





# Assumption University

Office of the Provost and  
Academic Vice President

Welcome to the *28<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,

Greg Weiner, Ph.D.  
Provost and Vice President for Academic Affairs





# Assumption University

<b>Academic Department</b>	<b>Faculty Advisor</b>
<i>Cybersecurity</i>	Dr. Raymond Albert
<i>Biological and Physical Sciences</i>	Dr. Elizabeth Colby Davie
<i>Psychology</i>	Dr. Amanda Cremona-Caira
<i>Biological and Physical Sciences</i>	Dr. Stuart Cromarty
<i>English</i>	Dr. Becky DiBiasio
<i>Biological and Physical Sciences</i>	Dr. Karolina Fucikova
<i>Biological and Physical Sciences</i>	Dr. Leamarie Gordon
<i>Biological and Physical Sciences</i>	Dr. Maria Teresa Herd
<i>History</i>	Dr. Carl Keyes
<i>History</i>	Dr. Deborah Kisatsky
<i>Biological and Physical Sciences</i>	Dr. Michele Lemons
<i>Psychology</i>	Dr. Karen Lionello-DeNolf
<i>SOPHIA Program</i>	Dr. Esteban Loustunau
<i>Management, Marketing, and Organizational Communication</i>	Dr. Bart Morrison
<i>Biological and Physical Sciences</i>	Dr. Brian Niece
<i>Human Services and Rehabilitation Studies</i>	Dr. Cinzia Pica-Smith
<i>Sociology and Criminology</i>	Dr. Francis Prior
<i>SOPHIA Program</i>	Dr. Cathleen Stutz
<i>Human Services and Rehabilitation Studies</i>	Dr. Christian (Scannell) Williams

# 28th Annual Undergraduate Symposium

## Program Schedule

Monday, April 11, 2022		
Time	Event	Location
9:00-10:00 AM	Presentation Session 1	Tsotsis Family Academic Center Ballrooms A&B
10:30-11:45 AM	Presentation Session 2	Tsotsis Family Academic Center Ballrooms A&B
1:00-2:30 PM	Presentation Session 3	Tsotsis Family Academic Center Ballrooms A&B

Tuesday, April 12, 2022		
Time	Event	Location
9:00-10:00 AM	Presentation Session 1	Tsotsis Family Academic Center Ballrooms A&B
10:30-11:45 AM	Presentation Session 2	Tsotsis Family Academic Center Ballrooms A&B
12:30-1:45 AM	Presentation Session 3	Tsotsis Family Academic Center Ballrooms A&B

Tuesday, April 12, 2022		
Time	Event	Location
2:00-4:00 PM	Poster Session	Tsotsis Family Academic Center Ballrooms A&B

# Monday, April 11, 2022

## Student Presentation Schedule

<b>9:00- 10:00 AM</b>		
<b>Ballroom A</b>		
<b>Moderator: Dr. Deborah Kisatsky</b>		
Time	Student	Presentation Title
9:00	Nicholas Macchione	William Lloyd Garrison: The Voice of Abolition
9:15	Colin Wren	Frederick Douglass: A Complicated Pacifist
9:30	Carl Allard	William Jennings Bryan - Statesman and Pacifist
9:45	Aaron Barber	Eugene V. Debs
<b>10:30 to 11:45 AM</b>		
<b>Ballroom A</b>		
<b>Moderator: Prof. Anthony Sacino</b>		
Time	Student	Presentation Title
10:30	Madelynn Johnson	"I Am No Man": The Importance of Female Archetypes in Fantasy
10:45	Brendan Lawrence	Volkswagen AG Strategic Analysis
11:00	Kaitlyn Calnan	Kindle Your Light
11:15	Katherine Galvin	Historic Worcester
11:30	Sarah Mattison	The Student Suicide Crisis in Worcester
<b>1:00 to 2:30 PM</b>		
<b>Ballroom A</b>		
<b>Moderator: Dr. Ray Albert</b>		
Time	Student	Presentation Title
1:00	Colin Orleman	Automotive Electronic Security
1:15	Mason Camille	The influence of standards, cryptography, and artificial intelligence on digital forensics
1:30	Nolan Collins	Ransomware
1:45	Matthew Kelley	The Ethical and Legal Implications of Honeypots
2:00	Jack Supernor	Cyberwarfare
2:15	Frederick Anim-Amofa	Email Compromise

# Tuesday, April 12, 2022

## Student Presentation Schedule

<b>9:00 to 10:15 AM</b>		
<b>Ballroom A</b>		
<b>Moderator: Dr. Francis Prior</b>		
<b>Time</b>	<b>Student</b>	<b>Presentation Title</b>
9:00	Martine Augusma	The Impact of COVID-19 to the mental health of Elementary school children and how teachers and school counselors understand them
9:15	Camal Brown	How Attorneys Perceive Marginalized Indigent Clients
9:30	Zachary Darling	Understanding the role of behavior in a legal setting.
9:45	Joshua Ferreira	Physical and Mental Effects of Stress on Police Officers and Differing Stress Levels Among Police Ranks
10:00	Nashley Perez	Diving Inside of Parents Minds When It Comes to Child Custody
<b>10:30 to 11:45 AM</b>		
<b>Ballroom A</b>		
<b>Moderator: Dr. Francis Prior</b>		
<b>Time</b>	<b>Student</b>	<b>Presentation Title</b>
10:30	Alexa Giroux	How COVID-19 Protocol has impacted court proceedings
10:45	Evelyn Kitchen	Power at Work
11:00	Monet Knott	Racial Inequality in the Non-profit Workspace
11:15	Antonia Kosnoski	How Unhoused Women Find Safe and Affordable Housing While Living in A Homeless Shelter
11:30	John Mastergeorge	Thoughts, Feelings, and Opinions of Employees and Volunteers at a Mentorship Programs on Working in a Non-Profit
<b>12:30 to 1:45 PM</b>		
<b>Ballroom A</b>		
<b>Moderator: Dr. Francis Prior</b>		
<b>Time</b>	<b>Student</b>	<b>Presentation Title</b>
12:30	Amy Nguyen	Exploring Work-Related Stress at an Alternative Behavioral School
12:45	Christina Raposo	Government and Communication: How Communication Shapes Trust
1:00	Isabella Ricciardi	Thoughts and Attitudes of Police Officers-A Study of how Officers Think
1:15	Gina Tomaiolo	Attorneys at Work: Examining Differences in Working Conditions of Public and Private Counsel
1:30	Matthew Young	Understanding Divorce Through the Court System

