

COURAGEOUS. *confident.* CLARION.



10<sup>th</sup> ANNUAL *academic excellence* SERIES

*honors program*

## SENIOR PRESENTATIONS

APRIL 22, 2015  
FOUNDERS HALL  
6:30 P.M.

CLARION  
UNIVERSITY

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HONORS PROGRAM



# OPENING CEREMONY *program*

Wednesday, April 22, 2015  
Center for Academic Excellence  
6:30 p.m.

Welcome and Introductions..... Eric Zavinski  
Honors Program Assistant Student Director

Remarks..... Brandon Yusko  
President, Student Honors Association

Introductory Remarks..... Dr. Ron Nowaczyk  
Provost and Vice President for Academic Affairs

Keynote Remarks..... Dr. Hallie Savage  
Professor, Communication Sciences & Disorders

Service Award Presentations..... Keith Weible and Nick Rhoades

Presentation of Seniors and Faculty Advisors..... Dr. Rod Raehsler  
Honors Program Director

Closing ..... Eric Zavinski  
Honors Program Assistant Director

Students will be dismissed immediately following the ceremony to prepare their presentations.  
Please remain seated until they have been dismissed.

Join us in Carlson Library and Founders Hall immediately following the opening ceremony.



2014-2015  
SENIOR HONORS *presentors*

David L. Aites

Kirsten Bare

Michael Bauer

Shannon Berrier

Natalie Bond

Cayleigh Boniger

David Brooker

Kristen Burkholder

Emily Carey

Dalton Chrobocinski

Samuel Curtis

Ashton Daily

Kristen Day

Derek Dietz

Kaitlyn DiVito

Rebecca Greenman

Emily Gysegem

Brianna Henry

Madeline Kopper

Leah Loscar

Erin Lynch

Anna McNurlen

Alex Nadas

John Owens

Madeline Robinson

Tonya Shaffer

Kelsey Slayton

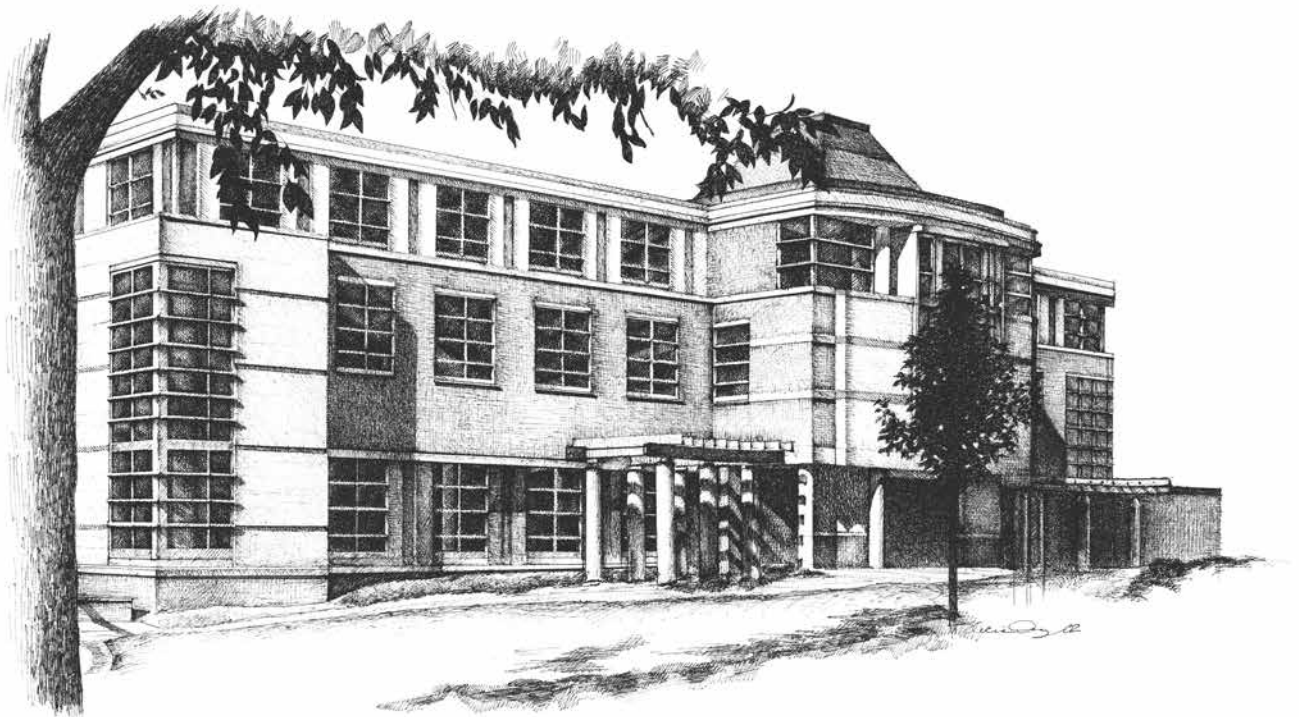
William Snyder Jr.

Laura Subject

Kathleen Warner

Stephanie Warner

Kurt Weres



# SENIOR PRESENTATIONS 2014-2015

## EARLY PRESENTATION SESSIONS (7 P.M.–8:15 P.M.)

### Session 1

Faculty Moderator:  
Faculty Moderator (Rehearsal):  
Honors Alumni Judge:  
Student Moderator:

### 104 FOUNDERS

Dr. Richard Lane  
Professor Joseph Croskey  
Danielle Emings '11  
Megan Beary

#### THE MODERATING EFFECTS OF TEACHER LIKABILITY ON STUDENT ENJOYMENT OF TEACHER-INTRODUCED TEXTS

By Rebecca Mae Greenman

#### SUBCREATION: HISTORY, SIGNIFICANCE, AND IMPLEMENTATION

By Kaitlyn DiVito

#### THROUGH THE DRUID STONE: MACBETH FROM THE CELTIC PERSPECTIVE

By Cayleigh Boniger

#### VISUALIZING THE PAST: INCORPORATING INFOGRAPHICS AND NONFICTION INSTRUCTION IN TODAY'S SECONDARY ENGLISH CLASSROOMS

By Derek Dietz

### Session 2

Faculty Moderator:  
Faculty Moderator (Rehearsal):  
Honors Alumni Judge:  
Student Moderator:

### 105 FOUNDERS

Dr. Shannon Nix  
Dr. Helen Hampikian  
Dustin McElhattan '09, '11  
Nicholas Rhoades

#### EFFECT OF ATRAZINE ON CRAYFISH FOOD CUE RESPONSE

By Brianna Henry

#### ANNEXIN I ABILITY TO FACILITATE CLEARANCE IN THE IMMUNE SYSTEM WITH THE ADDITION OF CALCIUM

By Madeline Robinson

#### PLAQUE PURIFICATION OF BLUE TONGUE VIRUS SEROTYPE 17 MUTANTS WITH DELAYED CYTOPATHOLOGY AND PRELIMINARY STEPS TO INVESTIGATE THE ROLE NONSTRUCTURAL PROTEIN 3 IN BTV – INDUCED APOPTOSIS

