

GUS 2026

START

TALKS | POSTERS
ART | MUSIC

15 April 2026

gus.guilford.edu | gus@guilford.edu

FROM THE PRESIDENT



Dear Friends,

Welcome to the 2026 Guilford Undergraduate Symposium (GUS), which showcases the undergraduate research of our students across many academic disciplines. The topics of research at the College are as impressive and diverse as the students themselves.

Since its inception in 2008, GUS has featured about 1,000 presentations in many forms by 1,500 students - video, sculpture, readings, music, dance, talks, posters, art exhibitions, costumes, educational resources, and demonstrations. Each installment of the annual symposium reveals the impressive range of creativity and scholarship among our students. Two hundred and sixty-five students

participated in the last two years.

Working side-by-side on undergraduate research with faculty, our students gain invaluable insights and highly practical problem solving experience that will give them tremendous advantages in competing for graduate/professional school or their first career endeavor.

I want to express my appreciation to William Kelly of Hege Library and Learning Technologies for the coordination of this year's symposium, to all of the faculty mentors, and to David Hildreth, Lincoln Financial Professor of Education Studies, and Noah Fetveit '29, for their promotional efforts.

Very best wishes to all the participating students for their presentations and for a very successful conclusion to the academic year.

Warm regards,

A handwritten signature in blue ink that reads "Jean P. Bordewich". The signature is fluid and cursive, with the first name "Jean" and last name "Bordewich" clearly legible.

Jean Parvin Bordewich
President, Guilford College

FROM THE PROVOST

Dear Guilford College Community,

Welcome to the Guilford Undergraduate Symposium (GUS)!

GUS is a celebration of student scholarship and creativity, providing a platform for students to share their work with the broader community. Participants will give conference-style presentations, display visual art, take part in panel discussions, and deliver performances. These projects are the result of coursework, independent research at Guilford, experiences abroad, conferences, and work at other institutions. Beyond highlighting individual achievements, GUS also demonstrates the amazing collaborative work within our community.



Held near the end of the spring academic term, GUS serves as a meaningful reflection on our students' achievements and provides an opportunity to recognize students' development and the influence of our collective educational experience. We invite you to join Guilford College students and faculty in celebrating their efforts and supporting their successes. GUS showcases the remarkable achievements within our community.

We look forward to seeing you all there.

Sincerely,

A handwritten signature in black ink, appearing to read "K. Rowan".

Dr. Kami Rowan,
Interim Provost, Guilford College

Welcome to GUS 2026!

Welcome to the 19th Annual Guilford Undergraduate Symposium!

More than 85 Guilford students representing a wide variety of departments and programs will present original research, exhibiting creative works, reciting original prose and poetry, demonstrating artwork, and leading panel discussions and group presentations throughout the day. This symposium is an exciting opportunity to highlight our collective academic achievements across all majors, programs, departments, divisions, and classifications.

We thank you for coming together in appreciation of cross-disciplinary scholarship. We hope that you have the opportunity to see as many of the presentations as possible to help us celebrate the diversity and depth of our students' interests. These interests, and this work, forms the bedrock that helps our students shape the future.

We wish to thank all of those who helped make GUS possible along the way, including Jean Parvin Bordewich, Kami Rowan, Adam Pearman, William Kelly, Liz Wade, Gwen Erickson, Michael Crouch, and David Hildreth. Two student workers also played vital roles in the symposium: Kitana Corbett and Noah Fetveit.

GUS is a unique opportunity for students to present their work to a diverse group of students, faculty, and community members. Thank you to all of you who are attending for supporting our students in this vital endeavor!



Presenter information



The Guilford Undergraduate Symposium (GUS) is a unique opportunity for students to present their work to a diverse group of students, faculty, and members of the community. Here are a few notes about presenting at GUS. If you have any questions, please don't hesitate to contact us at gus@guilford.edu. We hope that you will find you will find your experience rewarding!

Attendance: Tell your professors and your fellow students that you are presenting at GUS and encourage them to come. You are also welcome and encouraged to invite family members and friends to attend.

Dress code: Although there is no formal dress code, we encourage all presenters to wear professional attire. This means that nice jeans are fine while athletic wear is not. Please note, as well, that some session chairs may have more formal requirements.

Registration: Check in at the GUS registration table inside the main entrance of Hege Academic Commons prior to your session. This is where you will pick up your name tag and swag. The registration table will open at 8.30am.

Poster presentations: Please note the time of your poster session. You are expected to be present for that hour to answer any questions from your colleagues, your instructors, and community members. Be sure to arrive at least 10 minutes before your session begins.

Oral presentations: Have all of your materials ready to go, either on a USB drive or in your Google Drive or physically present (if you have physical props). Be sure to arrive at your assigned location at least 10 minutes before your session begins.

Location information

Carnegie Room, Hege Academic Commons: From the main entrance to Hege Academic Commons, turn to the right and go through the wooden doors. This is the original Library location.

Collaboratory/Experimental Classroom, Hege Academic Commons: Located on the second floor of Hege Academic Commons, this is the “front” of the large collaborative space. Presenters will need their Guilford College credentials to log in to the room PC.

Collaboratory/Idea Incubator, Hege Academic Commons: Located on the second floor of Hege Academic Commons, this is the “back” of the large collaborative space. Presenters will need their Guilford College credentials to log in to the room PC.

Guilford College Art Gallery, Hege Academic Commons: From the main entrance of Hege Academic Commons, go straight down the hallway. The Art Gallery is on the right-hand side just before the Poster Hall.

Leak Room, Duke Memorial Hall: Enter via the doors that face Hege Academic Commons and use the left-hand door only to get into the room.

Poster Hall: Located in the Commons Connection Zone, which is the large space in front of the CAPE offices, there are two sides. If your back is to the elevator, the right-hand side will be for artistic and other physical media presentations. The left-hand side will be used for poster presentations.

If you have any questions, please ask a member of the Library staff or a member of the GUS Committee.



GUS 2025 oral presentations

9.00am to 10.00am

Session 1: Art as medium for understanding, William Thomas, chair

Location: Carnegie Room, Hege Academic Commons

- Maeve Dunkerley: “A night Out: Exploring the Intimacy of Friendships Between Women” (William Thomas, Art)
- Hannah Ajayi: “The Ethics of War: Exploring Violence, Injustice, and Just War Theory” (William Thomas, Art)

Session 2: Modern issues in cybersecurity, , chair

Location: Collaboratory/Experimental Classroom, Hege Academic Commons

- Wilmer Acevedo Quezada and Kirsten White: “Network Security Lab” (Chafic Bou-Saba, CTIS)
- Andy Diaz Villatoro: “Building a Malware Analysis Lab with Open-Source Tools and Repurposed Hardware” (Chafic Bou-Saba, CTIS/Cyber Security)
- ZyQuan Williams: “Healthcare Breach Impact Calculator” (Chafic Bou-Saba, CTIS)



10.15am to 11.15am

Session 3: The end is the beginning: English capstone presentation, Gwen Erickson, chair

Location: Carnegie Room, Hege Academic Commons

- Ryan Shoenthal, Ahmaad Abdul-Haqq, Tori Collins, Timothy Rundle, and Amziel Chioke: “Recursive Generativity: The Eternal Beginning of Fiction” (Cynthia Nearman, English/Creative Writing)



Session 4: A celebration of musical influence, Robert Bell, chair

Location: Guilford College Art Gallery, Hege Academic Commons

- Shemar Roberts: “Benefits of Music Therapy” (Marjorie Church, Music/Psychology)
- Bec Cormack: “Wooded Wattage: A Visual Representation and Celebration of the Legacy of WQFS at Guilford College” (Kami Rowan, Music; Marjorie Church, CAPE)

Session 5: Using dance to improve student literacy, David Hildreth, chair

Location: Collaboratory/Idea Incubator, Hege Academic Commons

- Meghan Heaney: “Teacher Perceptions on How Dance/Movement Can Impact Student Literacy Skills” (David Hildreth, Tracey Crowe, and Brenda Swearingin, Education/ Sport Studies)

Session 6: Reappraising Grimm’s Fairy Tales, David Limburg, chair

Location: Collaboratory/Idea Incubator, Hege Academic Commons

- Joseph Lambert, Christopher Anderson, Aiden Shimpi, and Gabriel Peña: “*Der goldene Schlüssel*: Grimm’s Fairy Tales and their Meanings” (David Limburg, German)

11.30am to 12.30pm

Session 7: Reflections on enforced changes, TBA, chair

Location: Carnegie Room, Hege Academic Commons

- Brady Odell: “The Limits of Ideology: Behind Japan’s Acceptance of Surrender” (Philip Slaby, History)
- August Hutchins and Teri Quick: “Analyzing Australia’s Social Media Ban in Real Time” (Samantha Rummage-Massey, CMJS)

Session 8: Advocating for change in health and wellness, Marjorie Church, chair

Location: Guilford College Art Gallery, Hege Academic Commons

- Rebecca Pierre: “Student Advocacy” (Psychology)
- Nayani Annamalai: “Improving Menstrual Health and Sustainability: Menstrual Pads Redesigned” (Biomedical Engineering)

