The Schupf Scholars Program

Each year the Schupf Scholars Program funds students to participate in the Faculty Student Summer Research Program and to continue that research with their faculty mentor in the ensuing academic year. The Schupf Scholars Program focuses on science, technology, and mathematics, and pays special attention to interdisciplinary projects and to female students in fields where women are underrepresented. Each year these scholarships will provide students and a faculty partner with up to $10,000 for research beginning the summer after their freshman or sophomore year and continuing through the following academic year. Schupf Scholars will be able to use additional funding for travel to meetings and conferences as well as for research supplies and expenses during their continuing research with faculty during their academic career at Skidmore.

Trustee Sara Lee Schupf '62 established the $1.1 million scholarship fund for student research in an endeavor to inspire, cultivate, and support students' interest in science, because she sees it as an excellent avenue for exercising critical thought and shaping the progress of an idea from theory to practice. She says: this is what a Skidmore education is all about—getting involved in the process of discovery, which includes the satisfaction of success, failure, and mentorship. More broadly the Schupf Scholars Program seeks to help light an accessible pathway to science research and science career preparation. With such an early start on intensive research and continued work into their junior or senior year, Schupf Scholars will be well equipped to move on to graduate or professional school in the sciences.

2016-2017
Claudia Bennett-Caso '19
Alexandra Cassell '19
Erin Mah '19
Erin Maloney '18
Emily O'Connor '19
Kari Rasmussen '18

2015-2016
Kelly Cantwell, '18
Jillian Greenspan, '17
Katherine Shi, '18
Deborah Kim, '18
Talia Stortini, '18
Hannah Schapiro, '17
Meggie Danielson, '17

2014-2015
Jaya Borgatta, '16
Meti Debela, '16
Glenna Joyce, '16
Jenny Zhang, '16
Stephanie Zhen, '16

2013-2014
Melanie Feen '16
Michele Fu '15
Kelly Isham '16
Angelica Newell '15
Rafaella Pontes '15

2012-2013
Jennifer Harfmann '14
Rafaella Pontes '15
Kara Rode '15
Carol Wu '14

2011-2012
Tim Brodsky '13
Andrea Conine '13
Brenda Olivo '14
Kathryn Stein '13

2010-2011
Rebecca Connelly '12
Ava Hamilton '12
Caroline Loehr '12
Taylor Moot '13

2009-2010
Korena Burgio '11
Evan Caster '11
Megan Gaugler '12
James Turner '11

2008-2009
Catherine Baranowski '11
Maria DiSanto-Rose '11
Michael Letko '11
Paul Russell '11

Faculty Student Summer Research Program

Schedule of Final Research Presentations

Thursday, August 4, 2016

9:00 am – 9:25 am Coffee and Muffins

9:30 am – 10:30 am Oral Presentations

ROOM A

"I VOTED" STICKERS
Henry Jaffe, 2018; Chloe Singer, 2018
Christopher Mann, Assistant Professor, Department of Political Science

RESTORATIVE JUSTICE IN UNIVERSITIES: WHAT WORKS
Megan Schachter, 2017
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David Kar25AF.9(g:)1u0.004(I)-3(VE)-5(MUMa)Tj ET 66.1d ( )ca D-1(orTJ 0 , 0 sA)4(s)-15so61 0 Ter

SOCIAL WASPS AS BIOCONTROL AGENTS
Bruce Martin, 2018
Monica Raveret Richter, Associate Professor, Department of Biology

ROOM C

RESPONSE OF ***PENIUM MARGARITACEUM*** TO ENVIRONMENTAL STRESSORS THROUGH THE LENS OF REACTIVE OXYGEN SPECIES
Eleanore Ritter, 2018
David Domozych, Professor, Department of Biology

EXPLORING THE ENDOMEMBRANE SYSTEM OF ***P. MARGARITACEUM*** , A MODEL ORGANISM FOR PLANT CELL STUDIES
Kalika Likhi, 2018
David Domozych, Professor, Department of Biology

THE EFFECTS OF STRESSORS ON THE CELLULOSE NETWORK OF ***PENIUM MARGARITACEUM***
Kurt Hanebrink, 2017
David Domozych, Professor, Department of Biology

DISSECTING THE ROLES OF ENDOMEMBRANE ORGANELLES IN ***PENIUM MARGARITACEUM***
Alan Xiao, 2018
David S. Domozych, Professor, Department of Biology