By David Brooker

#### DEVELOPMENT OF A BIODEGRADABLE SCAFFOLD FOR SKIN REGENERATION

By Kathleen Warner

# SENIOR PRESENTATIONS 2014-2015

## EARLY PRESENTATION SESSIONS (7 P.M.-8:15 P.M.)

### Session 3

Faculty Moderator:  
Faculty Moderator (Rehearsal):  
Honors Alumni Judge:  
Student Moderator:

### 118 FOUNDERS

Dr. William Buchanan  
Dr. Rod Raehsler  
Victoria Reid  
Stephanie Lightner

#### SHINING LIGHT THROUGH THE GLASS CEILING

By Dalton Chrobocinski

#### SOPA AND PIPA: COULD THEY HAVE WORKED?

By Samuel Curtis

#### USING BANNED BOOKS TO TEACH HISTORY

By Tonya Shaffer

#### FACTORS INFLUENCING COLLEGE CHOICE: A STUDY OF DIVISION II STUDENT-ATHLETES AT A NORTHWESTERN PENNSYLVANIA INSTITUTION

By Emilee Gysegem  
(pre-recorded)

### Session 4

Faculty Moderator:  
Faculty Moderator (Rehearsal):  
Honors Alumni Judge:  
Student Moderator:

### 204 FOUNDERS

Dr. Jamie Phillips  
Dr. Myrna Kuehn  
Erich Spessard '09  
Catherine Hogg

#### HOW DOES PARENTAL INFLUENCE IN SPORTS EFFECT A CHILD'S SELF-ORIENTATION, PERFECTIONISM AND FUTURE IN SPORTS?

By Kristin Day

#### THE EFFECTS OF INCREASED WHITE SPACE ON READING ACCURACY

By Kristen Burkholder

#### "GROWING UP MASCULINE:" AN ANALYSIS OF GENDER EXPECTATIONS DEPICTED BY MALE CHARACTERS IN CARTOON NETWORK'S CLARENCE

By Leah Loscar

#### LONG-TERM EFFECTS OF CONCUSSIONS

By Laura Subject

# SENIOR PRESENTATIONS 2014-2015

**INTERMISSION (8:15 P.M.–8:30 P.M.)**

**LATE PRESENTATION SESSIONS (8:30 P.M.–9:45 P.M.)**

**Session 1**

Faculty Moderator:  
Faculty Moderator (Rehearsal):  
Honors Alumni Judge:  
Student Moderator:

**104 FOUNDERS**

Dr. Susan Prezzano  
Dr. Yasser Ayad  
Victoria Reid  
Logan Lauer

**LAND COVER CLASSIFICATION OF RECLAIMED STRIP MINES IN THE MILL CREEK WATERSHED**

By Kelsey Slayton

**3D GRAPHICS AND NEURAL NETWORK AI IN ROGUELIKE GAMES**

By L. David Aites

**ARCTIC PERMAFROST DYNAMICS**

By Alex Nadas

**Session 2**

Faculty Moderator:  
Faculty Moderator (Rehearsal):  
Honors Alumni Judge:  
Student Moderator:

**105 FOUNDERS**

Dr. John Heard  
Dr. Chunfei Li  
Dustin McElhattan '09, '11  
Coty Chetoka

**SYNTHESIS OF SILICON OXIDE NANOWIRES BY CHEMICAL VAPOR DEPOSITION**

By Shannon Berrier

**FABRICATION OF ICOSAHEDRAL QUASICRYSTALLINE NANOPARTICLES  
ON ALUMINUM BASED ALLOYS**

By Emily Carey

**PREPARATION AND ANALYSIS OF STABLE ICOSAHEDRAL QUASICRYSTALS**

By Michael Bauer

**CAMPFIRES IN THE SKY – STAR STORIES OF THE NATIVE AMERICANS**

By William Snyder

# SENIOR PRESENTATIONS 2014-2015

## LATE PRESENTATION SESSIONS (8:30 P.M. – 9:45 P.M.)

### Session 3

Faculty Moderator:  
Faculty Moderator (Rehearsal):  
Honors Alumni Judge:  
Student Moderator:

### 118 FOUNDERS

Dr. Colleen McAleer  
Dr. Mary Pat McCarthy  
Danielle Emings '11  
Scott Anderson

#### PATTERNS IN SPANISH LANGUAGE ACQUISITION: A COMPARATIVE ANALYSIS OF VOWEL PRODUCTION IN ENGLISH SPEAKING UNIVERSITY STUDENTS

By Kirsten Rene Bare

#### THE IMPACT OF AUDITORY STIMULATION DURING SHORT-TERM MEMORY THERAPY SESSIONS WITH ADULTS (35-90 YEARS) SUFFERING CEREBRAL VASCULAR ATTACKS AND TRAUMATIC BRAIN INJURIES

By Erin Lynch

#### PRONOUN ACQUISITION IN A TRANSITIONAL KINDERGARTEN CLASSROOM

By Natalie Bond

#### AN EXAMINATION OF SOCIO-COMMUNICATIVE ASPECTS OF APHASIA THERAPY

By Madeline Kopper

(pre-recorded)

### Session 4

Faculty Moderator:  
Faculty Moderator (Rehearsal):  
Honors Alumni Judge:  
Student Moderator:

### 204 FOUNDERS

Dr. Robert Balough  
Dr. Paul Woodburne  
Joslyn Dechant '11  
Austin Snelick

#### ANALYZING STUDENT DEBT AWARENESS AT CLARION UNIVERSITY

By John Owens

#### FINANCIAL ENGINEERING AND CANCER

By Anna McNurlen

#### PEACE DIVIDEND OF DEMILITARIZATION IN COSTA RICA

By Stephanie Warner



**L. David Aites**

## 3D GRAPHICS AND NEURAL NETWORK AI IN ROGUELIKE GAMES



It should be possible to create a roguelike game with 3D graphics and complex AI.

*Jeffrey Childs, Computer Information Sciences  
Faculty Advisor*

L. David Aites is from Oil City, Pa. He has a major in art and computer science and a minor in mathematics and will receive a Bachelor of Fine Arts degree and a Bachelor of Science degree. David served as Honors Council representative, as well as the Commencement Ceremony marshal. He was the VizArtz vice-president and won many awards and scholarships, including second place non-functional mug at Michelle's Café Mug Show, honorable mention at the Clarion Student Art Show, the Lesser Scholarship, the George Lewis Scholarship, the Honors Foundation Scholarship and was a Dean's Scholar. Upon graduation, David plans to pursue a graduate degree in ceramics.

**Kirsten Rene Bare**

**PATTERNS IN SPANISH LANGUAGE ACQUISITION:  
A COMPARATIVE ANALYSIS OF VOWEL PRODUCTION  
IN ENGLISH-SPEAKING UNIVERSITY STUDENTS**



With the growing population of people who speak a second language in their home or social environment, there will be a consistent increase in the linguistic diversity of the United States. As a result, many students are exposing themselves to a second language in order to be more successful in a country that is changing demographically. They are encouraged to acquire skills that will help them to communicate with others of a different background. In turn, many professionals will be expected to deliver skilled services to those of a different race or ethnicity, including the Hispanic population and second-language learners.

