



## Monday April 22nd

Session A: 8:30am - 2:00pm TFAC Ballroom A

Session B: 9:30am - 10:45am TFAC Ballroom B

Session C: 11:30am - 2:00pm TFAC Ballroom B

Session D: 4:15pm - 5:15pm TFAC Ballroom A

## Tuesday April 23rd

Session E: 10:00am - 11:30am TFAC Ballroom A

Session F: 11:30am - 1:00pm TFAC Ballroom B

Session G: 12:00pm - 1:15pm TFAC Ballroom A

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**Poster Session & Reception: 3:00pm - 4:30pm**

*Refreshments Served*

Location: TFAC Ballrooms

**ASSUMPTION  
UNIVERSITY'S**  
**Annual Undergraduate Symposium**

**2024**



# Assumption University

Office of the Provost and  
Academic Vice President

Welcome to the 30<sup>th</sup> *Annual Undergraduate Symposium*. The *Symposium* highlights the research and scholarly achievements of Assumption students working in collaboration with dedicated faculty mentors. These collaborations represent a model for integrating teaching, original research, and the beneficial effects of peer review in promoting intellectual development and professional growth. The *Symposium* provides the campus community with the opportunity to gain a greater appreciation of the individual and collective accomplishments of our faculty and students, as well as to applaud those achievements.

I hope that you enjoy and profit from viewing the posters, hearing the papers, and speaking with the authors of these impressive works.

Sincerely,

A handwritten signature in black ink that reads "Marc D. Guerra".

Marc D. Guerra, Ph.D.  
Provost and Vice President for Academic Affairs



# MONDAY APRIL 22

Session A: 8:30am-2:00pm

TFAC Ballroom A

## Criminology Panel

**Moderator and Mentor: Dr. Francis Prior**

	<i>Presenter</i>	<i>Title</i>
8:30-8:45	Brianna Catino	Exploring Sources of Work-Related Stress and Burnout: Insights from Alternative School Clinicians
8:45-9:00	Thomas Chenette	Reentry Worker's Perception of Recidivism in the Criminal Justice System
9:00-9:15	Michael Clark	Post-Release Counselors' Perspectives on Effective Prison Reentry Systems and Recidivism Reduction
9:15-9:30	Kyle Hipp	Fixing the Modern Reintegration Policies to Aid the Formerly Incarcerated Members of Society
9:30-9:45	Matthew Raymond	Inside the Minds and Hearts of Reentry Providers: Exploring Perspectives on the Provisions of Reentry Services
9:45-10:00	Michael Santana	Criminology Presentation
10:00-10:15	Tabatha Criollo Barros	How Do Tenants Experience Eviction Related to Legal Proceedings in Worcester
<b>Break</b>		
	<i>Presenter</i>	<i>Title</i>
10:30-10:45	Fiorela Cruz-Rivera	Exploring the Effects of Work-Related Stress in the Legal System: Insights from Attorney's Within the Legal Field
10:45-11:00	Lucia Nakao	Exploring the Life Outside of Work and How it is Impacted: Life of Attorneys
11:00-11:15	Valerie Otero	How Support Advocates have been Affected by their Cases and Line of Work
11:15-11:30	Patrick Rossetti	Thin Blue Line: A Closer Look at How Law Enforcement Officers Behave in Stressful Situations
11:30-11:45	Kobe Anderson	Courtroom Culture: The Impact of Race and Class in Criminal Court
11:45-12:00	Cooper Creek	Mental Health of Lawyers Working Sexual Assault Cases
12:00-12:15	Danisa Melendez	How Do Attorneys and Guardian Ad Litem (GAL's) Perceive the Effects of Guardianship Legal Proceedings on Children?
<b>Break</b>		
	<i>Presenter</i>	<i>Title</i>
12:30-12:45	Kyle Caissie	Examining The Use of Discretion Amongst Police Officers When Making an Arrest
12:45-1:00	Patrick Cunningham	Law Enforcement Perceptions of Body-Worn Cameras
1:00-1:15	Matthew Gardner	How Law Enforcement Officers Respond to Stressors on the Job
1:15-1:30	Dominic Massauro	Occupational Stress in Law Enforcement
1:30-1:45	Jennifer Walsh	How Stress Affects the Daily Lives of Park Rangers
1:45-2:00	Brandon Bibeault	Understanding School Safety: How Education Professionals Feel about School Security

# MONDAY APRIL 22

Session B: 9:30am-10:45am

TFAC Ballroom B

**Moderator Dr. Leamarie Gordon**

	<i>Presenter</i>	<i>Title</i>
9:30-9:45	Emily Fasteson	Humanae vitae and Fertility Awareness: Steps Toward a Comprehensive View of Women's Health
9:45-10:00	Kaitlyn Calnan	Why Didn't the Republican Majority Repeal the Affordable Care Act in 2017?
10:00-10:15	Christa Akariza Kanamugire Shekinah	Increase of Organization in Nature and Technology
10:15-10:30	Cassidy Elliott	The Unconstitutional Court Backlog
10:30-10:45	Elaine Danas	Understanding Formal and Informal Management Systems for Implementation in a Small Business

Session C: 11:30am-2:00pm

TFAC Ballroom B

**Cybersecurity Panel**

**Moderator and Mentor: Raymond Albert**

	<i>Presenter</i>	<i>Title</i>
11:30-11:37	Janil Patel	Experiences with Corporate Cybersecurity
11:38-11:45	Lucas Caira	Blockchain Technology in Internet of Things Device Security
11:46-11:53	Vic Ambrosino	Securing the Internet of Things (IoT)
11:54-12:01	Jacob Lazo	Artificial Intelligence and Data Security
12:02-12:09	Vincent Loria	A Comparative Analysis of Desktop Operating System Security Mechanisms
12:10-12:17	Joshua Kotokpo	The Impact of Artificial Intelligence on Today's Cybersecurity
12:18-12:25	Derek Donahoe	Securing Today's Critical Infrastructure for Tomorrow
12:26-12:33	Joshua Nixdorf	Cyberwarfare and the Artificial Intelligence (AI) Arms Race
12:34-12:41	Nicholas Dionne	Exploring Quantum Computing Threats to Cybersecurity
12:42-12:49	Reese Boucher	Exploration and Analysis of Ransomware and Associated Targets
12:50-12:57	Brett Dufault	The Rise of Cyberwarfare in Global Conflicts
12:58-1:05	Jack Barry	Impacts of Vulnerability Assessments
1:06-1:13	Jared Ducharme	Overview of Phishing Attacks, Techniques, and Preventative Measures
1:14-1:21	Lusiana Altidor	How to Secure Data in The Cloud
1:22-1:30	Daniel Nimiroski	Disaster Recovery through Cloud Technology
1:31-1:38	Brianna Michael	How Standards, Cryptography, and Artificial Intelligence Impact Application Security
1:39-1:46	William Pappas	Overview of Biometrics and Applications in Cybersecurity

## MONDAY APRIL 22

Session D: 4:15pm – 5:15pm

TFAC Ballroom A

### History Panel 1

**Moderator and Mentor: Dr. Carl Robert Keyes**

	<i>Presenter</i>	<i>Title</i>
4:15-4:30	Adam Ide	Historiography in Early America: How the Revolutionary Generation Understood History and Told the Story of the Revolution
4:30-4:45	Madison Kenney	Too Often Overlooked Stories: Native American Women in the Revolutionary Era
4:45-5:00	Julia Tardugno	Gender Roles in Reverse: Women as Entrepreneurs in the Era of the American Revolution
5:00-5:15	Madeline Johnson	The Value of an Internship in a Law Office

## TUESDAY APRIL 23

Session E: 10:00am– 11:30am

TFAC Ballroom A

### History Panel 2

**Moderator and Mentor: Dr. Carl Robert Keyes**

	<i>Presenter</i>	<i>Title</i>
10:00-10:15	Kendra Apicella	The Paradis Family's Road Trip: Tourism and the Immigrant Experience
10:15-10:30	Tyler Berube	Cataloging Ephemera from the Col. Henshaw Chapter of the Daughters of the American Revolution
10:30-10:45	Caroline Branch	Public History and Family History: Three Episodes
10:45-11:00	Elizabeth Chaclas	Processing the Paradis Family Scrapbook
11:00-11:15	Brendan Shaughnessy	Lessons Learned as a Guest Curator for the Slavery Adverts 250 Project
11:15-11:30	Yaire Hernandez	The Importance of Slavery Advertisements in Early American Life

## TUESDAY APRIL 23

### Session F: 11:30am-1:00pm

#### TFAC Ballroom B

**Moderator: Dr. Nicole Pantano**

	<i>Presenter</i>	<i>Title</i>
11:30-11:45	Shaeleigh Boynton	The Effects of a Self-Management Strategy on the Frequency of Exercise
11:45-12:00	Kaelyn Patch	Faculty Use of Active Student Responding in Post-Secondary Education
12:00-12:15	Hailey McKillop	Investigating Roles of Extracellular Matrix Molecules in Synaptic Formation
12:15-12:30	Owen Podolec	The Need vs. Demand of Adult Day Programs
12:30-12:45	Colin Brewer	Characteristics of Trebouxiophyte Organellar Genomes
12:45-1:00	Júlia (Jú) Braga Kenyon	The Complexity Behind the Genetics of Autism Spectrum Disorder

### Session G: 12:00pm-1:15pm

#### TFAC Ballroom A

**Moderator: Dr. Leamarie Gordon**

	<i>Presenter</i>	<i>Title</i>
12:00-12:15	Morgan Flodman	Thanatos Meets Eros: A Psychoanalytic Reading of Stevens's "Emperor of Ice-Cream"
12:15-12:30	Adam Ide	Clearing Up Counterfactuals: The Decades-Long Historiographical Debate
12:30-12:45	Colin Scuderi	Empowerment in a Hopeless World
12:45-1:00	Maureen Lynch	Is it Really Just...Us?
1:00-1:15	Brenna Aylward	Exploring Melodic Development

## TUESDAY APRIL 23

Poster Session and Reception: 3:00pm-4:30pm

*Refreshments Served*

Location: TFAC Ballrooms

- 3:00 Welcome Remarks, Dr. Marc Guerra, Provost and Vice President for Academic Affairs  
3:05 Recognition of Contributions to the Undergraduate Symposium, Presented to Dr. Joe Alfano  
3:10 Symposium Logo Contest, Presentation of Award

