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13th ANNUAL ***academic excellence*** *SERIES*

honors program
SENIOR PRESENTATIONS

APRIL 24, 2018

6 P.M.

SUITES ON MAIN NORTH THEATER

150TH ANNIVERSARY
CLARION UNIVERSITY

OPENING CEREMONY *program*

Tuesday, April 24, 2018
Suites on Main North Theater
6 p.m.

Welcome and Introductions ..... Dr. Rod Raehsler
Honors Program Director

Remarks ..... Peter Baschnagel
Honors Graduate

Presentation of Seniors and Faculty Advisors ..... Dr. Todd Pfannestiel
Interim Provost and Vice President for Academic Affairs

Presentation of Honors Stoles ..... Dr. Rod Raehsler
Honors Program Director

Prof. Joseph Croskey
Honors Program Assistant Director

Closing ..... Katie Gannon
Honors Program Student Director

SENIOR PRESENTATIONS SPRING 2018

6:40 P.M.–8 P.M.

Session I: 106 Still Hall

Faculty Moderator	Dr. Mary Pat McCarthy
Alumni Moderator	Kelly Dungan
Rehearsal Moderator	Dr. Rod Raehsler
Student Moderator	Brittany Fitzgerald

QUALITY OF LIFE AS A FUNCTION OF ALARYNGEAL MEANS OF COMMUNICATION: A META-ANALYSIS OF VHI RESULTS
Hope Zimmerman

UNDERSTANDING THE CHOICE: WHY STUDENTS PURSUE AN UNDERGRADUATE DEGREE IN SPEECH-PATHOLOGY AND AUDIOLOGY
Corinne Hoopes

BODY IMAGE RELATED ISSUES AND EATING DISORDER RISK MANAGEMENT NEED IDENTIFICATION ON CLARION UNIVERSITY CAMPUS
Kate Hammond

Session 2: 205 Still Hall

Faculty Moderator	Dr. Anthony Vega
Alumni Moderator	Erich Spessard
Rehearsal Moderator	Dr. Craig Scott
Student Moderator	Jessica Denzer

TIME-COURSE CHANGES OF WHITE BLOOD CELL DISTRIBUTION FOLLOWING STRESS IN A SEMI-TERRESTRIAL SALAMANDER (*DESMOGNATHUS OCHROPHAEUS*)
Jessica Fesenmyer

EXTRACELLULAR MATRIX COMPONENTS FIBRONECTIN AND COLLAGEN II MODULATE HEMATOPOIETIC STEM CELL COLONY FORMATION IN VITRO
Alex Francette

LINKING ERAD AND THE UPR: DEVELOPING A GENETIC SCREEN VIA THE EXPRESSION OF ANTITRYPSIN
Kinsey Laninga

IS ANNEXIN I PROTEIN REQUIRED TO TRIGGER PHAGOCYTOSIS OR DOES IT SERVE TO INCREASE PHAGOCYTIC ACTIVITY?
Marissa Paredes

SENIOR PRESENTATIONS SPRING 2018

6:40 P.M.–8 P.M.

Session 3: 203 Still Hall

Faculty Moderator	Dr. Ellen Foster
Alumni Moderator	Marissa Dechant
Rehearsal Moderator	Dr. Jesse Haight
Student Moderator	Katlyn Corbett

WEAVING NARRATIVES THROUGH IMAGES:
PROMOTING MULTIPLE LITERACIES THROUGH GRAPHIC NOVELS
Tyler Hilbert

BUILDING BRIDGES IN THE ENGLISH CLASSROOM
Lauryn Tyler

THE DISNEY AGENDA:
WHAT'S HAPPENING TO THE VILLAINS?
Samantha Beal

PETER PAN AND CAPTAIN HOOK:
TODAY'S VILLAINS OR HEROES?
Regan Gaydash

Session 4: 107 Still Hall

Faculty Moderator	Dr. Paul Woodburne
Alumni Moderator	Joslyn Dechant
Rehearsal Moderator	Prof. Joseph Croskey
Student Moderator	Rebecca Mullen

NONVERBAL COMMUNICATION PATTERNS WITHIN INTIMATE RELATIONSHIPS
Hunter Nicholson

USING THE ANDROID PLATFORM FEATURES
TO ASSIST IN COLLEGE STUDENT STUDYING HABITS
Sarah Hrubetz

WHAT DOES IT MEAN TO HAVE UNDERFUNDED STATE PENSION PLANS?
Marissa Sheffer

CONSUMER BEHAVIOR OF COLLEGE STUDENTS WHEN CONSUMING MUSIC
Andrew Skubisz

SENIOR PRESENTATIONS SPRING 2018

6:40 P.M.–8 P.M.

Session 5: 201 Still Hall

Faculty Moderator	Dr. Suzanne Boyden
Alumni Moderator	Miranda Spessard
Rehearsal Moderator	Dr. Kurt Regester
Student Moderator	Krista Mosi

SKELETOCHRONOLOGY OF THE EASTERN HELLBENDER: AGE STRUCTURE AND MANAGEMENT IMPLICATIONS FOR PENNSYLVANIA'S STATE AMPHIBIAN

Taylor Braunagel

ANIMAL PARTNERSHIPS: HOW HAVE HUMAN/ANIMAL INTERACTIONS IMPACTED HUMAN SOCIAL DEVELOPMENT THROUGHOUT TIME?