Session 9: New trends in app development, TBA, chair

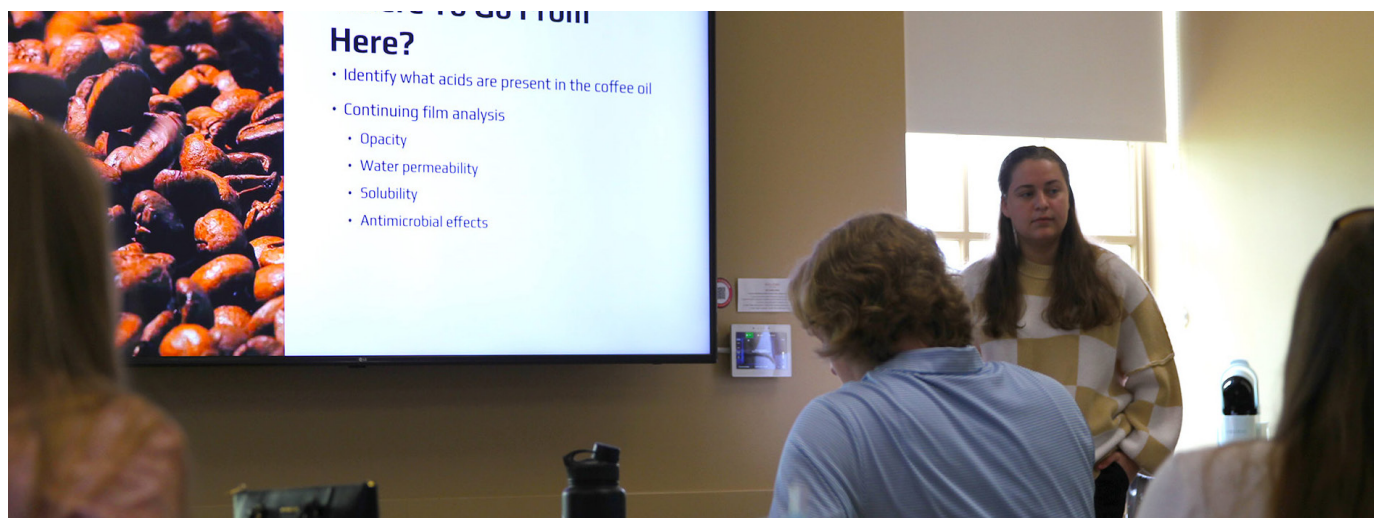
Location: Collaboratory/Experimental Classroom, Hege Academic Commons

- Ryne Rodrigues: “Pumped the Gym App” (Chafic Bou-Saba, CTIS)
- Wilmer Acevedo Quezada: “Elderly Home Assistant” (Chafic Bou-Saba, CTIS)
- Isaac Garbia: “PlanPlayGo: A Guide to Your Ultimate World Cup Experience” (Chafic Bou-Saba, CTIS)

Session 10: New analyses of ideology, culture, and policy, Tom Guthrie, chair

Location: Collaboratory/Idea Incubator, Hege Academic Commons

- Wyatt Hawks, Robin Tucker, and Aidan Shimpi: “Against the Grain: Subcultures, Conscience, and Policy” (Damon Akins, History)



1.00pm to 2.00pm

Session 11: Curating the 2026 *Greenleaf Review*, Cynthia Nearman, chair

Location: Guilford College Art Gallery, Hege Academic Commons

- Charlie Miller, Juno Steele, Sole Williams-Brewer, and Cristina Dellinger: “The Creation of the 2026 *Greenleaf Review*” (Cynthia Nearman, English/Creative Writing)

Session 12: Got Spanish? Student-made short films, Hunter Newman, chair

Location: Collaboratory/Experimental Classroom, Hege Academic Commons

- Aya Abdalla, Dhruv Revankar, Joel Sekyema, and Aura López-García: “Crónicas de la Antártida” (Hunter Newman, Spanish)
- Nataly Aguilar, Ava Arias, Courtney Bradford, Denisse Castro, and Janey Galek: “Ser o estar?” (Hunter Newman, Spanish)
- Abid Husain, Favour Faleye, Emily Zhang, Nick Jamieson, and Dara Adegoroya: “WEIRDOS en Terapia” (Hunter Newman, Spanish)

Session 13: Photo-polymer etching demonstration, Katy Collier, chair

Location: Collaboratory/Idea Incubator, Hege Academic Commons

- Ariadna Sosa and Amanda Sayaseng: “Photo-polymer etching demo” (Katy Collier, Art)
- Live streamed from Hege-Cox to this space via Zoom:



2.15pm to 3.15pm

Session 14: The ongoing impact of community gardens, Christine Stracey, chair

Location: Guilford College Art Gallery, Hege Academic Commons

- Elizabeth Martinez, Areli Patterson, Trinity Whitfield, and Brianna Campbell: “Development of a Community Serving Garden” (Zandra Pinnix, Michele Malotky, and Christine Stracey, Biology)

Session 15: Religious Studies Colloquium, Part 1, Kathryn Shields, chair

Location: Collaboratory/Experimental Classroom, Hege Academic Commons

- Emma Butts: “Death Cycles: Pre-Colonial Inuit Views of Death, Afterlife, and Continuity” (Eric Mortenson, Religion)
- Emma Evans: “Reincarnation Through the Lens of Embodiment” (Eric Mortenson, Religion)

Session 16: Mapping and modularity in modern computing,

Location: Collaboratory/Idea Incubator, Hege Academic Commons

- Aprilia Grimaldo-Welsh and Gabriel Peña: “Climate Crisis Mapping” (Rob Whitnell and Chafic Bou-Saba, CTIS)
- Erick Trejo Velázquez: “Modular Smartwatch ‘Pip-Boy’ System” (Chafic Bou-Saba, CTIS)



3.30pm to 4.30pm

Session 17: Peripheral: An Art senior thesis discussion, Katy Collier, chair

Location: Guilford College Art Gallery, Hege Academic Commons

- William Decareaux, Amziel Chioke, Parker O’Keefe, Fiona Lewis, Maddie Thaxton, Madison Underwood, Jane Uebbing, and Claire Dumont

Session 18: Religious Studies Colloquium, Part 2, Mark Justad, chair

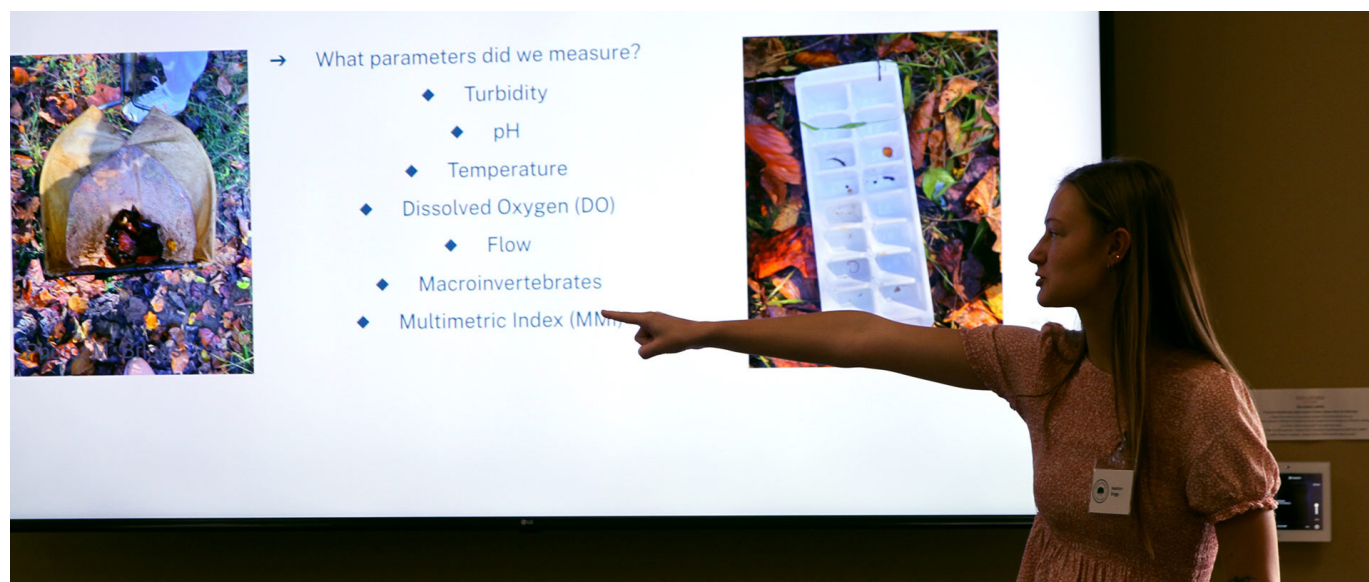
Location: Collaboratory/Experimental Classroom, Hege Academic Commons

- Z Tate: “Ayahuasca and the Market for Enlightenment” (Eric Mortenson, Religion)
- Richard Acquaye: “Radio DJing: Dealing with Musical Enculturation, Censorship, and Misinformation” (Eric Mortenson, Religion)
- Ezekiel Blanchard: “Why Are There Tales of Flying Reindeer?” (Eric Mortenson, Anthropology)

Session 19: Current research in biology and chemistry, Zandra Pinnix, chair

Location: Collaboratory/Idea Incubator, Hege Academic Commons

- Natalie Moore: “Synergistic Effects of Iberin and Sulforaphane on Triple Negative Breast Cancer cell line MDA-MB-231” (Zandra Pinnix, Christine Stracey, and Anne Glenn, Biology)
- Elizabeth Martinez: “Optimizing Mechanophotocatalysis Redox Reactions” (Samuel Horsewill, Daniel Scott, and Anne Glenn, Chemistry)
- Hayden Moody: “Tuning Photochemical Properties of [2.2] Paracyclophanes Through Isomer, Electronic Donor/Acceptor, and Steric Modulation” (Anne Glenn, Chemistry)



Poster sessions

All poster sessions are held on the first floor of Hege Academic Commons in the Commons Connections Zone (the area in front of the CAPE offices).