### Presenters:

Madison Ayik  
Riley Bina  
Matthew Brouillet  
Katy Cannistraro  
Tiana Cogoli  
Alexis Culver  
Madilyn Curti  
Samantha Curtis  
Carly Duval  
Adam Ide  
Emilie Janelle  
Mira Kirschner  
Lindsey Kuniewich  
Katherine Laboissonniere  
Allison Labrada  
Josie Maldonis  
Elizabeth Massicotte  
Isabel Melim  
Mia Monahan  
Emily Moran  
Claire Mullen  
Lauren Norton  
Lorena Nunes  
Caroline O'Connell  
Katie Quinn-Cyr  
Brianna Rawlston  
Olivia Shan  
Ryan Singley  
Brian Stevens  
Jenna Swist  
Meadow Taylor  
Olivia Vandoros  
Allyson Wargo  
Ashley Wenzel  
Danting Zhu

# Senior Seminar in Graphic Design

*The seminar is devoted to an advanced project in Graphic Design as a culmination of a program of study for the major in Graphic Design.*

*The seminar is completed by an exhibition of student work.*

## ART & DESIGN SHOW

April 16th - May 10th

*Emmanuel d'Alzon Library*

April 20th - April 22nd

*Worcester PopUp*



**Brenna Aylward**

**Elizabeth Cormier**

**Lauren Haley**

**Bridgette Kline**

**Jonathan Ng**

**Joseph Nunn**

**Marcus Oliver**

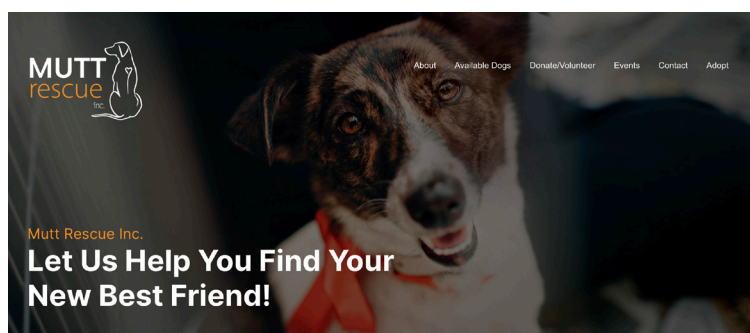
**Olivia Ryan**

*Faculty Mentor:*

**Professor Scott Glushien**



These are just a few of the works on display.





# Abstracts

## **Presentation Session A Panel 1 Monday, April 22, 2024**

### ***Exploring Sources of Work-Related Stress and Burnout: Insights from Alternative School Clinicians***

Brianna Catino '24

Sociology and Criminology

Current research suggests that caregiving professions like clinical social work have a connection to high levels of work-related stress and burnout. This study used interview methods to gain insight on the perspective of the alternative school clinicians to see how they experience work related stress and what may be the potential causes of it. Interviews were transcribed and analyzed to find patterns within the data. By using the data on the workers perspective, this research may identify potential avenues for dealing with work related stress that have yet been explored, as well as identify potential risk factors of work-related stress that could be avoided.

*Faculty Mentor: Dr. Francis Prior*

### ***Reentry Worker's Perception of Recidivism in the Criminal Justice System***

Thomas Chenette '24

Criminology

Recidivism remains a persistent challenge within the criminal justice system, with significant effects if not addressed early with officials. This research contains qualitative studies that explore the perceptions of reentry workers regarding the factors contributing to recidivism among individuals reentering society after incarceration. I plan to conduct 5 interviews with workers at a government run reentry service provider, this research aims on the insights of recidivism. Featuring the socio-economic challenges of lack of employment, housing cost, and treatment for substance abuse. Knowing these factors and how to combat them, is how a reentry counselor will understand why their clients recycle in the criminal justice system. Furthermore, this research plays a part in understanding recidivism for reentry counselors and possibly those who dictate the future sentencing for ex-offenders. The data that I intend to collect throughout my research will be given a voice thus, amplifying the importance for change in the criminal justice system to lower the chances of reincarceration.

*Faculty Mentor: Dr. Francis Prior*

### ***Post-Release Counselors' Perspectives on Effective Prison Reentry Systems and Recidivism Reduction***

Michael Clark '24

Criminology

There are many opinions as to what is most effective when it comes to the prison reentry process in the United States and various different methods used to combat recidivism for those who go through these programs post-release. This study aims to understand the effectiveness of various methods used in the prison reentry process in the United States, with a focus on combating recidivism post-release. To do so, we will conduct interviews with post-release counselors from a local prison reentry program, focusing on their workplace policies, methods, and the impact of these on successful reentry and recidivism rates. In the interview, they will be asked about the policies their workplace has in place, the effectiveness of their methods and policies when it comes to successful reentry, the impact their methods have had on those they worked

with, and how common recidivism is within their program. This study will then be able to address the potential processes and methods that need to be introduced into reentry in order to improve the effectiveness and efficiency of the reentry process as well. As the research has not been conducted or concluded, it can be hypothesized that the findings will present to us a direct outlook on how the prison reentry system both works efficiently and needs to be improved to increase the effectiveness of their work in the fight against recidivism. The findings from this study could inform the development of more effective and efficient reentry processes and methods once completed.

*Faculty Member: Dr. Francis Prior*

### ***Fixing the Modern Reintegration Policies to Aid the Formerly Incarcerated Members of Society***

Kyle Hipp '24

Criminology

This article examines the necessary changes within the United States reintegration policy, to aid in the reduction of reoffending, and how the United States can implement more effective policies that aid those re-integrated back into society each and every year. By doing so, I will be conducting in-depth interviews with government reentry service providers at the Worcester County Sheriff's Office. These Interviews allow me to possess a more accurate understanding of how effective these current re-entry policies have on formerly incarcerated individuals. This article will showcase the problems that lie within the processing of parolees, and the indirect effects of meeting the legal requirements while attempting to gather the necessities that modern life requires. Mitigating these main driving factors, mostly reoffending, aids in solving our nation's problem of mass-incarceration. By conducting several interviews with case workers and members alike, this article will examine the potential positive outcomes which come from these changed reintegration policies. Those that read this article will adopt a clearer understanding of the importance of more effective reintegration policies.

*Faculty Mentor: Dr. Francis Prior*

### ***Inside the Minds and Hearts of Reentry Providers: Exploring Perspectives on the Provisions of Reentry Services***

Matthew Raymond '24

Criminology

Reentry into society after incarceration is hindered by many challenges, including social stigma, limited employment opportunities, inadequate social support, and barriers to accessing housing, healthcare, and education. These hurdles often exacerbate issues related to mental health and substance abuse, further complicating the reintegration process. For formerly incarcerated individuals with families, the pressure to support both themselves and their loved ones adds an additional layer of complexity. This study aims to explore the perspectives of reentry service providers at a non-profit prisoner reentry organization regarding the delivery of reentry services. By delving into the viewpoints and experiences of these professionals, the study seeks to uncover the attitudes, experiences, and implied knowledge that shape the effectiveness of reentry programs. The findings are intended to deepen our understanding of the challenges inherent in the reentry process and inform future research, practice, and policy initiatives in this domain. Qualitative interviews will be conducted with five reentry professionals affiliated with the organization, focusing on their insights and experiences. The data collected will be analyzed using grounded theory, allowing for an inductive approach to uncover new insights within the organizational context. While data collection is ongoing, it is anticipated that the perspectives of reentry service providers will illuminate current shortcomings in reentry approaches, identify areas for improvement, and generate innovative ideas to enhance the overall effectiveness of reintegration programs.

*Faculty Mentor: Dr. Francis Prior*

### ***Criminology Presentation***

Michael Santana '24

Criminology

*Faculty Mentor: Dr. Francis Prior*

### ***How Do Tenants Experience Eviction Related to Legal Proceedings in Worcester***

Tabatha Criollo Barros '24

Criminology

Eviction presents a negative impact on tenants as they try to navigate through the court system to make their case. With rent increases and limited spaces, stable housing has become a concern for many. A tenant must decide how to respond, and most of the time they are representing themselves with no prior knowledge of how the court system works. Through 60-minute semi-structured interviews, five participants will discuss how eviction has impacted them emotionally, financially, and physically and how they have navigated the court system. The findings will highlight the power imbalance between the tenant and landlord and what has been the biggest impact of the process of eviction.

*Faculty Mentor: Dr. Francis Prior*

## **Presentation Session A Panel 2**

**Monday, April 22, 2024**

### ***Exploring the Effects of Work-Related Stress in the Legal System: Insights from Attorneys Within the Legal Field***

Fiorela Cruz-Rivera '24

Criminology

Burnout is defined as negative emotions or actions that are a consequence of being unable to properly cope with high-stress levels, which appears as low productivity levels, frequent negative attitudes, etc. Extensive research points to burnout as being extremely prevalent in attorneys due to their high-performance expectations, high demand from clientele, tight deadlines, and many other factors. This study draws on personal statements from participants describing their personal experiences with stress in their workplace. Participants are those employed as an attorney in the District Attorney's office. Interviews conducted will be analyzed to find common themes within participants that aim to provide more insight into how attorneys experience stress and ultimately lead to potential solutions. I hypothesize that attorneys will share similar experiences of high moments of stress, but that ultimately it is their job, which is a general pattern I have seen in the data thus far.

*Faculty Mentor: Dr. Francis Prior*

### ***Exploring the Life Outside of Work and How it is Impacted: Life of Attorneys***

Lucia Nakao '24

Criminology

Research shows that attorneys live a stressful life. There are many factors that account for these stressors. Researchers look into how they deal with all of this stress and not bring it home with them to their families, they also look at what these factors may be and what may be causing them. By interviewing different attorneys at a District Courthouse about their line of work and what helps them alleviate the stress from their day-to-day jobs, I am able to see what can be done. In this study, I am able to interview ADA's and lawyers to

collect data for what strategies they are using as well as others. With this data, I am able to conclude that there are things that can be done to help these attorneys release their stress elsewhere, rather than bringing it home to their families.

*Faculty Mentor: Dr. Francis Prior*

***How Support Advocates have been Affected by their Cases and Line of Work<sup>‡</sup>***

Valerie Otero '24

Criminology

Advocates are an important part of the court systems and are the people who are directly help survivors that have been through a domestic violence issue. They provide resources for survivors to get away from abusers and help them throughout their court cases. For this study, I have interviewed five support advocates that have dealt with domestic violence at either one point of their careers or lives and asked how their careers have affected them emotionally. Each advocate was in a 60-minute interview and was asked about their lives and careers and the emotional affect their careers have been on them. Currently, 2 subjects have not regretted how they got into advocacy work and see it as what they are meant to do and I believe many advocates will follow with a similar answer with how their careers, has helped them rather than cause harm.

