The Utica University Student Conference for Research, Professional Activities, and Creative Arts

Wednesday, April 23, 2025

Donahue Auditorium/Library Concourse/Gordon Science Center

SCHEDULE OF EVENTS

1:30 pm	**Poster Set-up: Presenters Report to the Library Concourse**
2:00 pm	**Welcoming Remarks – Provost Stephanie Nesbitt** ● **Donahue Auditorium (Gordon Science Center)**
2:15 - 3:15 pm	**Poster Presentations & Refreshments** ● **Library Concourse**
3:15 – 3:30 pm	**Students report to classrooms for oral presentation set-up**
3:30 – 4:45 pm	**Concurrent Oral Presentations** ● **Session A: Gordon 261** ● **Session B: Gordon 262** ● **Session C: Gordon 271**

POSTER SESSION: 2:15-3:15 PM – Library Concourse

1. **Enhancing Real-Time Object Detection with Semi-Supervised Learning in Plants vs. Zombies**
   - Nathaniel Baumes and Savior Wah (Unnati Shah and John Kim, Faculty Advisors)

2. **Beneath the Surface: Cybersecurity in the Human Body**
   - John Hrustich, Chris Rawlins, and Kate Vaughan (Unnati Shah, Faculty Advisor)

3. **Cryptography in the Quantum Era**
   - Christopher Rawlins, John Hrustich, and Kate Vaughan (Unnati Shah, Faculty Advisor)

4. **The Effect of Sucralose and Taurine on the Female Reproductive System and Related Anatomy in Female Swiss Webster Mice**
   - Tess Barrett and Julie Savitskiy (Terri Provost, Faculty Advisor)

5. **Do Eastern Red-backed Salamanders Click Less in Response to Other Salamander Scents in Light Compared to Total Darkness?**
   - Kira Kuhn (Bryant Buchanan and Sharon Wise, Faculty Advisors)

6. **Discovery of the Hyalinamides, a New Family of Peptaibiotics from the Mycoparasitic Fungus, *Hypomyces hyalinus* (Hypocreales, Hypocreaceae)**
   - Emma Rogers (Richard Tehan, Faculty Advisor)

7. **Discovery of New Species and New Specialized Metabolites in the Ophiocordycipitaceae, a Family of Entomopathogenic Fungi**
   - Diana Svetlov (Richard Tehan, Faculty Advisor)

8. **Specialized Metabolite Profiling of the Cordycipitaceae, a Family of Arthropod-Pathogenic Fungi**
   - Jallen Wright (Richard Tehan, Faculty Advisor)

9. **Effectiveness of Transcranial Magnetic Stimulation Combined with Occupational Therapy for Upper Limb Function in Stroke Patients: A Systematic Review**
   - Fallon Siniscarco, Anna Beach, Hannah Bertella, Madison Derouin, Thomas Yoxall, and Emma O'Donnell (Yvonne Monti, Faculty Advisor)

10. **Perceived Social Support Predicts Mental Wellness Among American Indian Adults: A Systematic Review**
    - Brittany Ninham and Alhanoof Alkhaldi (Yvonne Monti, Faculty Advisor)

SESSION A: Gordon 261

Moderator: **Elizabeth Threadgill, Associate Professor of English**

3:30 - 3:45: **Lessons from Orwell; America's Descent into Censorship**

- Emily Bond (Elizabeth Threadgill, Faculty Advisor)

3:45 - 4:00: **The Cost of Crossing: Does Immigration and Deportation Create More Issues?**

- Olivia Clark (Elizabeth Threadgill, Faculty Advisor)

4:00 - 4:15: **Reddit Research Project: Trump's Leadership**

- Amaya Funk (Elizabeth Threadgill, Faculty Advisor)

4:15 - 4:30: **Immigration and Media: A Study of Influence on Public Opinion**

- Lilly Messler (Elizabeth Threadgill, Faculty Advisor)

4:30 - 4:45: **Social Emotional Learning in Adolescent Social Studies Education**

- Jenna Smolinski (Kerry Sullivan, Faculty Advisor)

SESSION B: Gordon 262

Moderator: **Nicole Lawrence, Assistant Professor of English**

3:30 - 3:45: **Once Upon a Time: Fairy Tales, Identity, and Ideology**
The Evils of Female Curiosity: Bluebeard's Wife and Descendancy from Eve