All presenters should arrive 10 minutes to their scheduled session to give themselves enough time to set up their posters and prepare their areas. If you need any accommodations, please talk to a GUS Committee member either before or during your scheduled time.

Attendees should come prepared for interaction. Engage with the presenters, ask questions, and be mindful of others' time. These sessions are designed for interactive discussions and quick information exchanges. Check the schedule and the abstracts to determine which ones you're most interested in. As you talk with our presenters, feel free to take notes.



12.00pm to 1.30pm

- Mohammad Agha Mohammadi: “Multi-purpose Operational Unmanned Aerial System for Emergency Response and Environmental Monitoring (M.O.U.S.E)” (Chafic Bou-Saba, CTIS)
- Natalia Alfaro Diaz, Corey Hayes, Terrence Jackson, Taiwo Jones, and Marnie Lasher: “Sustainable Textiles: From Raw Fiber to Woven Textile” (Aleks Babić, Public Health/Environmental Studies)
- Liliana Arias: “Measuring the Wavelength of Visible Light with the Michelson Interferometer” (Don Smith, Physics)
- Ella Barton-Biegelsen, Elijah Troop, Tanner Royals, Sarah Camille Loubondo Yembet, Logan Monkus, Kiya Penley, Morgan Singletary, and Kaylyn Little: “Spiders In the Spotlight: Orb Weavers and Artificial Light at Night” (Christine Stracey, Biology)
- Jana Bassalat and Mohammad Agha Mohammadi: “Open-Source Capture the Flag in Education” (Chafic Bou-Saba, CTIS)
- Adeline Beatty-Squire and Hayden Moody: “The Urban Core Sample: 1392 East New York Avenue and The Corner of W First Street and N Spring St” (Damon Akins, History)
- Sanmukh Malyala and Jimmy Ma: “Variable or Not? Investigating Stellar Brightness Variability Through Photometry” (Don Smith, Physics)
- Kylie Muse: “Identifying Bacteria from Turf Burn using Microbiology Lab Techniques” (Zandra Pinnix, Biology)
- Vihaan Sesetty and Joel Sekyema: “Computational Analysis of Sackur-Tetrode Deviations in High-Pressure Real Gas Mixtures” (Rob Whitnell, Chemistry)
- Elijah Troop: “Running With the Wolves: How You Can Study Wolves in Minnesota!” (Christine Stracey, Biology)
- George Wall: “A Quantitative Overview of The Microplastics Found in Preserved Samples of Spottail Pinfish (*Diplodus holbrookii*)” (Holly Peterson, Anne Glenn, Bronwyn Tucker, and Christine Stracey, Biology/Environmental Science)





GUS 2026 Presenters

Aya Abdalla, Dhruv Revankar, Joel Sekyema, and Aura López-García
“Crónicas de la Antártida”

Advisor: Hunter Newman, Spanish

This presentation is a class project for Hunter Newman’s Spanish 202 that we have worked on throughout the semester. The film features the struggles of a couple, Fernando and Maria, in order to teach the reader how to use the present subjunctive in Spanish. The actors in the film make use of the present subjunctive in an array of different contexts in order to show the reader the full utility of the verb tense. The video’s script and instructional segments are done entirely in Spanish.



Wilmer Acevedo-Quezada
“Elderly Home Assistant”

Advisor: Chafic Bou-Saba, CTIS

This project focuses on the design and development of a mobile home assistant robot intended to support elderly individuals who live alone. As populations age and more people live independently, there is an increasing need for simple and reliable ways to monitor daily wellbeing and reduce the risk of delayed assistance during emergencies. Many elderly individuals do not have constant supervision, which can lead to situations where help is not provided in time.

The goal of this project is to create a practical and easy-to-use system that helps confirm daily activity, provide basic reminders, and allow caregivers or family members to check on the user’s status. The robot is built using a Raspberry Pi 5 and a mobile chassis, allowing it to move within a home environment. It includes components such as a camera, motion sensors, and audio features to support interaction and monitoring. Ethical considerations, such as data protection and user consent, are also taken into account.

The system is designed to detect basic activity and identify periods of inactivity that may indicate a problem. When unusual behavior is detected, the system can generate alerts that can be viewed through a simple web interface. This allows caregivers to stay informed without needing to be physically present at all times. The robot can also provide reminders, such as medication alerts, using audio output.

Wilmer Acevedo-Quezada and Kirsten White
“Network Security Lab”
Advisor: Chafic Bou-Saba, CTIS

This project focuses on building a low-cost and simple network security system that can monitor traffic without interrupting it. The goal is to create a safe and realistic environment where network activity can be studied and analyzed. The system uses open-source tools and affordable hardware, making it accessible for students and small labs.

The design is based on a passive setup, meaning it only observes network traffic instead of blocking or changing it. A small device running OpenWRT acts as the gateway and sends a copy of network traffic to another device that runs Snort 3 and Zeek. These tools help detect possible threats such as unusual activity, unauthorized access, or signs of attacks.

The project also includes a simple monitoring setup that collects and displays alerts in one place. This helps users understand what is happening on the network and how threats are detected. The system can track things like scan attempts, login failures, and unusual patterns in encrypted traffic.

One important part of this project is that it works well even when traffic is encrypted. Instead of looking at the data itself, the system analyzes patterns and behavior to detect threats. This reflects how modern security systems work in real-world environments.

Richard Acquaye
“Radio DJing: Dealing with Musical Enculturation, Censorship, and Misinformation”
Advisor: Eric Mortenson, Religion

Alongside the future of information, communication, and community building, come worries of censorship, information processing, and “harmful” music. This presentation addresses these problems in relation to one of the largest modes of spreading information and culture: Radio and Radio DJing.

Utilizing personal observations and opinion tied into scholarship, this essay creates an informed yet personal work. My proposed solutions provide a steppingstone both for me and for fellow DJs to overcome issues of censorship, misinformation through radio, and ways of using cultural music positively. These solutions would impact not only DJs but any form of information-sharing media, of which there are plenty in the modern era. I have found that these problems, although seemingly complex, involve less effort than originally thought, and that my biggest worries pertain to listeners and not larger powers such as governments.



Mohammed Agha Mohammadi

“Multi-purpose Operational Unmanned Aerial System for Emergency Response & Environmental Monitoring (M.O.U.S.E)”

Advisor: Chafic Bou-Saba, CTIS

This project presents the design and development of a multi-purpose, autonomous unmanned aerial vehicle (UAV) intended for emergency response, environmental monitoring, and operational support in hazardous or inaccessible environments. The system integrates advanced hardware and software components to enable autonomous navigation, real-time data collection, and payload delivery with minimal human intervention.

Designed with scalability and cost-efficiency in mind, the platform leverages open-source technologies such as ArduPilot alongside a Raspberry Pi companion computer for high-level processing and data management. By combining autonomous flight, intelligent sensing, and adaptive software, this project aims to improve emergency response efficiency, reduce risks to first responders, and provide reliable environmental intelligence for a wide range of real-world applications..

Nataly Aguilar, Ava Arias, Courtney Bradford, Denisse Castro, and Janey Galek

“Ser o Estar?”

Advisor: Hunter Newman, Spanish

In this video, we will explain the differences between the verbs ser and estar and highlight some of the most common mistakes students make when using them. Many new Spanish learners often confuse these two verbs, so this presentation is designed to clarify their uses and help prevent future errors and confusion. To accomplish this, we will first review the basic meanings and uses of each verb, then look at specific examples in context, and finally discuss common pitfalls that students should avoid. By the end of this video, you should feel more confident deciding when to use ser and when to use estar in everyday sentences.

Our goal is not only to teach the rules but also to help you feel more comfortable and natural when using these verbs in real-life situations, such as conversations, homework assignments, and exams. We hope that by the end of this presentation, the difference between ser and estar will be much clearer, and you will be able to avoid many of the common mistakes that beginning learners often make. es.