*Faculty Mentor: Dr. Francis Prior*

***Thin Blue Line: A Closer Look at How Law Enforcement Officers Behave in Stressful Situations***

Patrick Rossetti '24

Criminology

This study is focused on the larger view of how law enforcement officers behave in stressful situations. Researchers have looked at various topics such as police brutality, training, and the culture of policing as a whole. This study is a participant observation of how men and women in law enforcement behave in these stressful everyday situations. The researcher conducting this study will be looking at the various types of environments in which these stressful situations take place and how they are handled by law enforcement officers. The study will be conducted with different officers to gain perspective as to how they each handle stressful situations rather than one officer only. This will allow the researcher to see a wider variety of stressful situations and how different officers deal with them. I believe that the officer will either rise or fall to the level of their training and experience when dealing with certain situations especially when they feel as if their life is on the line.

*Faculty Mentor: Dr. Francis Prior*

***Courtroom Culture: The Impact of Race and Class in Criminal Court<sup>‡</sup>***

Kobe Anderson '24

Criminology

Observing courtroom culture is my task in my research project. The culture inside the courtroom will allow me to see the norms and values between attorneys, judges, and defendants. I want to further observe how this culture impacts people negatively. Being an observant in criminal court will allow me to see how race and economic social class shape legal proceedings in criminal court. Completing field notes for certain cases that are useful for my research will allow me to provide firsthand insights into the legal process, including the behavior of legal professionals. By immersing myself in the courtroom environment, I will document various aspects of the trial process, such as courtroom procedures, communication patterns, and power dynamics from white legal professionals toward people of color.

*Faculty Mentor: Dr. Francis Prior*

### ***Mental Health of Lawyers Working Sexual Assault Cases***

Cooper Creek '24

Criminology

Legal prosecutors are tasked with handling cases of great importance and magnitude, with those components being heightened in cases involving sexual assault. It's common for Lawyers to grapple with mental health struggles, as some may turn to substances whilst others turn to alcohol. The research that was conducted addresses these mental struggles of the lawyers handling these cases. Five in person interviews will be conducted for this research, asking sexual assault lawyers questions with the interest of learning more about their mental health and mental challenges they have faced, as well as how they have coped. This research is important as it raises more awareness for lawyers and their mental health. I believe the research will indicate that the lawyers involved in the study will experience similar mental hurdles, and also implement similar coping strategies.

*Faculty Mentor: Dr. Francis Prior*

### ***How Do Attorneys and Guardian Ad Litem (GAL's) Perceive the Effects of Guardianship Legal Proceedings on Children?***

Danisa Melendez '24

Criminology

The purpose of this study is to investigate the impact of guardianship legal proceedings on minor children through interviews with Family Law Attorneys and Guardian Ad Litem (GALs). The study entails the insights of five legal professionals who shared their respective perspectives on the dynamics of these proceedings with a focal point on the well-being of children. Through qualitative analysis of these 5 interviews and their invaluable insights, they shed light on the diverse effects of guardianship legal proceedings on minor children. By further exploring the perceptions and experiences of legal professionals in this line of work, the aim of this study is to provide a more comprehensive and profound understanding of the challenges and intricacies that are essential built-in when trying to uphold the best interest of a child in the context of family law cases.

*Faculty Mentor: Dr. Francis Prior*

## **Presentation Session A Panel 3**

**Monday, April 22, 2024**

### ***Examining The Use of Discretion Amongst Police Officers When Making an Arrest***

Kyle Caissie '24

Criminology

In recent years discretionary decisions of police officers have become a hot topic amongst police agencies and the media. More specifically the decision to arrest or set a person free. Many believe that police officers need to have a more definitive "rule book" but others believe discretion is an officer's best asset when it comes to policing. To understand how police officers feel about discretion when making an arrest I conducted several semi-structured interviews with current police officers. When doing this I was able to learn how officers deal with and use discretion in their everyday lives and especially when making an arrest. My research showed that majority of officers find discretion to be useful and very few wish there were more guidelines and rules that aided them on when and how to arrest a person.

*Faculty Mentor: Dr. Francis Prior*

## ***Law Enforcement Perceptions of Body-Worn Cameras***

Patrick Cunningham '24

Criminology

Over the past few decades, there has been a debate on whether law enforcement officers should be wearing body-worn cameras. The idea behind body-worn cameras being implemented is to create increased transparency and accountability. It is important to understand how police officers perceive the idea of wearing a recording device. The information from this study was gained through interviews with current law enforcement officers of different ranks. These were in-person, qualitative interviews that were thirty minutes to an hour in length. The interviewees were from one police department that is currently employing a body-worn camera program as well as officers from a department that does not have a body-worn camera program but will have one soon. The findings from the interviews were somewhat contrary to my preliminary research. The officers were not really concerned about wearing a body-worn camera but were more so concerned with the additional logistics that come along with the cameras.

*Faculty Mentor: Dr. Francis Prior*

## ***How Law Enforcement Officers Respond to Stressors on the Job***

Matthew Gardner

Criminology

This research study aims to investigate the stressors encountered by law enforcement officers in an era where they are constantly under public surveillance. With the use of cell phones and media capturing high-intensity moments, officers face the challenge of maintaining professional standards for managing stress effectively. The purpose of this is to explore the stressors experienced by officers and the on-the-spot coping mechanisms they employ. Understanding these stressors and coping strategies is crucial for enhancing officers' overall well-being and effectiveness. This study dives into the demanding nature of law enforcement, exposing various stressors such as high-risk situations, trauma, and long work hours potentially leading to burn out which can lead to compromised decision-making. By identifying stressors and coping mechanisms we can develop actions to aid officers' resilience, job satisfaction, and overall public safety. Additionally, this research sheds light on how occupational stress influences officers' attitudes toward misconduct and the role of organizational justice in moderating these effects, thus informing policies and training programs to maintain professionalism and ethical conduct within law enforcement agencies around the country. Overall, understanding police officer stressors through research contributes to shaping a supportive system for officers and the communities they serve.

*Faculty Mentor: Dr. Francis Prior*

## ***Occupational Stress in Law Enforcement***

Dominic Massauro '24

Sociology and Criminology

In the world of law enforcement, law enforcement officers are subjected to stressors that the everyday human never experiences. This is important because a law enforcement officer under the vest and behind the badge are themselves everyday humans. They are fathers, mothers, brothers, and friends. These stressors have an impact on these individuals whether it is talked about or not. This study, through interviews, seeks to understand how occupational stress affects these individuals. I seek to uncover how they deal with these stressors whether it be in a positive or negative way so that future law enforcement officers can live longer healthier lives. Hopefully with the knowledge found awareness can be brought to the silent killers of officers such as PTSD, suicide, and alcoholism. I also hope to find what parts of the job in particular cause unnecessary or unavoidable stress.

*Faculty Mentor: Dr. Francis Prior*

### ***How Stress Affects the Daily Lives of Park Rangers***

Jennifer Walsh '24

Criminology

Professions all experience stress, and how each person handles that stress varies. One profession that does not have much is stress and its effects are park rangers. This study looks at how the stress levels of park rangers, and effects their work. Interviewing rangers was how I got their feedback on the matter and any stressful situation they may have been put in how they handled the stressful situation, and how it affected them and how they do their job. I think that I am going to find that park rangers experience stress and once that situation happens they change how they may handle the situation in the future. Stress can affect someone's mental health and how they handle situations in the future so taking a look at how stress affects park rangers gives us a leg up on how to help them in the future if something should arise.

*Faculty Mentor: Dr. Francis Prior*

### ***Understanding School Safety: How Education Professionals Feel about School Security***

Brandon Bibeault '24

Criminology

In the last few decades school safety and security have become an increasingly large topic in the United States due to many school-related disasters such as school shootings. The issue with school security is that there is no clear-cut outline for what schools need to help prevent these disasters from happening. There is also little research on the effects on students and faculty experience due to the implementation of security measures in schools. I will be conducting a qualitative interview study of five administrative professionals in a school setting regarding their attitudes toward school-related disasters and security and safety measures.

*Faculty Mentor: Dr. Francis Prior*

## **Presentation Session B Monday, April 22, 2024**

### ***Humanae vitae and Fertility Awareness: Steps Toward a Comprehensive View of Women's Health<sup>‡</sup>***

Emily Fasteson '24

Theology

The Catholic Church has expressed its opposition to contraception from the beginning. Use of the Pill is not coincident with the Church's vision of the human person, and I will explore the anthropological grounds upon which the Church informs her stance. Modernity has a different anthropology than that of the Church; I seek to unearth and understand the difference between these two views by synthesizing the philosophy and theology behind *Humanae vitae*, taking its predictions seriously, and analyzing how they have come to fruition in the modern world. My focus is on man's attempt to overcome his own limits and transcend the boundaries of his body by examining how medical advancements and technology have magnified this issue. I will make a case in favor of fertility awareness methods of family planning and health monitoring purposes as a better alternative to preventing pregnancy that respects the female body.

*Faculty Mentor: Dr. Rachel Coleman*

### ***Why Didn't the Republican Majority Repeal the Affordable Care Act in 2017?‡***

Kaitlyn Calnan '24

Political Science

The provisions of the Affordable Care Act (ACA) were originally designed to be funded through an individual mandate. Thus, after the repeal of the mandate penalty in 2017, most supporters believed the entire ACA would collapse. However, despite a Republican Congressional majority, it has not. How come? While Republicans have generally opposed government involvement in healthcare, today's Republican party has taken a populist turn. A study of American populism suggests that populism is compatible with government involvement in healthcare. America's original right populist, the Nebraskan William Jennings Bryan, began a movement that produced electoral success as it moved north, even into Canada. These governments, most notably that of Saskatchewan, introduced single-payer healthcare. Bryan's populism also spread southwest into Arizona, home of John McCain, who cast the deciding vote to save the ACA. Therefore, the Republican turn to populism helps to explain the modern Republican lack to repeal the benefits of the ACA.

*Faculty Mentor: Dr. Jeremy Geddert*

### ***Increase of Organization in Nature and Technology***

Christa Akariza Kanamugire Shekinah '26

Physics

Complex systems organize themselves without any internal or external command. Least action principle is the driving force for self-organization. Data of various types of CPUs was collected and analyzed using various models of self-organization such as: positive feedback loop and size-complexity rule to determine if these systems of circuits have this quality of self-organization. By using benchmarks of CPUs such as CPU Mark, Integer Math, and number of transistors it was observed that as these systems get bigger, they become more self-organized and more efficient. The knowledge that was obtained in this research can be used to understand the concept of self-organization in other fields.

