)

Faculty Mentor: Spencer Mass (Biology)

#### ***Treading Through Murky Waters: an Ecosystem Wide Change to Lake Minnewaska***

Erich Stern (Biology) Valerie Stanson (Biology) Benjamin Albers (Biology)

Faculty Mentor: David Richardson (Biology)

#### ***Protein Purification From Human Liver X Receptor Constructs LXR Alpha and Beta***

Emily Rouse (Biology)

Faculty Mentor: Jeff Reinking (Biology)

#### ***Science in 3D: Designing 3D Models for Biological Research & Pedagogy***

Diane Won (Biology) Michael Pakidis (Biology)

Faculty Mentor: Jeffrey Reinking (Biology)

#### ***Toward The Syntheses of Isomeric Macrocycles Containing Both Dach and Binol Subunits***

Hannah Powers (Chemistry) Adam Noach (Chemistry) Joseph Bromley (Chemistry)

Faculty Mentor: Frantz Andersen (Chemistry)

#### ***A Study of Didymo, an Algal Species, in The Catskills, NY***

Steven Dimeglio (Environmental Geochemical Science)

Faculty Mentor: David Richardson (Biology)

#### ***Antibacterial Properties of Dragonfly Wings***

Marc Belanich (Environmental Geo-Chemical Science)

Faculty Mentor: Megan Ferguson (Chemistry)

#### ***Latex Package for Math Jeopardy***

Devin Grady (Mathematics) Paul Lake (Mathematics)

Faculty Mentor: Ekaterina Shemyakova (Mathematics)



***Wind Power Generation***

Andre Candido (Mathematics)  
Faculty Mentor: Diego Dominici (Mathematics)

***A Short Study of Mobius Forms***

Emily Sobel (Physics/Astronomy) Ryan Kropas (Physics/Astronomy)  
Faculty Mentor: Diego Dominici (Mathematics)

***The Effects of Ideology on The Decision to Privatize the Water Sector:  
Analysis of African Countries***

Corah Walker (Political Science)  
Faculty Mentor: Joel Lefkowitz (Political Science)

***Functional or Fictional? Political Culture Typologies in the American States***

William Raphaelson (Political Science)  
Faculty Mentor: Nancy Kassop (Political Science)

***Understanding the Theoretical Foundations of Drug Policy to Shape Better Policy***

Thomas Savidge (Political Science and Philosophy)  
Faculty Mentor: Kate McCoy (Educational Studies)

***Whine Sampling: Understanding Whining in Young Children***

Michael Costa (Psychology) Amanda Lane (Psychology) Sarah Rodriguez (Psychology)  
Faculty Mentor: Alison Nash (Psychology)

***Are All Performance Goals Created Equal? A Meta-Analysis of Effects Produced by  
Different Measures***

Blair Dawson (Psychology)  
Faculty Mentor: Corwin Senko (Psychology)

**Poster Session II 5:10-5:50 pm**

***Dental Analysis of the W. Montague Cobb Skeletal Collection***

Emily Brackett (Anthropology)  
Faculty Mentor: Kenneth Nystrom (Anthropology)

***“We Are All Savita”: Transnational Irish Abortion Activism***

Brenna Mccaffrey (Anthropology; Women's, Gender, and Sexuality Studies)  
Faculty Mentors: Lauren Meeker (Anthropology) Benjamin Junge (Anthropology)

***Examination of Ru-Based Compound Cytotoxicity Mechanism***

Francy Hernandez (Biochemistry) Maria Ortiz (Biochemistry) Marae Thompson (Biology)  
Faculty Mentors: Maureen Morrow (Biology) Daniel Freedman (Chemistry)

***Characterization of The Antimicrobial Compound Produced By an Isaria Fungus***

Katherine Betuel (Biology) Megan Grant (Biology)  
Faculty Mentors: Maureen Morrow (Biology) Hon Ho (Biology)

***Comparing the Effects of BPA and BPS on Planarian Regeneration***

Hannah Miller (Biology) Izabela Mlynarska (Biology)

Faculty Mentor: Spencer Mass (Biology)

***Analysis of Diversity Across Domains in A Coral Reef Biofilm***

Morgan Campbell (Biology)

Faculty Mentor: Jason Valens (Biology)

***Molecular Organometallic Resists (MORE) for EUV Lithography***

Rachel Kaminski (Chemistry)

Faculty Mentor: Daniel Freedman (Chemistry)

***Characterization of DNA Surfactant Aggregates***

Kathleen Westervelt (Chemistry) Adam Rimawi (Chemistry)

Faculty Mentor: Pamela St.John (Chemistry)

***Residential Solar Energy Demand Estimation: A Comparative Analysis of Germany and United States***

Rui Wang (Economics)

Faculty Mentor: Simin Mozayeni (Economics)

***Teaching Brains***

Roberta Sahagian (Education, Elementary)

Faculty Mentor: Lindsey Russo (Elementary Education)

***Narrative Strategies and Fictional Minds in Young Adult Literature***

Jordan White (Education, Secondary /English)

Faculty Mentor: Andrew Higgins (English)

***Design of Digital Circuits Using Binary Logic on Three Valued Algebras***

Nicholas Falco (Electrical and Computer Engineering)

Faculty Mentor: David Clark (Mathematics)

***The Effects of Migration on the Educational Systems of Sending and Receiving Countries: Ecuador and US***

Mary Kate Nagy (Latin American and Caribbean Studies)

Faculty Mentor: Ligia Aldana (Latin American and Caribbean Studies/Spanish)

***The Fight for Heritage Corn: Campesino Struggle for Land and Food Sovereignty in Neoliberal Mexico.***

Luis Lopez (Latin American and Caribbean Studies)

Faculty Mentor: Ligia Aldana (Latin American and Caribbean Studies/Spanish)

***The June 2013 Protests and Brazil's Emergent Middle Class***

Adam Repose (Latin American & Caribbean Studies; Spanish)

Faculty Mentor: Benjamin Junge (Anthropology)

***Exploring Squares in Different Bases***

Paul Lake (Mathematics)

Faculty Mentor: David Hobby (Mathematics)

***Representation of the Struggle in Vieques Through Artistic Narratives***

Mariel Ramirez (Sociology)

Faculty Mentor: Roberto Velez-Velez (Sociology)

***Modes of History: The Study and Reproduction of a 19th Century Corset***

Julia Fell (Theatre Arts)

Faculty Mentor: Andrea Varga (Theatre Arts, Costume Design)

***Buried Child Scenic Design***

Elizabeth Reid (Theatre)

Faculty Mentor: Ken Goldstein (Theatre)

**Poster Session III 5:50-6:30 pm**

***Low Dose BPA and Planarian Regeneration***

Izabela Mlynarska (Biology) Hannah Miller (Biology)

Faculty Mentor: Spencer Mass (Biology)

***Carbohydrate Expulsion as Observed in The Crop of Musca Domestica***

Michael Khoury (Biology)

Faculty Mentor: Aaron Haselton (Biology)

***No-Till and Organic Fertilizer Effects on Physiology of Corn***

Anna Jakubek (Biology)

Faculty Mentor: Eric Keeling (Biology)

***Heavy Metal Absorption Through Local Mycelia***

Kelly Gluchowski (Biology)

Faculty Mentors: Hon Ho (Biology) Megan Ferguson (Chemistry)

***Flowering and Leaf-Out Varies By Tree Species, Site and Year***

Justine Dill (Biology)

Faculty Mentor: Eric Keeling (Biology)

***Courtship Song Variation and Mate Choice in Field Crickets***

William Fyke (Biology)

Faculty Mentor: Thomas Nolen (Biology)

***Assessing 3D Technology for Morphometric Research***

Caryn Bylott (Biology, Evolutionary Studies, Anthropology) Kyra Nolte (Anthropology, Evolutionary Studies, Spanish) Lauren Parry (Biology) Katherine Marriott (Geology, Visual Arts)

Faculty Mentors: Alex Bartholomew (Geology) Ken Nystrom (Anthropology) Spencer Mass (Biology)

***Next Generation DNA Diagnostic Test for Rhodesian Ridgeback Dogs***

Kasandra Diaz (Biology)

Faculty Mentor: Jennifer Waldo (Biology)

***Characterization of DNA-CTAB Aggregates***

Kathleen Westervelt (Chemistry)

Faculty Mentor: Pamela St.John (Chemistry)

***New Furanocoumarin From Heracleum maximum***

Ilana Heckler (Chemistry) Alfonso Garcia (Chemistry) Javier Santos (Chemistry)

Faculty Mentor: Preeti Dhar (Chemistry)

***Circadian Rhythm Stimulator for Human Health Restoration***

Julio Aguirre (Electrical and Computer Engineering)

Faculty Mentor: Baback Izadi (Electrical and Computer Engineering)

***Temperature and Energy Aware Scheduling of Heterogeneous Processors***

Rashadul Kabir (Electrical and Computer Engineering)

Faculty Mentor: Baback Izadi (Electrical and Computer Engineering)

***Transfer From Second Language to Third Language: Role of Second Language in Third Language Acquisition***

Chen Zhou (Linguistics)

Mentor: Oksana Laleko (Linguistics)

***Training English Speakers to Perceive Hindi Speech Sounds***

Brittany T. Williams (Psychology) Catherine Attanasio (Psychology)

Faculty Mentor: Navin Viswanathan (Psychology)

***Exploring The Board Game Design Process***

Caitlin Hoben (Psychology) Lauren Handy (Psychology)

Faculty Mentor: Douglas Maynard (Psychology)

***Perception and Production Behaviors of Spanish-English Bilinguals***

Ana Bennett (Psychology) Ashley Mannine (Psychology)

Faculty Mentor: Anne Olmstead (Psychology)

***Emotions From the Heart***

Peter Marinelli (Psychology) Zachary Bergoine (Psychology) Robert Arena (Psychology)

Faculty Mentor: Maryalice Citera (Psychology)

***Anticipatory Emotions and Heart Rate Variability***

Christina Covington (Psychology) Mailie Casey (Psychology) Samatha Weiss (Psychology)

Matasci Ariel (Psychology)

Faculty Mentor: Maryalice Citera (Psychology)

## *Abstracts*

### ***Dental Analysis of the W. Montague Cobb Skeletal Collection***

**Emily Brackett** (Anthropology)

Faculty Mentor: Kenneth Nystrom (Anthropology)

The current research presented examines dental pathologies in the W. Montague Cobb skeletal collection. The Cobb collection contains the skeletal remains of African American cadavers that had resided in poverty stricken areas of Washington D.C during the early 20th century. Dental pathology data for each tooth in the collection as well as age and sex of the individual, which had previously been collected by Dr. Nystrom, was entered in the software program, Osteoware. The dental pathologies were analyzed to determine the frequency of dental caries, periapical abscesses, and antemortem tooth loss. Subsamples within the population were compared to determine dental trends in the Cobb collection. This study will contribute information on the examination of the relationship between dental health and early 20th century African Americans.