10:40 am e

EXPANDING THE GENETIC CODE WITH PYROGLUTAMATE
Meggie Danielson, 2017; Hannah Schapiro, 2017
Kelly Sheppard, Associate Professor, Department of Chemistry

DEVELOPMENT OF A MICROFLUIDIC ASSAY FOR ANALYSIS OF IODIDE IN WATER SYSTEMS
Laura Swenson, 2019
Kimberley A. Frederick, Professor, Department of Chemistry

SEPARATION OF CHIRAL COMP OUNDS WITH CAPILLARY ELECTROPHORESIS USING CYCLODEXTRINS AS BUFFER ADDITIVES
Emily O'Connor, 2019
Kimberley A. Frederick, Professor, Department of Chemistry

#MORETHANMYDISORDER: A CONTACT AND EDUCATION VIDEO CAMPAIGN TARGETING KNOWLEDGE AND STIGMA ATTITUDES FOR SOCIAL ANXIETY DISORDER
Gabriella Ponzini, 2018
Casey Schofield, Assistant Professor, Department of Psychology

ABSORPTION AND EMISSION PROPERTIES OF INDOLE: WHAT'S THE RIGHT FUNCTIONAL TO USE?
Justin Gerard, 2017
William W. Kennerly, Teaching Professor, Department of Chemistry

EFFECTS OF SUPPLEMENTARY INFORMATION ON SOLUTION METHODS TO KINEMATICS PROBLEMS
Erin Maloney, 2018
Evan Halstead, Teaching Professor, Department of Physics

TUNNELING NANOTUBES AS A MECHANISM FOR THE CELL- TO-CELL SEEDING OF ATXN1 AGGREGATES IN SPINOCEREBELLAR ATAXIA TYPE 1
Eliza Burr '17
Sarita Lagalwar, Assistant Professor, Neuroscience Program

DOES A GENE CLUSTER CONFERRING COPPER RESISTANCE AID BACTERIAL SURVIVAL OF PHAGOCYTOSIS?
Cheyanne Slocum, 2017
Sylvia Franke McDevitt, Associate Professor, Department of Biology

DEVELOPING A METHOD TO STUDY SOCIOSEXUAL MOTIVATION IN RATS
Morgan Lavoie, 2017
Hassan Lopez, Associate Professor, Department of Psychology

ELUCIDATING THE MECHANI SM BEHIND POST-COPULATORY SLEEP REDUCTION IN FEMALE DROSOPHILA MELANOGASTER
Brianne Luz Cook, 2018
Christopher G. Vecsey, Assistant Professor, Neuroscience Program

SINGLE VS MIXED APPROACHES TO FORM GREEN NANOPARTICLE FILMS
Hannah Skipper, 2017
Maryuri Ro

HETEROGENEOUS PHOTOCHEMISTRY IN THE MARINE BOUNDARY LAYER
Erin J. Mah, 2019
Juan G. Navea, Assistant Professor, Department of Chemistry

SYNTHETIC STUDIES ON TANDEM INTRAMOLECULAR DIELS -ALDER AND [3+4] ALLYLCATION CYCLIZATIONS
Matthew Lueckheide, 2017
Raymond J. Giguere, Professor, Department of Chemistry

RESTORATION OF CEREBELLAR PURKINJE CELLS THROUGH SUCCINIC ACID TREATMENT
Donna Nguyen, 2018
Sarita Lagalwar, Assistant Professor, Neuroscience Program

COPPER/SILVER RESISTANCE OF ***Enterobacter cloacae*** ATCC13047
Makhzuna Khudoynazarova, 2017
Sylvia McDevitt, Associate Professor, Department of Biology

ELLIPTIC CURVES OVER FINITE EXTENSION FIELDS 7 ABC]ISaDe4(E)j / r ciate PreI6L/P <</MCI

Project:

EFFECTS OF A COMBINED PROTEIN AND ANTIOXIDANT SUPPLEMENT ON MUSCLE RECOVERY IN COLLEGE -AGED MALES

Sam Bloom, 2017; Noelle Morrow, 2019; Alexs Matias, 2018
Paul J. Arciero, Professor, Department of Health and Exercise Sciences
Stephen J. Ives, Assistant Professor, Department of Health and Exercise Sciences