*Faculty Mentor: Dr. Georgie Georgiev*

### ***The Unconstitutional Court Backlog‡***

Cassidy Elliott '25

International Business

Currently, within the Massachusetts Criminal Justice System, defendants are forced to wait up to 12 months for a trial. These pre-trial delays have significantly detrimental effects on defendants. For example, there are economic implications, strains on personal relationships, and physical and mental health risks associated with incarceration. There are several other criminal justice systems that can provide criminal defendants trials in a timelier manner than Massachusetts. This thesis explores the right to a speedy and fair trial under the U.S. Constitution, the reasons for the potentially unconstitutional delays in Massachusetts, and proposes reforms to ensure individuals accused of a crime in Massachusetts receive a "speedy trial" as required under the U.S. Constitution.

*Faculty Mentor: Prof. Michael Matraia*



## ***Understanding Formal and Informal Management Systems for Implementation in a Small Business<sup>‡</sup>***

Elaine Danas '24

Management

Most small businesses rely on the owner having and/or developing talents and skills necessary for the business to operate. Many begin the operation without utilizing formal organizational systems theory. As a result, the owner develops ways of doing business (“systems”) that are unique to the owner and their business. However, these informal systems lack the application of management systems theories that may provide opportunities for more effective and efficient operations. This case study examines the operations of a small independent forensic laboratory and in doing so can identify and implement more formalized systems theories.

*Faculty Mentor: Dr. Cary LeBlanc*

## **Presentation Session C Monday, April 22, 2024**

### ***Experiences with Corporate Cybersecurity***

Janil Patel '24

Cybersecurity

Cybersecurity is paramount within corporations as it safeguards sensitive data, proprietary information, and financial assets from ever-evolving cyber threats. This paper presents an overview of my experiences within a corporate cybersecurity setting in which I have witnessed, first-hand, digital advancements driving business operations, heavy reliance on interconnected networks, cloud services, and various technological platforms. The interconnected nature of these systems makes them susceptible to ransomware attacks and various forms of data breach. This paper highlights that a robust cybersecurity framework not only protects against potential financial losses and reputational damage but also ensures the continuity of business operations thus fostering customer trust by demonstrating a corporate commitment to cybersecurity. Proactively addressing cybersecurity risks is essential for corporations to adapt to the evolving threat landscape, thereby reinforcing their resilience and sustaining long-term success in the digital age. Finally, it conveys my observations of the use of cryptography, cybersecurity standards, and artificial intelligence within the corporation.

*Faculty Mentor: Dr. Raymond Albert*

### ***Blockchain Technology in Internet of Things Device Security***

Lucas Caira '24

Cybersecurity

The increase in the number of Internet of Things (IoT) devices and their scope of use have demonstrated their practical utility in many applications. With the increasing prevalence of integration of this technology in human lives, it is important for their respective security components to evolve. Nearly all IoT devices are responsible for collecting, storing, and transmitting data they rely upon to function. Such data is often shared with and analyzed by a central server, leading to many possible vulnerabilities. This paper explores IoT device security and the role that Blockchain technology can offer through its decentralized, immutable, and transparent ledgers. Through a synthesis of current research and industry trends, it examines the benefits, and disadvantages,

of integrating blockchain technology with IoT devices, paving the way for more resilient and transparent IoT ecosystems.

*Faculty Mentor: Dr. Raymond Albert*

### ***Securing the Internet of Things (IoT)***

Victor Ambrosino '24

Cybersecurity

The development of Internet of Things (IoT) devices has successfully advanced numerous fields, including healthcare, environmental monitoring, and industrial automation, and has improved convenience for many tasks. As valuable as these devices are to our everyday lives, the rapid emergence of IoT technology has also introduced numerous unexpected security vulnerabilities due to these devices often lacking proper embedded security features that ensure data privacy and user safety. The insecurity of the IoT has opened the door to an increasing number of vulnerabilities, threats, and cyberattacks including software worms that create large botnets across multiple IoT devices. Such attacks have already resulted in devastating security impacts on individuals and businesses across the globe. The challenges of securing IoT devices include a lack of standardization and hardware limitations, which must be addressed to eliminate vulnerabilities. This paper provides an overview of the concerns and best practices for securing IoT devices. It draws attention to the lack of urgency to solve this problem and the skewed priorities of manufacturers of these devices, who would instead prioritize profit over efficient security measures. Finally, it emphasizes that developers need to keep consumer protection in mind.

*Faculty Mentor: Dr. Raymond Albert*

### ***Artificial Intelligence and Data Security***

Jacob Lazo '24

Cybersecurity

In recent years, the development of Artificial Intelligence (AI) systems and programs has increased drastically, with many corporations and non-profit organizations working diligently to develop AI systems to enhance both their programs and operational systems. This paper examines tools such as Microsoft's Azure AI, IBM's Watson, and OpenAI's ChatGPT and how they have enabled both individuals and organizations to enhance their daily operations, outsourcing various tedious or repetitive tasks to the AI programs, ultimately increasing organizational efficiency. It explores the growing influence of AI integration within software applications allowing for a multitude of opportunities within many different fields. It focuses on the application of AI tools within the cybersecurity industry, with AI integration being used to bolster the security of applications and security devices. It concludes with an overview of the relationship between AI and both cryptography and cybersecurity standards.

*Faculty Mentor: Dr. Raymond Albert*

### ***A Comparative Analysis of Desktop Operating System Security Mechanisms***

Vincent Loria '24

Cybersecurity

In today's digital age, desktop operating system (OS) security mechanisms are of utmost importance in addressing evolving cyber threats. This paper conducts a comparative analysis of security features in popular desktop OSs, aiming to empower users to enhance their personal computing security. Focusing on the most prevalent OSs (e.g., Microsoft Windows and Apple MacOS), it evaluates key security mechanisms including access controls, authentication protocols, encryption, and incident recording and response capabilities to reveal each OSs cybersecurity strengths and weaknesses. The paper aims to equip readers with practical knowledge to

effectively secure their desktop computers. Recognizing the gap in user awareness, it offers recommendations and best practice guidance for individuals to safeguard their desktop computer environments.

*Faculty Mentor: Dr. Raymond Albert*

### ***The Impact of Artificial Intelligence on Today's Cybersecurity***

Joshua Kotokpo '24

Cybersecurity

Artificial Intelligence (AI) in cybersecurity acts as a powerful tool that complements human capabilities rather than replacing them. It aids in automating threat detection, response systems, risk prioritization, malware detection, incident response guidance, and intrusion detection to bolster security efforts and stay ahead of evolving cyber threats. AI systems and their application can be found in many other realms as well (e.g., contemporary social media, and financial regulatory compliance). The complexity of AI systems is great and so too are the number of corresponding vulnerabilities. This paper discusses the common use of AI today and its impact on cybersecurity.

*Faculty Mentor: Dr. Raymond Albert*

### ***Securing Today's Critical Infrastructure for Tomorrow***

Derek Donahoe '24

Cybersecurity

Today, there are many emerging cybersecurity threats, particularly to critical infrastructure such as power grids, water supply plants, and telecommunications systems. This paper examines such threats and emphasizes the vital need for greater cybersecurity when it comes to power and water plants. Through a synthesis of current research and industry trends, it examines the different approaches and the corresponding pros and cons of various cybersecurity standards, practices, and the potential role of AI in security critical infrastructure for tomorrow.

*Faculty Mentor: Dr. Raymond Albert*

### ***Cyberwarfare and the Artificial Intelligence (AI) Arms Race***

Joshua Nixdorf '24

Cybersecurity and Computer Science

This paper assesses the current state of cyberwarfare standards in both a national and international setting, detailing the aspects of this style of warfare, and how the development of Artificial Intelligence (AI) will serve as the next arms race between global superpowers. Additionally, it addresses the problems surrounding the implementation of AI in modern warfare by gauging its effectiveness relative to various cyberwarfare strategies and mechanisms, including threat intelligence, espionage, lethal autonomous weapon systems, and cryptography. Finally, this paper shares the notion that despite the very significant ethical implications of the use of AI in cyberwarfare, ongoing unbridled AI development will hasten the arms race, as countries surge forward to implement AI as a key element of both their defensive and offensive capabilities.

*Faculty Mentor: Dr. Raymond Albert*

### ***Exploring Quantum Computing Threats to Cybersecurity***

Nicholas Dionne '24

Cybersecurity

Quantum computing holds the promise of improvements to research and development, supply-chain optimization, production, and advances in artificial intelligence and other fields. The vastly increased processing

capabilities of quantum computers also exacerbate risks and pose new threats. This paper explores the threat of quantum computing in cybersecurity, especially cryptography. It briefly covers the importance of cryptography through a historical lens and then explores the contemporary challenges that newly emerging quantum computing technologies pose. By exploring the inherent vulnerabilities of traditional cryptographic systems, one can better understand the threat posed by quantum computing algorithms such as Shor's and Grover's algorithms. Moreover, these developments accentuate the need for standardization of post-quantum cryptographic techniques that resist these increasing technological advancements. Finally, anticipated and new developments in quantum computing are considered to further inform evolving approaches to ensuring cybersecurity.

*Faculty Mentor: Dr. Raymond Albert*

### ***Exploration and Analysis of Ransomware and Associated Targets***

Reese Boucher '24

Cybersecurity

Ransomware, a pervasive threat in cybersecurity, has significantly impacted individuals, businesses, and governmental entities. This paper provides a comprehensive exploration of ransomware, detailing its operational mechanisms, including infiltration vectors and encryption techniques, as well as the dire consequences of ransomware attacks, such as operational disruptions, financial losses, reputational harm, and regulatory sanctions. Furthermore, it delves into various security standards and guidelines, such as the National Institute of Standards and Technology (NIST) Cybersecurity Framework, ISO/IEC 27001, Payment Card Industry Data Security Standard (PCI DSS), and the Center for Internet Security (CIS) Controls, which aim to manage cybersecurity risks and fortify defenses against ransomware threats. Additionally, the paper analyzes industries frequently targeted by ransomware attacks and the effects of cryptography and artificial intelligence (AI) on ransomware operations. Through this examination, stakeholders can gain insights into the evolving tactics of cybercriminals and develop effective strategies for prevention and mitigation against this enduring threat.