This study expands on second-language acquisition research that has been conducted in the field of speech language pathology. It utilizes adult subjects and attempts to compare features of the English and Spanish languages. It identifies consistent influences of vowels in English to the second language acquisition of Spanish, focusing on analyzing /i/ and /a/, present in both languages. This study facilitates a qualitative understanding of influences the native language has on second language acquisition of young adults with regards to production proficiency ranging from nice to advanced levels.

The prediction of speech production errors will aid in further study of prevention of consistent vowel errors between English and Spanish within the field of speech language pathology. In this way, students of a second language will be able to find success in communication with others from a Spanish background in the growing population in the United States and professionals will be able to better serve the bilingual population.

*Dr. Mary Pat McCarthy, Communication Sciences and Disorders  
Faculty Advisor*

Kirsten Rene Bare is from York, Pa. She has a major in speech pathology and audiology and foreign languages: Spanish, a minor in honors and will earn Bachelor of Science and Bachelor of Arts degrees. While pursuing her undergraduate degrees, Kirsten was inducted into Phi Eta Sigma, Phi Kappa Phi and Alpha Mu Gamma Honor Societies. She served as president of the Student Honors Association and was a member of the Clarion University Honors Council. Kirsten also had the opportunity to present research at the 2014 National Collegiate Honors Conference. Upon graduation, Kirsten plans to attend graduate school for speech language pathology in order to pursue her goal of one day working in a clinic for children with disabilities.

**Michael Bauer**

## PREPARATION AND ANALYSIS OF STABLE ICOSAHEDRAL QUASICRYSTALS



Alloys of compositions  $Al_{65}Cu_{20}Fe_{15}$  and  $Al_{59}Cu_{37}Fe_{3}Si_1$  containing Icosahedral Quasicrystalline Nanoparticles (IQNPs) will be sliced using a diamond saw, subjected to various annealing conditions and analyzed using Clarion University's scanning electron microscope.

The purpose of the annealing process is to increase grain size in order to yield quasicrystals larger than 200 micrometers so that the reciprocal image of their atomic structures can be obtained by Electron Channeling Contrast Imaging.

The conducted research is vital to being able to efficiently alter particle size and further understand the crystallography of these particles. In addition, the relatively large pure quasicrystals can then be subject to various processes in order to extract free-standing IQNPs, which would be a novel result.

*Dr. Chunfei Li, Physics  
Faculty Advisor*

Michael Bauer is from Clarion, Pa. He has a dual major in mathematics and physics, with minors in both computer science and honors. He will receive a Bachelor of Science degree. While completing his undergraduate degree, Michael spoke at the Joint Mathematics Meeting in 2015 and the Regional Pi Mu Epsilon Conference in both 2013 and 2014. He has published multiple papers in his field. He has received the Board of Governors Scholarship, the William and Elizabeth Hart Scholarship, the Nancy Shaw McKee Scholarship for Arts and Sciences, the Helen and Lawrence Smith Scholarship and the Paul Shank Award for Excellence in Physics. He has also received the Honors Foundation Scholarship, the Ruth Bleakney Montgomery Science/Mathematics Scholarship and the Dr. and Mrs. Arthur Phillips Scholarship. Upon graduation, Michael will begin his career as a software engineer with CA Technologies in Pittsburgh.

**Shannon Berrier**

## SYNTHESIS OF SILICON OXIDE NANOWIRES BY CHEMICAL VAPOR DEPOSITION



Silicon oxide nanowires have shown promise in fields such as fiber optic communications and light emitting sources, but have undergone limited study.

The experiments to be performed utilize a vacuum tube furnace to fabricate the wires through chemical vapor deposition. In the presence of reduced pressure and a temperature gradient, vaporized raw materials are expected to condensate onto silicon wafer substrates, located near the far end of the tube, in the form of nanowires.

Previous experiments utilized silicon wafers as the silicon source necessary to fabricate the nanowires. In future experiments, efforts will be made to obtain nanowires by using fly ash as the source.

*Dr. Chunfei Li, Physics  
Faculty Advisor*

Shannon Berrier is from Pulaski, Pa. She has a major in physics, with minors in computer science and mathematics and will graduate with a Bachelor of Science degree. While pursuing her undergraduate degree, Shannon published an article in the *Journal of Non-Crystalline Solids*. She was also invited to present at the Conference for Undergraduate Women in Physical Sciences at the University of Nebraska-Lincoln and received first place for her presentation at the Conference for Undergraduate Women in Physics at Penn State University. Upon graduation, Shannon hopes to obtain a position as either a nuclear engineer or materials scientist in the Pittsburgh area.

**Natalie Bond**

## PRONOUN ACQUISITION IN A TRANSITIONAL KINDERGARTEN CLASSROOM



The usage of correct grammatical structure is vital to successful communication in both academic and social settings. One of the grammatical structures that are often not obtained in children with language impairments is correct pronoun usage. Researchers have studied the use of a pronoun extension on the Expanding Expressions curriculum to see if it will help kindergarteners or delayed talkers with pronoun acquisition, comprehension, and expression.

A multiple baseline design across pronoun skills was used to investigate the effects of an extension on the Expanding Expressions curriculum on pronoun acquisition, comprehension and expression. The participating students were evaluated before the initiation of the curriculum as well as at the conclusion of the curriculum via the baseline and post-test measures.

Ongoing progress monitoring occurred throughout as well via data collection related to the targeted pronoun book. The use of the post-test will show if the emphasis on pronouns throughout the curriculum was effective in improving the students' grammatical structure, specifically for pronoun acquisition, comprehension and expression.

*Dr. Mary Beth Mason-Baughman, Communication Sciences and Disorders  
Faculty Advisor*

Natalie Bond is from Danville, Pa. She has a major in speech pathology and audiology and has minors in Spanish and honors and will receive a Bachelor of Science degree. While pursuing her undergraduate degree, Natalie served as the Honors Program Recruitment coordinator and Summer Academy coordinator, as well as the National Student Speech-Language-Hearing Association president and the Golden Key International Honour Society president. She also received the France Allison Honors Scholarship for the 2014-2015 year. Upon graduation, Natalie plans to attend Clarion University to receive her master's degree in speech language pathology.

**Cayleigh Boniger**

**THROUGH THE DRUID STONE:  
MACBETH FROM THE CELTIC PERSPECTIVE**



This paper focuses on parallels between Shakespeare's *Macbeth* and Celtic folklore and culture. More specifically, it examines Macbeth's motives in the case of Duncan's death and the roles of kings, echoes of ancient fire festivals and the three weird sisters as a goddess figure.

Using some of these possibilities, the paper also discusses whether Macbeth's actions would be seen as unnatural to the Celtic people as it is to a Christian society, since it is a central theme of the play.

*Dr. Ralph Leary, English  
Faculty Advisor*

Cayleigh Boniger is from Girard, Pa. She has a major in English with a concentration in general literature and a minor in honors and will receive a Bachelor of Arts degree. While pursuing her undergraduate degree, Cayleigh had a First Place Review in Institute for *Theatre Journalism and Advocacy* at the KCACTF Region II Festival.