Sarah Garrett

TOXIC CONCENTRATIONS OF COPPER SULFATE FOR GASTROPODS

Tyler Miller

Session 6: 104 Still Hall

Faculty Moderator	Dr. Dan Clark
Alumni Moderator	Dani Emings
Rehearsal Moderator	Dr. Sharon Montgomery
Student Moderator	Keith Maitland

PIECING TOGETHER THE CPI-2 ENCODED TYPE-III SECRETION SYSTEM FROM CHROMOBACTERIUM VIOLACEUM

Brandon Nielsen

PREVALENCE OF POTENTIALLY PATHOGENIC SPECIES OF STAPHYLOCOCCUS IN COMPANION ANIMALS

Brooke Homan

CREATION OF A POINT-OF-CARE PCR DEVICE AMENABLE TO HEALTH CARE SETTINGS IN THE DEVELOPING WORLD

Rebecca Dudek

QUANTUM INFORMATION: THEORY AND APPLICATIONS

Jacob Beckey

SAMANTHA BEAL

The Disney Agenda: What's Happening to the Villains?

Over the last few years, Disney Studios has produced live-action remakes of several previously animated princess films: *Snow White and the Seven Dwarfs*, *Cinderella, Sleeping Beauty* and *Beauty and the Beast*. In doing this, they've also produced a new type of villain: one who has (somewhat) good reasons for being villainous, expresses compassion and appreciation for the finer things in life, and inspires admiration—if not loyalty—from audiences. Why has the Disney villain changed? And what does this say about today's storytelling...and society itself?

Dr. Kathleen Welsh, Faculty Advisor

Samantha Beal, from Knox , Pa., is an English major with a minor in journalism. She will receive a Bachelor of Arts in English. Samantha has presented original work at a half-dozen conferences, has had creative pieces accepted by three publications and worked four years as a journalist for local media. Currently, she is expanding her freelancing brand by completing assorted writing projects for local entities. Samantha serves as chapter president for Sigma Tau Delta, president of English Club, and is one of three senior editors for the campus' literary arts journal, Tobeco. She has finally completed her novel manuscript! Upon graduation, Samantha plans to edit and publish her novel. She is determined to see her name on the cover of a book (preferably her own).

JACOB BECKEY

Quantum Information: Theory and Applications

Quantum information is a burgeoning field of physics in which the principles of quantum mechanics are utilized to create new techniques for processing, storing and transmitting information.

Starting with some basic principles of quantum mechanics, important results are derived and connections are made to the fields of quantum optics and quantum cryptography.

The aim of this project is to illuminate the connections between quantum theory and exciting, new applications in the field broadly referred to as quantum information.

Dr. Sharon Montgomery, Faculty Advisor

Jacob Beckey, from New Sewickley, Pa., is a double major in physics and mathematics. He will receive a Bachelor of Science in Mathematics and a Bachelor of Science in Physics. Jacob has been awarded the Karl Sendler Freshman Physics Award, the Board of Governors STEM Scholarship, the Helen and Lawrence Smith STEM Scholarship, the William and Elizabeth Hart STEM Scholarship, the Clarion International Scholar Award and the France-Allison Honors Scholarship. Upon graduation, Jacob will pursue a master's degree in quantum physics in the United Kingdom as a Fulbright Scholar. Following that, he will seek a Physics Ph.D. at the University of Colorado, Boulder.

TAYLOR BRAUNAGEL

Skeletochronology of the Eastern Hellbender: Age Structure and Management Implications for Pennsylvania's State Amphibian

Population demographics are a foundation of conservation, and understanding these dynamics yields information of a population's response to social, economic and environmental changes. Attempts to slow amphibian declines have increased around the world but a lack of detailed demographic information on many populations has hindered long-term management plans for many species.

Age classes and growth rates have been used to study the biology of amphibians through skeletochronology. Skeleto-chronological assessment involves the analysis of annual growth rings in bones, or lines of arrested growth (LAG). In this study, we quantified LAGs in phalanges from 45 Eastern Hellbenders (*Cryptobranchus alleganiensis*) representing four populations in western Pennsylvania.

Because existing age classes for hellbenders are based on total length, and body size is not a reliable indicator of age or sexual maturity, most populations typically appear skewed toward adult age classes. However, because habitats vary in resource availability and competition, length is not an accurate indicator of age. Our baseline data reveals a more varied age structure in hellbender populations than previously known. Skeleto-chronology, as a complementary technique to field-based estimates of demography, is a valuable technique in amphibian management and conservation.