*Faculty Mentor: Dr. Raymond Albert*

### ***The Rise of Cyberwarfare in Global Conflicts***

Brett Dufault '24

Cybersecurity

In the field of global conflicts, cyberwarfare has become a critical battleground component, transforming the way wars are fought. This paper investigates the growing role of cyber operations and their impact on worldwide security. Through an exploration of the use of targeted cyberattacks between countries, it sheds light on the challenges of defending a nation's critical infrastructure and ensuring data protection. It stresses the importance of global cooperation among countries to address rapidly evolving international cybersecurity threats and cyberwarfare rules of engagement imposed during times of conflict.

*Faculty Mentor: Dr. Raymond Albert*

### ***Impacts of Vulnerability Assessments***

Jack Barry '24

Cybersecurity

Vulnerability assessments are key to organizations wishing to ensure the overall security of their technology systems. Within an organization, vulnerability assessments are regularly performed to detect vulnerabilities, discover threats, and to minimize the damage associated with security breaches perpetrated by attackers inside or outside of the organization. This paper explores the impacts of vulnerability assessments with a focus on their many benefits, including identification of security vulnerabilities, ensuring compliance with

security requirements and standards, and strengthening incident response. Organizations who perform regular vulnerability assessments are much more secure and successful than those that do not. Vulnerability assessments aid in reducing threats and associated organizational risk. Finally, this paper provides an overview of vulnerability assessment standards and the roles of cryptography and artificial intelligence in the design and implementation of such assessments.

*Faculty Mentor: Dr. Raymond Albert*

### ***Overview of Phishing Attacks, Techniques, and Preventative Measures***

Jared Ducharme '24

Cybersecurity

Prioritizing safety and security have become crucial in a world where technology is present in every aspect of daily life and business. People of all ages are spending increasing time online. In terms of computer and network security, humans are often characterized as the weakest link in cybersecurity as they are the most vulnerable to exploitation. Phishing attacks, which aim to trick the user into inadvertently disclosing private information or granting access to their system, are the primary method used by malicious actors to compromise users. This paper provides an overview of the various phishing attacks and describes the techniques used by malicious parties to create them. Additionally, information on how to recognize these attacks and take appropriate action will be provided, as well as the future of phishing attacks and how advancements in cryptography and artificial intelligence will play a crucial role.

*Faculty Mentor: Dr. Raymond Albert*

### ***How to Secure Data in The Cloud***

Lusiana Altidor '24

Cybersecurity

Securing data in the cloud is crucial in today's digital world. As businesses and individuals increasingly rely on cloud services to store and manage their data, it is essential to implement robust security measures to protect sensitive information from unauthorized access and cyber threats. This paper provides an overview of best practices for securing data in the cloud. It addresses the importance of cloud security and the growing concerns surrounding data protection. It discusses common security risks and threats in cloud storage and data handling, along with user and administrative perspectives on securing data. It also emphasizes the need for ongoing monitoring and risk management in cloud environments and suggests future solutions for improving cloud security.

*Faculty Mentor: Dr. Raymond Albert*

### ***Disaster Recovery through Cloud Technology***

Daniel Nimiroski '24

Cybersecurity

Cloud service models offer an option to protect and store data that would otherwise be left vulnerable to localized disasters by storing it in a resilient and centralized environment. This paper explores the use of cloud-based disaster recovery solutions as a service model. It delves into the role of cloud-based technology within the context of compliance with varying government and industry standards and frameworks. Additionally, it discusses active and developmental cryptography and artificial intelligence techniques, along with the respective risks and benefits that each imposes on disaster recovery.

*Faculty Mentor: Dr. Raymond Albert*

## ***How Standards, Cryptography, and Artificial Intelligence Impact Application Security***

Brianna Michael '24

Cybersecurity

Application security is the practice of using security software, hardware, techniques, best practices and procedures to protect computer applications (apps) from external security threats. Application security is essential because apps are readily available to users through networks and the cloud, increasing the number of potential cyber threats and the impact of potential breaches. The use of standards clearly affects application security. This paper explores the OWASP ASVS standard that delineates fourteen focus areas with detailed charts and questions to increase clarity, with further explanation provided for the five main areas. Cryptographic techniques, especially their use at the application layer of the TCP/IP model typically involves encryption of almost all data accessed or produced by an application. This paper emphasizes that such techniques reduce the apps potential attack surface and aids in securing sensitive data before being stored in local and cloud-based databases. Finally, the role of artificial intelligence and its use in automated risk assessment tools which uses machine learning algorithms to quickly detect and prioritize vulnerabilities is addressed.

*Faculty Mentor: Dr. Raymond Albert*

## ***Overview of Biometrics and Applications in Cybersecurity***

William Pappas '24

Cybersecurity

Biometrics in cybersecurity involves using unique physical and behavioral characteristics to verify individuals' identities, offering a higher level of security compared to traditional methods like passwords. Biometric technologies include fingerprint scanning, facial recognition, and iris scanning among others. These systems are crucial in protecting sensitive data and ensuring secure access to environments, servers, or computers. Engaging in research about biometrics in cybersecurity helps one understand how they are used and regulated in today's world. This paper presents an overview of different aspects of biometrics, their common applications, and the role they play in ensuring cybersecurity. It also includes an overview of biometric system standards and the roles of cryptography and artificial intelligence in the design and implementation of such systems.

*Faculty Mentor: Dr. Raymond Albert*

## **Presentation Session D Monday, April 22, 2024**

### ***Historiography in Early America:***

#### ***How the Revolutionary Generation Understood History and Told the Story of the Revolution***

Adam Ide

History

Historians have studied the American Revolution since its inception to try to document its origins, causes, and effects. In doing so, historians have developed multiple schools of thought about the American Revolution era. It is not as often, however, that we think about historiography during the era of the American Revolution. How historians conduct research has changed so much in the past 250 years that it is rare that historians want to delve into centuries-old historiographical practice when they are trying to keep up with contemporary studies. In my paper, I take a look at how some historians have characterized the historiography, or lack thereof, in Revolutionary America and critique their claims using primary sources from the time.

*Faculty Mentor: Dr. Carl Robert Keyes*

***Too Often Overlooked Stories: Native American Women in the Revolutionary Era***

Madison Kenney '24

History

The important roles of Native American women in the American Revolution have been largely overlooked or erased throughout history. Many Native American women served their communities as farmers and diplomatic leaders during the era of the American Revolution. Despite their contributions, their stories were suppressed by the American revolutionaries during and after the war. During the war, American forces savagely attacked Native women's farming efforts and stole personal belongings they deemed too European for Indian women. After the war, Native women who helped the American cause had their stories rewritten to suit Anglo-American feminine standards, including emphasizing motherhood and a superior sense of morality compared to men. My research shows how the American revolutionaries terrorized Native women and dismissed their stories during the era of the American Revolution and beyond.

*Faculty Mentor: Dr. Carl Robert Keyes*

***Gender Roles in Reverse: Women as Entrepreneurs in the Era of the American Revolution***

Julia Tardugno '24

History

Due to a system that is deeply rooted in gender inequality, the narratives of businesswomen before the Revolutionary War are often overlooked. During the eighteenth century, women demonstrated their independence by participating in business affairs as female sole traders and successful shopkeepers. Women were always a part of the colonial economic market but faced many more challenges compared to their male counterparts. The visibility of women in the business world continued to grow as they demonstrated economic success by claiming sole ownership over their shops and businesses. While the period of the American Revolution did not witness the birth of female entrepreneurship in the colonies, the era increased the visibility of these businesswomen.

*Faculty Mentor: Dr. Carl Robert Keyes*

***The Value of an Internship in a Law Office***

Madeline Johnson '25

History

Throughout the spring semester, I documented my internship experience as a legal administrative assistant at Ravosa Law Offices, P.C., in Worcester. Throughout my internship, I learned about the daily life of an attorney, including elements of practicing law and the day-to-day business aspects of running a law firm. An internship experience can confirm or alter someone's planned career path. Throughout my presentation, I will present the benefits of being an intern in a law firm and how it solidified my choice of career and future plans.

*Faculty Mentor: Dr. Carl Robert Keyes*

**Presentation Session E**  
**Tuesday, April 23, 2024**

***The Paradis Family's Road Trip: Tourism and the Immigrant Experience***

Kendra Apicella '24

History

Have you ever gone on a road trip? Maybe collected pamphlets, brochures, or tickets during the vacation? In 1938, the Paradis Family did just that. Almost a century ago the French-Canadian Paradis Family

immigrated to the United States, but that was not to say they did not visit home. Their road trip, which they documented in a scrapbook currently in the collections of the French Institute on campus, is a well-organized compilation of their trip from New Bedford, Massachusetts, to Saint-Donat, Quebec, and back. The Paradis Family scrapbook contains a hand-drawn and colored map of their journey in pen and colored pencil, as well as a collection of family and souvenir photos. This presentation examines a portion of the Paradis Family's journey and what we can learn from their experiences.

*Faculty Mentor: Dr. Carl Robert Keyes*

***Cataloging Ephemera from the Col. Henshaw Chapter of the Daughters of the American Revolution***

Tyler Berube '24

Global Studies and History

I am participating in an internship in Special Collections at the Leicester Public Library. My responsibilities include organizing, cataloging, and creating a finding aid for materials donated by the Col. Henshaw Chapter of the Daughters of the American Revolution in Leicester. This organization is dedicated to historic preservation, education, patriotism, and honoring the patriots of the Revolutionary War. The D.A.R. is a prominent group in the town of Leicester and a good source for learning about local history. The Col. Henshaw Chapter donated a desk full of relics relating to the town of Leicester that needed to be organized and archived. In my presentation I will provide an overview of the kinds of materials in this collection, the challenges I faced in identifying some of those materials, and how I successfully organized and cataloged them.

*Faculty Mentor: Dr. Carl Robert Keyes*

***Public History and Family History: Three Episodes***

Caroline Branch '24

History

My presentation examines three episodes of family history in America, drawing from two public history projects and the experiences of my own family. I will start with the disruptions to family life that enslaved people experienced during the era of the American Revolution, using newspaper advertisements from the *Slavery Adverts 250 Project* to tell some of their stories. Then I will look at the opportunities and challenges of a French-Canadian family that immigrated to New England. The Paradis Family Scrapbook, recently digitized for the French Institute, documents some of the ways they maintained their cultural heritage. Finally, I will explore my own family's history as part of this larger effort to demonstrate that family history plays an important part in understanding the history of our nation.

*Faculty Mentor: Dr. Carl Robert Keyes*

***Processing the Paradis Family Scrapbook***

Elizabeth Chaclas '24

History

My presentation will focus on my contributions to digitizing the Paradis Family Scrapbook and researching and writing descriptions of its contents for use by researchers and the public. The Paradis Family immigrated to the United States from Canada. The Paradis Family Scrapbook is a compilation of ephemera that the family collected during their travels through New England and Quebec in 1938. Its delicate pages are housed in the French Institute on campus. The scrapbook has captivated me and many others through its charming commentary that was written by different family members and its collage-like organization. The scrapbook testifies to the experiences of Franco-Canadian immigrants who maintained ties in Quebec.