Tuesday, April 12, 2022  
 Poster Presentation Schedule  
 Ballroom A&B  
 2:00-4:00 PM

<b>Student(s)</b>	<b>Poster Title</b>
Julie Aguiar Jenna Graf	Impact of pat-3 mutation on commissural patterning in C. elegans
Jenny Call	Effect of disease on algal communities in artificial ecosystems
Katy Cannistraro Nicole Leonardo Casey Powers Connor Querrard	The Impact of Alcoholism on Families
Patrick Davidson	Using Digital Software to Train ABA Delivery Staff
Thomas Dow	Modeling Radical Halogenation for an Undergraduate Laboratory
Rylee Ferguson	Scared of Blowing it?: The Role of Learning in the Relationship between Anxiety and Risk
Laura Goyette Ashleigh Hughes	Earthworms' Diets and their Effects on Soil pH, Earthworm Population and Length
Andrew Hall	Does Significant Size Difference In Crayfish Affect Competitive Food Dominance?
Sydney McCann	Effects of Body Coloration on Female Mate Preference in Betta Fish
Brooke Phillips	How Temperature Differences Effect Color Change in Green Anoles
Taylor Poland Matthew Sanchez	Mindfulness and Memory
Deyana Underwood	The Effects of Serotonin on Aggressive Behaviors in Crayfish
Emma Ushchak	Quantitative Ultrasonic Properties of Prostate Cells
Rebecca Wesson	Impacts of Bd on Tadpole Eating Process

***William Lloyd Garrison: The Voice of Abolition***

Nicholas Macchione '22

History

This research project explores the life and writings of William Lloyd Garrison and his impact on the abolition movement. In addition to providing an outline of Garrison's life, the research views his major accomplishments through the lens of his pacifism and traces the roots of this peaceful ideology to their origins in the political philosophy of the Enlightenment and American founding and the Baptist theology of the Great Awakening. Through the synthesis of these ideas, Garrison's complicated relationship with non-violence and the evolution of his ideas for ending slavery in the United States are also investigated. The product of this research is a paper that aims to resolve some of the contradictions within Garrison's ideas and provide readers with a greater sense of his importance both as a proponent of non-violence and an abolitionist.

*Faculty Mentor: Dr. Deborah Kisatsky*

***Frederick Douglass: The Conscience of America***

Colin Wren '22

History

During his lifetime, Frederick Douglass acted as a conscience for America. He began his life enslaved in the South, but he never stopped believing in what America could become if it fulfilled the promises of its founding documents. Douglass was a man of strong convictions and he never hesitated to act on what he believed to be right. Early in his abolitionist career, he believed in total nonviolence as the only means for ending the institution of slavery. During this time, he used his skills as an orator to denounce both slavery and segregation by painting vivid images of their brutality and immorality. He also achieved great victories for the cause of abolition as a pacifist. He played a key role in the liberation of George Latimer, and in the rallying of British support for the American abolitionist movement. However, while his dedication to abolition never wavered, his methods for achieving it changed and evolved over time. Later in his life in the lead up to the Civil War, he would abandon his pacifist beliefs and actively encouraged violence to end the terrible institution. Nevertheless, through it all he never failed to act as the Conscience of America, always reminding it of its duty to remain true to its higher values enshrined in the Declaration of Independence.

*Faculty Mentor: Dr. Deborah Kisatsky*

***William Jennings Bryan: American Statesman and Pacifist***

Carl Allard '22

History

William Jennings Bryan was an American politician from the turn of the century who championed the cause of peace ultimately to the result of his resignation. His commitment to an idealized version of the United States, where America would be the most virtuous and excellent version of itself possible, was longstanding, and he conducted every political act in pursuit of this vision. Though a flawed human being, Bryan aimed for consistency in his political platform, and was willing to stake his career on promoting peace in the early twentieth century and avoid what he saw as the evils of imperialism. It was against his will and his cajoling that President Woodrow Wilson decided to enter WWI, leading to Bryan's resignation.

*Faculty Mentor: Dr. Deborah Kisatsky*



**Eugene V. Debs**  
Aaron Barber '22  
History

Eugene V. Debs was a leading American Socialist who lived from 1855-1926. Debs began as a union official and led major rail strikes as part of his efforts to achieve greater rights for the working man. Later, Debs was nominated as the Socialist Party candidate for president of the United States a record five times. Debs was opposed to war, citing it as an affront to the working classes. His protests against US entry into World War I violated the Sedition Act of 1918 and he was imprisoned. While imprisoned he ran for president again, still managing three percent of the vote. Eugene V. Debs remains a relevant historical figure because he sought radical change through nonviolent means. His careful use of the strike, the ballot box and the lecture circuit helped him create subtle but genuine effect over the political discourse of the 20<sup>th</sup> century.