## David Brooker

# PLAQUE PURIFICATION OF BLUE TONGUE VIRUS SEROTYPE 17 MUTANTS WITH DELAYED CYTOPATHOLOGY AND PRELIMINARY STEPS TO INVESTIGATE THE ROLE OF NONSTRUCTURAL PROTEIN 3 IN BTV-INDUCED APOPTOSIS



Blue tongue virus (BTV) is an arthropod-borne pathogen of cattle, sheep and wild ruminants. Upon infection, the virus immediately attacks healthy muscle cells of the airways causing apoptosis. As the virus spreads, it infects macrophages which migrate to or reside in the lymphatic system.

The mechanism of this process, however, is unknown. When BTV serotype 17 is placed onto Vero cells, apoptosis is induced. Cytopathic effects are observed as early as 48 hours post infection (hpi), and by 96 hpi, the cells are completely apoptotic.

I am interested in discovering which gene product(s) are responsible for inducing apoptosis in BTV-infected Vero cells. Mutant viruses have been made and are used in the process of plaque purification to discover a strain of mutant virus that is defective in apoptosis.

One of those mutant strains that shows reduced and delayed cytopathology is currently in the process of being purified. BTV is a fairly simple, double-stranded RNA virus with only 10 genes and 11 proteins. Because of this, most of them are well-characterized in the literature, although two of the proteins have unclear functions. One of those, nonstructural protein 3 (NS3) appears to be a likely candidate in the role of inducing apoptosis in BTV-infected cells. NS3 primarily resides in the plasma membrane where it could potentially serve as an apoptotic and phagocytic signal giving the virus a means to enter the next host cell.

*Dr. Douglas Smith, Biology  
Faculty Advisor*

David Brooker is from Marble, Pa. He has a major in molecular biology and biotechnology with a minor in honors and will be receiving a Bachelor of Science degree. While completing his undergraduate degree, David was a brother of Phi Delta Theta. He attended the Commonwealth of Pennsylvania University of Biologists Meeting, the Northeast Regional Honors Council Conference and the National Collegiate Honors Council Conference. He was also named to Deans List six out of seven semesters. Upon graduation, David plans to attend the Lake Erie College of Osteopathic Medicine starting in fall 2015.

**Kristen Burkholder**

## THE EFFECTS OF INCREASED WHITE SPACE ON READING ACCURACY



This research sought to do a review of literature regarding a specific intervention for targeting oral reading fluency in children who are identified as having a specific learning disability in reading.

It has generally been concluded that learning disabilities in reading are a result of phonological deficits, but there has been significant research to indicate that it may also be a result of impaired visual perception.

Following this conclusion, studies have been completed to test the intervention of increasing white space between words and lines in text with this particular group of children.

This review of literature seeks to compile the findings of such studies to propose the educational implications and further research of this particular intervention to improve the reading accuracy of children identified as having a specific learning disability in reading.

*Dr. Richard Sabousky, Special Education, Rehabilitation and Human Services  
Faculty Advisor*

Kristen Burkholder is from Mount Holly Springs, Pa. She has a major in early childhood and special education and will receive a Bachelor of Science in Education degree. Upon graduation, Kristen plans to pursue a job in either elementary or special education. After a few years of teaching experience, she hopes to return to school to obtain her master's degree in special education, specifically emotional and behavioral disorders.



**Emily Carey**

## FABRICATION OF ICOSAHEDRAL QUASICRYSTALLINE NANOPARTICLES ON ALUMINUM BASED ALLOYS



It is already known that stable quasicrystals can form in compositions of Al-Cu-Fe and Al-Cu-Fe-Si. However, quasicrystalline structures on a nano-scale have not been reported.

The purpose of this research is to determine if they can be fabricated on the nano-scale. It will be tested if there is a possibility for quasicrystalline nanoparticles to form on either alloy through a process of crushing small samples of each alloy and sending them through a filtering process.

They will then undergo a process of chemical etching to reduce the particle size even more. Afterward, the particles of each alloy will be analyzed with a Tescan scanning electron microscope. If icosahedral structures are found in the alloys, then quasicrystals are present on the nano-scale.

*Dr. Chungel Li, Physics  
Faculty Advisor*

Emily Carey is from Camp Hill, Pa. She has a major in physics, cooperative engineering, with minors in mathematics and honors. She will be receiving a Bachelor of Science Degree. While completing her undergraduate degree, Emily was named to the Dean's List every semester, was a member of Phi Eta Sigma and a member of Pi Mu Epsilon Mathematics Honors Society. She also received the Board of Governors Scholarship, the Karl and Igne Sandler Memorial Scholarship and the William Hard Scholarship. After graduation, Emily plans to transfer to the University of Pittsburgh to pursue a bachelor's degree in civil engineering, focusing mainly on structural design.

## Dalton Chrobocinski

### SHINING LIGHT THROUGH THE GLASS CEILING



My senior project is about the glass ceiling in the business world. Since I plan to become a senior manager of a business, I believe that everyone should be compensated at the same level regardless of gender.

This project will shed light on the pay differences among men and women and how education levels affect pay.

*Dr. Gustavo Barboza, Administrative Science  
Faculty Advisor*

Dalton Chrobocinski is from Willow Grove, Pa. He has a major in business management and will receive a Bachelor of Science in Business Administration. While pursuing his undergraduate degree, Dalton was a member of Phi Eta Sigma and Omicron Delta Epsilon and averaged a Dean's List QPA. Upon graduation, Dalton plans to move back home to Philadelphia and pursue his management career.

## Samuel Curtis

### SOPA AND PIPA: COULD THEY HAVE WORKED?



In regards to the increased infringement upon intellectual property, the United States government has looked into passing anti-piracy laws. The Stop Online Piracy Act (SOPA) and the Protect Internet Protocol Act (PIPA) attempted to “provide tools to the attorney general and rights holders to protect from intellectual property infringement.”

This research uses an event-study methodology to examine investor and market response to the changes made by the introduction of these acts. Data is included from several music, cinema and other media-related sectors.

The study findings will show whether the effects of introduction of the acts had the intended effects on the media markets or were ineffective as enforceable laws.

*Dr. William Pratt, Finance  
Faculty Advisors*

Samuel Curtis is from Punxsutawney, Pa. He has a major in mathematics and corporate finance and will receive a Bachelor of Science and a Bachelor of Science in Business Administration. Upon graduation, Samuel plans to enter the workforce to gain experience and then return back to school for a Master’s in Financial Engineering degree.

## Kristin Day

### HOW DOES PARENTAL INFLUENCE IN SPORTS EFFECT A CHILD'S SELF-ORIENTATIONS, PERFECTIONISM AND FUTURE IN SPORTS?



Parents can have an extreme impact on their children as they grow up and participate in sports. Not many parents realize the dangers that can come from their involvement. It has been found that athletes with harsh and critical parents tend to perceive every mistake with personal failure.

The fear of failure is socialized by the parents' punitive behavior, controlling behavior and high expectations for achievement. When athletes acquire this fear of failure, they develop anxiety and high levels of perfectionism that can be detrimental to their emotional and physical health.

While most of the studies that have been previously performed looked at the negative side of parental involvement, I would like to also incorporate the positive aspect that can be a result.

For my research, I created a survey that delves into athletes' socialization in sports from their parents, discover their levels of perfectionism, explore their self-orientations and look at the future that they plan to have with sports. The population I surveyed is college athletes here at Clarion University. The results will be compiled into tables, and statistically significant results will be reported.