Dr. Kurt J. Regester, Faculty Advisor

Taylor Braunagel, from Milford, Pa., is a biology major with a concentration in ecology and evolution. She will receive a Bachelor of Science in Biology. Each of the last four years, Taylor has received the Alpha Gamma Phi, Tippin, David C. Smith Housing and Honors, Mochnick Honors and Board of Governors scholarships. She has also received Pennsylvania State Athletic Conference and Atlantic Region honors. She has been a Dean's List designee, was captain of Leadership Council for CU volleyball team and is a scholar-athlete designee (6 semesters). Taylor presented a first-place research project at the Pennsylvania State Wildlife Society Conference in 2017, and received the Best Student Poster Award at the 2018 conference for this research project. Upon graduation, Taylor plans to spend the summer working for the USGS, surveying amphibians in New England, before attending graduate school and eventually getting her Ph.D. to teach and research at the collegiate level.

REBECCA DUDEK

Creation of a Point-of-Care PCR Device Amenable to Health Care Settings in the Developing World

In developing countries, much disease-associated mortality is caused by insufficient diagnostic capabilities. The leading diagnostic method in modern clinical settings today is polymerase chain reaction (PCR).

PCR amplifies DNA from patient samples so that technicians can visualize and identify whether DNA of a specific disease-causing pathogen is present, thus confirming the cause of the patient's illness and helping doctors prescribe proper treatment. However, PCR requires the use of an expensive piece of equipment called a thermocycler, which amplifies DNA by heating and cooling patient samples to specific temperatures.

Many hospitals in developing countries are too poor to purchase a thermocycler. I have designed a device to amplify DNA without using a thermocycler. This device would save lives in developing countries by allowing doctors to accurately diagnose disease.

Instead of using a computer to control temperature changes of the DNA, the device circulates DNA through a series of liquids that boil at the temperatures necessary to amplify DNA. My device was designed using a computer-aided drafting program, and a prototype was printed using a 3-D printer.

Based on this prototype, the device design is currently being optimized. Once optimized, the device will be used to conduct PCR, and results will be compared to those collected via traditional PCR.

Dr. Helen Hampikian, Faculty Advisor

Rebecca Dudek, from Freeport , Pa., is a molecular biology and biotechnology major with minors in French and political science. She will receive a Bachelor of Science in Molecular Biology and Biotechnology. Rebecca is a three-time scholar-athlete award recipient, has received the Full Board of Governor's Scholarship and has studied abroad at the Université de Caen Basse-Normandie, France. Rebecca also completed Research Experience for Undergraduates (REU) at both the University of Georgia and the University of Notre Dame. Her passion is helping people by conducting medical research. Upon graduation, Rebecca plans to gain a few years of experience working in the medical field, and then apply to either a Ph.D. or M.D.-Ph.D. graduate program.

JESSICA FESENMYER

Time-course Changes of White Blood Cell Distribution Following Stress in a Semi-terrestrial Salamander (*Desmognathus ochrophaeus*)

Many vertebrate stress responses facilitate changes that will maximize survival and decrease those that are not imperative. An elevation in glucocorticoid, a hormone that increases in response to stress, is linked to an increase in the ratio of circulating neutrophils to circulating lymphocytes (N:L).

Exposure to stressors causes an increase in neutrophils and a decrease in lymphocytes. These changes have generally been observed 24-72 hours following stress, but more rapid changes have yet to be characterized.

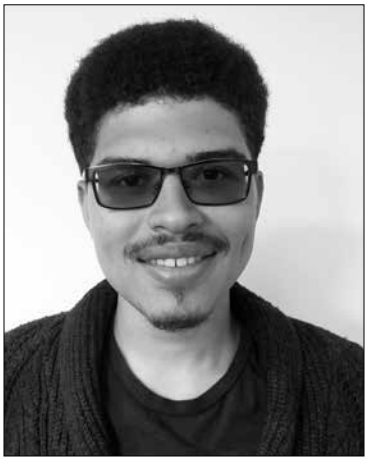
This study evaluated the stress-induced changes in circulating WBCs over time using semi-terrestrial salamanders, *Desmognathus ochrophaeus*, which were exposed to a handling-stressor. These changes in circulating WBCs were measured at 30 minutes, 12 hours and 24 hours following stress.

Dr. Jessica Thomas, Faculty Advisor

Jessica Fesenmyer, from Pittsburgh, Pa., is a biology/pre-physician's assistant major. She will receive a Bachelor of Science in Biology. Upon graduation, Jessica will be attending a phlebotomy class to obtain her certification and will then apply for a position at a healthcare facility to increase her patient care hours until she applies for graduate school. Within the next two years, Jessica plans to apply for graduate school to become a physician's assistant.

ALEX FRANCETTE

Extracellular Matrix Components Fibronectin and Collagen II Modulate Hematopoietic Stem Cell Colony Formation in Vitro



The hematopoietic stem cell (HSC) is a type of multipotent cell most abundant in the bone marrow. These cells exhibit the capacity to self-renew or differentiate to produce the majority of blood cells found in circulation including erythrocytes, thrombocytes and leukocytes.