*Faculty Mentor: Dr. Deborah Kisatsky*

***"I Am No Man": The Importance of Female Archetypes in Fantasy***  
Madelynn Johnson '22  
English

According to JRR Tolkien in his essay "On Fairy-Stories," fantasy stories and storytelling are important universal aspects to humanity. This two-part project explores the use of female archetypes in the fantasy genre as an example of their importance. For part one, various pieces of fantasy literature were read to gain a closer understanding of the scope of each author's style, worldbuilding, and use of female characters. Then a creative piece of three fantasy short stories in the fantasy genre were written to shed light on various aspects of the female experience. For part two, a critical analysis essay was written that discusses each story's creation in detail and explains how fantasy and archetypes influence our views of women and the female experience. This presentation summarizes an original capstone project that fulfills the final requirement of the Honors Program.

*Faculty Mentor: Dr. Becky DiBiasio*

***Gaining and Maintaining Competitive Advantage in the Global Automobile Manufacturing Industry:  
Volkswagen AG***  
Brendan Lawrence '22  
Management

This study asks the question: how can Volkswagen AG (VW) gain and maintain competitive advantage in the global automobile manufacturing industry? A three step, iterative strategic management process (Analysis, Formulation, and Implementation), commonly used by business strategists, is utilized to consider a wide array of elements in the business environment of VW. Several analytical tools are employed to describe and analyze the internal and external environments, three levels of strategy, and multiple levers of strategy implementation at VW. Based on this description and analysis, sets of trends, strengths, weaknesses, opportunities, and threats facing VW are specified. Finally, the analysis is used to develop proposed strategies that can enable VW to successfully answer the research question.

*Faculty Mentor: Dr. J. Bart Morrison, DBA*

***Kindle Your Light***

Kaitlyn Calnan '24

Political Science

A thoughtful reflection on the texts read in The Figure of the Seeker (CLT 255), which was the SOPHIA program class last fall. It requires exploration of the idea of vocation across different cultures with a special attention to spiritual traditions and how these relate to Catholic social teachings. This paper encapsulates what it means to be a Seeker in the eyes of many authors, but mainly focused on the specific texts by Parker Palmer, Dorothy Day, and Leif Enger. Each one speaks upon how we can be the truest versions of ourselves while still struggling in our daily lives. This struggle speaks to how we overcome the most difficult experiences and overall helps us to know ourselves better to discover our own life path.

*Faculty Mentor: Dr. Cathleen Stutz*

***Working History: Exploring the Different Areas of Public History***

Katie Galvin '22

History

In this presentation I will discuss the work I have undertaken during internships at two public history sites, the Worcester Historical Museum during Spring 2022 and the American Independence Museum in Exeter, New Hampshire, during Summer 2021. Even though both sites are museums, I had very different responsibilities at the Worcester Historical Museum and the American Independence Museum. That demonstrates that the field of public history has many different career trajectories for people interested in studying history but not teaching in traditional classrooms. At the Worcester Historical Museum, I worked primarily in the library, assisting with processing and digitizing original sources and generating metadata for the digital versions. I also contributed to projects at Salisbury Mansion, a historic home constructed in 1772 and now a museum. At the American Independence Museum, I worked in the archives conducting research and alongside curators in presenting the collections to the public. I also interacted directly with visitors at special events. I will share how I learned firsthand about the many kinds of careers available at public history sites.

*Faculty Mentor: Dr. Carl Robert Keyes*

***The College Suicide Crisis: A Student's Story in Context***

Sarah Mattison '23

English & Human Services and Rehabilitation Studies

Throughout the past decade, mental health challenges of college students have been a concern across the nation. Due to the overwhelming stress and pressure put on today's students, suicides on college campuses have become more common, even in Worcester. Within the past year six have died by suicide. Colleges around the area have been attempting to provide extra resources for students who show mental health concerns. However, one of the best ways to learn about the mental struggles of students is by learning from the students themselves. While I spent time in an emergency mental health ward, I was able to create a poem that depicted my suicidal ideation formed within the past year. This piece of writing was created in hopes that a student's perspective of mental health struggles will inspire others to act and consider new initiatives to stop student suicides from occurring.

*Faculty Mentors: Dr. John Hodgen and Dr. Cinzia Pica-Smith*

## ***Automobile System Security***

Colin Orleman '22

Cybersecurity

In the production and development of automobiles, security can often be overlooked. Security systems include the potential for the users of such systems to suffer loss of personal data, belongings, or even the vehicle itself. As automotive technology advances, it brings with it new security vulnerabilities and risks. Features associated with autonomous safety and driving functions, mobile device connected multimedia systems, “smart” electronic locks, and other systems, can be exploited by attackers. In this paper, I explain the evolution of automotive system security and the roles played by cybersecurity standards, cryptography, and artificial intelligence.

*Faculty Mentor: Dr. Raymond Albert*

## ***The Impact of Standards, Cryptography, and Artificial Intelligence on Digital Forensics***

Mason Camille '22

Cybersecurity

Digital forensics involves the collection, transportation, storage, and evaluation of digital evidence. In the field of digital forensics, there continues to be new technology and with that, new problems that arise. This paper will discuss how the use of standards, cryptography, and artificial intelligence has impacted and continues to impact the field of digital forensics. The use of standards affects the practices that digital forensics professionals use regarding the collection, transportation, and evaluation of physical and digital data. Cryptography poses a challenge to digital forensics professionals because the inability to access data on a system makes it nearly impossible to identify what is on the system without being able to decrypt the data. Artificial intelligence is an important part of the evaluation of evidence specifically being able to search for specific types of data or being able to identify pieces of evidence that a human might not be able to notice. Cybersecurity standards, cryptography, and artificial intelligence are expected to continue to have a significant impact on Digital Forensics well into the future.