Hannah Ajayi

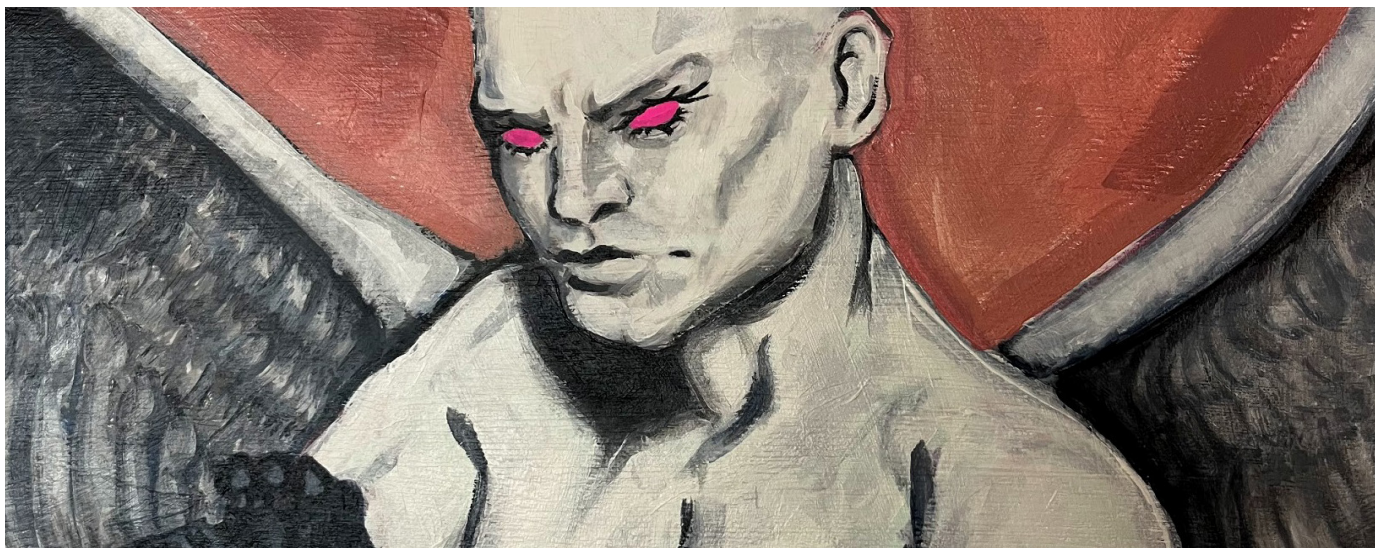
“The Ethics of War: Exploring Violence, Injustice, and Just War Theory”

Advisor: William Thomas, Art

We live in a world built on and sustained by violence. Through wars, genocides and economic inequalities many have had the dream of a peaceful life taken away from them. The roots behind such conflicts being hateful ideologies, religious ideals and an extortionist profit seeking mindset.

This project aims to pay respect to civilians who have lost their lives in war and to draw attention to such atrocities. This visual research will highlight the current genocide in Sudan, the effects of Christian Nationalism in the US, and injustice against Black & Indigenous activist communities. Specifically drawing inspiration from activists Kathleen Cleaver, Sarah Winnemucca, and scholarly commentaries on Just War Theory. For example, Issac Taylor’s article “Just War Theory and the Military Response to Terrorism” (Social Theory and Practice Vol. 43).

On the topic of examining international violence, I wonder when self-defense deserves to be labeled as violent. Who gets to decide the criteria? Very often in history, and today, when a marginalized group fights against, or even simply points out, injustice and violence committed against them it is then portrayed as violent, criminal, and savage. This project reflects my own process of exploring what is truly violent or not- I’m also questioning when self-defense is necessary and what fighting for an equitable future looks like.



Natalia Alfaro Diaz, Corey Hayes, Terrence Jackson, Taiwo Jones, and Marnie Lasher

“Sustainable Textiles: From Raw Fiber to Woven Textile”

Advisor: Aleks Babić, Public Health/Environmental Studies

Sustainable Textile Production students tracked the labor hours, skills learned, and resources required to create a piece of woven textile from raw animal fiber (wool). Students will showcase raw fiber/wool, yarn that they hand spun and plied, and a piece of textile that they wove using a frame loom. The purpose of this exhibit is to demonstrate the amount of skills and resources required for sustainable textile production, and the impact of textile production on human and environmental sustainability.



Nayani Annamalai

“Improving Menstrual Health and Sustainability: Mentrual Pads Redesigned”

Advisor: Rob Whitnell, Chemistry

Menstrual pads and tampons are essential for menstrual care, yet many users are unaware that these products commonly contain toxic substances that are extremely damaging to human and environmental health. This project aimed to design a menstrual pad that prioritizes both human health and environmental sustainability.

Using data synthesized from existing research on menstrual health, toxicology, and sustainable materials, a three-layer pad design was developed. The first layer is made of a porous hemp fabric that would allow period blood to flow past, into the second absorbent layer. Hemp fabric is made from the plant fibers of *Cannabis Sativa*, making it completely biodegradable and hypoallergenic, decreasing the chances of bacteria build-up. The second and thickest layer is made of a superabsorbent cellulose polymer, produced by the *Komagataeibacter Xylinus* bacteria. This bacterium can produce its own bacterial cellulose, eliminating the use of highly toxic chemicals to create other man-made superabsorbent polymers. This polymer will be able to absorb immense amounts of liquid, transforming the liquid into a gel-like substance and preventing leakage.

Liliana Arias

“Measuring the Wavelength of Visible Light with the Michelson Interferometer”

Advisor: Don Smith

The Michelson interferometer was developed in 1881 by Albert A. Michelson and Edward W. Morley to test for the existence of the aether- a medium for the propagation of light. The experiment disproved the existence of aether and it provided a useful tool that can have many applications- including measuring the wavelength of light. In this experiment I used a Michelson interferometer to explore the wave properties of red, blue, and green light by producing fringes- alternating bright and dark bands of light.

When the path length of the light changes, these bands alternate rapidly. I then utilized a silicon photodetector and electronic counter to count how many times these fringes alternated while the path length was being changed. I will be reporting on the wave nature of light; if light has wave properties, combining monochromatic light beams at different phases will result in constructive and destructive interference. Changing the path length changes the relative phase of the waves. Counting the fringes that pass by when the path length is changed allows us to determine the number of waves that fit into the path length difference, revealing the wavelength of the light.

Ella Barton-Biegelsen, Elijah Troop, Tanner Royals, Sarah Camille Loubondo Yembet, Logan Monkus, Kiya Penley, Morgan Singletary, and Kaylyn Little
“Spiders In the Spotlight: Orb Weavers and Artificial Light at Night”
Advisor: Christine Stracey, Biology

Artificial Light At Night (ALAN) has become a prevalent problem in urbanized areas, negatively affecting nocturnal animals and showing a decrease in biodiversity. The goal of our research is to explore the question: How does ALAN influence prey capture and web size of orb-weaving spiders on Guilford College Campus? Our Conservation Biology class conducted an observational study on spider webs around Guilford’s campus, then an experiment in the Fulcher Gardens by isolating half of the webs with artificial lighting. Our results were generally inconclusive in terms of prey capture and consistency. However, web size was positively correlated with the amount of prey caught. Light pollution is widespread, and understanding its effects on prey capture is important because of spiders’ role in controlling insect populations. Future research should focus on consistency and expanding the data set.

Jana Bassalat and Mohammad Agha Mohammadi
“Open-Source Capture the Flag in Education”
Advisor: Chafic Bou-Saba, CTIS

Capture The Flag (CTF) platforms are increasingly used in cybersecurity education to provide hands-on, gamified learning experiences. Open-source CTF platforms offer flexibility and cost-effective solutions for academic institutions seeking to integrate practical labs into their curricula. However, limited research exists on the comparative analysis of these platforms in educational contexts, especially concerning integration with institutional infrastructure (e.g., LMS) and measurement of learning outcomes.

This project aims to bridge that gap by analyzing and testing multiple open-source CTF platforms from both technical and pedagogical perspectives.

Adeline Beatty-Squire and Hayden Moody
“The Urban Core Sample: 1392 East New York Avenue and The Corner of W First Street and N Spring St”
Advisor: Damon Akins, History

The Urban Core Sample is a method to understand history in a city. It involves a deep, delicate investigation into a specific location throughout all of time in an attempt to fit that one story into the context of larger processes in an urban environment. But the Urban Core Sample also promotes grassroots, people-oriented thinking by focusing on such a precise place. Professor of History Damon Akins has all the credit for the creation of this concept, and using his framework, we have conducted extensive research into two locations: 1392 East New York Avenue, New York, New York, and the corner of W First St and N Spring St, Downtown Los Angeles, California.

Ezekiel Blanchard

“Why are their tales of flying reindeer?”

Advisor: Eric Mortenson, Religion

Tales of flying reindeer that have been passed around from culture to culture across the world, with reasons behind these stories varying greatly. Origins for the multitude of stories can be traced back to indigenous peoples along the Siberian and circumpolar regions. These people used reindeer to lead them to a warmer climate during the winter, to carry their supplies, and hunted them for food and fur. The reindeer also hold spiritual significance to shamans of the different groups of indigenous people. Flying Reindeer serve as guides to shamans in their spiritual aspects through shamanic practices and the worlds beyond that shamans visit by whom they see and interact. The tales that sprung from these experiences have turned into other, modern stories of reindeer, they still help to promote people to learn more and care for reindeer as a species.

Emma Butts

“Death Cycles: Pre-Colonial Inuit Views of Death, Afterlife, and Continuity”

Advisor: Eric Mortenson, Religion

The pre-colonial Inuit’s relationship with death and what happened postmortem are closely related to the landscape, the cycles, and the other beings that inhabited the environment. Through the examination of the rituals of the pre-colonial Inuit this paper explores the ways in which death was understood and shaped by the harsh arctic environment. Even though there are diverse religious and ritual variations within Inuit culture, there are patterns of continuity surrounding death rituals. Instead of the physical body and its burial, death rituals focused on souls and their continuation. Whereas the Inuit were flexible, ritually, when it came to disposal of a dead body, there were terrifying, strict taboos surrounding how the living went about their lives during the period of mourning and the aftermath of the death of a member of the family or community. This essay focuses on how violations of taboos affect the lives of the living.

Bec Cormack

“Wooded Wattage: A Visual Representation and Celebration of the Legacy of WQFS at Guilford College”

Advisor: Kami Rowan and Marjorie Church, Music

Wooded Wattage is a celebration of 60 years of WQFS at Guilford College, and shares the intertwined history that the two organizations share. This visual fixture will be in the MCR of WQFS in Founders, and will represent the legacy that lives in Founders Hall. Come learn about the history of WQFS and the meaning behind the mural Wooded Wattage.