Regulation of hematopoiesis is critical in order to maintain a healthy pool of progenitor cells while producing appropriate numbers of differentiated cell types to compensate for blood cell turnover. This regulation is conducted through a complex combination of signaling molecules, cell-cell interactions and interactions with the extracellular matrix (ECM). For this reason, culture of the HSC in vitro and outside of the native microenvironment within the bone marrow lend to ready differentiation and loss of multipotency.

To make the conditions of in vitro HSC culture more like the microenvironment of bone marrow, ECM proteins fibronectin and laminin were assessed for their ability to support culture of multipotent hematopoietic cells. Colony-forming unit assays were performed on bone marrow aspirates cultured with fibronectin or laminin to determine abundance and frequency of HSCs. The evidence gathered suggests that ECM substrates may induce differentiation of HSCs. Further attempts to recreate microenvironment stimuli in a culture system may have implications for research and personalized medicine.

Dr. Douglas Smith, Faculty Advisor

Alex Francette, from West Mifflin, Pa., is a double major in molecular biology/biotechnology and chemistry with a concentration in biochemistry. He will receive a Bachelor of Science in Biology degree. Alex has received the CPUB Outstanding Student Award and Awards for Studies in Inorganic and Organic Chemistry. Alex is the Translational Research/Medicine Club president, and received an internship at Cold Spring Harbor Laboratory. Upon graduation, Alex will resume his education at the University of Pittsburgh Molecular, Cell and Developmental Biology Ph.D. program to continue biological research and training the next generation of scientists.

SARAH GARRETT

Animal Partnerships:
How Have Human/Animal Interactions Impacted Human Social Development Throughout Time?

This project attempts to identify and describe the important influences non-human animals have had on the history of human social development. It examines human/animal relationships and how they relate to the development of human social systems.

Using literary accounts, contemporary interviews and archaeological findings, the impact of human/animal relationships on human social behavior are displayed.

The project is composed of an ethnographic film, research paper and presentation that displays the findings.

Dr. Susan Prezzano, Faculty Advisor

Sarah Garrett, from Jersey Shore, Pa., is an anthropology major. She will receive a Bachelor of Arts in Anthropology degree. Sarah has been on the Dean's List. Upon graduation, she plans on serving with the Peace Corps in Myanmar as a secondary education English teacher for two years. She then would like to continue her education and get a graduate degree in international affairs.

REGAN GAYDASH

Peter Pan and Captain Hook: Today's Villains or Heroes?

Peter Pan, the boy who wouldn't grow up, is perceived to be the child hero who, with his band of Lost Boys, opposes the evil pirate Captain Hook. However, in the story as originally told by J.M. Barrie, is Pan truly a hero in a boy's body or is he a character with a darker nature?

It wasn't until years later that spinoffs of the Peter Pan story began to question who was the hero and the villain. Through the analysis of the characters from several works, this project compares and contrasts the characterizations of Pan and Hook in modern day retellings to Barrie's characters.

Many retellings cast Pan as the villain and Hook as the hero as a way to switch the characters' roles and change the perspective from which the story is told. This project determines if writing a villainous Pan and a heroic Hook is truly changing those characterizations from Barrie's work or simply rewriting the characters for the modern consumer.

Dr. Annette Rosati, Faculty Advisor

Regan Gaydash, from Fisher, Pa., is an English major with a concentration in literature and a minor in psychology. She will receive a Bachelor of Arts in English degree. Regan has been a member of Phi Eta Sigma National Honor Society, Sigma Tau Delta English International Honor Society and The National Society of Leadership and Success. Regan was on the Dean's List every semester and received the English Department's Nemmer Award for Outstanding Graduating English Major. Other scholarships include the Board of Governors Scholarship and the Foundation Honors Scholarship. Upon graduation, Regan plans to work in the editing and publication field before pursuing further education in graduate school.

KATE HAMMOND

Body Image Related Issues and Eating Disorder Risk Management Need Identification on Clarion University of Pennsylvania's Campus in Clarion, PA.

Eating disorders are the deadliest mental illness that are currently affecting women between the ages of 18 and 25, which includes the average college population (Smith-Jackson, Reel, Thackeray, 2014).

College is an environment that has been found to increase risk of developing eating disorders, disordered eating and worsened body image. Stress related to poor body image and the development or worsening of eating disorders can cause anxiety, depression, self-harm and physical illness.

Many universities across the country have begun to develop early detection and support services related to eating disorders for students on their campuses (National Eating Disorders, 2014).

This research project is focused on identifying the significance of eating disorders and poor body image among students on Clarion's campus, the existing services on campus and the student body's knowledge of current available services to identify areas of improvement based on evidenced-based practice recommendations gathered from the National Eating Disorder Association's national college campus report.

Cheryl Bowersox, Faculty Advisor

Kate Hammond, from Sandyston, NJ, is a nursing major with a minor in molecular, cell and organismal biology. She will receive a Bachelor of Science in Nursing degree. Kate is an NRHC conference participant, an IHSA Academic First Team member and is an ANAD certified representative. Upon graduation, Kate will begin work as an emergency/trauma registered nurse.