*Faculty Mentor: Dr. Raymond Albert*

## ***Ransomware***

Nolan Collins '22

Cybersecurity

When defending a ransomware attack the categories of cryptography and artificial intelligence are extremely important for the company that is under attack along with the standards that each company needs to follow to prevent as much loss as possible. Throughout this paper I will be explaining the usage of those three categories to help eliminate and prevent a ransomware attack. The use of cryptography can be used in these situations to help protect their data by encrypting it as well as backing it up. The use of standards is important because it allows the companies to follow and create a response plan in case of an emergency. Artificial intelligence is important because it can help us prevent these attacks by creating code that will automatically send an alert to the company or even counterattack the attacker. Artificial intelligence will be able to warn us way before a human will!

*Faculty Mentor: Dr. Raymond Albert*

## ***The Legal and Ethical Implementations of Honeypots***

Matthew Kelley '22

Cybersecurity

While honeypots and honeynets are incredibly useful tools that can be used for protecting an organization's assets or allowing security researchers to observe and document attack methods, many organizations are hesitant to use them due to the risks that come with a poorly configured and managed honeypot. There is a plethora of legal and civil issues that can occur, as well as a major risk to the organization's assets, should a compromised honeypot be used to launch attacks on other non-honeypot systems within the same network. To avoid these issues, organizations who wish to implement a honeypot need to follow standards and requirements for maintaining and monitoring the device and all connections. Data collected from honeypots foster advancements in machine learning and automated security systems, while preventing and collecting data on attacks that utilize cryptography.

*Faculty Mentor: Dr. Raymond Albert*

## **The Evolution of Cyberwarfare**

Jack Supernor '22

Cybersecurity

Technological advancement has become the backbone of humanity's ability to advance. It provides ever evolving and improved approaches to problem solving, entertainment, and intellectual growth. Unfortunately, it is also being increasingly employed in cyberwarfare. This is particularly alarming when key cybersecurity concepts, such as confidentiality, integrity, and availability are not adequately addressed. Engagement in cyberwarfare carries with it the profound potential to devastate society as it exists today. This paper explores the challenges that need to be overcome including: the full enforcement of cybersecurity standards, the appropriate use of cryptography, and artificial intelligence techniques. The evolution of cyberwarfare, as it is defined and implemented, must address these predicaments on a global scale through the legitimate establishment and implementation of an agreed set of regulations to ensure protection for humanity.

*Faculty Mentor: Dr. Raymond Albert*

## ***Email Compromise***

Frederick Junior Anim-Amofa '22

Cybersecurity

Email communication has increasingly become one of the most preferred modes of communication between people. Cyber criminals have, unfortunately, developed attacks used to capture or manipulate sensitive information. Many email users have fallen victim to such attacks. This paper presents an overview of my work experience at Area 1 Security in my role as a Threat Hunt Analyst Intern and the tools I used to analyze and identify malicious email messages. The role that cybersecurity standards, cryptography, and artificial intelligence each play in protecting email communications is also presented. Finally, guidance is provided to help email users differentiate malicious and benign email messages.

*Faculty Mentor: Dr. Raymond Albert*

***The Impact of COVID-19 on the Mental Health of Elementary School Children and How Teachers and School Counselors Understand Them***

Martine Augusma '22  
Criminology & Sociology

The aim of this research is to determine the effects of Covid-19 on elementary-aged students from the perspective of their teachers and counselors. This research will aim to answer the following questions: (1) How do teachers think about reducing students' psychological stress? (2) How do teachers think about addressing students' pandemic-related stress? (3) How do teachers address pandemic-related delays in student learning? Participants in this research will be completing 30-60 minutes interviews to speak about the impact of the pandemic on their students' social and academic performances. This research will provide data about the impact of Covid-19 on the mental health of kids in grades pre-K to 6<sup>th</sup> grade from an educator perspective. This will advance the current understanding of the effect of the pandemic on the mental health of elementary-aged students.

*Faculty Mentor: Dr. Francis Prior*

***How Attorneys Perceive Marginalized Indigent Clients***

Camal Brown '22  
Criminology

How do public service attorneys, i.e., attorneys, and court services workers who deal with marginalized and indigent clients regularly, perceive and feel about representing those litigants? It is documented within the literature that people of color and those of low-income households get poor representation when dealing with attorneys. I will be conducting 30 – 60 minutes interviews of five different attorneys, in hopes of finding the reason(s) of why most of an attorney's emotions, attitudes, and overall feelings when dealing with these types of litigants are the way they are. After the interviews I expect to find that most attorneys' attitudes, emotions, and overall feelings are in response to the overwhelming number of cases they receive on a daily basis.

*Faculty Mentor: Dr. Francis Prior*

***The Role of Behavior in a Legal Setting***

Zachary Darling '22  
Criminology & Sociology

How do people who seek legal assistance behave when being assisted by staff attorneys and how do the staff attorneys behave to treat the response? Scholars say that the behavior in times of crisis is important due to the changes and responses it may have on many different people involved with a particular crisis situation. I will be conducting participant observation examining the interactions of the parties involved in the meeting. By the end of the interaction, I expect to find strong behavior change in the litigants and strong behavior responses for the staff attorneys. The comparisons made in the interactions will help prove that behavior change is relevant in crisis situations in a legal setting.

