



PENN STATE LEHIGH VALLEY

Undergraduate Research Symposium

April 5–9, 2021

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PennState
Lehigh Valley

PENN STATE LEHIGH VALLEY **Undergraduate Research Symposium**

The Penn State Lehigh Valley Undergraduate Research Symposium showcases high-quality undergraduate student-faculty collaborative research and scholarship in all fields of academic study by students enrolled, or previously enrolled within the past academic year, at Penn State Lehigh Valley.

The event provides an opportunity to bring together college students, faculty, expert judges, and the public at large to share in the experiences, knowledge, and original thinking of students engaged in research scholarship.

WELCOME TO THE
PENN STATE LEHIGH VALLEY
Undergraduate Research Symposium

Thank you for attending our Undergraduate Research Symposium at Penn State Lehigh Valley. Our campus is fortunate to have outstanding faculty, with scholars who publish in prestigious academic journals and share their work at national and international conferences. Even more impressive, these faculty members periodically invite undergraduate students to work alongside them, and at times, this enables the undergraduate students to publish co-authored articles in scholarly journals. This is a tremendous opportunity for our students – the kind of opportunity typically only afforded to graduate students at research-intensive institutions.

Each spring our students and faculty have the opportunity to share their undergraduate research efforts with the campus community and general public. The research exhibited today illustrates the significant time and energy of both students and faculty mentors. This process begins as students demonstrate their intellectual curiosity combined with exemplary performance on class research projects. Faculty recognize these efforts and invite outstanding students to present their work in forums such as this research symposium.

Other campuses from the Penn State system have similar symposia. Judges select the best projects at each location and invite these individuals to present their work at regional competitions. Some of our students will or may have already exhibited their research efforts in other settings – such as the Capital Symposium in Harrisburg, or the University Symposium for Undergraduate Research at University Park.

An event like this does not happen without the assistance of many talented and dedicated faculty and staff, especially those faculty you see today along with their students. Many thanks to our faculty mentors, the members of the organizing committee, as well as the judges. Finally, thanks to our students for sharing their scholarship with our campus community.

Mark Gruskin, Ph.D.
Associate Director of Academic Affairs

SPECIAL THANKS TO FACULTY AND STAFF SERVING AS JUDGES AND MENTORS

JUDGES

Alison Bonner
Kermit Burley
Tracey Carbonetto
Dr. Margaret Christian
Eileen Grodziak
Dr. Nichola Gutgold
Dr. Daniel Jackson
Jen Jarson

Colleen Krcelich
Richard Martin
Dr. Maung Min
Elizabeth Nelson
Dr. Denise Ogden
Dennis Phillips
Dr. Hal Scholz

MENTORS

Tracey Carbonetto
Dr. Elizabeth Flaherty
Dr. Daniel Jackson
Dr. Karen Kackley
Dr. David Livert

Dr. Jennifer Parker
Dr. Todd Retzlaff
Dr. Nicole Ryerson
Dr. Harold Scholz

PLANNING COMMITTEE MEMBERS

Michelle Kaschak
Larry Musolino
Dr. Nicole Ryerson
Dr. Jeffrey Stone

STUDENT PARTICIPANTS

(in alphabetical order):

Nawal Afzal
Aemen Ali
Jeanette Bautista
Kate Byrnes
Chris Fiegel
Tobey Field
Anairobi Imbert-Sanchez
Simranpreet Kaur
Riley Koch
Francis Kuklis
Mahnoor Malik
John Marlo Medalla
Joshua Misiti
Boaz Mokaya
Alejandra Pena
Angelica Pirog
Sherina Suthakar
Victor Velez
Abigayle Ward

PENN STATE LEHIGH VALLEY
Undergraduate Research Symposium
SCHEDULE
APRIL 9, 2021

- 12:15 p.m. Welcome by Dr. Mark Gruskin
Associate Director of Academic Affairs
- 12:20 p.m. Keynote Speaker: Dr. Anita Yuskauskas
"Research as Formalized Curiosity"
The presentation deals with the importance of curiosity and question-asking in research. We will explore the different types of curiosity, and how it has influenced great discoveries. We will also look at how curiosity influences current social activism, particularly in the Gen Z cohort. Finally, we will address how curiosity and research have contributed to my own work in social and health policy.
- 12:40 p.m. Awards Presentation
- 12:50 p.m. Closing remarks