TYLER HILBERT

Weaving Narratives Through Images: Promoting Multiple Literacies Through Graphic Novels

Despite an increased interest in literacy-based instruction in the classroom, some mediums of text go ignored. One such medium is graphic novels, stories that are told through a combination of images and words, but are continually perceived as childish or pedestrian (Goldstein).

Graphic novels have the capacity to engage students in multiple literacy-based exercises, making the format a viable teaching tool in any discipline.

This project is split into two parts: the first is analyzing graphic novels and their potential in the classroom, and the second is discussing field tests of graphic novel-based units in secondary classroom environments.

Dr. Jesse Haight, Faculty Advisor

Tyler Hilbert, from Callensburg, Pa., is a double major in secondary education social studies and secondary education English language arts, with minors in English literature and history. He will receive a Bachelor of Science in Education degree. Tyler was a presenter at the National Council for the Social Studies Conference in 2015, 2016 and 2017. He was also a presenter at the Pennsylvania Council for the Social Studies Conference in 2015, 2016 and 2017. Upon graduation, Tyler plans to pick up a job teaching either social studies or English at the high school level. After teaching for a few years, Tyler plans on pursuing his master's and doctorate degrees in either curriculum and instruction or English literature.

BROOKE HOMAN

Prevalence of Potentially Pathogenic Species of Staphylococcus in Companion Animals

Staphylococci are Gram-positive, cocci bacteria. Within the genus, there are 40 species of staphylococcus, most of which are harmless and exist normally on animals and humans.

S. aureus is a common species often found in the human respiratory tract and on the skin. This species is not always pathogenic, but due to immune-evasive strategies it can cause a variety of serious illnesses including toxic shock syndrome, cellulitis, meningitis and pneumonia. Furthermore, there are antibiotic-resistant forms of this species, such as methicillin resistant *S. aureus* (MRSA), which are responsible for a variety of infections that are difficult to treat and can be fatal.

Documentation has revealed that potentially pathogenic strains of *S. aureus*, including MRSA, can be shed into the environment by human carriers and transferred from humans to animals.

Staphylococcus saprophyticus is an additional species of staphylococcus that has the potential to be pathogenic. Appearing as a coagulase-negative, Gram-positive bacterium, *S. saprophyticus* is the second-most common UTI-causing agent. We aim to establish whether there is a prevalence of these potentially pathogenic species of staphylococcus in domestic and/or feral companion animals that could be transferred to other pets and/or humans.

Working with the Tri-County Humane Society, we have gathered evidence to suggest that potentially pathogenic species of staphylococcus are prevalent in companion animals. We are currently clarifying exactly what species of staphylococcus are present on these animals. These findings could have wider implications in the local community regarding carriage and transmission of potentially pathogenic species of Staphylococcus.

Dr. Helen Hampikian, Faculty Instructor

Brooke Homan, from Altoona, Pa., is a biology major with a concentration in pre-physician assistant and a minor in psychology. She will receive a Bachelor of Science in Biology degree. Brooke has been on the Dean's List for six semesters and is a recipient of the Board of Governors Academic Scholarship (2014-2018). She is a member of The Golden Key International Honor Society (2015 – Present) and is recognized for being in the top 15 percent of her class. Brooke also presented during CPUB (2018). Upon graduation, Brooke plans to attend Chatham University to obtain her Master's in Physician Assistant Studies.

CORINNE HOOPES

Understanding the Choice:
Why Students Pursue an Undergraduate Degree in Speech-Pathology and Audiology

The purpose of this study is to gain insight into the motivators that drive undergraduate students at Clarion University to pursue a bachelor's degree in speech-pathology and audiology.

This study surveyed 181 undergraduate students who are currently enrolled in Clarion University of Pennsylvania's B.S. in Speech-Pathology and Audiology program. Participants in this study were given a survey consisting of three open-ended and six closed questions regarding various aspects, such as why they chose to major in speech-pathology and audiology, how they first heard about the field and their personal experiences with receiving speech-pathology and audiology related services.

Completed surveys were analyzed to find correlations between motivators for selecting this major, career goals and how previous experience with speech-pathology and audiology all play a role in deciding to pursue an undergraduate degree in speech-pathology and audiology.

Dr. Kristina L. Dworek, Faculty Advisor

Corinne Hoopes, from Woodstown, NJ, is a speech pathology and audiology major. She will receive a Bachelor of Science in Speech Pathology and Audiology degree. Corinne is a Marjorie Tippin Award recipient, a two-year David Smith Honors Housing Scholarship recipient and a three-year Foundation Honors Scholarship recipient. She also is a Sigma Tau Gamma Scholarship recipient, a Class of 1961 Scholarship recipient, and a France-Allison Honors Scholarship recipient. Corinne also is a two-year recipient of the Best SOAR Mentor Award.

SARAH HRUBETZ

Using the Android Platform Features to Assist in College Student Studying Habits

The purpose of this project is to assist students with studying efficiently. I have created an Android application that serves as flashcards.

Through this project various computer science techniques are used to create this application. The presentation will discuss the functionality of the application, whereas the programming techniques are discussed in the paper.