*Faculty Mentor: Dr. Francis Prior*

## ***Physical and Mental Effects of Stress on Police Officers and Differing Stress Levels Among Police Ranks***

Joshua Ferreira '22

Criminology and Sociology

Research shows that stress plays a major role on both the physical and mental health of police officers. This can potentially wear an officer down and cause them to make bad decisions, while also having severe physical health implications. Participants were asked questions in an approximately 30-minute interview regarding the potential negative effects stress has on their personal and professional lives. I expect to find data confirming past research regarding the negative effects stress has on a police officer both physically and mentally while also expanding on current research regarding the effects stress has on a police officer's personal life outside of the job. The expected implication for this research is to help the general public understand the stress and adverse effects it can have on an officer in a time where there is great political division regarding the role of police in society.

*Faculty Mentor: Dr. Francis Prior*

## ***Diving Inside of Parents Minds when it comes to Child Custody***

Nashley Perez '22

Criminology

Ever wonder how parents feel when trying to win full custody or partial custody of their child? In this literature it is documented the insight of what it is like to battle for custody of a child through the court system. A deeper insight of the process and all feelings with a child custody case. I will be conducting a 45-minute to an hour-long interview with five different parents who are attempting to gain custody of their child so to gain a better understanding of how they feel during the process. When dealing with these circumstances, this literature will attempt to analyze emotions, perspectives, and general thoughts. This literature will focus on two main questions; 1) What are the advantages and disadvantages that males have when it comes to a judge making a final judgment on child custody? 2) What is the mindset of the parents during the child custody process?

*Faculty Mentor: Dr. Francis Prior*

## ***COVID-19 Impact on Court Processes***

Alexa Giroux '22

Criminology & Sociology

The COVID-19 pandemic has been detrimental to society in many ways. It has also affected court proceedings. Many people including defendants, judges and attorneys are impacted by the changes made to the system. Observations will be made to understand how the COVID-19 pandemic has impacted court proceedings and what changes could possibly be implemented to make it more efficient. I expect to find that many obstacles are being navigated by court personnel to ensure matters are handled in an efficient manner. Some of these obstacles include technical difficulties and lack of attendance due to infection of COVID-19. If my findings are correct, the implications could indicate that the court system is not running as efficiently as it could be.

*Faculty Mentor: Dr. Francis Prior*

***Power at Work***  
Evelyn Kitchen '22  
Criminology & Sociology

The type of power dynamics in an attorney's office can shape the forms that collaboration and individualization take across the workplace. Scholars debate on the balance between a strict structure creating tension and a lack of creativity versus an unstructured environment without checks and balances. Five participants will complete an interview about workplace culture, collaboration, and individualization and how these processes affect their work. I expect to find that people within the office enjoy a semi-structured environment which creates a balance between position, collaboration, and individualization between different levels of the District Attorney's Office. Implications of this study can create a better environment for people to work within a district attorney's office for the system to run the most efficiently that it can.

*Faculty Mentor: Dr. Francis Prior*

***Racial Inequality in the Non-Profit Workspace***

Monet Knott '22  
Criminology & Sociology

Sociological scholars have made note that there is a racial hierarchy and varying forms of racial domination within our society. I, however want to explore how do people in non-profit spaces feel about racial inequality in the workplace? Or in general? Through conducting six, 30-60 minute in-depth interviews with employers within the non-profit space surrounding the racial inequality in the non-profit sphere, I hope to find the answers to alleviate this issue of racial hierarchy and domination in the sphere where work is typically done for the betterment of marginalized groups in society. Expected implications would follow suit that there is a problem within the workspace surrounding this issue and ways to address or alleviate the issue would follow following the research that is conducted.

*Faculty Mentor: Dr. Francis Prior*

***How Unhoused Women Find Safe and Affordable Housing While Living in a Homeless Shelter***

Antonia Kosnoski '22  
Criminology

This study will look at how unhoused women living at a women's shelter, either at the emergency shelter or in the supportive housing unit, in Central Massachusetts find safe and affordable housing. This research may add to the pre-existing literature by providing insight through the interviews into how the women see homelessness and transient lifestyles and how they use different resources in their shelter to find housing. Through seven in-depth semi-structured interviews, two women living in the emergency shelter, four living in the supportive housing units, and the shelter advocate, I expect to find that safe and affordable housing will not always be synonymous with each other, meaning that just because a woman has found an apartment that she could afford to move into, it may not necessarily be in a safe neighborhood. This research will offer an inside look at the homeless epidemic facing our country.

*Faculty Mentor: Dr. Francis Prior*

***Thoughts, Feelings, and Opinions of Employees and Volunteers at a Mentorship Programs on Working in a Non-Profit***

John Mastergeorge '22  
Criminology & Sociology

Research shows how important mentor-type figures are to youth, especially at-risk youth. The purpose of this research is to discover what motivates individuals to either volunteer or seek employment at a non-profit that works with at-risk youth. This research will highlight the personality behind those involved in non-profit work. Five participants will take part in an in-depth semi structured interview that asks questions about their purpose in a mentor relationship and their opinion on it. I expect results to show that those involved have altruistic personalities and beliefs. I believe this shows that people with a specific mindset get involved in being involved in a mentorship program.