Andy Diaz Villatoro

“Building a Malware Analysis Lab with Open-Source Tools and Repurposed Hardware”

Advisor: Chafic Bou-Saba

This project presents the design and implementation of a distributed malware analysis laboratory built with open-source software and repurposed hardware. The platform provides an isolated environment for dynamic malware detonation on bare-metal hosts, network traffic analysis, intrusion detection, and threat-intelligence correlation — replicating the capabilities of a professional malware research environment at minimal cost.

The platform supports dynamic malware analysis, command-and-control traffic investigation, network forensics, intrusion detection rule development, and threat-intelligence. Because it relies entirely on open-source tools and commodity hardware, the lab can be reproduced by educational institutions and independent researchers seeking hands-on experience with modern malware analysis techniques.

Maeve Dunkerley

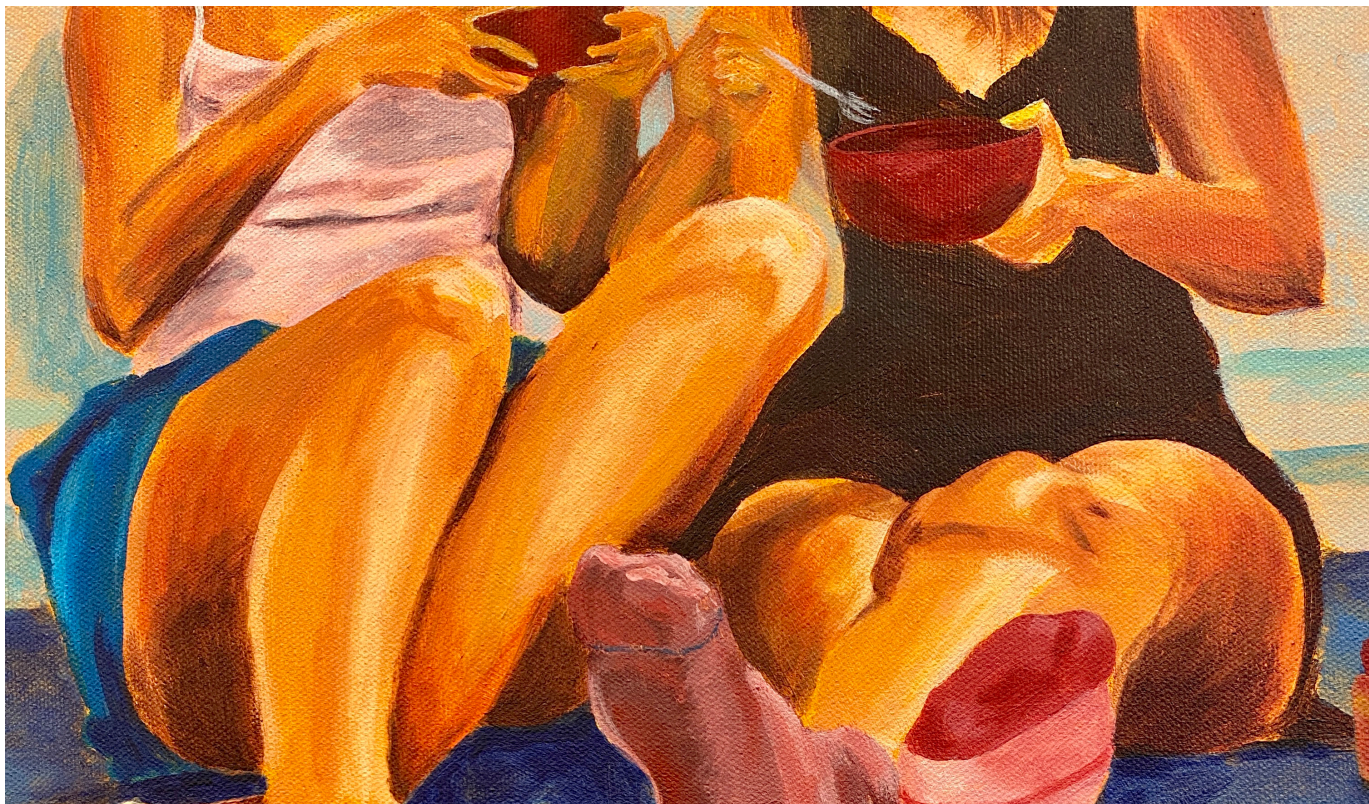
“A Night Out: Exploring the Intimacy of Friendships Between Women”

Advisor: William Thomas, Art

In this series, I explore the intimacy of female friendship as a secret and magical thing. The women that I paint share stories and subtleties, eat together, and consult each other on everything from career ambition to the color of their socks. They lean on each other, metaphorically and physically. In a culture that sexualizes so much of the female experience, against a backdrop of men’s understanding of friendships as surface-level and based on shared activities, this work shows the parts of womanhood that are intimate, easy, loving, and joyful.

Taking inspiration from artist Zinaida Serebriakova, I portray girlhood as shameless and deeply reliant on the little moments of everyday life. Following the example of artist Mary Hendersen, I focus on snapshots, attempting to capture the critical details of a moment, using imagined and over-saturated color palettes to give my paintings a quality more like memory than photograph. And grounding my work in my own experience, I show the details and moments that encapsulate the experience of being a young woman in the 21st century.

This series is called “A Night Out”, and shows every aspect of the night except the actual party. We see the young women getting ready together, escaping the party to eat on the kitchen floor, and brushing their teeth with the remnants of their revelry - cheap liquor bottles and ten-year-old makeup; condoms-just-in-case and three dollars in cash - on the familiar bathroom counter. The focus of this work is the ease and love with which the women share every aspect of their lives together, and in doing so find joy and meaning in an otherwise restless and uneasy world..



Emma Evans

“Reincarnation through the Lens of Embodiment”

Advisor: Eric Mortenson, Religion

Reincarnation is acknowledged in Buddhism and Hinduism as the process by which a life transitions to another life. Through the lens of Embodiment, the showcase of Reincarnation adds a challenge to the perspective about identity, memory, and the body, while acting as an aid to a better understanding of spiritual experience and its material presentation. This essay provides evidence that can be found in the body, and a connection is revealed about the cycle of karma, relating the spiritual being to concepts of embodiment. This project uses reports from children, the accounts of birthmarks, scarring, and body health, biology, and spiritual texts as support for the discussion of the role of embodiment in the context of reincarnation.

Isaac Garbia

“PlanPlayGo: A Guide to Your Ultimate World Cup Experience”

Advisor: Chafic Bou-Saba, CTIS

PlanPlayGo is a web-based and mobile-friendly travel planning application designed for soccer fans attending the 2026 FIFA World Cup in the United States. The platform uses artificial intelligence to generate personalized itineraries, including hotel recommendations, transportation routes, match schedules, and tourist attractions.

The application integrates multiple third-party services and APIs, processes user inputs, and operates on a public domain. As a result, it faces cybersecurity risks such as bot abuse, unauthorized access, API misuse, and service disruption. This project focuses on designing and implementing security and monitoring features to protect PlanPlayGo and its users.



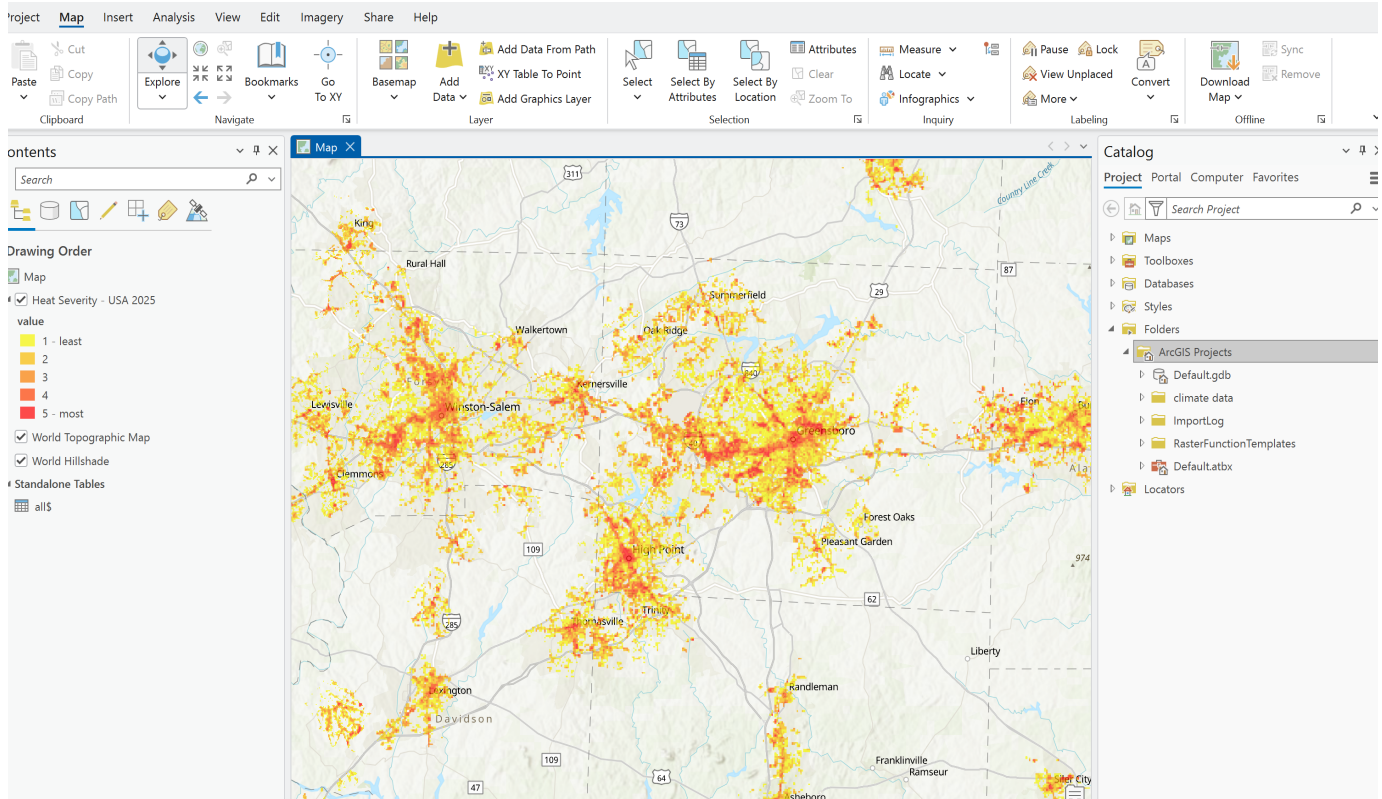
PlanPlayGo

Road to World Cup 2026

Aprilia Grimaldo-Welsh and Gabriel Peña
“AI Energy Consumption Prediction Model”
Advisor: Chafic Bou-Saba, CTIS