The purpose of this study was to determine the effects of combined protein and antioxidant (PRO+AO) on muscle soreness (MS) and function (MF). College-aged males were assigned to either: carbohydrates (CHO), protein (PRO), or PRO+AO. After baseline measures of peak isometric torque (PIT), peak isokinetic torque (PIKT), and MS, subjects performed 100 maximal eccentric contractions (ECC) of the quadriceps muscles. MF and MS were then measured at 1, 2, 6, and 24h post-ECC. Participants consumed their supplement immediately, 6, and 22h post-ECC.

agonist, and visualized developmental changes in commissural primary ascending (CoPA) and motor neurons through immunofluorescence. Neither CoPA nor motor neurons were substantially affected by AM251 exposure. These findings suggest that CB1 function understood in cell culture may not hold true *in vivo*.

Project:

Project:

EXPLORING THE ENDOMEMBRANE SYSTEM OF ***P. MARGARITACEUM***, A MODEL ORGANISM FOR PLANT CELL STUDIES

Kalika Likhi, 2018
David Domozych, Professor, Department of Biology

The endomembrane system of plant cells is a complex network of interacting organelles that function both in secretion of critical biochemicals to the outside and internalization/recycling of cell membrane. Only recently have specific components of the endomembrane system been identified and their functional roles revealed. In this study, an analysis of endomembrane components was performed in the unicellular alga, *Penium margaritaceum*, using endomembrane specific dyes, inhibitors and confocal laser microscopy. The dyes chosen include FM 4-64, a atuTJ 0 ( )Tj32-10(y)20(-0 Td [v)6(lin)

of chemical genomics, endomembrane-specific dyes, and confocal laser microscopy. Four specific inhibitors, brefeldin A, cytochalasin E, flufenacet, and monensin were chosen to interrogate the structure of the endomembrane system. Aberrations were noted in the endomembrane organelles for cells incubated with these inhibitors; however, only cytochalasin E and flufenacet showed disruptions in cell wall deposition. The results of this study highlight the complexity of the endomembrane system of *Pin* and its putative role in wall development.

Project:

EPARATION OF CHIRAL COMPUNDS WITH CAPILLARY ELECTROPHORESIS USING CYCLODEXTRINS AS BUFFER ADDITIVES

Emily O'Connor, 2019
Kimberley A. Frederick, Professor, Department of Chemistry

The function of biologically relevant compounds depends on their shape; it is common that one form delivers the intended therapeutic effect, while the other may have harmful effects. This makes it extremely important to know if you have the pure form or a racemic mixture for quality control purposes. Because the different forms are chemically identical except for shape, it is challenging to separate and identify them. The goal of this project is to develop a protocol for the separation of chiral compounds using Cyclodextrins as a buffer additive in capillary electrophoresis. We have focused on optimizing conditions for separations of the amino acid phenylalanine and the pharmaceutical naproxen by using novel derivatized alpha, beta, and gamma cyclodextrins as buffer additives.

Project:

DEVELOPMENT OF A MICROFLUIDIC ASSAY FOR ANALYSIS OF IODIDE IN WATER SYSTEMS

Laura Swenson, 2019
Kimberley A. Frederick, Professor, Department of Chemistry

Hydraulic fracturing (hydrofracking) is a technique used to extract oil and natural gas. Hydrofracking wells produce several million liters of flowback water containing ions (bromide, chloride and iodide), organic matter and radioactive materials. The water produced by these wells can contaminate nearby waters and contains 50,000-150,000 ppm dissolved solids which is more than 100 times the U.S.'s drinking water standard. The goal of this project is to develop a simple and inexpensive device that can detect the presence of iodide in water systems. Microfluidic paper chips offer many advantages: easy of transportation, low cost, and rapid detection. We have developed a paper chip that measures the colorimetric reaction between methylene blue and iodine, and is able to quantify concentrations up to 120 ppm. This color change is measured by absorption as well as an iPhone.

Project:

VAN DER WAALS EQUATION OF STATE AS A MODEL OF INFLATION

Akaylia Morgan, 2018; Dante Tobar, 2018
Evan Halstead, Teaching Professor, Department of Physics

The most popular theory for the creation of our universe, the Big Bang, has become a household term in the 21st century. With it came the prediction that the universe would have background radiation from all directions hailing from its dense past. When this phenomena was finally observed it had certain peculiar characteristics; it was both isotropic and homogenous. To explain this, a period of rapid expansion was postulated, known as inflation. Our research seeks to explain these observations using a model of inflation. To evaluate our model we treated the universe as a fluid and modified its properties. We compared the results from our computational models to observations of the cosmic microwave background which allowed us to constrain the parameters of the model.