- Victoria Elefante (Nicole Lawrence, Faculty Advisor)

3:45 - 4:00: **Once Upon a Time: Fairy Tales, Identity, and Ideology**
Agency and Patriarchy in Adaptations of the Bluebeard Tale

- Glory Stevens (Nicole Lawrence, Faculty Advisor)

4:00 - 4:15: **Once Upon a Time: Fairy Tales, Identity, and Ideology**
Fracturing the Fairy Tale Norms: How Sex in Malice Breaks the Passive Mold

- Eli Wilson (Nicole Lawrence, Faculty Advisor)

4:15 - 4:30: **Once Upon a Time: Fairy Tales, Identity, and Ideology**
Patriarchal Scopophilia in "Sleeping Beauty"

- Jenna Skutnik (Nicole Lawrence, Faculty Advisor)

4:30 - 4:45: **The Patterns, Trends, and Evolution of Video Game Advertising and Marketing**

- Abbey Notar (Patricia Swann, Faculty Advisor)

SESSION C: Gordon 271

Moderator: **Keni Cota, Assistant Professor of Biology**

3:30 - 3:45: **Investigating Natural Language Processing Challenges and Approaches in Low-Resource Languages Through the Lens of Twi, Amharic, Telugu and Nepali**

- Rahul Velpula KC Aryan, Junaid Berta, and Emmanuel Kow-Donkor (Rutal S.Mahajan, Faculty Advisor)

3:45 – 4:00: **Correlation Between Bursty Bulk Flows Evolution, Solar Wind Conditions, and Sub Storm Dynamics During Severe to Extreme Storms of Solar Cycles 23 and 24**

- Sydney Kinsella (Hava Turkakin, Faculty Advisor)

4:00 – 4:15: **Corpora Lutea In Group-Housed Versus Socially Isolated Mice**

- Joseph Odarchuk (Adam Pack, Faculty Advisor)

4:15 - 4:30: **Phosphomimetic Mutations in the *Caenorhabditis elegans* Cellular Fusogen EFF-1**

- Izabella Osilovskiy (Jessica Thomas, Faculty Advisor)

ABSTRACTS

The Effect of Sucralose and Taurine on the Female Reproductive System and Related Anatomy in Female Swiss Webster Mice

Tess Barrett and Julie Savitskiy
Terri Provost, Faculty Advisor
Poster Presentation

As drinks containing sucralose and taurine grow in popularity it is necessary to understand the impacts of these ingredients on the female reproductive system and related anatomy. In this study, 32 female Swiss-Webster mice were randomly placed into 4 treatment groups (water (N=8), sucralose (N=8), taurine (N=8), sucralose and taurine (N=8)) for four weeks. Vaginal lavages were performed on each mouse for the final 10 days of treatment. Microscope slides were stained with Giemsa for cytological assessment of present cell types to determine estrous cycle phases. Mice were weighed prior to treatment and sacrifice to determine percent body mass change. Post-euthanization fat pads were extracted, weighed, and relative weight calculated. Serum leptin concentrations were determined using enzyme-linked immunosorbent assay. Sucralose exposed animals had prolonged proestrus stage. Taurine treated mice gained significantly less body weight when reported as a % body weight change over time. Serum leptin concentrations were not impacted by any treatment. These data suggest that the impact of sugar substitutes and dietary additives are not clear and require more research.

Enhancing Real-Time Object Detection with Semi-Supervised Learning in Plants vs. Zombies

Nathaniel Baumes and Savior Wah
Unnati Shah and John Kim, Faculty Advisors
Poster Presentation

Through advancements in deep learning, computer vision has revolutionized various fields, including medical imaging, autonomous systems, and surveillance. However, challenges such as the demand for large labeled datasets, computational costs, and adaptability in dynamic environments persist. Traditional supervised learning techniques require significant human effort for annotation, limiting scalability. This project explores how self-supervised learning techniques can enhance computer vision models for real-time automation, reducing the need for extensive labeled datasets while improving detection accuracy and adaptability.