This project combines the real-world issue of anthropogenic climate change using environmental and demographic data that has been collected to model and visualize risks over time. Historic climate data are used to generate predictive models which are overlaid with vulnerable population data. Such populations will be disproportionately affected and the effects of current intersectional disparities will be exacerbated.

This analysis emphasizes the need for education, preparation, and awareness as integral components for mitigation and adaptation. Low-income housing in the U.S. is visually explored to see how this group will be disproportionately affected by sea level rise. Globally, the top ten largest refugee camps are found in Pakistan, Jordan, Kenya, Tanzania, Ethiopia, and Sudan. These areas are mapped as points over extreme heat wave data to show potential risk and climate-driven displacement. All datasets are managed within a PostgreSQL database, which supports a data pipeline into ArcGIS for geospatial visualization of intersecting variables. The system incorporates role-based access controls and encryption to ensure data security. This framework also allows for the integration of additional geographic datasets, supporting applications such as power grid, infrastructure resilience planning, emergency response strategies, and risk assessment for critical digital infrastructure..



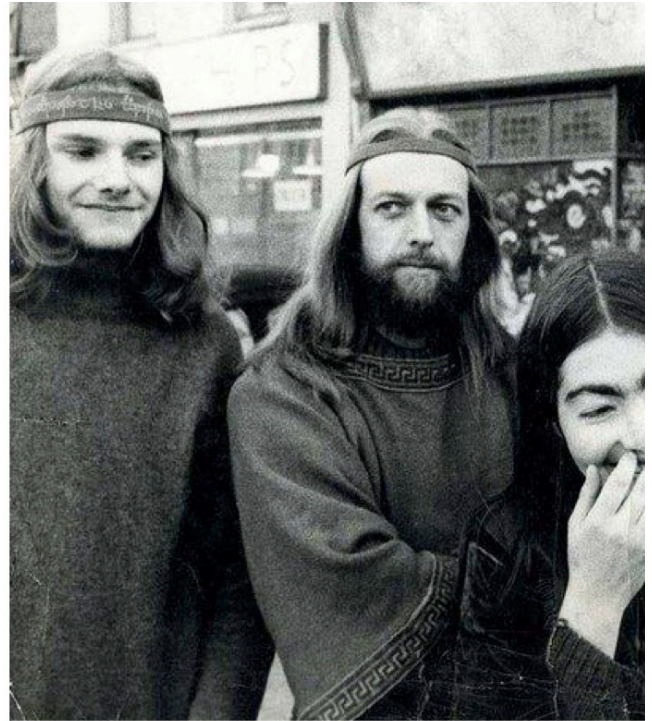
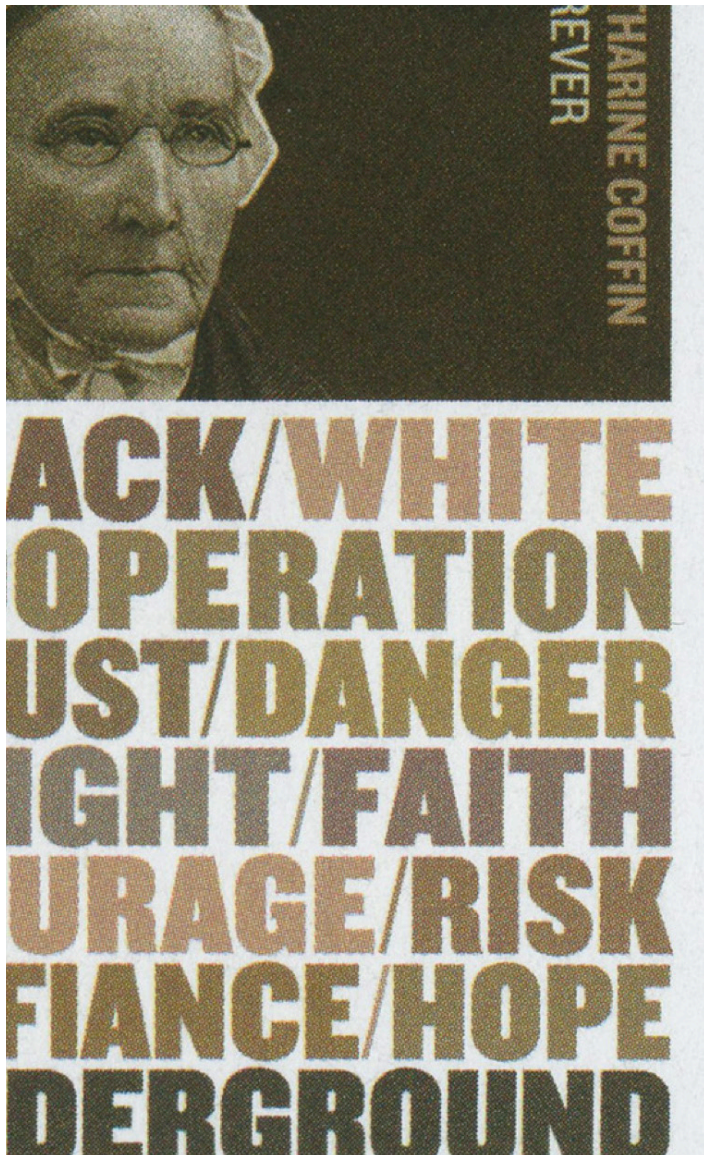
Wyatt Hawks, Robin Tucker, and Aiden Shimpi
“Against the Grain: Subcultures, Conscience, and Policy”
Advisor: Damon Akins, History

This panel brings together three history majors sharing their capstone projects. While they vary across time and region—from early nineteenth century to the late twentieth—they all explore the complicated relationships between subcultures and social movements.

Robin Tucker explores the work of Quaker abolitionist Catherine Coffin, who has been largely forgotten in histories of abolition. She was a woman in a critical time, place, and position that offers a unique perspective that can help break down ever-present myths around Quaker abolition, political power, and gender roles. The persistent myth that Quakers were ubiquitous in their anti-slavery sentiment ignores the reality of deep division among communities. Women played a major role in abolition that has largely been overlooked by their contemporaries and the historiography. This research seeks to illuminate their complex place in their communities and larger social context.

Wyatt Hawks explores the popularity of J.R.R. Tolkien’s *The Lord of the Rings* among the British countercultural movement of the 1960s, despite ideological differences with the famously conservative author.

Aidan Shimpi’s work explores the ethical and policy debates, and early scientific research surrounding the atmospheric testing of nuclear weapons after WWII and leading up to the Limited Test Ban Treaty of 1963.



Meghan Heaney

“Teacher Perceptions on How Dance/Movement can Impact Student’s Literacy Skills”

Advisors: David Hildreth, Tracey Crowe, and Brenda Swearingin, Education and Sport Studies

Learning to read is a fundamental part of a child’s educational experience. This skill is usually formally introduced in Pre-K and continues through second grade. Third through fifth grade is when, instead of learning to read, students read to learn. This implies that, by third grade, student attention should be on comprehension, not just decoding. Unfortunately, many students struggle with reading and reading comprehension. The question thus becomes: How can we better teach reading?

This study addresses the question: What do educators believe that incorporating a dance/movement-based approach to teaching reading does when teaching children to read? The supposition for this inquiry is based on the belief that adding movement into literacy instruction can perhaps benefit students and improve their reading skills. Teacher interviews, and via personal reflection as someone who grew up dancing and learning to read through a homeschool curriculum, will be examined in relation to perceptions of incorporating dance/movement into literacy instruction..

Advisor: Hunter Newman, Spanish

August Hutchins and Teri Quick
“Analyzing Australia’s Social Media Ban in Real Time”
Advisor: Samantha Rummage-Massey, CMJS

Joseph Lambert, Christopher Anderson, Aidan Shimpi, and Gabriel Peña
“Der goldene Schlüssel: Grimm’s Fairy Tales and their Meanings”
Advisor: David Limburg, German

Shanmukh Malyala and Jimmy Ma

“Variable or Not? Investigating Stellar Brightness Variability Through Photometry”

Advisor: Don Smith, Physics

Variable stars fluctuate in brightness due to intrinsic or extrinsic factors, serving as essential probes for stellar evolution and cosmic distances. We observe NSV 1619, a suspected 10th-magnitude variable, to verify its behavior. Over nine nights, we used Guilford College’s 16-inch telescope and AstrolImageJ to perform multi-aperture photometry. We used a 3-sigma significance test to compare NSV 1619 against three stable reference stars. NSV 1619 displayed significant fluctuations ($z = [3.93, 6.02]$) relative to the references, suggesting the star is variable. These findings provide the statistics for AAVSO to determine the star’s specific physical characteristics for astronomical predictions.