*Dr. Mary Jo Reef, Sociology*

*Jane Walsh, Sociology*

*Faculty Advisors*

Kristin Day is from Reynoldsville, Pa. She has a major in chemistry, with a concentration in bio-chemistry, along with minors in sociology and honors. She will receive a Bachelor of Science degree. While completing her undergraduate degree, Kristin reached numerous milestones in her sports career. In 2011, she was the bronze medalist in the World Age Group Championships on double-mini trampoline. Kristin also had an impressive swimming and diving career and, in 2014, won first place in both 3 meter and 1 meter. She was named an All-American six times. Also in 2014, she was named Division II Diver of the Year and Academic All-American of the Year. Kristin also received the honor of being a scholar-athlete through her entire college career. Upon graduation, Kristin plans to attend Lake Erie College of Osteopathic Medicine to become an orthopedic surgeon.

**Derek Dietz**

## VISUALIZING THE PAST: INCORPORATING INFOGRAPHICS AND NONFICTION INSTRUCTION IN TODAY'S SECONDARY ENGLISH CLASSROOMS



With the advent of new education policies, it has become increasingly important to effectively teach nonfiction writing and analysis in modern high school classrooms.

Instead of writing typical papers, infographics represent a new way to incorporate electronic literacy into the educational setting, and they allow students to craft a final product that has an authentic purpose and meaning.

This presentation will discuss the multitude of benefits infographics bring into the classroom, highlight the ways in which they augment nonfiction instruction and showcase the positive impact they have on a learning community of adolescents.

*Dr. Chris McCarrick, English  
Faculty Advisor*

Derek Dietz is from Butler, Pa. He has a major in secondary English education with a minor in honors and will be receive a Bachelor of Science degree. While completing his undergraduate degree, Derek was named Clarion University's English Major of the Month in October 2013. He also had a short fiction story published in *The Rectangle*, Sigma Tau Delta's creative writing journal. Upon graduation, Derek plans to acquire a teaching position at the secondary level and instill the passion of learning in the youth of America.

**Kaitlyn DiVito**

**SUBCREATION:  
HISTORY, SIGNIFICANCE, AND IMPLEMENTATION**



For my project, I investigated secondary world creation, the creation of fantasy worlds like Middle Earth, and applied it to my own writing.

*Dr. Melissa Downes, English  
Faculty Advisor*

Kaitlyn DiVito is from Cranberry Township, Pa. She has a major in English with minors in web development and honors, and a concentration in writing. She will receive a Bachelor of Arts degree. While completing her undergraduate degree, Kaitlyn was named to the Dean's List seven semesters, received the Foundation Honors Scholarship for the years 2012 to 2014 and was named English Major of the Month in May 2014. She also received a certificate of achievement in German language and literature from the German Consulate. Kaitlyn was a member of Phi Eta Sigma Freshman Honors Society and Phi Kappa Phi Junior Honors Society. She was a National Residence Hall Honorary, presented a group project on Jane Austen fanfiction at the EC/ASECS 45<sup>th</sup> annual conference and has been published in the *Tobeco Literary Arts Journal*. Upon graduation, Kaitlyn plans to either enter the workforce or attend graduate school for computational linguistics.

**Rebecca Mae Greenman**

## THE MODERATING EFFECTS OF TEACHER LIKABILITY ON STUDENT ENJOYMENT OF TEACHER-INTRODUCED TEXTS



Research concerning the relationship between a student's affective response to a teacher and his or her reaction to that teacher's assigned text is limited. The following research question directs this study: "Is there a correlation between a student's opinion of an assigned text and his or her opinion of the educator who assigned that text?"

My correlational study targets Clarion University students with a wide range of majors. With this research project, two topics which have thus far been connected only implicitly are analyzed directly: (1) the effects of teacher likability and (2) reasons students enjoy certain texts over others.

*Dr. Brian Maguire, Education  
Faculty Advisor*

Rebecca Greenman is from Fairview, Pa. She has a major in secondary English education, minors in both psychology and honors and will receive a Bachelor of Science in Education degree. While completing her undergraduate degree, Rebecca was named English Major of the Month and published poetry and prose pieces in *Tobeco*, Clarion's literary and arts journal. She was awarded numerous scholarships including the Belle Carson Randall Honors scholarship, the English Alumni Endowed Scholarship, the Lawrence Smith Outstanding Senior Education Scholarship, the Foundation Honors Scholarship, the Gilbert Neiman Scholarship and the Pennsylvania Board of Governors Scholarship. Rebecca was also a member of Phi Kappa Phi Collegiate Honors Society, Kappa Delta Pi Educational Honors Society and Sigma Tau Delta English Honor Society. Upon graduation, she plans to enter the Pennsylvania school system as a high school English teacher, and hopes to eventually earn a Master's of Education degree in curriculum and instruction.

## Emilee Gysegem

# FACTORS INFLUENCING COLLEGE CHOICE: A STUDY OF DIVISION II STUDENT-ATHLETES AT A NORTHWESTERN PENNSYLVANIA INSTITUTION



This research is aimed at identifying and evaluating college selection factors of current student-athletes at Clarion University. The data collected for this study was obtained through a modified version of the Student-Athlete College-Choice Profile (SACCP) survey created by Gabert, Hale, and Montalvo (1999).

The population of student-athletes at Clarion was asked to reflect on their decision to attend the university as a student-athlete and rate how influential the list of 38 factors were on their choice to attend and compete for the institution. The rating system consists of a five-point Likert-type scale.

The results from the analysis of this survey will be used to help Clarion University's coaches and admissions department in their recruiting efforts.

*Wendy Snodgrass, Athletics  
Faculty Advisor*

Emilee Gysegem is from Warren, OH. She has a major in business management and minors in sports management, athletic coaching and honors. Emilee will receive a Bachelor of Science degree. While pursuing her undergraduate degree, she was named an NCAA Division II All-American and an NCAA Academic All-American. She received the PSAC Scholar Award for 2014 and 2015 and maintained a 4.0 QPA, being named to the Dean's list seven times. She was named to the Capital One/CoSIDA Second Team Academic All-American in the at-large category. Emilee served as the women's swim team captain and was the Student Athlete Advisory Committee (SACC) vice president from 2013 until 2015. She received the E. James and Patricia Kelley Honors Program Athlete Scholarship in 2014. She was also a part of Phi Eta Sigma, Beta Gamma Sigma and Phi Kappa Phi. After graduation, Emilee plans to move to North Carolina to attend graduate school and plan her upcoming wedding.



## Brianna Henry

### EFFECT OF ATRAZINE ON CRAYFISH FOOD CUE RESPONSE



Atrazine, a triazine herbicide used to kill broadleaf weeds in agriculture and runway applications, is one of the most widely used pesticides in the United States. Rain and other storm events often carry the chemical from terrestrial to aquatic systems, where it has been observed to cause several negative effects, including reduced olfactory sensitivity.

In this study I examine the impacts of the herbicide Atrazine on crayfish responses to food cue and pursue possible explanations for behavioral changes based on observation of olfactory structure surface morphology utilizing scanning electron microscopy.