Project:

apparatus for 10 minutes. Subjects were tested under two hormonal conditions: nonestrous and estrous. We predicted that subjects would spend more time in the male chamber when in estrus.

conditions. The percent incorporation was measured using a proton NMR spectroscopy. Over five aldehydes were studied, and percent incorporation was determined to be 23-90%.

Project:

“I VOTED” STICKERS

Henry Jaffe, 2018; Chloe Singer, 2018
Christopher Mann, Assistant Professor, Department of Political Science

"I Voted” stickers are a quintessential part of American voting culture. But do they have an impact on our elections? We investigated the provision of “I Voted” stickers across counties and their subsequent effect on voter turnout. Our research began with a survey of election administrators about their counties’ use of stickers. We compared this data with demographic information to attempt to model “I Voted” sticker distribution. Using the same information, we assessed the relationship between sticker distribution and voter turnout. In addition, we took a closer look at

handle copper stress. After successful amplification we are currently working to insert the genes into plasmid pACYC177.

Project:

DOES A GENE CLUSTER CONFERRING COPPER RESISTANCE AID BACTERIAL SURVIVAL OF PHAGOCYTOSIS?

Cheyanne Slocum, 2017
Sylvia Franke McDevitt, Associate Professor, Department of Biology

A twenty-gene cluster encoding resistance mechanisms against heavy metals, including copper, has been identified within the genomes of several bacteria in the Enterobacteriacae family. This gene cluster has also been found on extrachromosomal plasmids and can be transferred from one bacterium to another via the process of conjugation. Since one of the ways macrophages kill phagocytized bacteria is by pumping copper into them, this gene cluster may enhance bacterial survival of phagocytosis. After verifying the existence of this gene cluster in *Cbtel* ATCC 43864, this gene cluster was transferred to *Eb b*GR161 via conjugation. Transconjugants were then subjected to *in vo* experiments testing for enhanced growth in the presence of copper followed by *in vo* experiments to test for increased survival of phagocytic attack by macrophages.

Project:

OXIDATION OF CHEMISORBED HYDROCARBONS BY NON-THERMAL PLASMAS

Claudia Bennett-Caso, 2019
Juan G. Navea, Assistant Professor, Department of Chemistry

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We are working to test the hypothesis that the atomic hydrogen (HI) content of early-type galaxies depends on local environment, suggesting recent infall from the "cosmic web." To this end we are creating a catalog of 41,527 galaxies including HI data along with position, photometric data, Galaxy Zoo classification, and Yang galaxy group classification. Our HI measurements come from WKH . UHOHDVH RI WKH $UHFLER /HJDF\ )DVW $/)$ VXUYH\ from the Sloan Digital Sky Surve\ '5 DQG '5 IRU JDOD[LHV ZLWKLQ WKH survey is complete. Along with the photometric data we include the galactic extinction in the direction of each galaxy using the Infrared Science Archive.

Project:

ASSESSING WITHDRAWAL FROM M ETHAMPHETAMINE IN ***DROSOPHILA MELANOGASTER*** THROUGH CHANGES IN CIRCADIAN ACTIVITY RHYTHMS

Alexandra Fall, 2018

Dr. Bernard Possidente, Professor, Department of Biology

Drug abuse contributes to over 500,000 American deaths every year. Methamphetamine, an abused illicit drug, is a psychoactive stimulant that is known to affect circadian activity rhythms. Circadian rhythms are driven by an endogenous clock in the brain and oscillate on a 24 hour cycle, which can become entrained to light. Using *Dp* *hgs* fruit flies, we looked for changes in circadian activity rhythms as evidence for methamphetamine withdrawal. Flies were given methamphetamine for four days and placed in activity monitors on a 12:12 light-dark cycle then taken off methamphetamine for the final four days. Data will be presented on whether the flies showed withdrawal symptoms, as well as the plausibility of using *Dp* as a model to study methamphetamine addiction.

Project:

DEVELOPMENTAL ETHANOL EXP.1(T14(-1(m)-6(et)-6(h)-4(848 0.481 re f 72.RL ET .481P(c

Project:

SOCIAL WASPS AS BIOCONTROL AGENTS

tRNA. Enhanced yellow fluorescent protein was used as a reporter system to determine levels of read-through, and therefore incorporation, of pyroglutamate at the amber stop codon position. Success of this system will be further determined by mass spectrometry to confirm site-specific incorporation of pyroglutamate.