### ***Changing HIV Identity with PrEP as a New Method of Safe Sex***

**Andrew Morgan** (Anthropology)

Faculty Mentor: Benjamin Junge (Anthropology)

This research focuses on how the introduction of a controversial new form of HIV prevention known as “PrEP” has influenced and challenged the personal and social identities of people living with HIV in the United States. PrEP, which stands for Pre-Exposure Prophylaxis, entails taking antiretroviral drugs in the form of an oral supplement on a daily basis; if taken consistently, it can provide users a 99% protection rate against HIV-infection. Recently, PrEP has become a prominent topic in debates on HIV and healthcare: While proven to be a safe and effective form of protection, it has been criticized by its opponents for purportedly encouraging disuse of condoms in favor of bareback sex, labeled as high risk behavior; throughout debates, many have argued what is safe, responsible sex. Using a linguistic methodology consisting in content analysis of texts and videos posted on online blogs and in non-academic articles, this research identifies and characterizes the ways that people talk about PrEP in relation to HIV-positive identity and the associations that emerge through their descriptions. Qualitative data analysis software was used to identify recurrent patterns in the data. Through this study, the views of HIV positive individuals as well as those of their partners and online communities will be explored, and the new roles and faces of HIV infected individuals will be attempted to be defined in light of the changes brought about by the introduction of PrEP.

## ***"Gray Area" and Acceptable Discourse in Abortion Activism***

**Brenna McCaffrey** (Anthropology; Women's, Gender, and Sexuality Studies)

Faculty Mentors: Meg Devlin O'Sullivan (Women's, Gender, and Sexuality Studies; History) Benjamin Junge (Anthropology)

This paper presents ethnographic research conducted with activists affiliated with a reproductive health clinic in the Hudson Valley, NY. I aimed to identify how suggestions for activism coming from feminist scholarship were integrated into activist practice. Discourses of individual choice, privacy rights, and defensiveness in reaction to “The War on Women” continue to dominate the agendas of mainstream organizations fighting for reproductive justice. Meanwhile, activists who are “on the ground”—working in abortion care and clinic defense—struggle with representing the realities of their work while reflecting the acceptable discourses of mainstream activism. This research was conducted through participant observation and semi-structured interviews with eleven activists. Key findings suggest that activists often think through “tough questions” about fetal life, ethics, and repeat abortion patients, yet understand the importance of “acceptable discourse” within the public face of activism. I address some the implications of this research, including the gap between feminist activism and feminist scholarship, the role of neoliberalism in shaping acceptable discourses, and the growing political attention being paid to the subject of “personhood” and fetal life. I argue that acceptable discourses about reproductive rights limit how activists and volunteers can engage with the political, moral, and intellectual conflicts that they encounter when fighting for reproductive justice.

## ***“We Are All Savita”: Transnational Irish Abortion Activism***

**Brenna McCaffrey** (Anthropology; Women's, Gender, and Sexuality Studies)

Faculty Mentors: Lauren Meeker (Anthropology) Benjamin Junge (Anthropology)

This research will present an anthropological discourse analysis of media coverage of the 2012 death of Savita Halappanavar and the subsequent global activism which pushed for the liberalization of Ireland’s abortion laws. I ask: How do categories of nationality, citizenship, and ethnicity play into discourse about the legalization of abortion in Ireland? Abortion remains illegal in all but a few rare cases in Ireland. Halappanavar, an Indian woman who was living in Ireland, died of septicemia after being repeatedly denied a medically necessary abortion. Halappanavar’s death sparked immediate action around the world, including in Ireland, England, India, and the United States, as activists gathered at rallies and vigils which urged Ireland to change its strict ban on abortion. My research focuses on international media coverage of this activism. Using qualitative data and anthropological discourse analysis, I examined newspaper reports, blogs, and op-eds which discussed the rallies and vigils for Savita Halappanavar. Media coverage of this activism framed traditional, religious Ireland in conflict with the rest of the Western world. However, discourses of human rights and collective identity, seen the popular rally slogans “Never again” and “We are all Savita,” also have implications for understanding transnational feminist activism.

## *Natural Dyes*

**Ryan Murray (Art)**

Faculty Mentor: Jill Parisi (Art)

In my study, art and science merged as I explored plant and insect derived alternatives to typical artists' pigments. The study revealed unknown factors resulting from a non-controlled substance of nature. In many ways this allows for a better the understanding of materials, along with the possibilities they offer for making unique works of art. The dyestuffs researched included red onionskins, madder root, cochineal bugs, Osage orange saw dust, Logwood chips, and walnuts. Each dye was tested on a range of fibers in both paper and textile form. Mordants were used to alter the color of a dye, and to enhance light fastness. Through experimentation I found that the majority of light fast qualities of the dye did improve with the introduction of mordants, yet less than half of the dyestuffs tested changed in color with the addition of a mordant. Further research will also include testing plant based mordants.

## *Examination of Ru-Based Compound Cytotoxicity Mechanism*

**Francy Hernandez (Biochemistry) Maria Ortiz (Biochemistry)**

**Marae Thompson (Biology)**

Faculty Mentors: Maureen Morrow (Biology) Daniel Freedman (Chemistry)

Cancer treatment with cisplatin (Cis-Pt) kills cells by irreversibly binding to DNA and inducing apoptosis. However, severe side effects and drug resistance occur. Ruthenium (Ru) based compounds are being tested as a potential replacement for Cis-Pt as they may have fewer negative effects; however, the cytotoxic mechanism is unknown. The purpose of these experiments is to determine if various [(paracymene) Ru (beta-ketoiminate) Cl] complexes work through the same or different mechanism as Cis-Pt. To address this question, the lung cancer cell line A549 was treated with combinations of Cis-Pt and our Ru complexes (Compound #1 (o-OHphenyl), and Compound #8 (o-carboxylatephenylNO)). Based on the concept of drug synergy, when two compounds are combined three outcomes are possible: subadditive effect (compounds inhibit each other, inconclusive mechanism), additive effect (compounds work through the same mechanism), and synergistic effect (compounds work through different mechanisms). Additionally, another assay will be done to see if the induced apoptotic pathway for each compound is similar. The colorimetric protease assay will determine which caspases are activated, which correlates with two pathways: the cell surface death receptor pathway and the mitochondria-initiated pathway. The drug synergy studies have demonstrated that Cis-Pt and the Ru compounds have an additive effect, suggesting that they have a similar cytotoxic mechanism. The results of the caspases studies will also be presented.

## ***Characterization and Effectiveness of the Antimicrobial Compound Produced By an Isaria Fungus***

**Katherine Betuel** (Biology) **Megan Grant** (Biology)

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

Certain species of fungi are able to produce anti-fungal properties that can be used commercially for various purposes. We have isolated a species of *Isaria* and determined that it produces an anti-fungal compound. We have examined the nature and effectiveness of this metabolite. To determine the anti-fungal effectiveness, the effect of *Isaria* culture supernatant was tested for the ability to inhibit sporulation of a number of fungi known to be common laboratory contaminants and plant pathogens. The results show that the *Isaria* metabolite inhibits growth of some fungi. The fungi that the metabolite did not inhibit are known to produce anti-fungal compounds or other toxins that we believe interfered with the *Isaria* metabolite. To further investigate the properties of the anti-fungal, we tested the effectiveness of the supernatant after exposure to high temperatures and at various pH values. The anti-fungal activity was inactivated after exposure to high temperatures, indicating that the metabolite may be a peptide. The pH studies are underway. To determine the range of cytotoxicity, we examined the effect of the *Isaria* metabolite on growth of bacteria, cultured human cells, and plants. The bacteria tested showed no inhibition but the A549 cell line was inhibited with a 1:5 dilution of the supernatant. Early results indicate some inhibition of seed germination and a large scale study is being conducted. The effect of the supernatant will also be examined using plant leaves. Longer term studies will include chemical characterization of the metabolite.

## ***Comparing the Effects of BPA and BPS on Planarian Regeneration***

**Hannah Miller** (Biology) **Izabela Mlynarska** (Biology)

Faculty Mentor: Spencer Mass (Biology)

Bisphenol-A (BPA) and Bisphenol-S (BPS) are both chemicals used in a variety of industrial processes to produce plastics, epoxy resins and thermal papers. In recent years, BPS has begun to replace BPA in many products. BPA is a known xenoestrogen and manufacturers claim the lower toxicity of BPS as the reason for the substitution. Prior work in our lab has shown that both BPS and BPA have dose-dependent effects on planarian regeneration, with increasing doses slowing the process and reducing the overall amount of tissue regrowth. We have also previously shown that the LC50 for BPS is approximately 25x higher than that of BPA. Here, we compare logistic growth parameters between BPA and BPS treatments during regeneration in the planarian *Schmidtea mediterranea*.



