

# 2020 Shepherd University Exhibition of Undergraduate Research and Creative Endeavors Abstracts Collection

## INTRODUCTION:

Starting Wednesday, April 15, on the Strategic Research Initiatives webpage ([www.shepherd.edu/sri/](http://www.shepherd.edu/sri/)), Shepherd University will host an Exhibition of Undergraduate Research and Creative Endeavors. At this event, we will highlight student research presentations (in both oral and poster formats) from across campus. Students selected by their departments or programs have assembled these works and present them to the members of the Shepherd community.

Although we are unable to be together in person for this event, please join us for this dynamic online undergraduate research experience. It is our hope that the event will foster interplay between multiple specializations as visitors and presenters come to appreciate the interconnections between disciplines. We also wish to recognize and celebrate the continued commitment of our undergraduate scholars. Their perseverance and academic commitment during this challenging time is noteworthy and deserving of recognition.

In order to give visitors an understanding of these research and creative works, we present in this document a collection of abstracts provided by the student authors. They are organized alphabetically by the following topic areas:

- Biology
- Computer Science, Mathematics, and Engineering
- Education
- English and Modern Languages
- Environmental and Physical Sciences
- Political Science, Global Studies, and Geography
- Psychology

We hope that you will join this online event, where you can listen to and view the products of our student scholars.

With appreciation,

The Exhibition of Undergraduate Research and Creative Endeavors Working Group-

Dr. Jason Best, Professor of Astronomy and Astrophysics & Director of Strategic Research Initiatives

Ms. Amy Speck, Senior Administrative Coordinator to the Provost

Dr. Sher Hendrickson, Associate Professor of Biology

Dr. Lindsey Levitan, Associate Professor of Psychology

Dr. Jennifer Penland, Associate Professor of Education

Dr. Janine Sam, Assistant Professor of Business Administration

## **BIOLOGY**

Title: Fruit Fly Males Occasionally Guard Their Recent Mates from Other Suitors

Presenter: Alexis Fritts

Presentation Type: Oral

Abstract: Competition between males for a mate is well-documented and affects reproductive success. Males of other insect species have shown complex mate guarding behavior during the post-copulation period to protect their mate from potential suitors. This behavior may be selected for since the trait of guarding and possibly other associated traits would be more likely to be passed down to subsequent generations over mating traits without mate guarding. The trait of mate guarding would ensure the selfish passage of that male's traits to future generations. Wild-type fruit flies (*Drosophila melanogaster*) were tested for their propensity to mate guard post copulation. To identify mate guarding, two marked males and a female fruit fly were placed in a breeding vial after a three-day maturation and isolation period. Their activity was videoed for three hours. A second-by-second study of the first competition test revealed six main male behaviors; 1, mate guarding, 2, mate-to-mate contact, 3, mate-to-mate contact followed by aggression towards the other male, 4, mater assaults non-mater, 5, non-mater assaults mater, 6, non-mater contacts female and assaults mater. The post-copulation behavior of the males in nine other tests were categorized by the six behaviors. If one considers mate guarding and other acts of aggression towards the non-copulating male together, then the video footage showed that males successful in copulation guarded their mates.

## **COMPUTER SCIENCE, MATHEMATICS, AND ENGINEERING**

Title: Modeling and Analyzing the Effect of a Radiation Therapy on Tumor Growth

Presenter: Katey Burner

Presentation Type: Oral

Abstract: Radiotherapy (RT) is one of the most common and effective cancer treatment options, even being used in more than half of all cases to cure cancer in high income countries. Due to the need for radiation therapy, research into maximizing the effectiveness of RT is critical. Mathematical modeling and computer simulations provide powerful tools to investigate potential optimal dosage and timing for tumor control. In this work, we have developed a mathematical model using a system of impulsive ordinary differential equations (IODE) to describe how RT interacts with other major players of the tumor microenvironment. Stability analysis was conducted for the tumor-free equilibrium. Future work includes analyzing ways to maximize the effects of RT using computer simulations. The objective of this study was to develop a platform to improve cancer management by manipulating dose and fractionation schedules of RT. This study is supported by NIH Grant P20GM103434 to the West Virginia IDeA Network for Biomedical Research Excellence.

Title: Using Remote Sensing and Convolutional Neural Networks for the Identification of *Picea rubens*

Presenter: Emily Cyford

Presentation Type: Oral

Abstract: Red Spruce (*Picea rubens*) is a native species to the Monongahela National Forest. Past mineland reclamation and timber harvest activities have resulted in a forest composed of non-native species. As part of current reclamation efforts, it is necessary to locate existing red spruce in large geographic areas. Making a physical survey of this large of an area would be too costly. Therefore, we are using remote sensing lidar and multispectral data with deep learning to automate the process.

Title: Modeling the Effects of An Anti-CTLA-4 Antibody Therapy on Metastatic Melanoma

Presenter: Heidi Reichert

Presentation Type: Poster

Abstract: CTLA-4 is a co-inhibitory molecule that functions to regulate T cell activation. Antibodies that block the interaction of CTLA-4 with its ligands B7.1 and B7.2 can enhance immune responses, including anti-tumor immunity. CTLA-4 blockade has demonstrated benefits in treatment of metastatic melanoma. Prior research has found that antitumor immunity can be enhanced through the blocking of CLTA-4. More recently, efforts to combine anti-CTLA-4 antibodies with other forms of cancer treatment like radiotherapy and chemotherapy have proven to be successful. This study has thus focused on the modeling and analyzing the effects of anti-CTLA-4 antibody therapy on tumor growth using impulsive differential equations and mathematics analysis. This project is supported by the NIH Grant P20GM103434 to the West Virginia IDeA Network for Biomedical Research Excellence.