Because Atrazine has been observed to be an endocrine and olfactory disruptor in other species, its non-lethal effects in crayfish could potentially disrupt the food web dynamics of aquatic systems. I hypothesize that exposure to ecologically relevant concentrations of Atrazine will result in irregular behavior in crayfish presented with chemical cues indicating the presence of a food source.

*Andrew Keth, Biology  
Faculty Advisor*

Brianna Henry is from Harrisburg, Pa. She has a major in biology, with a concentration in ecology and evolutionary biology, minors in sociology and honors, and will receive a Bachelor of Science degree. While completing her undergraduate degree, Brianna led three research projects, and assisted on three others. She acted as the manager of Dr. Keth's research lab for two years. She was president of the Society for Conservation Biology chapter for two years, presented at several conferences and has received the Cold Water Conservation Scholarship, along with an Honors Scholarship. After graduation, Brianna plans to attend graduate school at either the University of South Dakota or Ohio State. She hopes to obtain her PH.D. and become a college professor or government researcher.

**Madeline Kopper**

## AN EXAMINATION OF SOCIO-COMMUNICATIVE ASPECTS OF APHASIA THERAPY



This project examines the attitudes and opinions of practicing speech-language pathologists (SLP) toward socio-communicative aspects of therapy sessions when treating individuals with aphasia.

A researcher-designed survey, based on the work of Brown, Worrall, Davidson and Howe (2012) pertaining to therapeutic outcomes (e.g. participation, meaningful relationships, communication, positivity), was distributed to SLPs nationwide using an American Speech-Language-Hearing Association list-serve.

Data analysis provided information on therapeutic targets, methodologies and considerations which were considered most important for achieving satisfactory socio-communicative client outcomes. These results may potentially shed light on those factors important for the delivery of more “realistic” programs of intervention aimed at increasing the post-intervention quality of life for those with aphasia.

*Kenneth Staub, Communication Sciences and Disorders  
Faculty Advisor*

Madeline Kopper is from Poland, OH. She has a major in speech-language pathology and audiology, along with minors in psychology, leadership-entrepreneurial track and honors, and will receive a Bachelor of Science degree. While completing her undergraduate degree, Madeline served as Honors Program student director, secretary of the National Student Speech Language Hearing Association and historian for Psi Chi, Psychology Honor Society. She received the France-Allison Honors Scholarship, the Class of 1961 Scholarship, the Foundation Honors Scholarship, the Polish National Alliance Scholarship and the David Smith Housing Scholarship. Madeline was inducted into Phi Eta Sigma, Phi Kappa Phi and Psi Chi, and also presented research at several collegiate conferences. She also was on the Dean’s List each semester. Upon graduation, Madeline plans to attend graduate school in pursuit of a master’s degree in speech-language pathology.

**Leah Loscar**

**“GROWING UP MASCULINE:”  
AN ANALYSIS OF GENDER EXPECTATIONS DEPICTED BY MALE CHARACTERS  
IN CARTOON NETWORK’S “CLARENCE”**



Cartoon Network’s “Clarence” chronicles the adventures of a young boy named Clarence and his two best friends, Jeff and Sumo. This study analyzes gender expectations depicted by male characters in the series by comparing character behavior to a list of traditionally masculine and traditionally feminine traits.

Psychologists suggest that traditional views of masculinity in American culture are unhealthy. Examination of the first season’s episodes determines whether the show reinforces or challenges traditional views of masculinity in American culture.  
*Dr. Myrna F. Kuehn, Communication*

*Faculty Advisor*

Leah Loscar is from Pittsburgh, Pa. She has a major in communication with a concentration in journalism, with minors in both music and honors. She will receive a Bachelor of Science Degree. While completing her undergraduate degree, Leah interned at *The Derrick* and *The News-Herald* during her junior year, taking on the responsibilities of a staff writer. She also served as the arts and entertainment editor for *The Clarion Call*. After graduation, she would like to find a job in publication design, or would enjoy reporting for an entertainment-focused magazine. She also plans to continue pursuing her musical talents in the form of singing and songwriting.

## Erin Lynch

# THE IMPACT OF AUDITORY STIMULATION DURING SHORT-TERM MEMORY THERAPY SESSIONS WITH ADULTS (35-90 YEARS) SUFFERING CEREBRAL VASCULAR ATTACKS AND TRAUMATIC BRAIN INJURIES



This study will begin to explore the idea of integrating acoustic stimulation during regular therapy sessions of adult patients ages 35 to 90 recovering from Cerebral Vascular Attacks and traumatic brain Injuries.

Individuals studied will be receiving in-patient therapy in a skilled nursing facility. Short-term memory activities are very common treatment techniques used for rehabilitation in these scenarios.

The brain is an intricate organ that often works in mysterious ways. One of the best ways to work out each aspect of the brain is to combine tasks in order to facilitate growth. We are aiming to see if there will be improved success during short-term memory tasks with the addition of soft music in the background. Not only will this make the tasks more engaging, but the music will pose as an attention directive.

Every brain is different and requires specific treatment plans, so patients will be seen on their regular schedules with this implemented over a span of five therapy sessions over three weeks. Spontaneous recovery of the brain in a short period of time after the incident is common; in order to properly record the most accurate data, it will not begin to be collected until at least one month after the initial onset. The data collected will be compared to past cases of similar incidents along with research studies to determine if there is any difference with the introduction of soft background music during short-term memory tasks.

*Natalie Armstrong, Communication Sciences and Disorders  
Faculty Advisor*

Erin Lynch is from Smithtown, NY. She has a major in speech language pathology and audiology, minors in psychology and honors, and will be receiving a Bachelor of Science Degree. While completing her undergraduate degree, Erin was named an NCAA Division II Scholar Athlete every semester, along with being on the Dean's List her entire time at Clarion. Erin was also the recipient of the Women's Metropolitan Golf Association Scholarship. Upon graduation, she plans to enroll in the clinical doctorate of audiology program.

## Anna McNurlen

### FINANCIAL ENGINEERING AND CANCER RESEARCH



Biomedical research is becoming increasingly risky, complex and costly. Using public and private equity to finance this research is now more difficult.

The proposed solution to this problem is to create a “mega-fund,” which is a single financial entity that will invest in multiple biomedical projects at various stages in their development, financed by debt and equity. The assets within the “megafund” will be packaged with call options on cancer treatment companies that will hedge the risk for the total portfolio.

*Dr. Matthew Brigida, Finance  
Faculty Advisor*

Anna McNurlen is from Washington, Pa. She has a major in corporate finance with minors in economics, Spanish and honors. She will be receiving Bachelor of Science and Bachelor of Arts degrees. During completion of her undergraduate degree, Anna was a part of Phi Kappa Phi, Beta Gamma Sigma and Phi Eta Sigma. She was named to the Dean’s List for seven semesters and was a scholar athlete. After graduation, Anna will work as an entry-level financial analyst at The PFM Group in Harrisburg.

## Alex Nadas

### ARCTIC PERMAFROST DYNAMICS



Arctic permafrost is defined as soil that is at or below the freezing point of water for two or more consecutive years. My senior presentation will consist of an overview of permafrost basics while focusing on my field experiences from attending the University Centre in Svalbard, Norway.