We aim to develop an automated system that interacts with visual data in real time using machine-learning techniques. We aim to enhance object detection performance while minimizing the need for manually labeled data. We implemented a module capable of identifying and labeling objects within the game Plants vs. Zombies using a custom-trained YOLO object detection model. Since implementing full self-supervised learning was more complex than we could currently handle, the system was trained using PyTorch, leveraging semi-self-supervised learning techniques to improve efficiency and adaptability. By incorporating pseudo-labeling and iterative training, we aim to demonstrate how these techniques can accelerate training while maintaining or improving detection accuracy.

The implementation leveraged PyTorch and YOLOv8 for object detection, OpenCV for image processing, and PyAutoGUI for automation. The initial dataset comprised 35 manually annotated images, requiring an hour for labeling, and training for 50 epochs resulted in an average confidence level of 0.60 with inconsistent detection. Extending training to 100 epochs improved confidence to 0.97 but failed to generalize to new enemy types. A semi-semi-supervised learning approach was introduced, utilizing a teacher model to generate pseudo-labels for an additional 50 images, improving training speed and maintaining a confidence level of 0.95. Some false positives persisted, with incorrect bounding boxes appearing at a confidence level of 0.35, highlighting the need for further refinement. Future work will focus on exploring additional self-supervised techniques, experimenting with larger datasets, and refining the model architecture to minimize false positives while improving object detection accuracy and efficiency.

Lessons from Orwell; America's Descent into Censorship

Emily Bond
Elizabeth Threadgill, Faculty Advisor
Oral Presentation

In order to assess the threat of censorship in America I conducted research of scholarly articles and public opinion online. The consensus that I reached while searching for articles is that the threat of censorship is rapidly growing in America. This topic is important because many will remain ignorant to fascism until its dominance has already become widespread, and censorship has been a major component of every fascist regime in history.

For the social aspect of my research I analyzed a reddit thread that discussed censorship in America. The thread I analyzed is from the public subreddit r/DeclineIntoCensorship, and is available for any reddit user to comment on, which made it perfect for gauging public opinion. To conduct this analysis I created descriptive codes, categories, themes, and an overall theory.

The overall theory of my research is that censorship is being used as a tactic by politicians to gain power and further their agenda. The takeaway is that we must act before even the discussion of censorship becomes punishable.

The Cost of Crossing: Does Immigration and Deportation Create More Issues?

Olivia Clark
Elizabeth Threadgill, Faculty Advisor
Oral Presentation

In today's digital world, one viral comment can spread misinformation faster than the truth can catch up to you and the misinformation can eventually bite you in the butt. For my research, I got research articles from the Utica Library. These sources all have the same main reason for writing said papers; they might not be talking about the same thing, but they are all talking about the same effects that deportation and immigration could be having on the USA. The purpose of this study is to bring awareness to the growing hate for immigrants in the us. I chose this topic because of the change of presidents every so many years; there is always a time when conflict comes up, and I want everyone to know, so they can have correct information, so they can back themselves up. This topic is also important because the US has a huge immigrant population, which is because these immigrants are seeking safety and a better life. The Methodology is a qualitative content analysis. We had to find comments and add descriptive coding to each. Eventually, we had to come up with categories, themes, and an overall theory on a comment thread. I chose to do the Reddit thread about Sam Parker wanting to deport Selena Gomez. I chose it simply because it looked interesting and was up to date. The overall theory and theme of the research are social media discourse surrounding celebrities often foster toxic environments where nationalism, misinformation, and public outrage overshadow rational discussion, revealing the darker side of online culture and its impact on real-world perceptions. My major takeaway from this would be that we need to get our facts straight before we speak.

Once Upon a Time: Fairy Tales, Identity, and Ideology

Victoria Elefante, Glory Stevens, Jenna Skutnik, and Eli Wilson
Nicole Lawrence, Faculty Advisor
Oral Presentation