## **EDUCATION**

Title: An Examination of the Physical and Mental Spaces That 21st Century Veteran College Students Experience

Presenter: Morgan See

Presentation Type: Poster

Abstract: College experiences for veteran students are now becoming major factors in post-secondary education and success across the country. For many veteran students who find themselves moving into a more academic structured environment, where the focus is typically on the individual achievement and not as group effort. Research has shown this to have significant impacts on their success in college. This proposed mixed-method research will examine both social and academic experiences of veteran students and to determine how to maximize their success and retention in college.

## ENGLISH AND MODERN LANGUAGES

Title: The Wilderness Motif  
Presenter: Allison Brashears  
Presentation Type: Oral

Abstract: This piece primarily investigates the relationship held between early American colonists and the untamed wilderness that surrounded them, as distinguished by three American fiction novels: Edgar Huntly, Hope Leslie, and The Scarlet Letter. In each of these novels, recurring wilderness motifs work to transform a lead character and, as a result, relay information about the fears and values of American colonists in New England.

Title: Fairytales in Action  
Presenter: Linnea Meyer  
Presentation Type: Poster

Abstract: This project takes a closer look at fairytale retellings, an area of Young Adult Literature (YA) that isn't often specifically studied. The fantasy genre is thriving in all age ranges, and there are fairytale retellings for everyone, but YA is the most frequent target audience. These retellings cover an impressive range of genres outside their parent genre of fantasy, from horror to realism. I am studying the underlying reasons for and —more importantly— the effects of this phenomenon. In my blog, I talk about some theories connected to folklore and fairytales. In addition to collecting some different theories on folklore, I show how those theories are applicable by using them to analyze some of my favorite YA retold fairytales.

Title: Batman, Daffy, Wimpy, and *Girls on the Run*, Oh My! Postmodernism and the Cartoon World in John Ashbery's Poetry  
Presenter: Alexandra Rowe  
Presentation Type: Poster

Abstract: This poster is based on an undergraduate research paper titled "Batman, Daffy, Wimpy, and Girls on the Run, Oh My! Postmodernism and the Cartoon World in John Ashbery's Poetry." A segment of the paper was presented for the Department of English and Modern Languages at Shepherd University on December 4, 2019. The presentation critically examined John Ashbery's poem, "The Price of Eggs." Ashbery creatively utilizes the cartoon advertising mascot, Mr. Coffee Nerves, in the poem as a literary technique of postmodernist deconstruction and commentary. The argument of the presentation was based on a close reading of "The Price of Eggs" and through the scholarly research of texts based on the critical theories of postmodernism. Vivid visuals and illustrations were used for the presentation to highlight the relevant connection between Ashbery's poem and pop culture imagery.

## **ENVIRONMENTAL AND PHYSICAL SCIENCES**

Title: Finding Needles in Haystacks: Searching for Pulsars

Presenters: Daniel Speck and Austin Temples

Presentation Type: Poster

Abstract: Since 2015, Dr. Jason Best of Shepherd University has served as a research member on a successfully-funded multimillion dollar grant from the National Science Foundation titled "Gravitational Wave Astronomy and the Appalachian Freshwater Initiative." As noted in the proposal, "The research foci address fundamental science questions that align with state and NSF priorities in water resources science and gravitational wave astrophysics. Across both research foci, education, workforce development, and faculty mentoring programs engage students, the public, and faculty in research activities." This project is aligned with West Virginia's state science and technology strategic plan. As part of this grant, Dr. Best has funded undergraduate student activities as part of the national Pulsar Search Collaboratory (PSC). We present a brief overview of the PSC, and examples of analyses undertaken by the authors as part of their participation in the PSC.

This work is supported by the NSF OIA award number 1458952.

## **POLITICAL SCIENCE, GLOBAL STUDIES, AND GEOGRAPHY**

Title: Nationalism, Patriotism, and Gun Attitudes: the Rise of Identity Politics and Resistance to Gun Reform

Presenter: Erin Lehman

Presentation Type: Oral

Abstract: The mortality rate of American citizens due to gun violence has increased drastically over the last decade. Very little legislation has been passed at any level of government that has been successful in mitigating the damages that have been felt by American society and families. Over the same period of time, there has been a rise in nationalist sentiment in political discourse, and the prevalence of identity politics is creating a societal and political standstill. Patriotism and nationalism are two parts of what makes up an individual's national identity, and in turn forms their perception of society, their place in it, and influences the policies they support. The goal of this study is to further understand the relationship between nationalism, patriotism, and gun laws, on an individual level. Participants are introduction to psychology students, and were given three questionnaires to fill out. Li and Brewer's (2004) measures of patriotism and nationalism were used, as well as Tenhundfeld, Parnes, Conner and Witt's (2017) gun attitudes scale. I hypothesize that individuals who are more nationalistic will be more reluctant to support gun law reform, or banning assault weapons due to their inclination to maintain rigid views of society. Individuals who are patriotic will be more likely to support gun control than nationalistic individuals. Nationalism should account for more of the variance in gun attitudes than patriotism. Linear multiple regression was used to test the hypothesis. Neither nationalism nor patriotism alone could account for a significant amount of the variance, but together, they accounted for a total 9% of the variance in gun attitudes.

**PSYCHOLOGY**

Title: Follow the Leader? The impact of candidate rhetoric on voters' prejudice

Presenter: Michaela Sencindiver

Presentation Type: Poster

Abstract: The role of elections in prejudice expression was examined in 83 students. Participants selected groups they deemed "Un-American" either before or directly after the 2016 election, or after inauguration. There was a significant interaction whereby participants identified more groups targeted by candidate rhetoric as un-American after the inauguration, but only if they voted for the candidate using more prejudiced rhetoric. This suggests political rhetoric's power to shape the values of individuals who vote for candidates using that rhetoric.