STUDENT PRESENTATIONS: SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS

1. Using a computer program to determine the mechanical advantage of a pulley system

Student Presenter: Aemen Ali

Faculty Mentor: Tracey Carbonetto

Abstract: None

2. Civil Engineering Physics Research Project

Student Presenter: Tobey Field

Faculty Mentor: Tracey Carbonetto

Abstract: Climate change has significantly altered natural snow patterns causing record-breaking snowfall to take place. Homeowners should be aware of the powerful forces snow loads can exert on roofs. Previous studies have concluded too much snow on a roof can cause problems without displaying vital statistics of when the snow loads approach the upper limit. The research was required to examine the factors of different roof varieties and their relationships to snow loads and total weight. The total load and weight calculations were derived from the Omni snow loads calculator. Google maps were also utilized to measure the Northampton Lanes bowling alley in order to evaluate the collapse. The data from the spreadsheet provided vital information in determining one of the major factors of excessive snow loads. As snow sits on a roof, the type of snow changes as time goes on. Wind-packed snow which is denser than fresh snow exerted a greater force with less thickness. Although fresh snow is relatively safe, wind-packed snow should be removed from roofs when the thickness is eleven to twelve inches as these values cause the snow load to reach the upper bound of twenty-five pounds per square foot.

3. Impact of Urbanization on Total Species Richness and Diversity

Student Presenter: Sherina Suthakar, Nawal Afzal, Mahnoor Malik

Faculty Mentor: Dr. Karen Kackley

Abstract: The purpose of this experiment was to determine the effect of urbanization on species richness and diversity of the Laurel Run stream. Prior research shows a negative correlation between urbanization and the quality of the aquatic ecosystem (Roy, et al., 2003). To test the theory, physical, chemical, invasive species and biological data were collected to monitor the quality of the Laurel Run stream which runs into the Delaware basin to the Atlantic Ocean. A slight shift in the tolerance of the macroinvertebrates collected was observed. As explained by the Delaware River Basin Committee (2008), most impaired streams are found in urbanized areas. With an increase in urbanization in the Lehigh Valley, species diversity and richness may heavily shift to the extreme tolerant species, disrupting the transfer of energy. The study was undertaken to analyze the effect of urbanization on aquatic ecosystem's species richness and diversity.

4. Geochemical Composition of MGS-1 Martian Regolith Simulant and the Effects of Electroconductivity on Germination of Brassica rapa Fast Plants

Student Presenter(s): Francis Kuklis, Abigayle Ward

Faculty Mentor: Dr. Daniel Jackson, Dr. Karen Kackley

Abstract: The purpose of this study is to examine the impact of electroconductivity-adjusted Martian Regolith Simulant (MGS-1) on the germination of Brassica rapa. Regolith electroconductivity (EC) conditions of 0.5, 1, 1.5, 2, 2.5, and 3-mS/cm were examined. While none of the final percentage germinations were significantly different, there was a trend towards higher germination rates at lower regolith ECs. The highest percent germination was found at 1.0mS/cm.

5. Utilizing MATLAB to Model Solar Cell Output

Student Presenter: Joshua Misiti, Boaz Mokaya

Faculty Mentor: Dr. Harold Scholz

Abstract: None

6. Modeling the Changes and Differences in the Rate of COVID Infection

Student Presenter: Angelica Pirog

Faculty Mentor: Dr. Todd Retzlaff

Abstract: A program was written to analyze the Basic Reproduction Rate (BRR) of the Coronavirus as a function of time. The BRR is influenced by many factors, especially peoples' behavior. The program was used to analyze data from several states and countries to get trends of the BRR as the pandemic progressed, and to look at the effects of vaccination on the BRR.

7. Unhealthy Eating and Socioeconomic Disparities Among Young Adults During the COVID-19 Pandemic

Student Presenters: Simranpreet Kaur, John Marlo Medalla, Anairobi Imbert-Sanchez, Jeanette Bautista

Faculty Mentor: Dr. Jennifer Parker

Abstract: Maintaining healthy dietary habits is important to well-being but doing so during a pandemic may be especially challenging and pose additional health concerns alongside the spread of the virus. We investigated eating practices and habits of young adults living in the United States during the height of Covid-19 lockdown restrictions and conducted comparative analysis by socioeconomic status. A cross sectional survey design of 254 participants between the ages of 18 and 28 was employed. We used bivariate analyses (chi square, t-tests and ANOVA) to examine dietary trends and conduct sociodemographic comparative analysis. Results indicate that the Covid-19 pandemic was associated with unhealthy eating behaviors while influences were uneven across different sociodemographic groups. It suggests a need for interventions to ensure that all people are encouraged to eat healthy and have access to foods high in nutrition during national crisis, with particular attention to low-income groups.