In “Once Upon a Time: Fairy Tales, Identity, and Ideology,” students from LIT 356: From Fairy Tales to Modern Fantasy share their individual research projects. In “The Evils of Female Curiosity: Bluebeard’s Wife and Descendancy from Eve,” Victoria Elefante examines how the figure of Bluebeard’s wife in the classic “Bluebeard” tale is demonized for her curiosity, and how this precipitates directly from how Eve is portrayed in the Bible. In “Agency and Patriarchy in Adaptations of the Bluebeard Tale,” Glory N. Stevens explores how even when the heroines of "Bluebeard" tales exercise some degree of agency, vocal or physical, such as in the case of Beck in season one of the Netflix series You, they remain trapped by patriarchal gender stereotypes. Eli Wilson’s paper, “Fracturing the Fairy Tale Norms: How Sex in Malice Breaks the Passive Mold,” investigates sex, desire, and agency in “Sleeping Beauty” adaptations, as does Jenna Skutnik's “Patriarchal Scopophilia in ‘Sleeping Beauty,’” which looks particularly at how the male gaze functions in fairy tales, carrying over into real world events. Taken together, these presentations center identity, sexuality, and social ideology in both traditional and adapted fairy tales to critique and explore the social didacticism of the genre.

Reddit Research Project: Trump’s Leadership

Amaya Funk
Elizabeth Threadgill, Faculty Advisor
Oral Presentation

My findings have led me to the conclusion that many of Trump's negative viewers have the same opinion in that Trump leads similarly to foreign leaders, and that his attempt at border control is harsh. I chose this topic because I knew that with the recent election causing a huge divide in America, many people would have varying opinions, and were more likely to speak out because of the election. To conduct my qualitative content analysis, I gathered comments from a Reddit thread, then analyzed them in a chart, comparing the similarities in what commenters said. Specifically, I created descriptive codes, categories, themes, and an overall theory. Then I found articles from professional researchers relating to the comments and did the same thing. Through all this, I continued having peers check my work for validity. The overall themes are that Trump leads similarly to various foreign leaders and has no regard for America's democratic system. Along with the Immigration policies Trump has and is planning on implementing are brutal and criminalizing, although it has decreased Illegal immigration. The biggest takeaway from all of this is that history is always repeating itself, and we do nothing to stop it.

Beneath the Surface: Cybersecurity in the Human Body

John Hrustich, Chris Rawlins, and Kate Vaughan
Unnati Shah, Faculty Advisor
Poster Presentation

Imagine a homicide where the weapon is the same thing meant to preserve life. Security researchers have demonstrated the potential to hack medical devices such as pacemakers and insulin pumps, exploiting vulnerabilities that allow attackers to control them and prevent life-saving care. Approximately 10% of Americans rely on Implantable Medical Devices (IMDs), which communicate over wireless networks, making them vulnerable to cyber-attacks. With over 33 million Americans dependent on these devices, ensuring their security is critical. The problem arises from the fact that many IMDs are released with undiscovered vulnerabilities that are later identified. To address these risks, patches are needed. However, the process of applying patches is cumbersome—patients must visit healthcare providers for manual updates, leading to delays and inconvenience.

We propose a secure remote update mechanism that enables healthcare providers to apply patches to IMDs remotely, eliminating the need for in-person visits. This solution uses a secure, encrypted communication protocol to ensure the confidentiality and integrity of data during transmission. A public-private key encryption system will be implemented for authentication, ensuring that only authorized devices and healthcare providers can initiate updates. Update files will be encrypted and verified before installation to prevent tampering. A secure communication channel, such as VPN or a dedicated network, will transmit the updates, protecting against interception.

The advantages of this approach include enhanced security by enabling timely patch application, reduced patient inconvenience by eliminating the need for clinic visits, cost savings through fewer in-person appointments, and scalability for various IMDs. By addressing the vulnerabilities in IMDs and improving the update process, we aim to ensure the safety and security of these life-saving devices, ultimately benefiting both patients and healthcare providers.

Correlation Between Bursty Bulk Flows Evolution, Solar Wind Conditions, and Sub Storm Dynamics During Severe to Extreme Storms of Solar Cycles 23 and 24

Sydney Kinsella
Hava Turkakin, Faculty Advisor
Oral Presentation

Emission of magnetohydrodynamics (MHD) waves from the boundaries of Bursty Bulk Flows (BBFs) is investigated during severe to extreme geomagnetic storms of solar cycles 23 and 24 (1996--2019). We used Multiscale Atmosphere Geospace environment (MAGE) model with solar wind data from OMNI as input parameters. A special attention is given to the characteristics of BBFs with/without MHD wave emission during single-peak storms versus multi-peak storms. Correlation between the solar wind parameters, BBFs with/without MHD wave emissions, and substorm dynamics is also investigated. Kelvin-Helmholtz Instability (KHI) is considered as a possible mechanism for the MHD wave emission along the BBFs boundaries.