*Faculty Mentor: Dr. Francis Prior*

***Exploring Work-Related Stress at an Alternative Behavioral School***

Amy Nguyen '22  
Criminology

Working in the environment of an alternative behavior school is stressful. This is in part due to the psychological and behavioral issues of the students, as staff members work closely along with them to ensure they get the most out of their program. How does working at an alternative school influence school staff stress? Workers at an alternative school handle difficult experiences and calls as that shows personal character development as that could affect how they act and feel about themselves and others. According to scholars, this could lead to burnout of the profession workers are in. I used a Qualitative Method of research as I will interview five staff members about their work-related stress. Interviews were later transcribed to find related themes of stressors of the job. I expect to find that workers at alternative behavioral schools are facing multiple stressors on the job that later goes on to affect their personal life, as their emotions and thoughts could alter. Collectively we can learn more about alternative schools and how they function to ensure students' greater potential.

*Faculty Mentor: Dr. Francis Prior*

***Government and Communication: How Communication Shapes Trust***

Christina Raposo '22  
Criminology & Sociology

The type of communication from government officials' offices may have an effect on how constituents view government. If people have an unfavorable experience with a Congressional caseworker under their representative, they may harbor negative feelings, like mistrust, towards that official which could explain voting activity. To discover if this hypothesis is correct, interviews with a variety of backgrounds from Congressional employees to activists and constituents will be conducted. It is expected to find that negative interactions will lead people to not trust the elected official. These findings may help explain voting patterns and feelings held towards the United States Government.

*Faculty Mentor: Dr. Francis Prior*



***Thoughts and Attitudes of Police Officers-A Study of How Officers Think***

Isabella Ricciardi '22

Criminology

Scholars have researched police tactics, peacekeeping, and workplace culture, but less has been done on police officers' attitudes with respect to these topics. How do police officers feel about their working conditions and how do police feel about calls involving use of force? To answer these questions, I will conduct in-depth semi-structured 60 minute interviews with 5 police officers. I expect to find officers reporting stress in their responses to the questions I ask. The implications to this research are important for the future of police officers and how they can possibly change the way police departments are run.

*Faculty Mentor: Dr. Francis Prior*

***Attorneys at Work: Examining Differences in Working Conditions of Public and Private Counsel***

Gina Tomaiolo '22

Criminology & Sociology

While past scholars have conducted research on attorneys that considers concepts such as stressors, exposure to corruption, as well as better communicative skills between the attorney and the defendant to improve representation, the literature does not examine differences of attitudes between the public and private sector of criminal defense from the attorney's perspective. In this study, I will conduct five semi structured interviews in which attorneys will be questioned about their attitudes towards their labor as well as taking into account their self-image. Through codifying interviews, I expect to find common themes in both sectors like "stress" and "helping others" but I expect to find a preference towards private sector conditions in opposition to the public sector. The findings of the research will give an insight to an attorney's mindset, highlighting an integral part of the Criminal Justice system.

*Faculty Mentor: Dr. Francis Prior*

***Understanding Divorce Through the Court System***

Matthew Young '22

Criminology & Sociology

How do judges and other court staff members understand how the court system treats families that are going through divorce? People experience stress, anxiety, and confusion during the divorce process because of the impact it will have on them emotionally, physically, and financially. I will conduct in depth semi structured interviews with judges and other court staff about their perspective on divorce. I'll be interviewing 5-6 individuals. During the interviewing process, I'll be asking questions regarding their current understanding of the divorce process, their views and feelings about divorce, and their overall opinion and experience they have had with divorce. I expect to find that most of the individuals working at the courthouse will agree that people going through divorce are easily stressed and confused about the divorce process. They will base their findings off their different experiences dealing with divorce. My findings should help people get a better understanding of divorce and divorce process, hopefully easing the stress and confusion that divorce causes. This presentation summarizes an original capstone project that fulfills the final requirement of the Honors Program.

*Faculty Mentor: Dr. Francis Prior*

### ***Impact of pat-3 Mutation on Commissural Patterning in C. elegans***

Julie Aguiar '22 Jenna Graf '22

Neuroscience

Molecular mechanisms of neuronal development are not well understood. In these studies, we test if the beta integrin subunit pat-3 is required for proper neuronal patterning. We employed the model organism *C. elegans* to analyze cholinergic and GABAergic motor neuron patterning in wildtype and pat-3 mutant strains. We are studying three distinct pat-3 mutant strains, each of which has a distinct point mutation in a highly conserved NPxY phosphorylation site. More specifically, we are comparing the neuronal commissural patterning in mutant and wildtype backgrounds. In the *C. elegans* model, motor neuron commissures make critical connections between the dorsal and ventral side of the animal. In these studies, we are using fluorescent microscopy to view these commissures and determine if pat-3 is necessary for proper neuronal commissure patterning. This presentation summarizes an original capstone project that fulfills the final requirement of the Honors Program.

*Faculty Mentor: Dr. Michele Lemons*

### ***Effect of Disease on Artificial Algal Ecosystems***

Jenny Call '22

Environmental Science

*Batrachochytrium dendrobatidis* (*Bd*) is a fungal disease that was introduced into artificial ecosystems containing algae and tadpoles. When tadpoles are infected with *Bd*, they experience mouthpart deformations, causing them to feed on algae less effectively. The purpose of this study was to investigate if the presence of *Bd* changes the composition of the algal communities. Six algal samples were analyzed containing *Bd*, and the algae present were broadly categorized and quantified. A correlation analysis was done between the amount of *Bd* present in each sample and algal diversity and species richness. A negative moderate correlation was identified as *Bd* abundance and species richness increased. However, this was proven insignificant with a p-value of 0.81 ( $\alpha=0.05$ ). A significant weak, negative correlation between the Shannon Wiener Index and *Bd* was found, with a p-value of 0.03 ( $\alpha=0.05$ ).