Dr. Jody Strausser, Faculty Advisor

Sarah Hrubetz, from Pittsburgh, Pa., is a double major in mathematics and computer science. She will receive Bachelor of Science degrees in both mathematics and computer science. Upon graduation, Sarah hopes to enter the work force and wishes to obtain a job in software engineering. She is currently searching for jobs located in Pittsburgh.

KINSEY LANINGA

Linking ERAD and the UPR:
Developing a genetic screen via the expression of Antitrypsin

Genetic disorders, such as Alpha-1 Antitrypsin Deficiency (ATD), can lead to the accumulation of aberrant and aggregation-prone proteins within the endoplasmic reticulum (ER). The defect associated with ATD can cause cirrhosis of the liver and/or emphysema of the lung.

While the disease states of ATD have been studied, the mechanism of misfolded protein removal within the ER of hepatocytes is not understood. There are two biochemical pathways that exist to manage these misfolded proteins: Endoplasmic Reticulum Associated Degradation (ERAD) and the Unfolded Protein Response (UPR). ERAD primarily functions to identify newly synthesized misfolded proteins and retro-translocates them out of the ER to be degraded by the 26S proteasome. When ERAD is overwhelmed, the UPR pathway is induced and acts as an intracellular transmembrane signaling cascade to initiate specific gene expression.

Prior studies revealed that the Add66p protein is essential in the assembly of the 26S proteasome; therefore, deletion of the ADD66 gene will disrupt proteasome production, function, and ERAD pathway. Furthermore, the UPR targets the ADD66 gene during times of ER stress. The stress-inducing agent of focus is the expression of A1PiZ, a mutant form of the human gene A1Pi (Antitrypsin). This stress agent is expressed in two wild-type yeast strains as well as a strain lacking ADD66 (add66$\mathbf{\Delta}$).

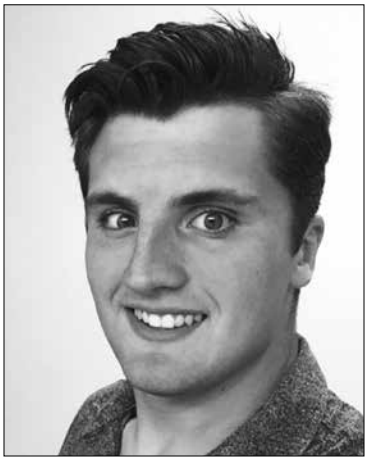
The goal of this project is to determine whether combining A1PiZ with an add66$\mathbf{\Delta}$ will result in a defective growth phenotype. If a reproducible growth defect can be identified and used as a positive baseline control, then this experimental method may be used to screen and identify new proteins involved in ERAD and/or UPR, helping to create a clearer picture of the cell's stress response pathways.

Dr. Craig Scott, Faculty Advisor

Kinsey Laninga, from Chagrin Falls, OH, is a biology pre-med major with minors in business administration: pre-MBA. She will receive a Bachelor of Science in Biology degree. Kinsey has been on the Dean's List and received a first-place award at CPUB 2017 for molecular biology. Kinsey will attend Lake Erie College of Osteopathic Medicine in July. After medical school, she hopes to become a pediatrician or gynecologist.

TYLER MILLER

Toxic Concentrations of Copper Sulfate for Gastropods



Gastropods (Snails) are an important part of freshwater ecosystems, but they are sensitive to anthropogenic inputs of toxins to streams and ponds. Many toxins affect the survivorship and behavior of invertebrates, which in turn can affect other trophic levels within an ecosystem.

This study was conducted to determine the lethal effects of copper sulfate on freshwater gastropods. Copper sulfate is the active ingredient in tree root killing treatments that are often poured directly into septic systems, and thus might expose riparian and freshwater ecosystems to its damaging effects.

Previous studies suggest that copper sulfate is lethal to sensitive invertebrates at extremely low concentrations—even fractions of a milligram per liter.

This study used wild-caught *Helisoma trivolvis* in a laboratory setting, with single animals exposed to a range of $CuSO_4$ concentrations. Trials were replicated for different size classes to determine whether there is a relationship between body size and mortality in snails exposed to water polluted with copper sulfate.

This study found that there is no significant relationship between body size and the ability to survive toxic environmental inputs of copper sulfate.

Dr. Andrew Turner, Faculty Advisor

Tyler Miller, from Freeport, Pa., is an environmental biology major with minors in environmental geoscience, sustainability, geography and economics. Tyler has previously presented *Toxicity of Copper Sulfate to Gastropods (Preliminary)*, and *Effects of Prey Biodiversity on Fish Growth*. Tyler is a member of the men's rugby team and served as captain (2017-2018) and president (2015-2017), was named 3RRC Rookie All Star (2014), and received the "King Tafur" Leadership award (2015-2017). He also is a member of Sigma Chi, Theta Alpha Chapter, and served as vice president (2016-2017). Upon graduation, Tyler would like to spend time traveling and working in ecology, and working on research projects or in fisheries.