Do Eastern Red-backed Salamanders Click Less in Response to Other Salamander Scents in Light Compared to Total Darkness?

Kira Kuhn
Bryant Buchanan and Sharon Wise, Faculty Advisors
Poster Presentation

Eastern Red-Backed Salamanders (*Plethodon cinereus*) are model organisms in the study of the evolution of agonistic behavior, such as territoriality, that are known to communicate using chemical signals and visual cues. Most studies of salamander behavior have occurred under lighted conditions to help researchers observe behavior, so we do not yet fully understand their natural behavior underground or at night. Eastern Red-Backed Salamanders rely heavily on chemosensory cues for interactions with their environment to determine territory, mate choice, and to find prey in low-light or no-light scenarios. Research in our lab has demonstrated that salamanders make an audible click in response to handling or the presence of other salamanders; it is possible this sound is a form of communication or simply an epiphenomenon associated with olfactory sampling. If it is acoustic communication or associated with olfactory sampling, we might expect fewer clicks in the light when vision is possible than in the dark when olfactory or auditory signals might be more useful. Past studies in our lab have demonstrated that salamanders reduce nose tapping (an olfactory sampling behavior) in dim lighting when vision is possible, whereas visual displays increase under those conditions. We predict that salamanders will reduce sound production at illuminations that enable vision compared to total darkness, where acoustic communication would presumably be more useful. We propose to test this hypothesis by monitoring clicks by resident salamanders in total darkness (<10-5 lx) or dim lighting (1 lx) when presented with their own odors vs the odors of other intruding salamanders.

Immigration and Media : A Study of Influence on Public Opinion

Lilly Messler
Elizabeth Threadgill, Faculty Advisor
Oral Presentation

To learn about diverse views on immigration, I researched a variety of sources. The recurring theme throughout the articles circles back to misinterpretation of people's intentions, like political views. I chose this topic because immigration was a popular topic of discussion entering the 2024 election. I wanted to see the different perspectives on immigration and how people go about discussing their views on it. I analyzed a reddit post regarding Selena Gomez's feelings on immigration. I first started by taking 100 comments and finding the main theme in each comment. Then I categorized the comments themes that reoccur, and then analyzed each theme that occurred. Throughout the research I conducted, I found that miscommunication has led to false interpretations of people's views and intentions, then causing a disturbance in peace through communities. The main point in my research is to use the topic of immigration to show the effects of misinformation.

Perceived Social Support Predicts Mental Wellness Among American Indian Adults: A Systematic Review

Brittany Ninham and Alhanoof Alkhaldi
Yvonne Monti, Faculty Advisor
Poster Presentation

Our review demonstrated that social support correlates with mental wellness among American Indian (AI) adults. Decreased social support was linked to increased psychological service use. Promoting social support in occupational therapy interventions may enhance mental well-being outcomes within AI communities.

The Patterns, Trends, and Evolution of Video Game Advertising and Marketing

Abbey Notar
Patricia Swann, Faculty Advisor
Oral Presentation

A content analysis was conducted among three different video game production companies, each company having a sample of three games each. The companies and games included Supermassive Games with Man of Medan, Until Dawn, and The Quarry; Skybound Entertainment with The Walking Dead: Season One, The Walking Dead: The Final Season, and Baldur's Gate 3; and finally, Don't Nod with Life is Strange, Tell Me Why, and Twin Mirror. Each of these games was categorized based on several components. These categories being the design of the game, the game type, single-player vs. multiplayer, the character type, the advertising methods, and finally, the use of celebrities. Through using this chart, I discovered that Supermassive Games consistently used the most methods for advertising across their games regardless of the games being released years apart. From here, I decided to conduct a more in-depth analysis of their company and one of their games in particular, The Quarry. Into looking at this game, I discovered that the game was advertised through Supermassive Games' Instagram page heavily, posting things such as the game's actual release trailer that was put out on Youtube, short clips showcasing the characters' looks and their personalities, and even videos including the Supermassive team who worked on the game being excited and proud of the game's release. In addition to Instagram, the game was also teased and advertised on Facebook, Youtube, and the official Supermassive Games website.