## ***Confocal Imaging of Planarian Neuroanatomy***

**Izabela Mlynarska** (Biology) **Hannah Miller** (Biology)

Faculty Mentor: Spencer Mass (Biology)

Planarians are flatworms that have the ability to regenerate themselves when injured. Previous studies of endocrine disruptors on planarian regeneration in our lab have shown that xenoestrogens, such as BPA and BPS, interfere with this process. Prior work has examined the gross anatomical morphology and kinetics of regeneration. We are interested in studying the histological changes (tissue and cell level anatomy) during regeneration under the effects of xenoestrogens. Immunohistochemistry was used to label specific proteins and fluorescence microscopy was used to visualize structures in planaria. We have looked at the actin cytoskeleton, nuclei, and neurosynaptic vesicles of *Schmidtea mediterranea* under normal conditions. These structures are imaged using a confocal microscope. This preliminary work of developing and adapting methods and protocols in control worms will allow us to study the histology of planarian regeneration under the effects of xenoestrogens.

## ***Low Dose BPA and Planarian Regeneration***

**Izabela Mlynarska** (Biology) **Hannah Miller** (Biology)

Faculty Mentor: Spencer Mass (Biology)

The environmental endocrine disruptor Bisphenol-A (BPA), used in the manufacture of polycarbonate plastics, thermal printing systems, epoxy resins and other industrial processes has been shown to depress and delay regeneration in a variety of flatworms at high doses. In this work we examine the effects of much lower concentrations which are more environmentally relevant and find a concentration dependent increase in blastema growth with decreasing dosage. In vertebrate systems, weak estrogen receptor agonists like BPA are known to repress estrogen-receptor (ER) responses at high doses and increase ER responses at low doses in a manner very similar to the decrease and increase in growth we observe in regenerating planaria. Prior work in our lab has suggested that bisphenol compounds are interacting with an ER-like pathway in planaria, and our current finding is consistent with this mechanism.

## ***Carbohydrate Expulsion as Observed in the Crop of Musca domestica***

**Michael Khoury** (Biology)

Faculty Mentor: Aaron Haselton (Biology)

The crop is a fly digestive organ known to store carbohydrate fluid for later nourishment between nectar meals. Additionally, it has been hypothesized that the crop plays an essential role in the regulation of blood glucose levels, but evidence for this homeostatic function is lacking. In this experiment, we explored the amount of time taken for an ingested sucrose solution meal to be completely expelled from the crop of the house fly, *Musca domestica*. The time-course for meal expulsion from the crop was approximately twenty-four hours. Blood glucose measurements will be correlated with crop volume throughout the meal-expulsion time-course to determine if crop volume decay serves to maintain constant blood glucose levels.

## ***Analysis of Diversity Across Domains in a Coral Reef Biofilm***

**Morgan Campbell** (Biology)

Faculty Mentor: Jason Valens (Biology)

While bacterial presence within biofilms has been studied in depth, rarely has the investigation crossed all domains in an attempt to fully understand the diversity of microbial life present. In this investigation, it was hypothesized that the diversity within a specific coral reef biofilm would cover the bacterial, archaeal, and eukaryotic domains. The 16s and 18s rRNA phylogenetic markers were used to determine the presence and identity of various microbial species that make up the biofilm. These genes were amplified by PCR using universal primers and cloned into vectors to be sequenced. The analysis of eukaryotic presence was attempted using two different sets of primers, amplifying the actin and 18s rRNA genes. The amplification of the 18s rRNA gene provided the best results and was optimized by magnesium titration. This investigation of diversity verified the presence of microbial species from all three domains. The sequencing of clones is underway and will help elucidate the species present and consequently, community structure within the biofilm.

## ***Treading through Murky Waters: An Ecosystem wide change to Lake Minnewaska***

**Erich Stern (Biology) Valerie Stanson (Biology) Benjamin Albers (Biology)**  
Faculty Mentor: David Richardson (Biology)

Lake Minnewaska, located within Minnewaska State Park, has historically been a clear, acidic, and fishless lake. Recently, increases in pH and an introduction of a minnow species, *Notemigonus crysoleucas*, have rapidly changed the ecosystem. Lake Minnewaska serves as a study system to test the synergistic effects of internal and external drivers on environmental change in protected and managed ecosystems. We hypothesize that *N. crysoleucas* zooplanktivory has allowed the phytoplankton population to boom, causing trophic cascade and lowered water quality. We measured pH, chlorophyll a, total phosphorus (TP), secchi depth, conductivity, and dissolved oxygen in Lake Minnewaska from 2012-2013. The population of *N. crysoleucas* was estimated via a mark and recapture method. The plankton communities were also assessed using density counts and microscopic identification. Increases in chlorophyll a and TP, decreases of secchi depth, and anoxic conditions in the hypolimnion each summer and fall indicate that the lake has risen to mesotrophic levels. The average size and density (individuals/Liter) of the zooplankton indicate that *N. crysoleucas* were having a significant effect on the trophic levels of the lake. The decrease in zooplankton populations and increase in phytoplankton populations is causing a degradation of the water quality. This could ultimately impose a threat on rare aquatic life inside of a rare aquatic ecosystem, as Lake Minnewaska is home to a globally rare sphagnum moss and behaviorally unique population of two-lined salamander. The research from this project is a result of strong collaboration with stakeholders, governmental agencies, and non-profits.

## ***No-till and organic fertilizer effects on physiology of corn***

**Anna Jakubek (Biology)**  
Faculty Mentor: Eric Keeling (Biology)

No-till farming has environmental and possibly financial benefits. However, farmers need to know the effects of no-till techniques on crop performance, and the possible interactions between no-till treatments and organic fertilizer treatments. At a local organic farm (Brook Farm, New Paltz, NY), we studied the effects of conventional tillage vs no-till and soybean meal amendments vs. no additional soybean meal on the physiological performance of sweet corn. We used four rectangular plots (a 2 x 2 design) to test both direct and interactive effects of the two soil treatments. There were no statistically significant differences between till and no-till treatments in photosynthesis rates, final plant height, final yield, or soil respiration. Plants in the no-till treatment had higher post-harvest leaf survival rates and lower stomatal conductance rates. Plants in the soy-treated plots had higher photosynthesis rates and larger final plant heights. There were no significant interaction effects between tillage and soy amendment treatments, although interactions were not tested for photosynthesis and stomatal conductance. Our results suggest that no-till treatments may be employed with little sacrifice in physiological performance or yield and with no negative interactive effects on soybean meal amendments. Longer term studies at a larger scale with more intensive sampling would be necessary to verify these preliminary findings.

## ***Heavy Metal Absorption Through Local Mycelia***

**Kelly Gluchowski** (Biology)

Faculty Mentors: Hon Ho (Biology) Megan Ferguson (Chemistry)

Surface and ground water contamination is a reoccurring environmental problem here in the Hudson Valley. Due to the area's agricultural nature, pesticides containing heavy metals such as cobalt, copper, and cadmium are still present in the environment. To mitigate the effects of this contamination, we questioned if local fungi had the ability to absorb the heavy metal contaminants transported in the areas runoff water. To test this hypothesis, we cultivated a local mycelia culture, *Hypizygyus ulmarius*, and conducted three tests, each 12 days long, where the mycelia culture was immersed in media enhanced with heavy metals in concentrations ranging from 1 to 100 ppm. After 12 days, the mycelia were removed by filtration and the metal concentrations remaining in the media = were determined using Flame Atomic Absorption Spectroscopy. We determined that *H. ulmarius* observably reduced the concentrations of cobalt, cadmium, and copper. The 100ppm samples showed the highest absolute uptake of copper, cadmium and cobalt. Thus, *H. ulmarius* is a promising mitigation technique for water or soils contaminated with these heavy metals. Surface and ground water contamination is a reoccurring environmental problem here in the Hudson Valley. Due to the area's agricultural nature, pesticides containing heavy metals such as cobalt, copper, and cadmium are still present in the environment. To mitigate the effects of this contamination, we questioned if local fungi had the ability to absorb the heavy metal contaminants transported in the areas runoff water.

## ***Flowering and leaf-out varies by tree species, site and year***

**Justine Dill** (Biology)

Faculty Mentor: Eric Keeling (Biology)

Phenology, the study of the timing of reoccurring biological events, is of increasing importance with expectations of warmer and earlier springs. However, ambient temperatures also vary spatially across a given landscape and temperature is not the only factor affecting phenological phases in plants. We were interested in how tree flowering and leaf-out dates were affected by species, location, and year. In spring 2013, we established two new study sites in the town of New Paltz, one in a forest adjacent to the SUNY campus (the "Campus Forest"), and one along the Wallkill River. To compare between different years, we used additional observations made in 2012 at Bard College. Flowering and leaf-out dates varied between five species in the Campus Forest. However red maple in the Campus Forest flowered approximately 3 days earlier than red maple along the Wallkill River. Most dramatically, red maple flowered ~27 days earlier in 2012 at Bard College than in 2013 at SUNY New Paltz. In contrast, American beech showed little difference between years. Our results are based on a limited number of observations, but provide preliminary confirmation that phenological responses vary by species and location, and that warmer spring temperatures (as we had in 2012) can dramatically affect some species' flowering and leaf-out dates. Continued observations will allow us to develop a better understanding of the effects that climate change is having on plants in our environment.

## ***Courtship Song Variation and Mate Choice in Field Crickets***

**William Fyke** (Biology)

Faculty Mentor: Thomas Nolen (Biology)

Many species employ a variety of strategies to analyze the potential fitness of a mate. Sexually selected traits often vary in ways that can distinguish high fitness mates from lower fitness mates. Variation in courtship displays within or between potential mates is often utilized to discern the quality of the mate. High or low amounts of variation within a single courtship strategy can serve as an indicator of fitness. High levels of variation can indicate that the potential mate possesses unique traits associated with high fitness. Conversely, variation, or a lack of consistency, in a courtship signal may be an indicator of poor fitness. The role of the courtship song in mate selection among species of crickets is unclear, however males who fail to produce any courtship song have low reproductive success. This study investigated the courtship song of the Australian field cricket, *Teleogryllus oceanicus*. A variety of statistical analyses were performed to determine if variation in frequency, amplitude and event duration of sound components from the courtship song of male crickets can predict their success. A blind was maintained regarding the success of each male. Courtship song content and mating success from twenty six males were analyzed. Comparative studies direct the focus of this research towards song energetics and consistent performance throughout the duration of the song. Consistency is predicted to be strongly correlated with mating success.