*Faculty Mentor: Dr. Carl Robert Keyes*



### ***Lessons Learned as a Guest Curator for the Slavery Adverts 250 Project***

Brendan Shaughnessy '26

History

The *Slavery Adverts 250 Project* aims to highlight both the complicity and participation of early American newspapers in the propagation and profiteering of slavery, as well as examine the contradiction of a nation fervent with enlightenment era ideals justifying the institution of slavery. In my role as a guest curator, I have searched through digitized newspapers databases of early American newspapers to identify advertisements that demonstrate the dehumanizing nature of slavery. These advertisements were widespread and inescapable during the era of the American Revolution. Ultimately the project attempts to display an aspect of the history of slavery in America that is unfamiliar to a vast majority of the general public.

*Faculty Mentor: Dr. Carl Robert Keyes*

### ***The Importance of Slavery Advertisements in Early American Life***

Yaire Hernandez '25

History

The *Slavery Adverts 250* project aims to shed light on America's not-so-perfect past by examining what life was like back in early America through various forms of advertisements. As a guest curator, I examined how newspaper advertisements contributed to the dehumanization of slaves, some of which ranged from selling "Negros" to capturing runaway slaves. This project opens doors to information for those who do not understand the extent of slavery in early America, and how it affected not only the economic state but the political state of America.

*Faculty Mentor: Dr. Carl Robert Keyes*

## **Presentation Session F Tuesday, April 23, 2024**

### ***The Effects of a Self-Management Strategy on the Frequency of Exercise***

Shaeleigh Boynton '24

Psychology

Engaging in exercise can improve one's mental health (Klemmer et al., 20203), reduce the risk of several diseases, and strengthen one's muscles and bones (Van Camp & Hayes, 2013). The purpose of this project was to explore how self-management strategies can be used to increase exercise behavior with one participant. The project used the principles of behavior analysis, including positive reinforcement and avoidance, to increase exercise. The goal of the intervention was to increase exercising to three occasions per week. The intervention results suggested self-management was an effective strategy for increasing exercise.

*Faculty Mentor: Dr. Nicole Pantano*

### ***Faculty Use of Active Student Responding in Post-Secondary Education***

Kaelyn Patch '24

Psychology

Previous research has evaluated how active student responding (ASR) can increase opportunities for students to respond (OTR) in educational settings. However, there is less research on the role of ASR and OTR in post-secondary education. This study aimed to discover whether faculty use ASR practices in the classroom, and if there was a relationship between graduate training and implementation of ASR. Overall, 50 individuals

who have taught in higher education completed a survey on demographic information, current teaching practices, and professional development. We found teachers do incorporate ASR into their classroom but may not always refer to it as ASR. Additionally, teachers have not received training during graduate school. This presentation will summarize those results and discuss implications for future teachers on how they can incorporate ASR and OTR into the classroom setting.

*Faculty Mentor: Dr. Nicole Pantano*

### ***Investigating Roles of Extracellular Matrix Molecules in Synaptic Formation<sup>‡</sup>***

Hailey McKillop '23

Neuroscience

Synaptic formation is guided by interactions between the extracellular matrix (ECM) and pre- and post-synaptic molecules. Here we investigated potential roles of the ECM in synaptic patterning by studying dendritic spines from the GABAergic neuron DD1 of the nematode *Caenorhabditis elegans*. We saw a significant decrease in the number of spines in *cle-1(cg120)*, a deletion of the endostatin domain of ECM molecule collagen XVIII/CLE-1. GABAergic expression of wildtype *cle-1* in the mutant background rescued the dendritic spine phenotype, indicating CLE-1 acts cell-autonomously. Furthermore, we explored the role of integrins, a family of heterodimeric transmembrane receptors that bind to ECM molecules. The investigated  $\alpha$  subunit mutant, *ina-1(gm144)*, showed a decrease in spine number. One allele of  $\beta$  integrin/*pat-3* showed a decreased spine number and abnormal spine directionality. Our research suggests the ECM molecule collagen XVIII/*cle-1* and the ECM receptor, integrin, are required for synaptic patterning.

*Faculty Mentor: Dr. Michele Lemons*

### ***The Need vs. Demand of Adult Day Programs***

Owen Podolec '24

Human Services and Rehabilitation Studies

Adult day programs in the Worcester area have been positively affecting adults with cognitive disabilities and brain injuries for years. Day programs support adults with health, nutrition, social, and daily living needs consistently. These programs are put in place to help people receive the care they need and to guide them to the working community. Thus, many day programs are now dealing with staffing shortages, transportation, and a lack of intake coordinators. This research project is a case study that explores the benefits and challenges of day programs for the adult population including specific client care, the intake process, and funding needs.

*Faculty Mentor: Dr. Christian Williams*

### ***Characteristics of Trebouxiphyte Organellar Genomes***

Colin Brewer '25

Bioinformatics

Trebouxiphyceae is a class of green algae that belongs to the phylum Chlorophyta. This class includes a diverse range of microorganisms. They are generally found in freshwater or terrestrial habitats. Trebouxiphyte organellar genomes vary considerably in size (94,206 - 306,152 for plastomes and 78,500 - 123,371 for mitogenomes). Trebouxiphyte chloroplast genomes have been studied more intensively than their mitochondrial genomes. In this study, we compiled data from available organellar genomes as well as nuclear ribosomal gene data and environmental data for the algae's localities of origin across Chlorophyta. We focused on GC content, genome size, and coding content. In addition, we contributed four newly sequenced trebouxiphyte chloroplast genomes (*Eremochloris sphaerica*, *Kalinella apyrenoidosa*,

*Leptochlorella* sp., *Muriella* sp., *Viridiella fridericana*, and *Xerochlorella olmae*), as well as two new mitogenomes (*Leptochlorella* sp. and *Xerochlorella olmae*).

*Faculty Mentor: Dr. Karolina Fučíková*

***The Complexity Behind the Genetics of Autism Spectrum Disorder*<sup>‡</sup>**

Júlia (Jú) Braga Kenyon '24

Biotechnology and Molecular Biology

Genetic screening tests can be utilized to diagnose many genetic and neurological disorders. Evidence suggests that 96% of cases of autism spectrum disorder (ASD) are induced by genetic variances. Given that the disorder has surged in prevalence by roughly 200% since the year 2000, there is an urgency for the discovery of precursor genes or genetic markers that can be utilized for genetic screening for earlier and more accessible diagnosis. This project aims to analyze the possible cellular and molecular mechanisms that are impacted by such ASD-linked gene alterations and resulting ASD behaviors. The known ASD-linked genes were categorized into nine distinct groups by molecular function, with genes in four of these groups posing potential for future ASD risk factor analysis tools.

*Faculty Mentor: Dr. Jessica McCready*

**Presentation Session G**  
**Tuesday, April 23, 2024**

***Thanatos Meets Eros: A Psychoanalytic Reading of Stevens's "Emperor of Ice-Cream"***

Morgan Flodman '26

English

Drawing from the work of Sigmund Freud and literary critic Lois Tyson, a psychoanalytic interpretation of Wallace Stevens's 1923 poem "The Emperor of Ice-Cream" reveals the unconscious desires of its speaker. Freudian psychoanalytic theory identifies Thanatos (death) and Eros (life/sex) as the primary drives behind pleasure-seeking behavior. Stevens's use of phallic and yonic symbols constructs the speaker's id, which in conflict with the superego, activates his libido and causes him to make inappropriate demands at an old woman's funeral. The complex interpersonal relationship between the speaker and the woman suggests an Oedipal fixation, meaning the speaker views her as a maternal figure and her death (a) culminates in displacement of his repressed attraction to her on other guests or (b) marks the pursuit of sexual relationships beyond the family romance. Psychoanalysis anchors the text in the Modernist period, allowing readers to understand its influence on the American literary imagination.

*Faculty Mentor: Dr. Paul Shields*

***Clearing Up Counterfactuals: The Decades-Long Historiographical Debate*<sup>‡</sup>**

Adam Ide

History

Counterfactual history, the telling and exploring of alternate histories in order to establish causation between points in history, has been a topic of debate for some time amongst academics working in the field. Do some historians truly know what is best when staying away from counterfactuals, or are other historians right in using them with confidence? Both sides of this decades-long historiographical debate have made complex points that add significant depth to the issue. In my honors thesis, I have uncovered the origin of this

disagreement, explored both sides of the debate, and explained historians' approaches and attitudes toward counterfactuals in order to reveal the pitfalls and potentials of the technique.

*Faculty Mentor: Dr. John F. Bell*

### ***Empowerment in a Hopeless World***

Colin Scuderi '24

English

The Critical Dystopia genre differentiates itself from its canonical predecessor by diverging in a pivotal area: the message they wish to send. Classical dystopias such as George Orwell's 1984 or Aldous Huxley's Brave New World often convey their themes through forcing their protagonists to submit to their corrupt societies. Older dystopian novels, by contrast, convey their themes by empowering their protagonists to resist through their actions and beliefs. This paper will argue that point by presenting three protagonists from three Critical Dystopian novels. First, it shall discuss how Hunger Games protagonist Katniss Everdeen rebels directly against The Capitol by firing an arrow during her evaluation. Following that, it shall examine Offred's subtle resistance through rewriting her story in The Handmaid's Tale and conclude with Gordon Krantz's restoring hope to a dead world in The Postman.

*Faculty Mentor: Dr. Kristen Carella*

### ***Is it Really Just...Us?‡***

Maureen Lynch '24

Communications and Media

The novel holds a special place in many readers' hearts due to its ability to capture human experience in a way no other form of writing can. A novel's use of long-form prose, combined with the trappings of metaphor and imagery, allows the reader to submerge themselves in the world created by the author. This style of writing fosters investigation, which allows readers to exercise their imagination, as well as their sympathies. With this project, I aimed to capture the intricacies of this form of creative fiction by writing my own novel. Just...Us centers around a seventeen-year-old girl named Margot, who is struggling with several changes occurring in her life. The narrative is designed to test Margot's sense of herself as she develops into a young adult. Just...Us covers topics such as self-harm, sexual awakenings, and self-image, and how these issues interact to shape a girl's developing identity.