Corpora Lutea In Group-Housed Versus Socially Isolated Mice

Joseph Odarchuk
Adam Pack, Faculty Advisor
Oral Presentation

Environmental stimuli can influence hormonal cascades with wide-ranging effects on physiology. During the COVID-19 lockdown, many of the implications of quarantine were unknown, including social isolation's effects on reproduction. In this project, we examined the presence of corpora lutea in ovaries of mice which had been either group-housed or socially isolated. The corpus luteum develops from the remains of an ovarian follicle after ovulation and plays a crucial role by producing the necessary hormones (primarily progesterone) for preparing and maintaining the endometrium for pregnancy. We tested the hypothesis that individually housing the mice impacts follicular development and, consequently, corpus luteum formation. To test this hypothesis, eighteen female mice were placed into one of two housing treatments: group-housed (three mice per cage) or individually housed (i.e., socially isolated) for five weeks. After the treatment, the ovaries were harvested, embedded in Durcupan, sectioned with a microtome, and analyzed at 25-µm intervals. An artificial intelligence custom model (from Rewire AI) was trained to identify corpora lutea in the images. The model analyzed 178 files. The analysis showed ten corpora lutea present in the group-housed and seven corpora lutea present in the individually housed cohorts. There were not enough corpora lutea identified to accept or reject our hypothesis, necessitating further data acquisition. Nonetheless, insight into the mechanisms that regulate corpora lutea formation, function, and regression will help better our understanding about fertility and regulation of the menstrual cycles.

Phosphomimetic Mutations in the *Caenorhabditis elegans* Cellular Fusogen EFF-1

Izabella Osilovskiy
Jessica Thomas, Faculty Advisor
Oral Presentation

Cell-cell fusion is a process in which cells fuse to form a multinucleated cell known as a syncytium. Cell-cell fusion occurs during sperm-egg fusion and to form tissues and organs such as skeletal muscle, placenta, osteoclasts, and the vertebrate eye lens. It is also implicated in cancer biology (Shinn-Thomas et al., 2011). However, this vast topic is still not fully understood. My research focuses on the cell-cell fusion process in *Caenorhabditis elegans*. *C. elegans* is a roundworm that is an ideal model organism for viewing and studying cell-cell fusions because it is transparent and approximately one-third of its cells fuse (Corsi et al., 2015; Podbilewicz, 2006). In this research, we study the type-1 transmembrane protein EFF-1 in C. elegans, which is necessary and sufficient to initiate cell fusion (Mohler et al., 2002; del Campo et al, 2002). More specifically, we focus on the serine amino acids at positions 632 and 634 (S632_634) in EFF-1's cytoplasmic domain. Previous studies showed that the cytoplasmic domain and potential phosphorylation of S632_634 are important for cell fusions (Balla et al., 2006 ; Shinn-Thomas et al., 2016). In this research, we made phosphomimetic mutations at S632_634 where we mutated the serines to aspartic acid (S632_634D). This mutation mimics constitutively phosphorylated amino acids allowing us to further analyze the impact of phosphorylation on EFF-1. In future research, we will observe how cell fusions are affected in *C. elegans* with these phosphomimetic mutations.

Cryptography in the Quantum Era

Christopher Rawlins, John Hrustich, and Kate Vaughan
Unnati Shah, Faculty Advisor
Poster Presentation

Imagine a general devising an infallible battle plan and transmitting it through what is believed to be a secure communication line. When the battle plan is executed, it fails catastrophically because the enemy somehow knows the opposing army's strategy. It is revealed that the enemy used a quantum computer to decrypt the general's communications in seconds, allowing them to evade capture and escape to safety. Quantum computers, leveraging qubits and superposition, can process information exponentially faster than classical systems, making current encryption methods vulnerable. While fully functional quantum computers remain scarce, even limited quantum capabilities provide a strategic advantage in breaking encryption. This raises a critical question: How can we develop cryptographic methods that remain secure in a quantum-enabled world? To address this challenge, we conducted an extensive literature review to explore current solutions and identify promising areas for investigation. Based on our findings, our research focuses on post-quantum cryptographic algorithms that are designed to withstand quantum attacks. We examine lattice-based cryptography, which relies on the hardness of problems like the Learning With Errors (LWE) problem, and hash-based cryptography, which utilizes collision-resistant hash functions. These approaches are considered strong candidates for securing data in a post-quantum world, as they are resistant to Shor's and Grover's algorithms, which could efficiently break current cryptographic systems like RSA, ECC, and symmetric encryption. Our research aims to design and implement quantum-resistant cryptographic protocols. By developing these advanced algorithms, we seek to contribute to the foundation of a secure, post-quantum cybersecurity framework. The implementation of these solutions will be a key step in ensuring the protection of sensitive data and maintaining digital security as quantum computing continues to evolve.