## ***Assessing 3D Technology for Morphometric Research***

**Caryn Bylott** (Biology, Evolutionary Studies, Anthropology) **Kyra Nolte**

(Anthropology, Evolutionary Studies, Spanish) **Lauren Parry** (Biology)

**Katherine Marriott** (Geology, Visual Arts)

Faculty Mentors: Alex Bartholomew (Geology) Ken Nystrom (Anthropology)

Spencer Mass (Biology)

Morphometric research in biology, bioanthropology and paleontology usually involves measuring physical specimens. The availability of 3D scanning and printing technologies has opened the door to using digital information in lieu of possessing actual physical specimens. We are morphometrically comparing actual physical specimens with traditional macro-photo-documentary techniques and 3D laser scanning with respect to dimensional accuracy and precision. We anticipate that this study will provide valuable information about the efficacy of utilizing 3D digital technology in lieu of physical specimens for a variety of different research and teaching purposes.

## ***Protein Purification from human Liver X Receptor constructs LXR alpha and beta***

**Emily Rouse** (Biology)

Faculty Mentor: Jeff Reinking (Biology)

A class of proteins identified as Nuclear Receptors have the ability to bind DNA and regulate the expression of target genes by interacting with their ligand molecule. The human Liver X Receptors (hLXR), a member of the Nuclear Receptor proteins, bind a hormone ligand and regulate the metabolism of cholesterol and fatty acids. Seemingly unrelated classes of compounds, known as the “big potassium” (BK) channel blockers, have been shown to be able to interact with certain nuclear receptors, such as hLXR. To test these interactions, a construct is first generated using LXR genes ligated into a pET15b vector. These exogenous plasmids are then introduced to a strain of BL21 (DE3) E. coli and induced to produce desired protein. The two isoforms LXRalpha and LXRbeta have been purified and prepared for further analysis on their binding activity.

## ***Science in 3D: Designing 3D Models for Biological Research & Pedagogy***

**Diane Won** (Biology) **Michael Pakidis** (Biology)

Faculty Mentor: Jeffrey Reinking (Biology)

Newfound accessibility to “affordable” personal 3D printers on the market (e.g. Makerbot) has the potential to revolutionize and expand the role of 3D printing in scientific research and pedagogy. While there is a plethora of 3D models that are available for free, these models are mostly geared towards the general public for personal use (i.e. toys, home improvement tools, tech tools, etc.) The field of science using 3D printing, whether it is bioengineering live tissues or making plastic lab ware for a general lab use, is relatively new. In collaboration with the research and teaching faculty in the Department of Biology, our lab has learned to use Computer Aided Drafting (CAD) software to create novel and custom lab ware and pedagogical prototypes via 3D printers accessible through 3D printing initiative (MakerBot Replicator 2, MakerBot Replicator 2x and Dimension 1200sst FDM) across different media (PLA, ABS & TPE). Thus far, our lab has produced several novel designs that have been reproduced and implemented in teaching labs and research. In addition to custom designs, we have ascertained a method of converting and editing pdb to stl files, thus gaining the ability to produce pedagogical models used to help students visualize sub-microscopic protein structures. Therefore, the work of our lab is twofold: creating new objects and tools that can aid in commonly applied research methods and scientific pedagogy, which have never been designed or created before; and adding to the growing field of 3D printing applications in scientific research.

## ***Next generation DNA diagnostic test for Rhodesian ridgeback dogs***

**Kassandra Diaz** (Biology)

Faculty Mentor: Jennifer Waldo (Biology)

Rhodesian ridgeback dogs are a recognized breed which is most notable for the distinctive ridge of hair running along their back. The genetic basis for this particular phenotype has been attributed to a duplicated region of chromosome 18. The ridge mutation is inherited in a dominant manner, with one copy of the duplication of the region resulting in the Ridge phenotype. The duplicated allele is “R”, while the normal, non-duplicated allele is “r”. During the summer of 2013, a test was developed to determine DNA sequence of Rhodesian ridgeback dogs. The main objective of the test was to distinguish dogs who are Rr, who have a ridge from those that are RR, who also have the ridge phenotype. This test uses a Real Time Quantitative PCR approach that can discriminate between 1 or 2 copies of the Ridge duplication. In this test, a set of primers were used that allowed us to quantify our area of interest. In the current work, we are exploring how different primer sets affect the quality of the DNA test. This work confirms the previous studies and will be useful as we begin the process of making this test available to interested patrons.

## ***Toward the Syntheses of Isomeric Macrocycles Containing both Dach and Binol Subunits***

**Hannah Powers** (Chemistry) **Adam Noach** (Chemistry)

**Joseph Bromle** (Chemistry)

Faculty Mentor: Frantz Andersen (Chemistry)

We have been pursuing the synthesis of chiral macrocyclic polyamines through the reductive amination of 1,1'-bi-2-naphthol (BINOL)-containing dialdehydes with enantiomerically pure trans-1,2-diaminocyclohexane (DACH). The efficiencies of these reactions are significantly influenced by the linkage geometry of the BINOL-containing dialdehyde precursor and in some cases, the relative stereochemistry of the DACH and BINOL subunits. The use of an ortho-linked (R)-BINOL-containing dialdehyde gave good yields of the expected [1+1] macrocyclic diamine when reacted with (R,R)-DACH, and this compound has been characterized by X-ray crystallography. However, the diastereomer derived from (S,S)-DACH is formed much less efficiently and has yet to be isolated. On the other hand, reaction of a para-linked dialdehyde gave good yields of both diastereomers of [2+2] tetraamine macrocycles, which could be purified without chromatography. Pilot studies suggest that both diastereomers of [1+1] meta-linked macrocycles are accessible, and we are currently working towards their purification on gram-scale. In the future, we hope to explore the use of other chiral diamines in place of DACH, and to employ the isolated chiral macrocyclic polyamines as enantioselective sensors and/or catalysts.

## ***Molecular Organometallic Resists (MORE) for Euv Lithography***

**Rachel Kaminski** (Chemistry)

Faculty Mentor: Daniel Freedman (Chemistry)

Over almost 50 years, the semiconductor industry has been able to double the number of transistors on integrated circuits approximately every two years through shrinking the size of the features patterned on silicon wafers. Current photoresist technology using 193 nm light sources are approaching their limit. Extreme UV (EUV) light is considered a likely replacement, but current photoresists do not use EUV efficiently. The goal of the MORE Project is to develop inorganic-based compounds for photolithography that will pattern 10 nm features. The MORE team has prepared, characterized, and screened over 200 compounds for solubility, coating quality, EUV sensitivity, and lithographic capability. Materials invented through this project, never considered before as EUV photoresists, have, thus far, achieved 18 nm features at radiation doses in the 20-30 mJ/cm<sup>2</sup> range.

## ***Characterization of DNA Surfactant Aggregates***

**Kathleen Westervelt** (Chemistry) **Adam Rimawi** (Chemistry)

Faculty Mentor: Pamela St. John (Chemistry)

Small strands of DNA may interact with various surfactants as a mechanism of gene delivery through nuclear and cellular membranes. Past studies involving UV-spectroscopy and gel electrophoresis show that when 20 to 100 base-length oligonucleotides interact with a surfactant, CTAB, in specific ratios of surfactant to oligonucleotide base, they form aggregates. The interaction between the oligonucleotide and surfactant molecule appears to involve both the hydrophilic head and the hydrophobic tail of CTAB. We characterized these aggregates using an atomic force microscope (AFM) by drying DNA-CTAB solutions on mica and silicon, reconstituting the dried aggregates in water and imaging them in fluid. Topographical images were collected that showed consistent, almost hexagonal, regular patterns of aggregates on the surface, and we studied the surface properties of the aggregates using force spectroscopy with functionalized AFM tips. The spring constants of the aggregates and information on the adhesion forces between the derivatized tips and the aggregate surfaces were obtained. Preliminary results show that tips functionalized with 1-dodecanethiol were found to have a lower adhesion to the aggregate surface than tips functionalized with mercaptoundecanoic acid implying that the surface of the aggregate is also hydrophilic.



## ***Characterization of DNA-CTAB Aggregates***

**Kathleen Westervelt** (Chemistry)

Faculty Mentor: Pamela St. John (Chemistry)

Oligonucleotides will aggregate in the presence of a surfactant, much like the DNA aggregates that form during the transportation of genes through cell membranes. Aggregates formed from oligonucleotides of 20 to 100 bases in length in the presence of the surfactant, CTAB (cetyl trimethylammonium bromide) have been characterized by UV spectroscopy and fluorescence. UV spectroscopy showed that the absorbance increased as a result of light scattering from various sized aggregates that formed between oligonucleotides and CTAB when the ratio of CTAB to oligonucleotide concentration was about 0.5 or larger. To further characterize the aggregates, they were stained and viewed using fluorescence microscopy. In addition, the fluorescence intensity of fluorescein-labeled oligonucleotides was monitored spectrofluorometrically and it was found to decrease with the addition of CTAB indicating that the dye may be quenching in the presence of the surfactant.