*Faculty Mentor: Prof. Kate Donius*

### ***Exploring Melodic Development ~An Original Composition and Performance~***

Brenna Aylward '24

Music

My presentation delves into a musical composition crafted as part of an assignment for Music Theory II. Inspired by the innovative jazz composer and arranger, Carla Bley, this project emerges as a homage following her passing in October 2023. The composition intricately weaves elements of melody, melodic development, phrase structure, motives, and accompanying harmonic progressions. Carefully curated to resonate with specific textual themes, the melody, and harmonies intertwine to evoke a nuanced narrative. With aspirations to showcase this piece in upcoming spring performances, I explore the creative process, thematic alignment, and musical execution, offering insights into the fusion of recognition and artistic expression.

*Faculty Mentor: Dr. Peter Clemente*

## Poster Session Tuesday, April 23, 2024

### ***Self-Organization in Thermodynamic Complex Systems<sup>‡</sup>***

Matthew Brouillet '24

Biological and Physical Sciences

Complex systems can be represented by flow networks for energy and matter such as Rayleigh-Benard convection, river basins, lightning, etc. Agents along those networks form flows between nodes and search for the path of least action. This research studied closed systems, where the number of agents and nodes are fixed, and therefore, as shown by the collected data, there is a point of saturation where increasing the number of agents can no longer improve the maximum order or the rate of self-organization. Another aspect which this research tested is phase diagrams. By measuring data exported from changing two variables, rather than only one, a threshold can be calculated based on how many paths were formed that visualizes whether the system is random or organized. This can be related to phase diagrams of real-life materials such as water/ice, where the material transitions from ordered (solid) to random (gas).

*Faculty Mentor: Dr. Georgi Georgiev*

### ***Beyond the Binary: The Exploration of Gender Constructs and Mental Health Dynamics within the LGBTQIA+ Community***

Katy Cannistraro '24

Health and Human Services

With a purpose to inform targeted mental health support services, reduce stigma, and advocate for policy changes promoting LGBTQIA+ rights and mental health equality, this study aims to address the existing gender gap in mental health literature. By adopting an intersectional perspective, the research acknowledges the nuanced experiences of individuals within the LGBTQIA+ community, recognizing how intersecting identities such as gender identity and sexual orientation shape mental health outcomes. Through a comprehensive analysis, this study endeavors to empower LGBTQIA+ individuals to challenge harmful narratives, foster resilience, and contribute to a more inclusive and supportive mental health environment for all.

*Faculty Mentor: Dr. Christian Williams*

### ***What Does a Roommate Say About You? How Your Personality & Self-Esteem Influence Preference***

Tiana Cogoli '24, Emilie Janelle '24, Emily Moran '25, and Mia Monahan '25

Psychology

Personality traits, such as some of the Big Five and Dark Triad, affect our self-esteem and interpersonal expectations. Participants completed four questionnaires. The first questionnaire is Rosenberg's self-esteem questionnaire. The second and third questionnaires are personality trait questionnaires, consisting of the Big Five Inventory and the Dark Triad. Lastly, there is a custom-made interpersonal perception questionnaire with a sliding scale. We hypothesized personality traits of extraversion, conscientiousness, openness, and agreeableness and possibly, the dark trait of narcissism would be positively correlated with self-esteem. Furthermore, we hypothesized that personality traits and self-esteem would affect interpersonal expectations.

*Faculty Mentor: Dr. Fang Zhang*

### ***Are We Color-Biased?***

Madilyn Curti '24, Allyson Wargo '25, Josie Maldonis '25, and Allison Labrada '24

Psychology

Previous research has shown that color may impact the way people are perceived. The colors yellow, white, and blue are used to explore interpersonal perception in this study. Participants were shown six different faces on these three colored backgrounds. Then they rated their impression of the faces using 8 adjective pairs. We predicted that faces on the yellow backgrounds would receive more positive ratings compared to faces on white and blue backgrounds. Likewise, we predicted that faces on the blue background would be rated more negatively compared to faces on white and yellow backgrounds.

*Faculty Mentor: Dr. Fang Zhang*

### ***Building an Inclusive Park for Holden: Understanding Community Needs, Priorities, and Expectations***

Samantha Curtis '24, WPI

Psychology

Holden is a small town in central Massachusetts, with highly rated school systems, competitive youth sports programs, and lively community organizations. However, community-members report that town playgrounds are in poor shape, and equipment is inaccessible for individuals with impaired mobility. For instance, children or parents who use wheelchairs cannot enjoy playscapes that lack ramps and accessible surfacing. The Holden Inclusive Park Committee is spearheading an initiative to design and build a multigenerational inclusive park, to be located at 1 Holden Street behind the Light Department. A large body of psychological research highlights the social, physical, and mental health benefits of outdoor play for children, parents, and grandparents alike. Building an inclusive park will help ensure that all Holden residents can engage in play and reap these benefits, regardless of their mobility status. This project aimed to understand Holden community members' experiences with inclusive and intergenerational play and to identify their needs and desires for the new park. Surveys of 280 community-members and interviews with 7 stakeholders helped to *[highlight lived experiences with exclusion, identify the need for specific playground equipment, and to uncover common misconceptions about the park's design]*. Finally, the information gathered was used to create a website of resources to further inform the Holden community about all aspects of the park, including the committee's timeline and the project's theoretical underpinnings.

*Faculty Mentor: Dr. Erin Ottmar*

### ***Black Education in the Emancipation South: 1863-1870***

Adam Ide '24

History

I spent this summer combing through monthly periodicals published by different Freedman's Aid Organizations to look at how black education was written about during the time of emancipation. In order to compile a list of possible sources, I read several secondary works that focused on education in the 1860s and pulled out citations from periodicals published by Freedmen's Aid Organizations. After compiling all of the citations into a spreadsheet, I went to the American Antiquarian Society to find physical and digital versions of these periodicals. Professor Bell and I then used my findings at the AAS to draw conclusions and identify differences between the different Freedman's Aid Organizations, which are normally lumped together in historiographical writing. My poster presentation provides a brief overview of the work and its findings.

*Faculty Mentor: Dr. John F. Bell*

### ***Psychosocial and Biochemical Correlates of Nicotine Administration via Vaping Behavior***

Mira Kirschner '24, WPI

Psychology and Biology/Biotechnology

The use of e-cigarettes has been prevalent and on the rise in this current generation. However, there is not much known about the social consequences of nicotine in young adults. This interdisciplinary project investigated the psychosocial and biological implications of vaping in college-aged students and through the use of a model organism, *Caenorhabditis elegans*. One part of the study contained a short survey focused on vaping behaviors and everyday mood that was administered to 173 undergraduates to determine what social factors surround vaping. The second part of the study used *C. elegans* as a model organism to measure social behaviors at a biological level by exposing them to varying concentrations of nicotine.

*Faculty Mentors: Dr. Angela Incollingo Rodriguez and Dr. Jagan Srinivasan, WPI*

### ***Culturally Responsive Trauma-Informed Interviewing for Postpartum Depression***

Lindsey Kuniewich '25

Human Services

In the diagnosis and treatment of postpartum depression (PPD), it is essential for a clinician to recognize the unique identity and needs of a client. Historically, both the physical and mental needs of women of color (WOC) in the fields of obstetrics and gynecology have been invalidated or ignored which has influenced modern attitudes in healthcare settings. Providing high-quality perinatal mental healthcare for WOC with PPD requires clinicians to utilize trauma-informed approaches while also acknowledging how a client's cultural identity impacts the assessment and treatment of their PPD. A literature review of PPD, trauma-informed care, and culturally competent practices was conducted. A semi-structured interview was also conducted with a maternal mental health clinician to learn more about clinical practice with culturally diverse clients diagnosed with PPD. This presentation concludes with evidence of best practices for women experiencing PPD.

*Faculty Mentor: Dr. Cinzia Pica*

### ***Boosting Memory with Color***

Katherine Laboissonniere, Ashley Wenzel, Riley Bina, and Madison Ayik '24

Psychology

Being presented with objects or words shown in colors such as red, yellow, blue, or green may enhance memory performance on a recall test. Participants viewed either a list of 20 words or images of 20 objects presented in colors or in black and white. The lists showed one word/object at a time for 3 seconds before automatically moving onto the next. Participants then viewed a short video to distract their minds, and took a memory test on the items presented to them. We predicted that participants would remember the colored objects more than colored words which both would be better than the black and white words and objects.

*Faculty Mentor: Dr. Fang Zhang*

### ***Analysis of Bee Species' Preferences for Native and Nonnative Plants on the Assumption University Campus***

Elizabeth Massicotte '23 and Meadow Taylor '23

Ecology

Pollination from bees is an important aspect of community structures, allowing for plants to reproduce. Since bees also utilize nectar and pollen from the flowers, they visit they have preferences for physical aspects such as shape and location of the plants. Since bees native to North America such as the bumble bee, *Bombus impatiens*, have adapted to environments overtime along with native flower species, it was hypothesized that bees will prefer native flowers of the introduced, nonnative flower species on the Assumption campus. To explore

this theory, bee abundance and species richness was measured at two nonnative and three native flower species from mid-September to mid-October. Results from U-test statistical analysis and R-studio bar plots showed that bee abundance was greater at native plants ( $p=1$ ) however species richness was greater at nonnative plants ( $p=1$ ). There was a similar plant preference for the bee species *Bombus impatiens* and *Apis mellifera*, but there was no similarity in bees' presence on native versus nonnative plants. Further studies should be conducted with greater sampling size and a longer collection period to further evaluate bee preferences for plant types.

*Faculty Mentor: Dr. Karolina Fučíková*

### ***Sex Differences in Mice Exposed to Nicotine Vape***

Lauren Norton '24

Neuroscience

There is seen to be a clear difference between male and female mice who are exposed to Nicotine vape with nicotine-seeking behavior. It is seen females seek out nicotine more than males. Mice were put on a 21-day protocol in an EVSA chamber, 10 days of FR-1 (fixed ratio), 10 days FR-3 and 1 PR (progressive ratio) day. The number of nose pokes were recorded for each sex and outliers were eliminated from the final data presentation to not skew the data. The mice also completed tasks after the 21-day protocol like the Elevated-Plus Maze (EPM) and Somatic Withdrawal Symptoms test. Through the 21-day EVSA protocol, females were seen to have higher nicotine-seeking behaviors than males and a higher number of withdrawal symptoms after exposure to nicotine had ended.