Discovery of the Hyalinamides, a New Family of Peptaibiotics From the Mycoparasitic Fungus, *Hypomyces hyalinus* (Hypocreales, Hypocreaceae)

Emma Rogers
Richard Tehan, Faculty Advisor
Poster Presentation

Fungi are major producers of structurally diverse secondary metabolites, many of which have potent biological activities with potential pharmacological applications. The interest of this study lies in identifying biologically active natural products for potential use in combating antibiotic resistance. Cultures of the mycoparasitic fungus *Hypomyces hyalinus* on media PDB (potato dextrose broth) and CSM (cheerios sucrose media) were extracted and fractionated using organic solvents, and the non-polar fractions were then analyzed by liquid-chromatography with high resolution tandem mass spectrometry (LC-HR-MS/MS). Mass spectrometry data were analyzed using computational metabolomics to provide an overview of the *H. hyalinus* secondary metabolome, from which we identified both the roseoferin peptide family and a new family of peptaibiotics, known for containing the non-proteinogenic amino acids Aib (α-aminoisobutyric acid) and Iva (isovaline). We predicted the structures of three of these novel peptaibiotics using MS/MS fragmentation spectra which showed linear, eleven-residue, Aib-containing peptides which we named hyalinamides A, B, and C. Cultures grown on PDB also produced roseoferins, particularly roseoferin A3, which has displayed strong antibacterial activity in closely related species. From these results we can conclude that *H. hyalinus* produces novel secondary metabolites with potential antimicrobial activity, and the production of these compounds varies depending upon their culture media. Moving forward we intend to introduce a third high-nitrogen medium for culture growth, use HPLC to isolate pure metabolites, and test the biological activity of both crude extracts and isolated metabolites for potential pharmacological application.

Effectiveness of Transcranial Magnetic Stimulation Combined with Occupational Therapy for Upper Limb Function in Stroke Patients a Systematic Review

Fallon Siniscarco, Anna Beach, Hannah Bertella, Madison Derouin, Thomas Yoxall, and Emma O'Donnell
Yvonne Monti, Faculty Advisor
Poster Presentation

Stroke is the leading cause of long-term disability worldwide with severe upper extremity impairments in two-thirds of stroke survivors. Studies indicate that transcranial magnetic stimulation (TMS) and repetitive transcranial magnetic stimulation (rTMS) can enhance motor recovery post-stroke by stimulating neural plasticity and modulating cortical excitability. Studies also indicate that occupational therapy interventions demonstrate strong to moderate evidence in improving motor control and hand function post-stroke. The purpose of this systematic review was to explore the question: Does combining OT with rTMS improve upper extremity function post-stroke? The results of our systematic review indicated that integration of low frequency rTMS stimulation combined with OT has been shown to be effective in enhancing upper limb functions in individuals with chronic stroke.

Social Emotional Learning in Adolescent Social Studies Education

Jenna Smolinski
Kerry Sullivan, Faculty Advisor
Oral Presentation

Social-emotional learning (SEL) is a method of teaching that helps students develop skills that can aid in regulating their emotions, making decisions, and building relationships. SEL can also have significant effects on students and help them develop a resilient mindset in the face of problems or stress. While the majority of SEL research focuses on implementing outside of the classroom SEL supports, SEL also has a place in daily instruction, specifically in social studies education. Social studies presents an opportunity to integrate SEL through the goals the subject seeks to accomplish.