Elizabeth Martinez

“Optimizing mechanophotocatalysis redox reactions”

Advisor: Samuel Horsewill, Daniel Scott, and Anne Glenn, Chemistry

Mechanophotocatalysis is an emerging interdisciplinary field that involves components of photochemistry and mechanochemistry to facilitate chemical reactions. Mechanochemistry has limitations with scalability while photochemistry also deals with excessive solvent usage. Experiments have shown results that mechanophotocatalysis does not experience the same limitations and issues. The specific photochemical reaction process utilized included consecutive photoelectron transfer. This process creates an excited radical anion photocatalyst that is able to reduce molecules with higher reduction potentials.

The methodology includes irradiation of the reactants and photocatalyst under Blue LED lights while being subjected to ball milling. Initially we focused on the reduction of aryl halides but saw little progress. We researched more literature reactions that had various levels of results. Optimization focused on varying the duration of irradiation, reactants, photo processes, photocatalyst, and varying light intensity or LED lights. An interesting result observed is similar product formation for mechanophotocatalysis and photocatalysis without the mechanochemical part.

Elizabeth Martinez, Areli Patterson, Trinity Whitfield, and Brianna Campbell

“Development of a Community Serving Garden”

Advisor: Zandra Pinnix, Michele Malotky, and Christine Stracey, Biology

This project is a part of a new senior seminar course that involves a collaborative effort between juniors and seniors majoring in biology. Components of the garden are broken down into three key concepts: Environmental, Design, and Purpose. Environmental researches professional in gardening, design creates potential 3D models of the garden, and purpose focuses on public outreach for community needs. The sections are lead by seniors to create a proposal for a garden. In coming years the years the juniors can focus on the development of the garden, that serves the community and the department of biology.

Charlie Miller, Juno Steele, Sole Williams-Brewer, and Cristina Dellinger

“Creation of the 2026 *Greenleaf Review*”

Advisor: Cynthia Nearman, English and Creative Writing

The Greenleaf Review is our student-produced literary magazine at Guilford College. In this panel discussion event, we will be bringing light to and sharing the unique and extraordinary prose, poetry, and art submissions we have received throughout the year, as well as giving an in-depth look at the creation of the 2026 issue. Our panel will include staff and accepted creators, all of whom will speak on their experiences with the magazine. We invite questions and inquiries during this open-ended conversation and celebration of our creative community.



Hayden Moody

“Tuning Photochemical Properties of [2.2] Paracyclophanes Through Isomer, Electronic Donor/Acceptor, and Steric Modulation”

Advisor: Anne Glenn, Chemistry

[2.2]Paracyclophane (PCP) scaffolds, with their rigid, non-planar geometries and through-space π -conjugation, offer a unique platform for the development of advanced optoelectronic materials. The exploration of isomeric effects, such as the changing of pseudo-ortho, para, or meta positions of the PCP scaffold, and the addition of donor-acceptor groups of various strengths to achieve different photochemical effects for applications towards organic optoelectronics, capable of both environmental photoluminescence modulation and molecular rectification.

This presentation aims to provide a brief overview of the importance and previous applications of PCPs, as well as the synthetic pathways employed for each isomeric route and the differences in results through characterization, including H^1 NMR, UV-visible absorption, and photoluminescence spectroscopy.

Natalie Moore

“Synergistic Effects of Iberin and Sulforaphane on Triple Negative Breast Cancer cell line MDA-MB-231”

Advisors: Zandra Pinnix, Christine Stracey, and Anne Glenn, Biology/Chemistry

Triple-negative breast cancer (TNBC) is an aggressive subtype defined by the absence of estrogen receptor, progesterone receptor, and HER2 expression, leaving patients without access to targeted hormonal or receptor-based therapies. This receptor-negative status contributes to poor prognosis and disproportionately burdens Black women, highlighting a need for less toxic, mechanism-driven treatment alternatives. This study investigates the anticancer and synergistic potential of Iberin and Sulforaphane, two naturally occurring isothiocyanates found in cruciferous vegetables.

Cell viability was assessed using an MTS proliferation assay across 0, 5, 10, or 20 μM concentrations of Sulforaphane, Iberin and both agents in combination using the MDA-MB-231 TNBC cell line. The results indicate that after 24 hours, the 5 μM concentration of the combination treatment was the most effective in reducing cell viability percentage. After 48 hours the 10 μM and 20 μM concentration of the combination treatment is the most effective in reducing cell viability percentage. This research aims to explore plant-derived therapeutic strategies for TNBC and emphasize the significance of maintaining a healthy lifestyle and diet as a preventative action within oncological research..

Kylie Muse

“Identifying Bacteria from Turf Burn using Microbiology lab techniques”

Advisor: Zandra Pinnix, Biology

This study focuses on bacteria that can be found in skin abrasions, specifically those caused by turf burn. Turf burn occurs when friction between the skin and artificial turf creates an open wound, increasing the risk of microbial contamination. The purpose of this study was to identify the types of bacteria present in turf-related abrasions and to examine the potential health risks associated with bacterial infiltration of the skin.

Standard microbiological techniques, including Gram staining, catalase and oxidase testing, triple sugar iron (TSI) agar, phenol red broth, and indole testing, were used to identify bacteria collected from a personal turf burn sample. The results indicated the presence of *Acinetobacter* species. In severe cases, *Acinetobacter* can lead to soft tissue infections and other complications.

These findings highlight the importance of proper wound care for athletes who experience turf burns. Additionally, this study emphasizes the need for improved sanitation and maintenance practices in artificial turf environments to reduce bacterial accumulation and transmission. .

Brady Odell

“The Limits of Ideology: Behind Japan’s Acceptance of Surrender”

Advisor: Philip Slaby, History

The ideology of Imperial Japan left no room for interpretation; either claim victory or accept death, there was no greater shame than surrender. Despite this, when Japan did eventually surrender in August of 1945 there was no major rogue military operation or civilian uprising against the Allied occupiers, nor was there a notable outbreak of mass suicides.

This paper looks at Japan both on the home front and on the front lines during the war years to explain why Japan would eventually accept surrender and occupation peacefully. Additionally it seeks to explain how Japanese soldiers and civilians would overtime become disillusioned with the Imperial and military institutions of their nation. It will also attempt to defenestrate the myth of a monolithic Japanese populace during World War II.

Rebecca Pierre

“Student Advocacy”

Advisor: N/A

With this project, I want to emphasize the importance of using your voice to help change happen. This lesson is as cliché as they get, but it’s not just about encouraging people to speak up; it’s about encouraging those who don’t “look/sound the role” to speak up. You don’t have to always know where to go in the beginning, or be really loud, or extremely social. The absence of certain traits should not disqualify you from trying to make a difference, and neither should the size of your problem. As long as you have the courage to care about an issue and are persistent, you can be heard.

STEPS TO SUCCESS

1. IDENTIFY THE ISSUE.

WHEN YOU HAVE AN ISSUE THAT SEEMS A BIT LARGER THAN YOU, LABEL IT. KNOW THE PROBLEM BY NAME.

2. BE SPECIFIC WITH THE “WHO.”

ONCE YOU KNOW THE EXACT PROBLEM YOU WANT TO SOLVE, GO TO SOMEBODY YOU TRUST TO HELP SHED SOME LIGHT ON IT. FIND SOMEONE YOU BELIEVE TO BE AN “EXPERT.”

3. SPEAK UNTIL YOU REACH.

WHEN SEEKING OUT CHANGE, IT CAN BE DIFFICULT AND MAY TAKE SOME TIME. BUT, DON'T GIVE UP. YOUR VOICE DOESN'T HAVE TO BE THE LOUDEST, BUT IF IT IS PERSISTENT, IT **WILL BE HEARD.**

**Thanks For Using
Your Voice!**



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<https://www.guilford.edu/rpierre@ Guilford.edu>

STUDENT ADVOCACY



GUILFORD COLLEGE
2026

Shemar Roberts
“Benefits of Music Therapy”
Advisor: Marjorie Church

Research on the positive effects of music therapy and how to move forward using music therapy techniques.

Ryne Rodrigues
“Pumped, the Gym App”
Advisor: Chafic Bou-Saba, CTIS

Pumped is a gym mobile app designed to bring fitness tracking, social interaction, and motivational support in one platform. Many current fitness apps focus only on workout logging, while social media platforms are not built specifically for fitness goals and progress sharing. Pumped addresses this gap by creating a space where users can track workouts, connect with others, share progress, and stay motivated through community.