*Faculty Mentor: Prof. Anthony Sacino*

### ***Psychophysiological Effects of Social Feedback During Social Media Use***

Lorena Nunes '24, WPI

Psychology

In recent years, rates of depression, anxiety, and other indices of poor mental health have increased dramatically among adolescents and young adults. Some research suggests that social media use has contributed to this mental health crisis, but few studies have examined psychological mechanisms that may underlie effects of social media on mental health, especially effects on anxiety levels tied to social evaluation on social media. Thus, the aim of the present study was to test whether there is a psychophysiological stress response to social feedback, as experienced on a social media platform. College aged students in the WPI community were recruited to participate in a two-part study in which they were first prompted to create captions for various images and memes that would later be used as mock social media posts—as part of a presumed new social media platform designed for WPI students (Part 1). Next, for Part 2, participants came into the lab and completed a PsychoPy task in which they were exposed to positive and negative feedback on the mock posts and captions they provided in Part 1, while having their heart rate and heart rate variability measured via an armband heart monitoring device. Throughout the task participants also reported how positively or negatively they felt after receiving different kinds of feedback. Preliminary findings from this study will be discussed, as well as next steps to further elucidate the role of social evaluative stress in online contexts, and how this may vary person to person and platform to platform.

*Faculty Mentors: Dr. Richard Lopez, WPI*

### ***The Use of Vascular Endothelial Growth Factor in Ligament and Tendon Repair<sup>‡</sup>***

Caroline O'Connell '24

Biology

The use of vascular endothelial growth factor (VEGF) endogenously and exogenously in tendon and ligament repair is beneficial as it decreases the duration of symptoms and decreases healing time. Many



individuals in their lifetime will face an injury that will impair the movement of their musculoskeletal system. Most of these injuries involve a tendon or ligament, with their treatment in the U.S. costing over \$40 billion annually. Surgery is often needed to fix ruptures to tendon and ligaments but does not always guarantee full recovery and the chances of re-injuring that tendon or ligament increases. This has led researchers to turn to VEGF, an angiogenic factor that regulates blood vessel formation in tendon and ligament healing. The studies described in the review have shown that VEGF increases ultimate tensile strength, decreases inflammation, and increases vascularization. In studies using exogenous VEGF, it was found that VEGF increases collagen type III fibers, which increases biomechanical strength, and improves graft revascularization. From the research, it can be concluded that endogenous injection of VEGF is more beneficial than exogenous due to endogenous not causing laxity of the connective tissue.

*Faculty Mentor: Prof. Anthony Sacino*

### ***Stress-dependent Cilia Remodeling in C. elegans***

Katie Quinn-Cyr '24, WPI

Psychology and Biology/Biotechnology

The purpose of this project was to determine if *C. elegans* was an appropriate model to study effects of physiological stress on primary cilia and, if that was true, to investigate the potential mechanisms by which cilia length and/or morphology changes occur in response to stress. Different genotypes of *C. elegans* were subjected to heat and cold shock assays followed by imaging of their ASH neurons to determine changes in cilia length and/or morphology. It was found that *C. elegans* was an appropriate model to study this mechanism and cilia shortening was seen at 30 min and appeared greater at 3 hr heat shock and also in 24 hr cold shock across all genotypes. RIC-8 (md1909) and K06A43(ok2979) mutations were examined in *C. elegans* to study the potential role a G alpha protein chaperone and actin, respectively, may play in cilia shortening and decapitation. There was a slight increase in cilia decapitation in both mutations compared to wildtypes, but minimal differences in the amount of cilia shortening. RIC-8 was found to localize to the cilia after a heat shock event. These conclusions support that *C. elegans* is an appropriate model to study cilia shortening and decapitation as a result of heat and cold shock assays, and while RIC-8 may not play a role in the mechanisms by which cilia shorten there is evidence that it serves a purpose in the cilia after a shortening or decapitation event, which requires future research.

*Faculty Mentors: Dr. Inna Nechipurenko and Dr. Jim Doyle, WPI*

### ***Identifying Environmental Factors of Different Mosses Across Assumption University's Campus***

Brianna Rawlston '24 and Carly Duval '24

Biology

Mosses are nonvascular plants that have spores, stems and leaves but not true roots. They grow in acidic, shaded, aqueous environments. They have important qualities that are necessary for woodland and forest environments. The effect of environmental factors was investigated in this experiment, and it was hypothesized that areas that were moist and heavily shaded would have more moss growth than in other areas where these factors were not prominent. Quadrats were used to section off specific moss communities to measure abundance and species types. Several types of mosses were found across campus. There were significant differences in Simpson index and Shannon-Wiener index, specifically in partially shaded areas and full sun areas. The results supported the hypothesis. Other studies were examined which showed that moisture, light and pH are the most necessary environmental factors for mosses to efficiently grow.

*Faculty Mentor: Dr. Karolina Fučíková*

## ***Replacing Traditional Lecture Time Through Asynchronous Spaced Retrieval***

Olivia Shan '24

Psychology

Retrieval practice is an information-recall strategy commonly used to enhance learning and memory. Blank Slate is an AI-driven mobile app that provides individualized retrieval practice on a spaced schedule for learners to complete on their own time. The goal of this study was to examine whether Blank Slate activities might replace some traditional lecture content in a classroom. Participants watched a 25-minute video lecture on one of two topics in general psychology, and then used Blank Slate for four weeks to review questions about both topics. Participants began with lower app accuracy on non-lectured vs. lectured questions but after one week performed equally on both question types. Importantly, on a final test of knowledge transfer, participants performed equally well on new questions targeting lectured and non-lectured content. Together, these findings suggest that some lecture time in traditional classrooms could be replaced by efficient, asynchronous retrieval practice.

*Faculty Mentor: Dr. Leamarie Gordon*

## ***The Role of Active Student Responding in Post-Secondary Education Settings<sup>‡</sup>***

Ryan Singley '24

Psychology and Applied Behavior Analysis

Active student responding (ASR) is a collection of common teaching strategies used by educators that are recognized to increase the accomplishments and opportunities of students in a variety of ways. Previous research has assessed the role of active student responding in kindergarten through high school classrooms; however, no comprehensive literature review has assessed the effectiveness of ASR with post-secondary education classrooms (i.e., undergraduate and graduate students). This review assessed the effectiveness of four active student responding systems (e.g., guided notes, student response systems, response cards, and choral responding) on activity grade, test scores, class grade, grade point average, and student engagement. This review also assessed the overall quality of each article using quality indicators as done in Common et al. (2020). Overall, research supports the effectiveness of ASR in post-secondary education, but the quality of this research varied greatly across these qualitative measures.

*Faculty Mentor: Dr. Nicole Pantano*

## ***Behavioral Responses of Branchiopod Crustaceans to Ultraviolet Light***

Brian Stevens '24

Neuroscience

Tadpole shrimp and fairy shrimp are branchiopod crustaceans that are thought to each have four spectral classes of photoreceptors in their compound eyes. There is some evidence to suggest that two species of these crustaceans (*Triops longicaudatus*) and (*Streptocephalus mackini*) have photoreceptors that are sensitive to ultraviolet, blue, green and red wavelengths of light. Here, we identify behavioral responses to ultraviolet light and compare this to broad spectrum responses in these species. In temporary habitats studied, light in temporary freshwater habitats varies and is often shifted to longer wavelength light due to suspended clay in the water column. Despite the longer wavelength shift, other researchers have found that tadpole and fairy shrimp both express opsin proteins in their compound eyes that are most likely sensitive to ultraviolet light. This leads us to predict that tadpole and fairy shrimp will respond behaviorally to light of these wavelengths of the electromagnetic spectrum.

*Faculty Mentor: Dr. Nicolas Lessios*

***Do You Experience Winter Blues? How Personality and Stress Can Affect Seasonal Moods***

Jenna Swist, Alexis Culver, Claire Mullen, and Isabel Melim '25

Psychology

Depending on an individual's stress level and personality type the mood can change throughout the different seasons. Participants completed a 15-minute survey including a personality test, seasonal mood assessment, and perceived stress scale. It was predicted that individuals who have an agreeable personality and who know how to deal with stress will have a lesser chance of seasonal mood changes. Individuals who have higher scores in neuroticism or impulsivity will experience more stress and constant seasonal mood changes.

*Faculty Mentor: Dr. Fang Zhang*

***Social Emotional Learning in the High School Classroom<sup>‡</sup>***

Olivia Vandoros '24

Education

Social-emotional learning (SEL) has become a growing need in schools and provides students with important skills that they can use to be successful in life. The majority of existing SEL programs are geared toward elementary and middle school students, but these skills should not stop being taught when students move on to high school. For this project, I focused on creating materials to be used to teach SEL to high school students. In order to do this, I started by conducting a literature review and interviewing high school teachers to gather information. This process informed the development of a toolkit shared in Google Drive. As a final step, I shared this toolkit with the teachers that I interviewed, giving them access to the materials for use in their own classrooms.

*Faculty Mentor: Dr. Samantha Goldman*

***The Impact of Import Competition on CEO Emotions:  
Insights from Earnings Conference Calls 2008-2021<sup>‡</sup>***

Danting Zhu '24

Finance

This project focused on examining international trade policy and its impact on the pricing strategies utilized by importers and exporters. We investigated how import competition affects a company's management's attitude towards the import source country by analyzing the correlation between the degree of import competition faced by US companies and the tone of management's statements during quarterly earnings calls to shareholders. For this project, we collected both S&P 500 and S&P 600 companies, a total of 1100 companies, between 2008 and 2021. Finally, we realized an intriguing observation: CEOs tend to remain silent and avoid discussing the topic of Chinese imports or their businesses in China when trade tensions arise between the United States and China.

*Faculty Mentor: Dr. Weixiao (Olivia) Wu*

## **Acknowledgements**

Thank you to all the students and faculty mentors for sharing their outstanding original work this academic year! A big thank you to Carrie Ferguson for all her work behind the scenes to make all aspects of this event run smoothly. Prof. Lynn Simmons deserves a special acknowledgement for coordinating the design of the program cover, flyers for the event, and the t-shirt design.

Thank you to Prof. Raymond Albert, Prof. Carl Keyes, Prof. Nicole Pantano, and Prof. Frank Prior who moderated presentation sessions, and collectively mentored a large cohort of student presenters this year. Additional thanks to the Office of the Provost, Office of the President, Media Services, Sodexo, Curry Printing, and all others who support this event and make it possible.

Finally, a special thank you this year to Prof. Joe Alfano, whose vision for this event thirty years ago has helped to highlight the work of so many talented students over the years.

*~Leamarie Gordon, Symposium Committee Chair*



Assumption  
University



"The key to wisdom is this -  
constant and frequent questioning,  
for by doubting we are led to  
question, by questioning we  
arrive at the truth."

- Augustine