## ***New furanocoumarin from *Heracleum maximum****

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

Faculty Mentor: Preeti Dhar (Chemistry)

Furanocoumarins are a class of naturally occurring compounds found in many plants and contain a furan ring fused with a coumarin (benzo-alpha-pyrone) either in a linear or angular fashion leading to Psoralen or Angelicin type of furanocoumarins. Furanocoumarins are known to be toxic and prior research from our lab has confirmed this through a brine shrimp bioassay. In this research, furanocoumarins were isolated from *Heracleum maximum*, a plant native to North America and known to contain several furanocoumarins. Extraction was performed on pulverized *Heracleum* seeds through the use of a soxhlet extraction using water as a solvent. The extract was frozen and lyophilized to yield a maroon crystalline solid (crude product). The crude product was suspended in water and phytochemical analysis performed on it. The aqueous solution of the crude product was also extracted with hexane and the hexane layer was concentrated. A pale green solid separated out and was isolated by filtering and recrystallization (several times with ether/hexane solvent system). Furanocoumarins of interest were isolated using preparative TLC plates and characterized using NMR spectroscopy. We have isolated an unreported compound, Heratomin, from this plant. This is a known compound but has not been reported from this species.

## ***Residential Solar Energy Demand Estimation: A Comparative Analysis of Germany and United States***

**Rui Wang** (Economics)

Faculty Mentor: Simin Mozayeni (Economics)

In this research we first develop a model for estimation of the demand for residential solar energy. We then examine the empirical evidence for two industrialized countries over a period of twelve years, encompassing a significant growth era in the history of solar energy market. For estimation of the demand we utilize both a linear model and a double log specification. Although, both models produce plausible results, the results for the log-linear specification indicate a better fit for our data. The estimations results have plausible signs for Price, Income, Cost of Other Energy, and the effect of subsidy (only available for Germany) on demand for solar energy. These variables have varying degree of statistical significance, as expected. The variable Price is the only variable that is significant at 95 % confidence interval for both Germany and US and the results are robust to alternative specifications of the model.

## ***Teaching Brains***

**Roberta Sahagian** (Education, Elementary)

Faculty Mentor: Lindsey Russo (Elementary Education)

The human brain is being overlooked in education, and yet, I will argue, it is the single most important element of education. We now know so much about the brain, but we don't pass any of this information on to our youth. This is a problem. Every goal of modern education can be distilled into an effort to optimize the function and deliberate use of the brain. I suggest that studies of the brain be included in education, starting in Kindergarten with the simplest concepts which are well-documented by the global scientific community. In my presentation, I will outline some of the first lessons in my suggested new curriculum, as well as defend the importance of such a pursuit.

## ***Narrative Strategies and Fictional Minds in Young Adult Literature***

**Jordan White** (Education, Secondary /English)

Faculty Mentor: Andrew Higgins (English)

This study considers how mental functioning can complicate and affect reading comprehension in young adult literature. When we read fiction we are constantly assessing the mental functions of the characters in order to get a full understanding of the text. Writers can provide us with Direct Thoughts, Thought Reports, or Free Indirect Thoughts from characters to overtly show the readers what characters are thinking. In addition, writers show us the minds of their characters more implicitly through means such as body language. Body language is likely to be ambiguous and requires constant inference from readers. Ultimately, this project illuminates the techniques Nathaniel Hawthorne, J.K. Rowling, and Elizabeth Speare use to expose the minds of their characters. Hawthorne is much more likely to use implicit techniques, which requires readers to do more inference. Meanwhile, Rowling and Speare overtly display the minds of their characters.

## ***Design of Digital Circuits Using Binary Logic on Three Valued Algebras***

**Nicholas Falco** (Electrical and Computer Engineering)

Faculty Mentor: David Clark (Mathematics)

I created a Java based software application for constructing circuit designs from performance specifications for digital switching circuits. The program systematically designs digital circuits using binary logic gates on three valued algebras. The program's performance is realized by its ability to find such circuit designs from an incredibly vast search space in fractions of a second. It has applications in both the fields of Mathematics and Computer Engineering.

## ***Circadian Rhythm Stimulator for Human Health Restoration***

**Julio Aguirre** (Electrical and Computer Engineering)

Faculty Mentor: Baback Izadi (Electrical and Computer Engineering)

Our circadian rhythm is a biological process that is endogenous and entrainable and follows a cycle of approximate 24 hours. The endogenous circadian rhythm is affected by local external stimulus (zeitgebers). The main factor in adjusting a circadian rhythm is daylight. With the introduction of artificial lighting, standardized time zones, shiftwork, international travel over various time zones, and most recently, the use of workstations and portable devices with illuminated display monitors, the circadian rhythm of modern individuals is being altered with a variety of negative effects on mental health, such as disruption in sleep quality and quantity, seasonal affective disorder (SAD), depression, cognitive performance degradation, and lack of alertness in critical tasks, among others. This work implements an LED light therapy system, using a combination of hardware and embedded software, allowing projection of a controlled intensity and spectrum (light composition) of light with precise timing and duration. The projection profile is easily edited in order to generate treatment sessions based on the subject's conditions and locale. The results of this work can benefit the research of sleeping disorder professionals and provide individuals with an economical electronic system for self-treatment in the near future.

## ***Temperature and Energy Aware Scheduling of Heterogeneous Processors***

**Rashadul Kabir** (Electrical and Computer Engineering)

Faculty Mentor: Baback Izadi (Electrical and Computer Engineering)

With widespread growth of the internet, data centers have been trying to incorporate faster and more powerful processors to meet the high data processing requirements. Faster and more powerful processors have resulted in higher heat dissipation and energy consumption, which have had detrimental effects on operating costs. High heat dissipation, however, also affects the reliability of processing units. Previous research on scheduling algorithms of processors have either focused on minimal energy consumption or minimal heat dissipation, but never a combination of both. Hence, the focus of this research has been to schedule tasks in a heterogeneous environment with DVFS enabled processors to minimize execution time, energy consumption and heat dissipation. The proposed algorithm, Temperature and Energy aware Dynamic Level Scheduling (TEDLS), favors the cooler and more energy efficient processors by introducing a cost function that affects the scheduling decisions. TEDLS uses a heat model to estimate the final temperature of every task prior to its execution. This estimation of temperature is based on processor characteristics, which aids in choosing the cooler processors. Since the heat model uses power values to calculate final temperatures, the algorithm focuses on minimal energy consumption as long as the most energy efficient processor is also one of the cooler processors. Thus the algorithm not only makes the system more energy efficient but also more robust.

## ***A study of Didymo, an algal species, in the Catskills, NY***

**Steven DiMeglio** (Environmental Geochemical Science)

Faculty Mentor: David Richardson (Biology)

*Didymosphenia geminata*, commonly called didymo, is an algal species found at low densities in nutrient poor streams throughout the northern hemisphere. However, recently didymo has spread to rivers in the northeastern U.S. including New York, and has begun forming big blooms covering vast portions of riverbeds. Rivers within the Hudson watershed are just some of the streams with increasing didymo growth. We examined didymo mat accumulations to assess spatial and temporal changes in blooms across the Catskills region in Ulster and Sullivan Counties throughout the 2013 summer. We compared didymo blooms in three watersheds, at sites along the Esopus, Rondout, and Neversink Creek. We compared didymo blooms from a site in Esopus Creek near Mt. Tremper to data from 2010-2012 from the same location. We sampled all sites in one day and performed correlations between didymo metrics such as cell density, mat size, and chlorophyll a. The Rondout site near the reservoir had the highest blooms over the summer with constant cold-water flow supporting growth. In Esopus Creek, high discharge decreased didymo densities in both 2011 and when we measured in 2013. We found a negative correlation between biofilm ash free dry mass and the frequency of dividing cells suggesting that didymo allocates resources for either stalk growth or reproduction depending on nutrient concentrations. Our work has added to past datasets and may lead to possible suggestions for future didymo management or removal.

## ***Antibacterial Properties of Dragonfly Wings***

**Marc Belanich** (Environmental Geo-chemical Science)

Faculty Mentor: Megan Ferguson (Chemistry)

Nanoscale protrusions found on dragonfly wings have been discovered to have antibacterial properties. These structures appear to physically burst bacteria when cells come into contact with the surface. Similar surfaces can be produced out of silicon and have the potential to be applied to a wide range of applications. The use of antibacterial silicon surfaces could partially replace the use and production of toxic antibacterial chemicals. There has been very little research on the antibacterial properties of these surfaces because of the relatively recent discovery of these protrusions. Using an atomic force microscope (AFM) we were able to image these protrusions on *Libellula lydia* dragonfly wings. The main focus of our research is on the kill rate of *P. putida* and *E. coli* bacteria by the exposure to dragonfly wings. Comparisons to a control have been made using a fluorescence microscope and quantitative data has been taken through colony counting of treated bacteria. Observations and data collected thus far suggest slight antibacterial properties towards the tested bacteria even when only a small fraction of the bacteria in a sample is in contact with the dragonfly wing at a given time.

## ***The effects of migration on the educational systems of sending and receiving countries: Ecuador and US***

**Mary Kate Nagy** (Latin American and Caribbean Studies/Spanish)

Faculty Mentor: Ligia Aldana (Latin American and Caribbean Studies/Spanish)

This study traces the effects of international and national education policies in Ecuador, such as the World Bank's Education For All initiative, that have attempted to expand access to education, increase graduation rates, and improve the country's infrastructure. My aim is to examine the evolution of Ecuador's education system starting from the eighteenth century, to determine its impact on migration within Ecuador and to the United States. In my conclusion, I offer an overview of how the United States' education system has responded to the large influx of Ecuadorian/Latin American immigrant students, incorporating information gathered during my experience as an intern at a dual-language elementary school in Albany, NY. My objective is to spread awareness about the large Ecuadorian population in New York, and expose the challenges that Ecuadorian children face when trying to access fair and beneficial education.