Project:

CHARACTERIZATION OF DUAL PATHWAYS OF ASPARAGINYL -TRNA FORMATION IN ***B. SUBTILIS*** AND ***B. ANTHRACIS***

Karli Rasmussen, 2018
Kelly Sheppard, Associate Professor, Department of Chemistry

Protein synthesis begins by attaching an amino acid to its cognate transfer RNA (tRNA). Some bacteria have two ways to attach asparagine (Asn) to $tRNA^{Asn}$. In the direct route, asparaginyl-

in the other Asn is synthesized on the tRNA using a transamidosome complex composed of a non-discriminating aspartyl-tRNA synthease (ND-AspRS) and GatCAB. *Bacillus* uses both routes for Asn-tRNA formation. It is unknown why *B. subtilis* encodes for these dual pathways. We are purifying the components of the transamidosome in order to characterize the indirect pathway under various conditions. The work will provide insight into why *B. subtilis* has retained the indirect route for Asn-tRNA synthesis and adapted to survive in different environmental niches.

Project:

THE ROLE OF THE *BACILLUS SUBTILIS* ASPARGINYL-TRNA SYNTHETASE

Emily Williams, 2018; Veronica Mierzejewski, 2019
Kelly Sheppard, Associate Professor, Department of Chemistry

Two distinct routes for attaching asparagine (Asn) to its cognate transfer RNA ($tRNA^{Asn}$), an essential step in protein synthesis, are known. In one path Asn is directly attached to $tRNA^{Asn}$ by the enzyme AsnRS and in the other Asn is synthesized on the tRNA using a non-discriminating AspRS and GatCAB. *Bacillus* uses both routes for Asn-tRNA formation. It is unknown why *B. subtilis* encodes for these dual pathways. To better understand why *B. subtilis* uses the direct route, we are knocking out *asnS*, the gene for AsnRS to remove the pathway. In addition, we are purifying AsnRS to test its activities under different chemical conditions. This work will provide insight into how *B. subtilis* has adapted to survive in different environmental niches.

Project:

ENVIRONMENTAL AND PLANT COMMUNITY CONTROLS ON ECOSYSTEM PROCESSES IN THE ADIRONDACK MOUNTAINS OF NEW YORK STATE

Jennifer Cristiano, 2018; Daniel Casarella, 2018
Kurt Smemo, Assistant Professor, Environmental Studies and Sciences Program

Forest trees possess specific traits that regulate many fundamental ecosystem processes, including decomposition and soil fertility. Thus, understanding the relative influence of these traits can provide the means to predict the consequences of environmental change and altered biodiversity. The Adirondack Park provides a novel system for studying such relationships due to a relatively small number of overstory tree species, distinct climatic gradients, and uniform underlying geology. Utilizing a Geographic Information System, we selected study sites based on state land classification, tree species, and environmental conditions and then established 24 plots to quantify tree species patterns expected to control nutrient and carbon cycling. Thus far, we conclude that specific species distribution patterns are apparent across short distances and result in correlating patterns of carbon and nutrient cycling.

Project:

EVIDENCE OF PROMISCUOUS TELEOLOGICAL THOUGHT: CHILDREN MAKE FUNCTIONAL JUSTIFICATIONS WHEN CLASSIFYING ANIMATE AND INANIMATE OBJECTS

Julia M. Iannucci, 2017
Jessica Sullivan, Assistant Professor, Department of Psychology

Teleological thought involves reasoning about the purpose or goal of something's existence. What role does teleological thought play in children's reasoning about and classification of objects? Previous research has shown that children (unlike adults) prioritize information about function/purpose, suggesting a reliance on functional information (e.g., what's a chair *for*?) during classification (Keil, 1992; Keleman,1999). However, research has also shown that children rely heavily on appearance-based information (e.g., what a chair looks like?) when classifying objects (Keil, 1992). In the present study, we tested 41 preschool children and 10 adults to understand whether function or appearance guides classification. Participants learned labels (e.g., *tom*) for novel objects, and then for each label decided whether (a) a function-matching but appearance-mismatching; or (b) an appearance-matching but function-mismatching item was a *tom*. Participan