*Faculty Mentor: Dr. Karolina Fučíková*

### ***The Impact of Alcoholism on Families***

Nicole Leonardo '22, Katy Cannistraro '24, Casey Powers '24, Connor Querrard '24

Human Services and Rehabilitation Studies

More people in our community are impacted by alcoholism than we think and more often than not there is a stigma surrounding the families of those addicted to alcohol. Participants completed an anonymous survey that asked various questions about the impact of alcoholism on their lives, as well as their perceptions of alcoholism. The data was compiled and presented in order to portray the significance of the impact of alcoholism in our Assumption Community. Similarly with information obtained and researched, it can be concluded that this stigma does still exist, and we need to break that stigma down.

*Faculty Mentor: Dr. Christian E (Scannell) Williams*

### ***Using Digital Software to Train ABA Delivery Staff***

Patrick Davidson '22

Psychology

The purpose of this study was to determine if the Train-to-Code (TTC) software was effective in increasing the accuracy of participants' implementation of discrete trial training (DTT). TTC was used to teach participants to recognize common DTT error types. Different video examples of trial types were presented to participants and participants had to code whether the example was correct or incorrect and, if incorrect, the type of error. A multiple baseline across participants combined with a pre- posttest design was used to evaluate the effectiveness of TTC training. Pre- and post-tests consisted of the participants completing a role play DTT session. One participant has completed the entire training sequence and results indicate that participant's accuracy improved from 43% at pre-test to 90% at post-test; accuracy in a two-week follow-up role play was 93%. The results of the study indicate that TTC may be an effective online training option for ABA service delivery staff.

*Faculty Mentor: Dr. Karen Lionello-DeNolf*

### ***Computational Applications in Radical Mechanisms for the Undergraduate Organic Chemistry Laboratory***

Thomas Dow '22

Chemistry

Synthetic organic chemistry is an incredibly important field of research, and the development of computational methods allows for the ability to learn important chemical information about contemporary and traditional synthetic methods. The radical chain mechanism was studied, specifically the mechanism of synthesizing benzylic bromides. Toluene, cumene, and p-cymene were radically brominated, and the reactions were monitored in a UV/Vis spectrophotometer to obtain rate information. Additionally, <sup>1</sup>H NMR spectra were taken to confirm the correct product was formed. Spartan software was used to model the mechanisms using transition state calculations, and relevant thermodynamic and rate information were obtained from computational calculations. Wet experiments with cumene and p-cymene resulted in unexpected products due to the reactivity of cumyl halides. Therefore, only results for toluene were focused on. Radical bromination of toluene successfully synthesized benzyl bromide, and the results from computational mechanistic calculations closely matched rate data and previously determined thermodynamic values. This presentation summarizes an original capstone project that fulfills the final requirement of the Honors Program.

*Faculty Mentor: Dr. Elizabeth Colby Davie and Dr. Brian Niece*

### ***Scared of Blowing It?: Relations Between Risk Taking, Learning, and Anxiety***

Rylee Ferguson '22

Psychology

Deficits in associative learning, the ability to recognize patterns in the environment, may explain the relationship between risk avoidance and heightened anxiety symptoms. To test this, undergraduate participants completed a Balloon Emotional Learning Task (BELT) to assess risk taking and learning, and the Adult Self-Report (ASR) to measure anxiety symptoms. Results showed a positive correlation between risk and learning, and negative correlations between risk and anxiety and learning and anxiety. Counter to our hypothesis, associative learning did not mediate the relationship between risk and anxiety. This may be a result of multicollinearity, or high correlation between learning and risk. Future research should continue investigating whether learning or risk taking is truly responsible for the development and maintenance of anxiety symptoms to inform novel treatments to target the route of anxiety problems in young adults. This presentation summarizes an original capstone project that fulfills the final requirement of the honors program.

*Faculty Mentor: Dr. Amanda Cremone-Caira*

## ***Earthworms' Diets and their Effects on Soil pH, Earthworm Abundance and Length***

Laura Goyette '23, Ashleigh Hughes '23  
Biology

*Eisenia fetida*, also known as "earthworms", are the most well-known decomposers in the New England area. Earthworms play a key role in maintaining a healthy environmental system by breaking down organic matter, increasing soil water retention, and facilitating the growth of plants via nutrient cycling. The goal was to evaluate the effects of diet pH on earthworm abundance and length. It was hypothesized that the worms would thrive most with a pH neutral diet. This was tested by dividing worms into four groups and feeding each group a diet with a different pH. Soil pH, worm abundance, and length were measured weekly. The results showed that the worms thrived most in the alkaline environment, which was within the best pH range for earthworms. These pHs ranges from 5.0-8.0, as indicated by both the greatest abundance and largest average size within this diet.

*Faculty Mentor: Dr. Karolina Fučíková*

## ***Does Size Difference Contribute to Food Competition Dominance in Crayfish?***

Andrew Hall '22  
Biology

Crayfish, like other crustaceans, are very aggressive animals and they display that aggression especially amongst themselves. They fight for many things in the wild such as territory, shelter and food. The goal of this experiment was to determine if a significant size difference between a pair of crayfish would lead to one of them exhibiting dominance when placed in a competitive situation for food? A series of trials were run in which two crayfish of significant size difference were placed into a tank filled with only water and no other environmental features. Control experiments featured crayfish of similar size. Since the experiment is focusing on physical size differences alone, many features such as shelter needed to be made unavailable. A food item was placed within the tank and whichever crayfish was able to obtain the food item before its rival was scored as the winner.