HUNTER NICHOLSON

Nonverbal Communication Patterns Within Intimate Relationships

When thinking of the nonverbal communication associated with an intimate relationship, it is recognizable that there are distinguishing characteristics to indicate the relationship status.

Haptics is a form of nonverbal communication involving touch. My goal was to determine the significance of touch in an intimate relationship and its influence on fulfillment within.

By utilizing outside research and conducting a survey to grasp the concept of touch relevance, it was determined that touch is significant to the satisfaction between partners in an intimate relationship.

Dr. Naomi O'Neil, Faculty Advisor

Hunter Nicholson, from Houtzdale, Pa., is a strategic communications major. She will receive a Bachelor of Science in Communication degree. Hunter has received the Greek Academic Achievement Award in 2017 and 2018, and has been on the Dean's List for six semesters. Upon graduation, Hunter plans to accept a position as a social media specialist and move out of state.

BRANDON NEILSEN

Piecing together the Cpi-2 encoded Type-III Secretion System from *Chromobacterium violaceum*

Chromobacterium violaceum is an opportunistic bacterial pathogen which utilizes a special virulence machine referred to as the Type-III Secretion System (T3SS). Through utilizing this syringe-like structure the *C. violaceum* bacteria is able to shuttle specific cytotoxic proteins and enzymes into the host cell and ultimately cause host cell disease.

Putative genes encoding for two complete T3SSs were discovered through genomic analysis by the Brazilian Genome Project Consortium in *C. violaceum*. These two T3SSs share homology with the Spi-1 and Spi-2 (salmonella pathogenicity islands 1 and 2) encoded T3SSs from pathogenic salmonella species. Based on the observed homology, putative function was assigned to each open reading frame within the *C. violaceum* gene clusters, which were named Cpi-1 and Cpi-2 (chromobacterium pathogenicity islands 1 and 2), respectively. Our work has focused on the putative T3SS encoded by Cpi-2.

Presently we have made progress in identifying the proteins involved in constructing the syringe part of the secretion system that extends through the periplasmic space, peptidoglycan, outer membrane and surrounding microenvironment. Through the use of specific protein-protein interaction assays, we have found the following: Interactions between CsaQ-U indicate they likely comprise the inner membrane ring structure, CV2588 interacts with itself in a manner consistent with its putative role as the needle protein, CseB1-4 may be capable of forming an extra-cellular filament, and CV2578 (putative class-II chaperone) interacts with the putative translocator proteins CV2576 and CV2676. We are currently in the process of performing further protein-protein interaction analyses to investigate the role of additional proteins.

Dr. Helen Hampikian, Faculty Advisor

Brandon Nielsen, from Warren, Pa., is a molecular biology/biotechnology major. He will receive a Bachelor of Science in Biology degree. Brandon has received the Board of Governors Scholarship (2015-2018) and the University-Wide Research Grant (2015-2018). He is also a Commonwealth of Pennsylvania University Grant Recipient (2015) and the Student Honors Association president (2016-2017). Upon graduation, Brandon plans to attend graduate school and get a Ph.D. in microbiology/virology.

MARISSA PAREDES

Is Annexin I Protein Required to Trigger Phagocytosis or Does It Serve to Increase Phagocytic Activity?

Annexin 1 is a phospholipid-binding protein that has been found to aid in various biological activities. Our lab has shown that annexin I protein facilitates in clearance of dead and dying cells by secondary immune cells as a signaling protein. We also believe that annexin I has the capability to bind cancerous human cells, specifically HL60 cells, with potential to promote clearance of these cells.

The three cell types of interest include; HL60s, HL60 neutrophil-like cells, and HL60 macrophage-like cells. We have been investigating the role of the Ca2+ in the binding of annexin I to each cell type with data supporting better clearance of senescent neutrophils than HL60 cells and neutrophil-like cells even in the absence of calcium when incubated with annexin I. However, annexin I was not as readily able to bind to the senescing neutrophils when calcium was removed, indicating that calcium does play a role in the binding of annexin I.

Our data also suggests that annexin I was able to better bind HL60 cells when calcium was removed. Future experiments will focus on characterizing the binding patterns of annexin I and the effects of variable conditions on phagocytic activity. We also hope to better characterize HL60 cells to better understand annexin I's capability of binding and signaling for clearance of these cells. This research is of interest because of its possible implications in medicine as a treatment for those patients suffering from burns, diabetes, and other autoimmune diseases where normal clearance of infection is interrupted.

Dr. Douglas M. Smith, Faculty Advisor

Marissa Paredes, from Pittsburgh, Pa., is a biology/pre-medicine major. She will receive a Bachelor of Science in Biology degree. Marissa has been on the Dean's List for seven semesters, is a recipient of the W.E.B. Dubois Award (2015-2018), the Honors Foundation Scholarship (2015-18), the David Smith Honors Housing Scholarship (2015-16) and the Board of Governors Scholarship (2014-18). Upon graduation, Marissa will attend Lake Erie College of Osteopathic Medicine (LECOM) to earn her Doctor of Osteopathy degree.