## ***The Fight for Heritage Corn: Campesino struggle for land and food sovereignty in Neoliberal Mexico.***

**Luis Lopez** (Latin American and Caribbean Studies/Spanish)

Faculty Mentor Ligia Aldana (Latin American and Caribbean Studies/Spanish)

My research examines the effects that neoliberalism has had on land ownership and the preservation of heritage corn in Tlaxcala, Mexico, since the amendment of Article 27, and the signing of the North American Free Trade Agreement (NAFTA) in January of 1994. In this study, I explore the effects of the implementation of NAFTA upon Mexico's rural landscape, which has deteriorated due to reforms and cutbacks on social spending, in accordance with the imposed neoliberal economic model. In particular, I analyze how the deterioration of the landscape has impacted Mexicans' relationship to the land, due to economic austerity measures. As a result, people have mobilized politically to defend not only their land but also their culture, and to maintain their most important heritage crop, corn, a crop that is much more than food. Recently, Genetically Modified Organisms (GMOs) have contributed to the sterilization of these varieties of heritage corn. In my conclusion, I will discuss my own experience, while conducting research in Tlaxcala and working with grassroots organizations who are fighting to defend the 26 varieties of heritage corn that exist in the region, and their ancestral lands. Ultimately, my study intends to show how Tlaxcala's communities have articulated alternative strategies to survive in the age of neoliberalism.

## ***The June 2013 protests and Brazil's emergent middle class***

**Adam Repose** (Latin American & Caribbean Studies; Spanish)  
Faculty Mentor: Benjamin Junge (Anthropology)

This research examines the political identities of Brazil's "new middle class" (NMC) and how this group has made sense of national protests that begin in June 2013 in Rio de Janeiro and São Paulo. The NMC is made up of 40-50 million people who have risen from poverty through participation in Bolsa Familia, a conditional cash transfer (CCT) program run by the leftist federal government in power since 2002. The ongoing protests reflect an established socioeconomic and political malaise in Brazil, but also echo the frustrations of many Brazilians who never had a political voice until very recently. Drawing from recent scholarly and journalistic accounts, this research asks: (1) How has Bolsa Familia shaped the education, health, and economic circumstances of participating household? (2) What are the consumptive practices and identities of the NMC? (3) How do members of the NMC understand their rights and obligations and what are their expectations of the state? (4) How has the NMC been involved in, and responded to, the ongoing national protests? Research findings argue that the participation of the NMC in the ongoing protests reflects both their new-found political voice and their struggle to forge a new identity within the traditional social structure. The often contradictory demands of the protestors are emblematic of the clash between their expectations and reality, between their aspirations and obligations as citizens.

## ***Transfer from Second Language to Third Language: Role of Second Language in Third Language Acquisition***

**Chen Zhou** (Linguistics)  
Mentor: Oksana Laleko (Linguistics)

Third language (L3) acquisition used to be regarded as a branch of Second language (L2) acquisition, but some studies argue that third language acquisition should be treated separately, because L2 may also play an important role in L3 acquisition (Leung, 2007). For example, a native speaker of English with French L2 and German L3 may utter a sentence maintaining correct German syntax but unintentionally producing the French personal pronoun and auxiliary (Selinker & Baumgartner-Cohen, 1995). In this paper, I explore whether the transfer from L2 to L3 exists by providing original evidence from interviews with language learners. Results are suggestive of L2 influence on L3 in both vocabulary and syntax. In order to answer the question of when and how the influence of L2 on L3 happens, I interviewed two different groups of L3 learners who have the same L1 (Mandarin Chinese) and L2 (English). The participants are divided according to the kind of L3 they are learning (French or Japanese). The results show that the presence and nature of the influence that L2 has on L3 depends on the typological relationships between L1, L2 and L3. Additionally, the influence exists in both vocabulary and syntax. By addressing two main questions (whether transfer from L2 happens in L3 acquisition and in what areas of language it occurs), this paper provides empirical evidence that contributes to the study of L3 acquisition, which is a relatively new domain of language research.

## ***Exploring squares in different bases***

**Paul Lake** (Mathematics)

Faculty Mentor: David Hobby (Mathematics)

When the majority of people think of numbers they think of them in base 10 by default. However certain tasks require different bases, such as base 2 for electronics, and base 16 for computer programming. A group of numbers that many people are familiar with is squares. These are numbers that result from a number that is multiplied by itself. The purpose of this study was to determine if there were any relations between perfect squares when they were re-written in different bases. We started by writing every perfect square from 1 to 10,000 side by side from base 2 all the way up to base 100. From there we began to dissect our data for patterns. We hope to gain a new understanding of patterns of perfect squares in different bases.

## ***Latex package for Math Jeopardy***

**Devin Grady** (Mathematics) **Paul Lake** (Mathematics)

Faculty Mentor: Ekaterina Shemyakova (Mathematics)

There are many existing programs for jeopardy-styled games, but none of them were specifically designed for mathematicians. The questions and the answers are kept as pictures or as plain text, and all of them are either Power Point based or on-line sites. However, mathematicians usually type their lecture notes or articles using a special language -- LaTeX, a software that converts code into text that beautifully depicts any mathematical formula. The purpose of our project was to create a LaTeX package which would allow anyone to create a math oriented jeopardy in a minimal time. Note that since Latex is not technically a usual programming language, some difficulties arise when implementing some easy (for other programming languages) tasks.

While working on this project we had to learn how to code in latex (rather than just type some formulas or text), how to use beamer package which provides basic dynamical effects to latex, as well as such rare package as ocgx which allows one to hide and show chosen objects. We combined a package called hyperref with those and some others to create full functioning jeopardy board as seen on TV. The package has been used to run 6 Trivia Nights for our math club -- SIAM student chapter at New Paltz.

## ***Wind Power Generation***

**Andre Candido** (Mathematics)

Faculty Mentor: Diego Dominci (Mathematics)

America is home to one of the largest and fastest growing wind markets in the world. In 2012 The U.S. wind power installations were more than 90 % higher in 2011. With the growing demand of installations, the need for modelling has grown critically more apparent. Using only algebra and simple calculus I will go over the derivation of a commonly used wind power model.



## ***A Short Study of Mobius Forms***

**Emily Sobel** (Physics/Astronomy) **Ryan Kropas** (Physics/Astronomy)  
Faculty Mentor: Diego Dominici (Mathematics)

In this presentation, we present a Mobius strip and a figure eight immersion Klein bottle produced by a MakerBot Replicator 2. We studied systems of parametric equations, and in our search for interesting quadratic shapes we had gained an affinity for non-orientable surfaces. We coded for the shapes in Wolfram Mathematica 9, and then developed a methodology for adding thickness to the parametric surfaces via mapping small tubes to the coordinates of sample points so the 3D printing software would recognize the form. We then conducted a short study of the surface properties of the forms. After converting the surfaces into readable files for the 3D printing software, we learned the mechanics of printing along with the programs affiliated. This project has furthered both our understanding and the school's ability to utilize 3D printing in mathematical applications.

## ***The Effects of Ideology on the decision to privatize the water sector: Analysis of African Countries***

**Corah Walker** (Political Science)  
Faculty Mentor: Joel Lefkowitz (Political Science)

It's the year 2014, one year away from the Millennium Development Goals Deadline but we are far from reaching the goal of halving the population without access to clean water as over 1 billion people still lack access to potable water. The efforts to address the problem of access to potable water have been unsuccessful. Throughout the 1990s, privatization became to be seen as the assured method to address this problem as public provision was inefficient and had potential for corruption. This shift was largely a result of the World Bank's policy agenda via structural adjustment programs, where African countries were forced to privatize the water sector as a stipulation in receiving World Bank loans. While World Bank surely has a significant role in the process, this paper argues that ideology is a significant factor in the process, as ideology forms the foundations of political agendas and policies of a country. This study uses data from 26 African countries, with variables broken in to the categories of economic indicators, social indicators, political structure, access to water/water sector, and ideology. The findings suggest that ideology has no statistical significance in the water privatization decision, while the level of decentralization proves to hold the most statistical significance. Yet, Namibia never privatized its water sector but was influenced by the World Bank. Further, Ghana and South Africa had water sector privatization under one ruler, and not under another, thus suggesting ideology does still matter. More in depth works on this topic are needed, including looking at the influence of ideology on the water sector privatization decision at the local level, and perhaps a more appropriate, Non-Western method of coding ideology.

## ***Functional or Fictional? Political culture typologies in the American states.***

**William Raphaelson** (Political Science)

Faculty Mentor: Nancy Kassop (Political Science)

As a government by and for the people, prevailing attitudes, beliefs and sentiments regarding good governance should have an effect on real legislative outcomes in the American states. Using survey, religious, and migratory flow data, political scientist Daniel Elazar and his academic offspring have attempted to document these state “political cultures” since the 1960s. Drawing off of this body of work, I use multiple linear regression analysis and difference of means testing to track associations between political culture and state policy variance in twelve fields. I find that Elazar’s typology fails to account for a significant level of policy variance in eleven of twelve legislative policy fields when using linear regression analysis, and fails in ten of twelve fields when tested for difference in means. This suggests a need for further research regarding the methods by which political scientists measure political culture in the American states, as well as revised methods to measure the subsequent effects of political culture on legal and political outcomes.

## ***Understanding the Theoretical Foundations of Drug Policy to Shape Better Policy***

**Thomas Savidge** (Political Science and Philosophy)

Faculty Mentor: Kate McCoy (Educational Studies)

This project aims to examine how various western traditions about the self (primarily the belief that reason trumps other bodily appetites) shaped the western view that drug use is both a moral failing and irrational. In addition, this project attempts to challenge these assumptions by presenting a contrary view of the self by highlighting the limits of human reason. This challenge is informed by researching selected writings of F.A. Hayek and the influence of empiricist thinkers on his work, as well as data from neuropsychologist Dr. Carl Hart, Dr. Andrew Weil, and Dr. Norman Zinberg. This data provides new insight into the understanding of drug use through the role of set and setting, which are not accounted for under current drug policy standards. The role of an individual’s set and setting when considered along with the pharmacological effects of a drug suggest that there are limits to human reason when one makes the choice to use drugs. Current US drug policy continues to fail to stop drug use because it does not take into account set and setting and must change its orientation and perhaps its goals in order to see success. The national drug policy of Portugal is a model of drug policy that does take into account set and setting and has seen a drop in overall drug use and drug-related harm since its implementation in 2001.