Being selected from over 60 applicants to participate in the International Bachelor Permafrost Summer Field School for three weeks last summer allowed me to gain valuable experience in Arctic field methods.

In regards to my research paper, I focused on researching arctic coastal dynamics related to permafrost such as thermal erosion and block failure.

*Dr. Anthony Vega, A.G.E.S.  
Faculty Advisor*

Alex Nadas is from Mansfield, Pa. He has a major in environmental geoscience with a concentration in oceanic/atmospheric sciences and honors and will receive a Bachelor of Science degree. While pursuing his undergraduate degree, Alex received the Board of Governors Full Tuition Scholarship and the PSECU International Study Scholarship. He was selected to participate in a one-year ISEP Study Abroad Placement in Bodo, Norway, and the International Bachelor Permafrost Summer Field School. Alex was on the Dean's List from 2011-2015 and was also a member of Phi Eta Sigma Honors Society. Upon graduation, Alex will either take a paid internship or a job in his field. He also has interests in joining the Peace Corps, or enlisting in the Air Force Reserves.

## John Owens

### ANALYZING STUDENT DEBT AWARENESS AT CLARION UNIVERSITY



This research examines student debt awareness on the campus of Clarion University. It evaluates students' awareness of their loan debt, how they feel that compares with other students, their knowledge about loans and their plans to repay them.

*Dr. Paul R. Woodburne, Economics*

*Dr. Rod Raehsler, Economics*

*Faculty Advisors*

John Owens is from Nesquehoning, Pa. He has a major in finance, with concentrations in corporate and personal, and minors in both economics and honors. He will receive a Bachelor of Science in Business Administration degree. During completion of his undergraduate degree, John was nominated for the Ali Zaidi Award and the James Gemmell Award. He received the France-Allison Honors Scholarship, the Charles P. Leach Scholarship, the Enid Dennis Scholarship, the Foundation Honors Scholarship, the Henry G. Burns Scholarship, The Bernard F. Boyle Scholarship, the PPL Intern Scholarship, the Burns & Burns Scholarship and the APSCUF Scholarship. He was also given the Distinguished Service to Honors award. John was a part of Beta Gamma Sigma, Phi Kappa Phi, Phi Eta Sigma and was president of Omicron Delta Epsilon. He was named to the Dean's List and received The Harrisburg Internship Semester. Upon graduation, John will work at the University of Pittsburgh's Medical Center, with their financial management rotation program. He eventually hopes to pursue a master's degree in public administration.

**Madeline Robinson**

## ANNEXIN 1 ABILITY TO FACILITATE CLEARANCE IN THE IMMUNE SYSTEM WITH THE ADDITION OF CALCIUM



Annexin 1 is a calcium/phospholipid-binding protein which promotes membrane fusion and is involved in exocytosis and evasion of foreign entities in the immune system.

My project studies the involvement of Annexin 1 on the clearance of bacteria by macrophages and by studying the receptor complex on the neutrophil where Annexin 1 binds. My main focus is whether or not calcium facilitates in this binding interaction on the neutrophil.

*Dr. Douglas Smith, Biology  
Faculty Advisor*

Madeline Robinson is from East Amherst, NY. She has a major in biology with a pre-medicine concentration, minors in psychology and honors and will be receiving a Bachelor of Science Degree. While working to complete her undergraduate degree, Madeline was named an NCAA Scholar Athlete every semester, along with being named to the Dean's List, and received the Who's Who in American Universities award. She was varsity tennis team captain. Madeline was a member of Beta Beta Beta Biology Honorary, National Residence Hall Honorary and Phi Eta Sigma Honorary. Upon graduation, Madeline plans to attend medical school and train to be a pediatrician.



## Tonya Shaffer

### USING BANNED BOOKS TO TEACH HISTORY



Banned books are a frequent topic of discussion in libraries and classrooms.

Classics, or those books that have achieved significant recognition and represent the time period in which they are written, are prone to even more scrutiny and are often banned for social reasons such as offensive language or racial issues.

In high schools, banned classics can face much opposition that ultimately undermines their historical value. High school English teachers can help combat this opposition by selecting texts to be used in interdisciplinary units, further integrating the curriculum.

Fifty Pennsylvania school districts were selected at random to survey high school English teachers and determine their familiarity with banned books, attitudes toward censorship and historical merit of banned classics. The data will be used to determine if banned classics are worthy of cross-curricular inclusion in the high school curriculum.

*Dr. Simon Aristeguieta, Library Science  
Faculty Advisor*

Tonya Shaffer is from Brookville, Pa. She has a major in library science, minors in history and honors and will be receiving a Bachelor of Science in Education degree. While working to complete her undergraduate degree, Tonya was a member of Phi Kappa Phi, Kappa Delta Pi and Phi Eta Sigma. She was treasurer for Lambda Sigma, the library science honorary, and was named to the Dean's List all seven semesters. Tonya was the recipient of the Class of 1961 Scholarship, the Charles R. Flack Scholarship and the France Allison Honors Scholarship. After graduation, Tonya plans to receive a master's degree in library science from Clarion University.

**Kelsey M. Slayton**

## MAPPING RECLAIMED STRIP MINED AREAS THROUGH CHANGE DETECTION USING NDVI



For much of the mid-20<sup>th</sup> century, western Pennsylvania has undergone extensive strip mining. These practices have been reduced drastically in recent years, but the repercussions of past mining efforts still remain in full force.

Acid mine drainage (AMD) has been a major polluter of western PA's environment, increasing acidity of streams and rivers and devastating their ecology. The Mill Creek Watershed is no exception to the effects of AMD. Much of this watershed has been polluted, as can be seen by the orange streams and creeks that abound in the area.

Efforts to reduce the effects of AMD can be made; however, it can be difficult to locate point sources of AMD while out in the field. These point sources are the old mines that have undergone reclamation and are very difficult to distinguish from naturally vegetated locations. That is why I aimed to create a reference map to be used in the field to easily locate old strip mines and determine areas most likely to be point sources for AMD.

Using ENVI remote sensing software and ArcMap GIS technology, I was able to map the historic location of strip mines and determine areas that have undergone the most extensive reclamation efforts.

*Dr. Yasser Ayad, A.G.E.S.*

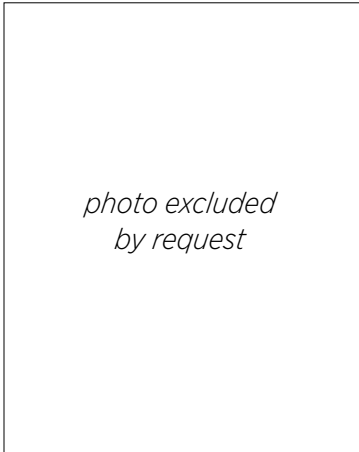
*Mitch McAdoo*

*Faculty Advisors*

Kelsey Slayton is from White Lake, Mi. She has a major in environmental geoscience with concentrations in GIS and atmospheric/oceanic sciences. She has minors in GIS and honors. Kelsey will receive a Bachelor of Science degree. During completion of her undergraduate degree, Kelsey was named to the Dean's List and was a four-year scholar athlete. She received the D2 Athletic Directors Association Academic Achievement award, the Clarion University Academic Achievement award and the Marjorie Tippin Leadership award. She was also the women's swimming and diving team captain. After graduation, Kelsey plans to explore the job force for an opportunity that utilizes her skills working with geographic information systems. She is also open to pursuing a master's degree.