STUDENT PRESENTATIONS: ARTS, HUMANITIES, BUSINESS, AND SOCIAL & BEHAVIORAL SCIENCES

8. Impact of Stress on Behaviors Related to COVID-19 Exposure and Other Health Risks

Student Presenters: Mahnoor Malik

Faculty Mentor: Dr. Nicole Ryerson

Abstract: COVID-19 is a public health crisis due to its cold and flu-like symptoms and quick spread. Policies have been implemented to reduce the spread of the infection resulting in a wide range of consequences. A study was conducted (N=148) to analyze the relationship between stress and behaviors related to susceptibility to COVID-19 and other health risks. Students reporting greater levels of stress were more likely to report reduced in-person contact and more likely to identify COVID-19 as a public health threat. Reported levels of stress did not relate to adherence to safety guidelines, however, considering COVID-19 as a public health threat did relate to adherence to safety guidelines. Students reporting greater levels of stress were more likely to report increased screen time and increased caffeine consumption (but not more alcohol or nicotine use). Future research should investigate the physical, mental, and health risk effects resulting from this stress.

9. Alcohol and Tobacco Use Norms Among Restaurant Workers

Student Presenters: Kate Byrnes

Faculty Mentor: Dr. David Livert

Abstract: The current study investigated the degree to which workers perceived positive norms regarding smoking and alcohol consumption in the restaurant industry. Restaurant workers are more likely to engage in heavy drinking than workers in other fields (Duke et al., 2017; Moore et al., 2009). Comorbid addictive behaviors among restaurant workers has been documented: those who smoked tobacco also had a higher rate of problem drinking (Moore et al., 2009). The survey was distributed to the students at The Culinary Institute of America by

email. The participants were asked to report the alcohol and tobacco use norms within their workplace. The results did not show heavy drinking and smoking norms within the workplace.

10. What happens when we believe the conspiracies?: The relationship between conspiracy theories and COVID-19 attitudes

Student Presenters: Alejandra Pena

Faculty Mentor: Dr. Nicole Ryerson

Abstract: The ongoing COVID-19 health crisis has created perfect conditions for conspiracy theories and misinformation to flourish. The following correlational investigation explored the relationship between endorsing conspiracy theories and attitudes concerning COVID-19, including the government's response to the virus. Results found that individuals endorsing conspiracy theories were less likely to view COVID-19 as a general threat or as a public health threat. These individuals were also less likely to report COVID-19 related news exposure. Regarding government response, individuals endorsing conspiracy theories were less likely to support government restrictions, punishment of those not adhering to COVID-19 safety guidelines, government funded research, or government funded economic stimulus. Additionally, these individuals reported negative reactance to government policies meant to limit the spread of the virus. Finally, individuals endorsing conspiracy theories were more likely to identify as politically conservative. Future research should investigate whether combating misinformation could also aid in combating the spread of COVID-19.

11. Narcissism and alcohol use: a correlational study of archival neurophysiological data

Student Presenters: Chris Fiegel, Riley Koch

Faculty Mentor: Dr. Nicole Ryerson

Abstract: Alcohol use, narcissism, and neurophysiological response to alcohol cues shape various actions in the daily lives of many individuals around the world. Using archival experimental data, this study set out to examine the relationship between narcissism, self-reported alcohol use, and neurological responses measured by the N1 ERP waveform - to alcohol cues included in the dot probe task. The study

was pre-registered using the Open Science Framework (OSF) tool through the Center of Open Science's organization. The a priori hypotheses for the current study were correlational and explored the relationship between the aforementioned variables. A significant positive relationship between NPI scores and AUDIT scores was found, while the second a priori hypothesis and the two exploratory hypotheses were not supported. Implications of this study suggest the need for the continued research into treatment, intervention, and prevention programs for alcohol use disorders and unhealthy actions related to narcissistic personality traits.

12. The Survival of Arts During COVID-19

Student Presenter: Victor Velez

Faculty Mentor: Dr. Elizabeth Flaherty

Abstract: I will be discussing my experience working with Mrs. Lalik on an art exhibit that utilizes Zoom to stream the art pieces. I will be showing the research I've gathered from my discussions with faculty from PSU and the artists of the submissions along with the implications about technology's impact on media that is consumed every day.