## ***Training English speakers to perceive Hindi speech sounds***

**Brittany T. Williams** (Psychology) **Catherine Attanasio** (Psychology)  
Faculty Mentor: Navin Viswanathan (Psychology)

The perception of speech sounds from a second language has been shown to be strongly influenced by one's first language. For example, when presented as individual language sounds, American English speakers typically have difficulty perceiving the difference between the Hindi consonants /t/. They report hearing these non-native consonants as instances of the English /t/ (Pruitt, Jenkins, & Strange, 2006). In this study, we will investigate whether American English speakers will be able to distinguish the Hindi consonants when provided in the context of English words. Specifically, English words produced by a Hindi-English speaker will be recorded. The stimuli will be created by systematically replacing the English consonant "t" (as in Tick) and "th" (as in Thick) with two instances of the Hindi "t". We expect that the exposure to non-native speech sounds in English word contexts will allow the participants to separate the Hindi consonants into two separate categories. If the results indicate that listeners are able to do this task in a lexical context (i.e. in the context of words), this would present clear evidence that lexical information allows non-native listeners to learn to perceive the difference between challenging speech sounds in a foreign language.

## ***Exploring the Board Game Design Process***

**Caitlin Hoben** (Psychology) **Lauren Handy** (Psychology)  
Faculty Mentor: Douglas Maynard (Psychology)

For over a century, board games have been an important part of American culture. Contemporary board games vary widely in their game mechanics and narratives, and educators and businesses are increasingly interested in designing course materials, training programs, and other experiences that incorporate game play. But how are these games actually designed? Because there are no courses at SUNY New Paltz focused on game design, in the current investigation, our goal was to actively explore the game design process. We illustrate this primarily with our design process for a competitive game with a snowball fight theme, which includes brainstorming, content development, designing and building a prototype, play-testing and revising based upon play-test feedback. We will highlight obstacles and challenges we have encountered. We will also briefly discuss our experience designing a second game – this time, a cooperative turn-based strategy game – while participating in a "game jam," which is a relatively new way of stimulating creativity among game design teams . intensive design sessions over a very brief period of time (24 to 48 hours). We conclude by identifying lessons learned and demonstrating the similarities between the processes involved in game design and scientific investigation.

## ***Perception and production behaviors of Spanish-English bilinguals***

**Ana Bennett** (Psychology) **Ashley Mannine** (Psychology)  
Faculty Mentor: Anne Olmstead (Psychology)

Speech sounds such as /b/ and /p/ are differentiated by voice onset time (VOT), the time between when the lips pop open and vocal cords begin vibrating for the following vowel. VOTs for voiced consonants (/b/) are shorter than those of their unvoiced counterparts (/p/). Interestingly, VOT differs among languages. For example, an English /b/ has a similar VOT to Spanish /p/. Such overlap in how speech sounds are defined may lead to difficulties for bilingual speakers of Spanish and English. For example, the same token with a short VOT may be labeled /p/ in Spanish, but /b/ in English. Furthermore, in English, vowels following voiced consonants are longer than those following their voiceless counterparts; this is not true in Spanish. Thus, vowel length affects the categorization of these consonants by English speakers but not by Spanish speakers. In order to determine how Spanish-English bilinguals deal with this overlap in their speech sound categories, we measured their performance on three tasks – a speech sound categorization task, a speech sound discrimination task, and an imitation task. Pilot studies showed that bilinguals vary in their performance of these tasks. In part, this may be due to differing language dominance. To assess the role of language dominance we measured participant's proficiency in both of their languages on three dimensions. We expect bilingual individuals to behave similarly to monolinguals of their dominant language.

## ***Emotions From the Heart***

**Peter Marinelli** (Psychology) **Zachary Bergoine** (Psychology) **Robert Arena** (Psychology)  
Faculty Mentor: Maryalice Citera (Psychology)

The present research study was designed to test how well participants can differentiate between the four anticipatory emotions (anxiety, dread, enthusiasm, and comfort) and how they affect an individual's level of procrastination. Russel's circumplex model of emotion places all emotions including anticipatory emotions on a scale of two dimensions: pleasantness (negative or positive) and arousal (high arousal and low arousal) (Russel, 1980). Based on this research and our own prior research, we hypothesized that individuals should be able to distinguish between the four anticipatory emotions and that procrastination should correlate with dread and anxiety. The results showed that the anxiety, dread and enthusiasm variables were all significantly higher in the corresponding condition. An implication of this study is that people can distinguish between positive and negative anticipatory emotions easily. A limitation of this study was its small sample size. Future research should examine methods of lessening the adverse effects of negative anticipatory emotions.

## ***Anticipatory Emotions and Heart Rate Variability***

**Christina Covington** (Psychology) **Mailie Casey** (Psychology) **Samatha Weiss** (Psychology) **Matasci Ariel** (Psychology)  
Faculty Mentor: **Maryalice Citera** (Psychology)

When approaching a difficult task, individual motivation and emotional reactions may differ (Baumgartner, Pieters, & Bagozzi, 2008). This study focuses on predicting goal completion, procrastination and heart rate variability using personality and anticipatory emotions. We will examine four anticipatory emotions developed based on Russell's (2011) circumplex model of emotion. We believe that the dominant anticipatory emotion individuals experience will predict how well they perform on a challenging academic task. We will also incorporate the eastern science of Ayurveda to encompass a broader understanding of individuals (Shilpa & Murthy, 2011). Using the personality traits represented in the Ayurveda tridosha vriki paradigm, we hypothesize that a person's tridosha paradigm will predict their dominant anticipatory emotion and their level of heart rate variability when facing a challenging task. We also predict that the anticipatory emotions will predict procrastination and task performance. Study participants completed a personality questionnaire then were asked to come to the lab to have their emotional reactions and heart rate variability about a challenging class assignment measured. We will asked them to complete a short survey each night for 7 nights on anticipatory emotions and procrastination. They completed a final on-line survey that assessed their grade on the assignment. Data collection is ongoing and we will present preliminary results.

## ***Whine Sampling: Understanding Whining in Young Children***

**Michael Costa** (Psychology) **Amanda Lane** (Psychology) **Sarah Rodriguez** (Psychology)  
Faculty Mentor: **Alison Nash** (Psychology)

Whining has been shown to be a salient behavior in young children that causes both parents and teachers of preschool age children much annoyance and irritation. Surprisingly, little is known about why children whine. Previous studies found that whining and motherese, a form of child-directed speech, share similar acoustical properties, so that claims have been made that like motherese, whining serves both attachment and self-regulatory functions. To test these claims, we conducted naturalistic observations at a child-care center. We documented all interactions involving whining, including to whom children whined, the initiating events, recipients responses, and outcomes. We found that children whined significantly more to very familiar teachers and peers than to less familiar assistants, supporting an attachment claim. Furthermore, even when children's whines didn't get them what they wanted, interactions were likely to continue. Therefore whining may serve as a way to modulate young children's emotions and desires, allowing them to continue their interactions with attachment figures.

## ***Are All Performance Goals Created Equal? A Meta-Analysis of Effects Produced by Different Measures***

**Blair Dawson** (Psychology)

Faculty Mentor: Corwin Senko (Psychology)

The present meta-analysis of 202 studies examined whether the effects of Mastery and Performance achievement goals depend on how those goals are operationally defined. For each study, goal measures were coded for thematic content, and correlations with different antecedents and consequences of the goals were recorded. Results show that each goal has different effects based on their thematic content. This demonstrates that Achievement Goal Theory may have confounding constructs which impact the observed effects of these goals.

## ***Representation of the Struggle in Vieques through Artistic Narratives***

**Mariel Ramirez** (Sociology)

Faculty Mentor: Roberto Velez-Velez (Sociology)

We analyzed and explored the visual metaphors of the three-piece series of oil paintings, *La Causa Viequense* by Juan A. Silva, and the work of artist Rafael Trelles, titled *En Concreto*, which is comprised of a series of “urban graphics.” We argued that both art series serve as pictorial and metaphorical representations of the social movement struggle in Vieques from the perspective of the citizens. Our content analysis consisted of using key research objectives to be contrasted with the dominant themes that emerged from the data. These objectives were based on current understanding of the role of identity, narrative and memory in the Vieques Movement. We found that through the use of universal symbols and juxtapositions, the artists connected to existing and familiar definitions for the struggle but also the artists were able to form new relations and ultimately expand of the visual representations available to the community.

## ***Modes of History: The Study and Reproduction of a 19th Century Corset***

**Julia Fell** (Theatre Arts)

Faculty Mentor: Andrea Varga (Theatre Arts)

Corsetry during the 19th Century was a requisite of women's dress, making any example of a corset from that century a very intimate and important part of that woman's personal history, as well as part of the greater picture of everyday life during that time period. Although specific details about any historical garment are generally unavailable, much can be speculated and inferred from the details of a single piece.

As an intern at Historic Huguenot Street, I selected a 19th century corset from their clothing and textile collections. I studied this corset from both the historical and the technical perspective to make a reproduction of the piece. By taking detailed photographs, making technical drawings, and conducting specific historical research into the period and locale, I gained a greater understanding of the construction methods from the time period of the corset, as well as the context of the garment. Working with an actual historical piece of clothing and going through the process of patterning and constructing a reproduction is a unique and enriching interdisciplinary experience—one that brings together the fields of Dress History, Costume Design, and Costume Construction.