**William Snyder**

## CAMPFIRES IN THE SKY – STAR STORIES OF THE NATIVE AMERICANS



For thousands of years, civilizations of people have looked up at the night sky with wonder and awe to become witness to the greatest storyteller in the universe – the stars. These tales have been passed down over generations and have become the basis for our modern day constellations and star patterns that decorate the night sky.

We often credit these stories and discoveries to ancient civilizations such as the Greeks and Babylonians; however, the contributions of the Native Americans often go unnoticed and untold.

This planetarium program explores our night sky through the stories that Native Americans have told around campfires for generations. The end result is a live and automated, multi-media presentation appropriate for middle-school students through adulthood.

This program will be utilized in future years by Clarion University's community outreach programs in planetarium presentations for visiting school groups, university students and the Clarion community as a whole.

*Dr. Sharon Montgomery, Physics  
Faculty Advisor*

William Snyder is from Monroeville, Pa. He has a major in physics with an astrophysics concentration, with minors in mathematics and honors. He will be receiving a Bachelor of Science degree. During completion of his undergraduate degree, William was the recipient of the Paul Shank Award for Excellence in Physics and was employed as the community director at Diane L. Reinhard Villages. Upon graduation, William plans to pursue a master's degree in business administration at Clarion University.

## Laura Subject

### LONG-TERM EFFECTS OF CONCUSSIONS



In the past 5-10 years, a plethora of research has been done on a traumatic brain injury known as a concussion.

New research has found that sustaining a major concussion or multiple minor ones can create long-term negative effects for people in their everyday lives.

*Jim Thornton, Athletics  
Faculty Advisor*

Laura Subject is from Novi, MI. She has a major in athletic training with a minor in honors and will be receiving a Bachelor of Science degree. During completion of her undergraduate degree, Laura was named to the Dean's List and was a member of Phi Eta Sigma. She also played volleyball. She was named Capital One/CoSIDA Academic All American of the Year in 2014, Daktronics Atlantic Region Player of the Year in 2014 and PSAC West player of the Year in both 2013 and 2014. After graduation, Laura plans to attend Grand Valley State University to receive her doctorate in physical therapy.

**Kathleen Warner**

## DEVELOPMENT OF A BIODEGRADABLE SCAFFOLD FOR SKIN REGENERATION



As the first line of defense against the elements, human skin can undergo a significant amount of damage and trauma.

The study focuses on the development of a porous scaffold, into which the skin cells can grow, composed of two FDA approved biocompatible and biodegradable substances – polylactide/polylactic acid (PLLA), and poly(lactic-co-glycolic acid) (PLGA).

Both PLLA and PLGA are degraded through ester bond breakages, which occur naturally in water over time. The by-products – lactic acid and glycolic acid – are also naturally found as cellular metabolites, minimizing cytotoxicity.

A thin porous scaffold can be achieved through the successive flash freezing and lyophilization processes of PLLA/PLGA solutions. In order to test the scaffolds formed in this preliminary project, primary human keratinocytes were seeded onto each of the scaffolds, allowed to grow, and then assessed for cell viability using an MTT assay.

*Benjamin Legum, Applied Research / Intellectual Property Development  
Faculty Advisor*

Kathleen Warner is from State College, Pa. She has a major in biology with a concentration in pre-medicine and a minor in honors. She will be receiving a Bachelor of Science degree. During completion of her undergraduate degree, Kathleen was a four-year NCAA Division II scholar athlete. She also served as secretary of Beta Beta Beta. Upon graduation, she will be attending the Hull York Medical School in England starting in September.

## Stephanie Warner

### PEACE DIVIDEND OF DEMILITARIZATION IN COSTA RICA



On December 1, 1948, after a brief civil war, Jose Figueres declared the Costa Rican army abolished in order to preserve the country's peaceful status. Figueres was a visionary leader that realized the damages the military was having on this small economy.

After retrieving historical data directly from the Costa Rican Institutions (Central Bank and National Archives), this paper will determine the peace-dividend effects of the decrease of government spending in arms.

An econometric analysis of the different macroeconomic and development variables accounts for the tradeoffs the Costa Rica society faced in terms of a greater quality of life.

*Dr. Sandra Trejos, Economics  
Faculty Advisor*

Stephanie Warner is from Aliquippa, Pa. She has a dual major in accounting and economics, with minors in international business, finance and honors. She will be receiving Bachelor of Science and Art degrees. During completion of her undergraduate degree, Stephanie was a member of Beta Gamma Sigma, Phi Kappa Phi, Omicron Delta Epsilon and Phi Eta Sigma. She was nominated for the Ali-Zaidi Award and received the France Allison Scholarship. Upon graduation, Stephanie plans to complete a summer internship with KPMG at their Pittsburgh location. After that, she hopes to further her education by obtaining a master's degree in business administration.

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Junior: Jocelyn Uchic  
Junior: Emma Carter  
Sophomore: Kaitlynn Sass  
Sophomore: Warren Huey  
Freshman: Andrew Skubisz  
Freshman: Corinne Hoopes

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Rebecca Dudek	Kaitlynn Sass
Erica Fries	Danielle Savitsky
Emilee Gysegem	Andrew Skubisz
Kate Hammond	Madison Stahr
Brooke Homan	Sarah Strausbaugh

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**Clarion University Foundation, Inc.**

**Jane France and Chris Allison**

**The Mochnick Family**

**Sigma Tau Gamma Fraternity**

**The Class of 1961**

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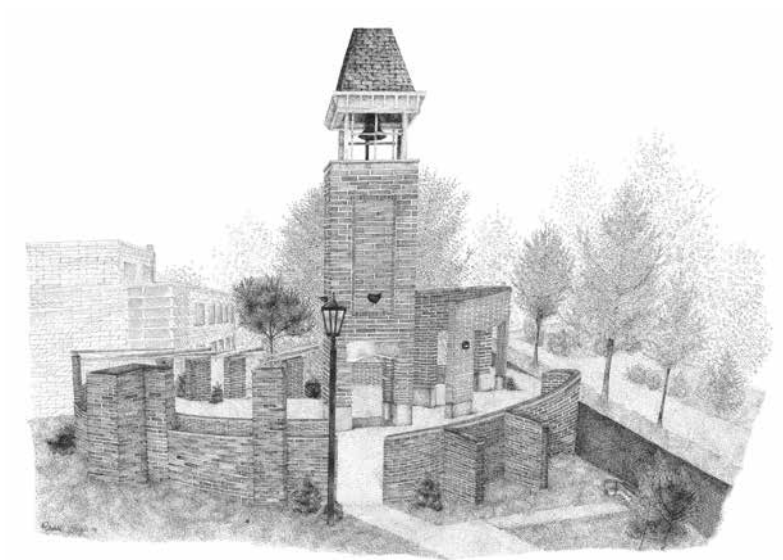
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**Special thanks to those assisting us in this evening's arrangements:  
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