*Faculty Mentor: Dr. Stuart Cromarty*

## ***Effects of Body Coloration on Female Mate Preference in Betta Fish***

Sydney McCann '22  
Biology

Female sexual selection on external coloration has been documented in many species of fish and proves to be advantageous in selecting healthy and sexually attractive males. In this experiment, color preference in red and blue female *Betta splendens* on red and blue males was tested. This was to determine if females have a color preference, regardless of their own coloration, or if they color-match when selecting mates. Females were assigned two pairs of males and were placed into a central tank; the males were placed into separate cups on opposite ends of the tank. Fixation behavior was observed during three-minute trials, timing when the female fixated on red males and blue males. Most females, both red and blue, spent significantly more time fixating on red males than blue males, and did not exhibit color-matching behavior. This data suggests that Female *B. splendens* do exhibit sexual selection on external coloration similar to other species of fish.

*Faculty Mentor: Dr. Stuart Cromarty*

## ***How Temperature Differences Effect Color Change in Green Anoles***

Brooke Phillips '23

Biology

Green anoles (*Anolis carolinensis*) are known for their ability to change color. Their color change can be a response to temperature, humidity, and/or hormonal/mood changes (Gibbons 2021). Their coloring is controlled by a variety of specialized skin cells. Three layers of pigment cells, one layer for yellow, one layer for blue, and one for brown are activated singularly or in a combined fashion to regulate skin color (Elmer 2020). The following experiments were done to determine how temperature effects color change by manipulating high and low temperatures. By observing the colors of anoles in initial temperature environments as well as how they changed colors when their environmental temperatures were altered. My results showed that anoles placed in a warmer environment will change to a darker brown color while placed in a colder environment will change to a bright green color.

*Faculty Mentor: Dr. Stuart Cromarty*

## ***Mindful Meditation's Effect Upon Memory and Misinformation***

Matthew Sanchez and Taylor Poland '22

Psychology

In the present study our goal is to pilot a briefer paradigm and method for introducing misinformation and testing memory. Previous research has found that participation in a mindful meditation task prior to examining various household scenes enhances the ability to encode information; while also improving memory retention in addition to reducing one's susceptibility to post misinformation. In our current research, participants were asked to engage in a three minute mindfulness activity, followed by the encoding of six household scenes, a filler phase, the introduction of contagion information, followed by a recall and recognition test of where participants believed they encountered the scene information. Data collection for the project is ongoing. We will focus our presentation on the methodological components and present preliminary findings.

*Faculty Mentor: Dr. Leamarie Gordon*

## ***Serotonergic Effects on Aggressive Behaviors in Crayfish***

Deyana Underwood '23

Biology

Crayfish are excellent models in animal behavior research because their individual behaviors as well as behaviors towards conspecifics can be easily identified and tracked. This experiment was done to determine the effectiveness of serotonin on aggressive behaviors in crayfish. Previous published studies have shown serotonin to be an important modulator of crustacean aggressive behavior within the species. Six control experiments of two sized-matched crayfish were done to create a baseline for behaviors; six more experiments were done on size-matched crayfish with one animal injected with 0.1mM of serotonin solution to observe the aggressive behaviors with serotonin present. The results concluded that the walking backwards and escape response behaviors were statistically significant. These submissive behaviors were observed less in the experimental serotonin injected crayfish while in the serotonin injected crayfish claw grab, an aggressive behavior was statistically higher. Overall animals injected with serotonin were more aggressive and more dominant.

*Faculty Mentor: Dr. Stuart Cromarty*

## ***Ultrasonic Properties of Prostate Cells***

Emma Ushchak '22

Biophysics

In the United States, prostate cancer is the second leading cause of cancer death and the most diagnosed form of cancer in men. It has been shown that healthy and malignant cells have differences in their quantitative ultrasonic (QUS) properties. This study explored the fundamental QUS properties of healthy prostate cells by determining attenuation, speed of sound, and backscatter, with the object of comparing the QUS differences between cancerous and non-cancerous prostate cells in the future. Ultimately, these findings could lead to a non-invasive way of detecting cancer through quantitative ultrasound. It was found that in the higher frequencies, the cells reflected more of the waves leading to higher backscatter coefficients generally matching the theoretical fit for a spherical scatterer, attenuation also increased with frequency following a power law of  $f^{0.7}$ . Speed of sound was determined to be frequency independent. This presentation summarizes collaborative research conducted with a faculty member made possible by an Honors Summer Fellowship.

*Faculty Mentor: Dr. Maria Teresa Herd*

## ***Effects of *Batrachochytrium dendrobatidis* on Tadpoles Grazing Capabilities***

Rebecca Wesson '23

Biology

*Batrachochytrium dendrobatidis* (*Bd*) causes a fungal infection (chytridiomycosis) of the skin in amphibians. One third of the world's amphibian's population is threatened by viral diseases, habitat loss, pollution, drought but the biggest threat is *Bd*. *Bd* is known to affect the mouth parts of tadpoles which should affect the way that the tadpoles eat. It was hypothesized that diseased tadpoles would feed differently than healthy tadpoles, changing the composition of algal communities in the diseased mesocosms. The type and abundance of algae were determined using light microscopy and recorded into a spreadsheet. Further data collection is underway, and analysis will continue later in the year.

*Faculty Mentor: Dr. Karolina Fučíková*





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