## ***Buried Child Scenic Design***

**Elizabeth Reid** (Theatre)

Faculty Mentor: Ken Goldstein (Theatre Arts)

My job as the scenic designer was to come up with a design for the scenery that worked with the necessities of the script. This is an important task in any production because it not only establishes a physical world for the actors to work in it also can evoke emotion for the audience. Through individual research of images as well as historical information, I was able to begin my design and bring a clear concept to our early design meetings. From this we as a team were able to collaborate our continued research to create a full sense of what the world of this play really looked and felt like. The scenery provided the centermost part of the process and allowed the designers from other elements to take from it and incorporate the concepts into their own design. Through the evolution of this process I was able to make all of the elements come together to provide a very successful design. I was able to digitally document each step and further create posters accurately representing my design process. I then attended and presented this work at USITT after which the posters will remain in the Theatre Department to represent the work done on this production.

## *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 <http://lilt.ilstu.edu/critique/default.htm>

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://www.umich.edu/~mjps/>

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.html>

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](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](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://jpi.morningside.edu/index.htm>

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.psych.ucla.edu/undergraduate/research>

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/yurp/>

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/pubs/journal/default.aspx>

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/index.aspx?id=5096>

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](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/call\\_for\\_papers.html](http://www.jurp.org/call_for_papers.html)

The Journal of Undergraduate Research in Physics (JURP) is a peer-reviewed, online journal of the Society of Physics Students (SPS) and Sigma Pi Sigma, the physics honor society

[http://www.jurp.org/about\\_jurp.html](http://www.jurp.org/about_jurp.html)

The Allegheny Review, now entering its 31<sup>st</sup> year of publication, 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://www.usca.edu/english/pubs/oswald/oswald.html>

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 2014 issue. The submission deadline is January 17, 2014. Information about *Discussions* can be found at: <http://www.case.edu/provost/source/discussions/>

## *2013 SURE Award Recipients*

**Hannah Powers**, Chemistry, '14 (Mentor: Franz Folmer-Anderson, Chemistry)

Exploring geometrical effects on the macrocyclization reactions of BINOL-containing dialdehydes

**Jonathan Valle**, Geology, '14 (Mentor: Alexander Bartholomew, Geology)

Testing for Biofacies Recurrence in the Middle Devonian of Eastern New York State

**James Baglia**, Geology/Environmental Geoscience, '14 (Mentor: Shafiul Chowdhury, Geology),

Evaluation of factors contributing to stream bank erosion in the Chichester Site 2 at Stony Clove Creek

**Alexis Tellefsen**, Ceramics, '14 (Mentor: Bryan Czibesz, Ceramics)

Applications of Generative Modeling and Ceramic Tape Casting in Adorning the Human Form

**Jordan White**, Secondary Education/English, '14 (Mentor: Andrew Higgins, English)

Narrative Strategies and the Representation of Minds in Young Adult Fiction

**Samantha Schiffman**, Psychology, '13 (Mentor: Tabitha Holmes, Psychology)

All you need is (more than) love: Work, social relationships, and well-being during emerging adulthood

**Michael Facelle**, Computer Engineering, '15 (Mentor: Rajeev Narayanan, Elect. & Comp. Engineering)

Reliability Analysis of Digital Circuits

**Adam Simone**, Computer Science, '14 (Mentor: Aaron Knochel, Art)

Interacting with the Wassaic Project: A Cross Platform, Open Source, Mobile Application

**Hannah Miller**, Biology/Spanish, '14 (Mentor: Spencer Mass, Biology)

Characterizing the xenoestrogenic effects of BPS on planarian regeneration

**Adam Rimawi**, Biology, '15 (Mentor: Pamela St. John, Chemistry)

Characterization of DNA-surfactant aggregates

**Blair Dawson**, Psychology/Disaster Studies, '14 (Mentor: Corwin Senko, Psychology)

Are all Performance Goals Created Equal?

**Joshua Angehr**, BFA Graphic Design/Art History, '14 (Mentor: Amy Papaalias, Art)

The Living Archive: Designing a Multi-Modal Gaming Environment for Place-Based Arts Learning

**Rachel Silverbloom**, Philosophy, '14 (Mentor: Dan Werner, Philosophy)

“Sisyphus Smiles”

## *2013 SURE Award Recipients continued....*

**Erich Stern**, Biology, '14 (Mentor: David Richardson, Biology)

Invasion of a minnow (Golden Shiner) in Lake Minnewaska, NY: What are they eating and how are they affecting the lake food web?

**Savannah Blum**, BFA/Sculpture, '14 (Emily Puthoff, Art/Sculpture)

At Home in Detroit: An Artist's Study of Community Downsizing

**Michael Carey**, Biochemistry, '14 (Mentor: Michael Machczynski, Chemistry)

Increasing the Reduction Potential of SLAC: Optimizing the Catalytic Properties of Lacasses

**Steven DiMeglio**, Environmental Geochemical Science, '14 (Mentor: David Richardson, Biology)

Phosphorus and nitrogen as chemical controls of the growth of the invasive river diatom, *Didymosphenia geminata* (didymo)

## *Fall 2013 AYURE Award Recipients*

**Kelly Gluchowski**, EGS, '14 (Mentors: Megan Ferguson, Chemistry and Hon Ho, Biology)  
Uptake of Cd, Zn and Co by *Hypsizygus Ulmarius*

**Kimberly Lane**, Biology, '15 (Mentor: Richard Halpern, Physics)  
Developing an Electroplating Protocol for Vibrating Probe Systems

**Hannah Miller**, Biology/Spanish, '14 (Mentor: Spencer Mass, Biology)  
Further Isolation and Characterization of Estrogen Receptor LBD Sequences in Planaria

**Katherine Betuel**, Cellular/Molecular Biology/Chemistry, '14 (Mentors: Maureen Morrow, Biology and Hon Ho, Biology)  
Analysis of *Isaria fumosorosea* for Antifungal Activity

**Ryan Murray**, Printmaking/Psychology, '14 (Mentor: Jill Parisi-Phillips, Art/Printmaking)  
Handmade Natural Dyes for Works on Paper

**Morgan Campbell**, Biology, '14 (Mentor: Jason Valens, Biology)  
Investigation of Biological Diversity across Domains in a Coral Reef Biofilm

**Emily Rouse**, Biochemistry, '14 (Mentor: Jennifer Waldo, Biology)  
Thermal Stability of the Dad2 Subunit of the Dam1 Complex

## *Spring 2014 AYURE Award Recipients*

**Elizabeth Reid**, Theatre Arts and Technology/Scenic Design, '14  
(Mentor: Ken Goldstein, Theatre Arts)  
Scenic Design and Research for Sam Shepard's *Buried Child*

**Micheal Khoury**, Biology/Computer Science, '15  
(Mentor: Aaron Haselton, Biology)  
Crop Involvement in Carbohydrate Homeostasis in the House Fly

**Izabela Mlynarska**, Biology/Evolutionary Studies, '15  
(Mentor: Spencer Mass, Biology)  
Using TSA to label B-Catenin in regenerating planaria exposed to BPA

**Thomas Savidge**, Political Science-Theory/Philosophy, '15  
(Mentor: Kate McCoy, Educational Studies)  
Drug Use, Drug Policy, the Self, and the Limits of Reason

**Ari Kaputkin**, Geography/Asian Studies, '14  
(Mentor: Lawrence McGlenn, Geography)  
Pathways through time: Effectiveness of Mapping Human Movement in 3D

**Julia Fell**, Theatre Arts/History, '14  
(Mentor: Andrea Varga, Theatre)  
Modes of History: Study & Reproduction of a 19<sup>th</sup> Century Corset from Historic Huguenot St.

## *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

**Samantha Schiffman '13 (Psychology/SURE)** Presenter at the 6th Conference on Emerging Adulthood in Chicago, IL

**Rachel Silverbloom '14 (Philosophy/SURE)** Presented at the Albert Camus & Philosophy of Communication: Making Sense in an Age of Absurdity conference in Erie, PA

**Jonathan Valle '14 (Geology/SURE)** Presented at the GSA (Geological Society of America) Annual Conference in Denver, CO

**Juliana Hedeman '14 (Anthropology/AYURE)** Presenter at the American Anthropological Association in Chicago, IL

**Kathleen Westervelt '15 (Chemistry/Environmental Studies/AYURE)** Presenter at the Biophysical Society 58th Annual Meeting in San Francisco, CA

**Adam Rimawi '15 (Cell/Molecular Biology/SURE)** Presented at the Biophysical Society 58th Annual Meeting in San Francisco, CA

**James Baglia '14 (Geology/SURE)** Presenter at the GSA Northeastern Section 49<sup>th</sup> Annual Conference in Lancaster, PA

**Elizabeth Reid '14 (Theatre Arts/AYURE)** Presented at the USITT and Stage Expo in Fortworth, TX

## *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

**Max Benezra '15 (Psychology/Sociology/Disaster Studies)** Presenter at the American Psychological Association Annual Convention in Honolulu, HI

**Ryan Taylor '13 (Chemistry)** Presented at the ACS Northeastern Regional Meeting in New Haven, CT

**Brian George '15 (Psychology)** Presenter at the Psychonomic Society Annual Meeting in Toronto, Canada

**Martina Rodriguez '14 (Theatre Arts)** Presented at the USITT and Stage Expo, Fortworth, TX

**Sara Gilley '14 (Sociology)** Presented at the Eastern Sociological Society Annual 2014 Conference



Students accepted at the National Conference on Undergraduate Research (NCUR 2014) at the University of Kentucky.

(from left to right)

**Katherine Betuel** (Cellular/Molecular Biology/Chemistry); **Emma Lagle** (History/Sociology); **Rui Wang** (Economics); **Chen Zhou** (Linguistics)



## *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.

**Passion Fruit** by Dino Davaros, Jenna Ely, and Brendan O'Keefe

**First Name: Jogger, Last Name: John** by Kaleigh Griffin, Claudia Gallo, Keri Sheheen, and Lindsay Nimphius

**Greatness** Mark Dellas, Jake Coulter, and Megan Eisenberg

**At Home in Detroit** Savannah Blum

***Notes:***