This study seeks to explore the integration of social-emotional learning into the adolescent social studies classroom as a way to enhance learning and address students' social, emotional, and developmental needs. Existing research was synthesized and analyzed to explore the use of social-emotional learning in the adolescent social studies classroom. Practical applications were described, as well as limited connection to my student teaching experience. The alignment between adolescent developmental tasks, SEL goals, and social studies objectives provides a level of justification to implement SEL into the adolescent social studies classroom. Given SEL's proven benefits and its role in reducing negative outcomes, the focus shifts from whether SEL should be integrated into the classroom to how it can be implemented most effectively.

Discovery of New Species and New Specialized Metabolites in the Ophiocordycipitaceae, a Family of Entomopathogenic Fungi

Diana Svetlov
Richard Tehan, Faculty Advisor
Poster Presentation

The Ophiocordycipitaceae is a family of parasitic fungi in the order Hypocreales (Ascomycota, Sordariomycetes). Hypocrealean fungi are prolific producers of structurally diverse, biologically active organic molecules termed specialized metabolites (SM's). New and overlooked hypocrealean species present particularly fertile sources for the discovery of new bioactive SM's of potential medicinal value. We aimed to obtain a phylogenetic overview of North American collections of fungi in the family Ophiocordycipitaceae using multi-locus sequencing. Here we present a preliminary report of seven new species of insect pathogens and fungal parasites in the Ophiocordycipitaceae based on molecular and morphological analysis. We also present the initial investigations of secondary metabolite production in new and known species.

Investigating Natural Language Processing Challenges and Approaches in Low-Resource Languages Through the Lens of Twi, Amharic, Telugu and Nepali

Rahul Velpula KC Aryan, Junaid Berta, and Emmanuel Kow-Donkor
Rutal S.Mahajan, Faculty Advisor
Oral Presentation

This collaborative research investigates methodological approaches to overcome fundamental challenges in computational linguistics for four low-resource languages: Twi, Amharic, Telugu, and Nepali. Our research aimed to identify effective strategies for developing NLP capabilities in languages with limited computational resources and to determine how linguistic diversity impacts computational approach requirements. We sought to answer: (1) What are the primary barriers to effective NLP in these languages? (2) How can methodological innovations address these barriers? (3) What common approaches can benefit diverse low-resource languages? Our initial analysis identified critical research gaps including severe resource deficiency, limited annotated corpora, standardization inconsistencies, inadequate evaluation frameworks, and absence of benchmarking standards. For Twi, we examined how rule-based approaches could overcome limited domain diversity in datasets. Amharic research investigated how to address standardization issues and symbol redundancy while building comprehensive disambiguation frameworks. Telugu research explored techniques for cross-lingual applications despite evaluation complexities. Nepali research analyzed methods for quantifying linguistic features in literary contexts. Our findings revealed that successful approaches must: develop annotation frameworks respecting linguistic uniqueness, create culturally-nuanced evaluation metrics, adapt NLP architectures to function under resource constraints, and establish appropriate benchmarking standards. The research contributes methodological innovations including language-specific annotation schemas, cross-lingual transfer learning techniques, and community-engaged resource development, demonstrating how computational linguistics research can advance despite resource limitations while preserving linguistic integrity.

Specialized Metabolite Profiling of the Cordycipitaceae, a Family of Arthropod-Pathogenic Fungi

Jallen Wright
Richard Tehan, Faculty Advisor
Poster Presentation

Fungi are a rich source of biologically active specialized metabolites (=natural products), which presents a deep reservoir for the discovery of new molecules with therapeutic potential. In this study, we set out to profile the chemistry of eight cultured strains of fungi in the Cordycipitaceae, a family of arthropod pathogens. Each strain was cultured on potato-based, and cheerios-based media, cultures were extracted with organic solvents, and extracts were analyzed by liquid chromatography with high resolution tandem mass spectrometry (LC-HR-MS/MS) to afford a metabolite profile. LC-MS/MS data were analyzed with computational metabolomics tools to provide an overview of the specialized metabolites produced by fungi in the Cordycipitaceae. These analyses resulted in the dereplication of the beauvericins, a family of 6-residue, N-methylated depsipeptide toxins, which were detected in the moth-pathogen *Cordyceps tenuipes*, and the spider pathogen, *Engyodontium aranearum*. This study represents the first chemical analysis of any fungus in the genus Engyodontium.

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