MARISSA SHEFFER

What Does it Mean to have Underfunded State Pension Plans?

In my research, I found that several states have underfunded pension plans. This could have an effect on many of the people who work for the state including teachers, police officers, firefighters and countless others.

In a time when businesses have done away with pension plans because of the expensive cost and the often-unrealistic investment growth assumptions, states are struggling to fully fund pension plans. Only two states in the United States have pension plans that are fully funded.

These unfunded pension liabilities are a promised future benefit that state governments may not be able to pay out. This could have a major effect on the economy in the event of a recession.

Dr. Jeffrey Eicher, Faculty Advisor
Dr. Chad Smith, Faculty Advisor

Marissa Sheffer, from Tylersburg, Pa., is a triple major in corporate finance, personal finance and management, with a concentration in small business development. She will receive a Bachelor of Science in Business Administration (BSBA) degree. Marissa is a member of Beta Gamma Sigma. Upon graduation, Marissa will be starting full-time as a junior financial advisor at Barber Financial Co. in Dubois, Pa. She will study to get fully licensed as a financial advisor.

ANDREW SKUBISZ

Consumer Behavior of College Students when Consuming Music

With the introduction of digital downloads in the early 2000s, the recorded music industry began to transform. As it became easier for music to be reproduced, distributed, pirated and shared, the business model for music sales needed to adapt.

Today, as streaming services are dominating traditional music sales, the model has shifted yet again. Current college students have seen the shift from the popularity of physical music sales to download sales to streaming. Because of this, they are familiar with, and often use, the many avenues in which music can be obtained and enjoyed.

This study analyzes college students' current spending habits and perceptions when it comes to consuming music. The study seeks to discover trends between how they consume music, their preferences and their beliefs and perceptions regarding music consumption. By better understanding how this important market segment behaves, marketers can more successfully reach this group in a profitable way that also meets consumer demands.

Dr. Chad Smith, Faculty Advisor

Andrew Skubisz, from DuBois, Pa., is a marketing major with a minor in economics. He will receive a Bachelor of Science in Business Administration (BSBA) degree. Andrew has presented and co-authored research at the National Collegiate Honors Council (NCHC) conference in Chicago (2015) and Seattle (2016) and he was selected to participate in songwriting workshops at the Chautauqua Writers' Festival in Chautauqua, NY (2016, 2017). Andrew served as a student member of the Honors Council (2017-2018) and is one of 14 state semi-finalists in the PASSHE Business Plan Competition (2018). Upon graduation, Andrew will complete an internship in Tinton Falls, NJ, will keep an open mind about career opportunities and will always continue to learn.

LAURYN TYLER

Building Bridges in the English Classroom

Literature is a great way to build bridges in a classroom. Every student creates a unique opinion about a text and has the chance to hold a discussion with fellow classmates who may agree or disagree.

In today's contentious political climate, building bridges in the classroom is more important than ever. Students have been bullying their classmates and have been using the rhetoric of our president to back it up. So, what is a teacher to do when blame and intolerance becomes a part of the way their students interact with others?

As a future English teacher, I want my classroom to be as welcoming as possible to all students, but the environment my future students are growing up in is not going to make it easy.

My goal was to analyze the different ways students are facing discrimination in their classrooms recently, how teachers—specifically English teachers—have been combating this discrimination and what texts can be used in an English classroom to encourage making connections and building bridges.

Dr. Melissa Downes, Faculty Advisor

Lauryn Tyler, from Freeport, Pa., is a secondary education English major with a minor in special education. She will receive a Bachelor of Science in Education degree. Lauryn has been on the Dean's List for seven semesters and is a member of Phi Eta Sigma National Honor Society. She is also a recipient of the Class of 1961 Scholarship in 2017 and the Foundation Honors Scholarship in 2016-2017. Upon graduating, Lauryn will return home and pursue a master's degree.

HOPE ZIMMERMAN

Quality of Life as a Function of Alaryngeal Means of Communication: A Meta-Analysis of VHI Results

Following a total laryngectomy, individuals are given options for alternative means of communication and/or alaryngeal speech.

The present meta-analysis compared physical, emotional and functional quality of life of individuals who have undergone a laryngectomy as based on their means of postoperative communication/speech.

A review of the literature measuring these outcomes via use of the Voice Handicap Index (VHI) was done to ascertain which alaryngeal means results in greater overall post-surgical satisfaction. This is especially important as the success of rehabilitation and habilitation in the field of speech-language pathology is being increasingly determined by subsequent patient satisfaction and quality of life.

Prof. Kenneth Staub, Faculty Advisor

Hope Zimmerman, from Roaring Spring, Pa., is a speech-language pathology and audiology major with a minor in Spanish. She will receive a Bachelor of Science in Speech-Language Pathology and Audiology degree. Hope completed and presented research at NCHC and was a PSHA poster research presenter. She is also the NSSLHA secretary and president of Alpha Mu Gamma – Language Honors Society. Upon graduation, Hope will be working abroad as an AuPair in Spain until beginning her master's degree program in Speech-Language Pathology at Clarion University next semester.

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