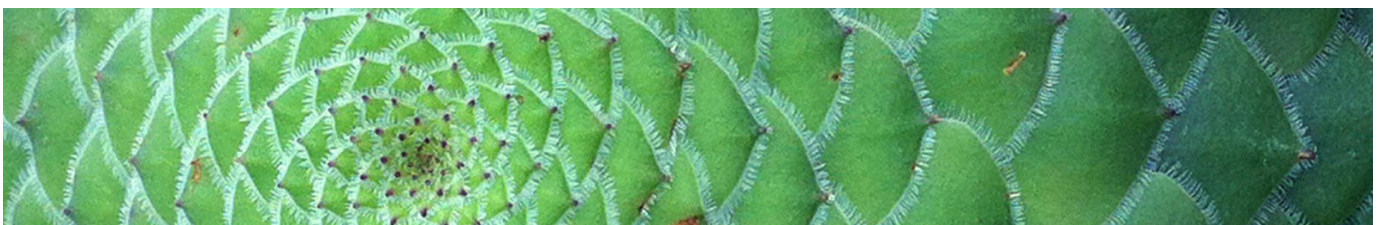
As well as providing an amazing platform for gyms and athletic wear advertising. The app includes features such as user profiles, a social feed, workout tracking, and community engagement tools. The project is being created with a focus on staying simple and easy for users to use. The goal of Pumped is to encourage consistency, accountability, and healthier habits by giving users a platform that supports both personal fitness progress and social motivation.

Ryan Shoenthal, Ahmaad Abdul-Haqq, Tori Collins, Timothy Rundle, and Amziel Chioke
“Recursive Generativity: The Eternal Beginning of Fiction”
Advisor: Cynthia Nearman, English and Creative Writing

Throughout the course of their capstone, the 2026 cohort of Creative Writing students have come into their own and developed a deeper understanding of their work. From initial creation to revision, they are always discovering something new within their stories and within themselves.

Keeping this at the heart of their work, these students have each created their own collection of short fiction. Ahmaad Abdul-Haqq, Amziel Chioke, Tori Collins, Timothy Rundle, and Ryan Shoenthal are honored to showcase their work through this reading with stories centered around themes of isolation, obsession, and betrayal.

Under the guidance of Cynthia Nearman, these students have spent their course time learning to use craft techniques to shape their narratives. By focusing their creative efforts on the revision of stories, this cohort has been able to dig into the art of beginning something again and again — and in that, come to understand the beauty of stories as things that must change throughout their creation.



Ariadna Sosa and Amanda Sayaseng
“Photo-polymer Etching Demo”
Advisor: Katy Collier, Art

During this presentation we will be introducing a hybrid photographic-printmaking process, photo-polymer etching, which is new to the Guilford College Art Department. In our demonstration, we will display our research by demonstrating the appropriate way to prep the plate and photographic image. We will also show the steps for applying the photo-polymer film, UV exposure, chemical solutions, etching times, and finally printing the plate.

Z Tate,
“Ayahuasca and the Market for Enlightenment”
Advisor: Eric Mortenson, Religion

Ayahuasca is a vine and a deity native to the Amazon, which, when consumed, produces psychedelic and spiritual experiences. Over the last half-century, Western psychedelic practices have reimagined Ayahuasca and the shamanic traditions of the Americas through the lens of consumer capitalism and psychological individualism, producing a form of neo-colonial spirituality that exists for consumption at the cost of indigenous communities.

Through analysis of ritual, ethnography, scholarship, and individual narratives, this presentation explores this defanging of an efficacious ritual and the creation of a severed, baseless community that thrives across the Nevada desert and the living rooms of the comfortable. Ultimately, arguing that Neo-shamanism needs a radical decentering and reflection, one that culminates in stepping away from the root entirely.



Erick Trejo Velazquez

“Modular Smartwatch ‘Pip-boy’ System”

Advisor: Chafic Bou-Saba and Rob Whitnell, CTIS

Smartwatch technology, although innovative and powerful, is largely obfuscated behind walled ecosystems of proprietary designs. Tech giants like Samsung or Apple who have produced their own watches encourage users to also have a respective phone from their brand to fully utilize the capabilities of the watch. This seamless but constrained integration limits user autonomy, abstracts privacy of user data, and locks users into one single ecosystem.

In response to these limitations, this project explores an alternative approach through the development of a fully customizable, wearable computing device inspired by the Pip-Boy interface from the Fallout series. Rather than relying on proprietary software and hardware constraints, the system is built using accessible, open-source components, allowing for greater flexibility, transparency, and user control. By utilizing an ESP32 microcontroller alongside a Raspberry Pi Zero WH, the design separates interface management from more CPU intensive tasks, enabling both responsiveness and functionality.

This approach is meant to challenge the conventional model of smartwatch design but also demonstrates how modular, “do-it-yourself” development can replicate the capabilities of commercial devices. Features such as customizable interfaces, independent media playback, and potential sensor integration illustrate the versatility of the system. This project highlights the value of open source hardware and software in empowering users to build, modify, and fully understand their own wearable technology.

Elijah Troop

“Running With the Wolves: How You Can Study Wolves in Minnesota!”

Advisor: Christine Stracey, Biology

Have you ever wanted to explore the beautiful landscapes of Northern and Central Minnesota, study animal tracks and signs, search for wolves in the front seat of a 4 seat airplane, or take in the peace of Sigurd Olson’s scenic Listening Point cabin? Are you interested in participating in a wildlife biology class in a movement centered, nature-loving, hands-on education experience? Osprey Wilds Environmental Learning Center’s Wolves, Wildlife Tracking, & Winter class may be for you! For a two-week jaunt in January, Osprey’s supportive and knowledgeable staff will guide you through the winter wonderland that is Northern and Central Minnesota and teach you all sorts of valuable skills in both enjoying the outdoors as well as field research.

Osprey Wilds provides an excellent opportunity for students who are interested in travelling abroad but may be nervous, or interested in a shorter or slightly closer to home experience. This class facilitates wonderful connections with staff, TAs, field researchers, wildlife centers, and other students. It is a great opportunity for students interested in outdoor field work that cannot get this education directly at Guilford College, and is overall an amazing experience to get more connected with our surroundings and have a unique hands-on learning adventure.

Come visit me at GUS to learn more about my experience tracking wolves and how you can get involved with Osprey Wilds!

George Wall

“ A Quantitative Overview Of The Microplastics Found In Preserved Samples Of Spottail Pinfish (*Diplodus holbrookii*)”

Advisors: Holly Peterson, Anne Glenn, Bronwyn Tucker, and Christine Stracey, Biology and Environmental Science

Microplastics (MPs) are small plastic particles with a size of <5mm that have the potential to cause physical and chemical harm when ingested by organisms. There is limited research on chemical digestions tailored for extracting MPs from organic samples and even less on preserved samples. This is due to varying compositions of organic matter as well as the nuances of preserving MP structure in a chemically preserved sample.

The goal of this study is to count and classify the MPs found in the gastrointestinal tract (GIT) of spottail pinfish (*Diplodus holbrookii*) in Wilmington, NC. We developed a chemical digestion built around KOH for the extraction of MPs in organic animal samples preserved in a 10% Neutral Buffered Formalin (NBF) solution. It is expected that we will develop an efficient digestion that effectively removes organic matter while also preserving the MPs' physical structure.

Recent studies suggest that excessive marine microplastic pollution negatively impacts the entire ocean, yet we still have much to learn. Future studies could help build a baseline for MP occurrence to gain further insights into the accumulation of toxins in our oceans' fish. I hope to bring possible new insights into how marine plastic pollution could be harming local fish populations, develop methods for future studies like this one, and to spread awareness about our marine ecosystem

ZyQuan Williams

“Healthcare Breach Impact Calculator”

Advisor: Chafic Bou-Saba, CTIS

My project presents the development of a breach calculator preferably for healthcare organizations, because these organizations hold valuable data. That data is fragile and it belongs to citizens all over the world. I wanted to be able to provide something that not only focuses on the aftermath of the breach but also beforehand, being able to provide insight on the likelihood a breach is going to take place

I built this system using Python and Flask. It runs on a Raspberry Pi making it more accessible. My project consists of an analysis before a data breach and a calculation after the breach. The process before the breach will assess the likelihood and vulnerabilities of a system and produce the likelihood of a breach. After the Breach, the process will consist of how bad the impact was by calculation and financial damage, records affected and system downtime to determine the severity of the impact.

The severity of the impact is displayed on a web-based dashboard that with holds the risk levels, impact scores, and visual charts. My project highlights how cybersecurity analysis, data modeling , and web development can be implemented together to build a decision support tool. The system I am building is target to help organizations prevent data breaches and to respond accordingly when those breaches happen.



Late breaking abstracts

William Decareaux, Amziel Chioke, Parker O’Keefe, Fiona Lewis, Maddie Thaxton, Madison Underwood, Jane Uebbing, and Claire Dumont

“Peripheral: An Art senior thesis discussion”

Advisor: Katy Collier, Art

Students from the 2026 Senior Art Thesis will be giving brief, 3-5 minute talks centered around the experiences, concepts, and technical processes we have utilized during thesis. After each student has spoken, we will allot time for questions and comments. Our projects thus far have accumulated in an exhibition opening April 17th, Peripheral. “PERIPHERAL, Adj, “On the Edge.”

Memory, experience, and physical recollection are things that populate our lives and reside in existence on the fringes of our daily, present selves. Through a year of collective creation, the exhibiting artists are acknowledging the occurrences that settle in the periphery of life through mediums which encapsulate and emphasize these phenomena.

Vihaan Sesetty and Joel Sekyema

“Computational Analysis of Sackur-Tetrode Deviations in High-Pressure Real Gas Mixtures”

Advisor: Don Smith, Physics

The Sackur-Tetrode equation describes the entropy and thermodynamic properties of ideal gases. While modified equations exist for diatomic gases and mixtures, their validity in extreme scenarios is rarely tested. A computational simulation allows us to evaluate these deviations across a much broader range of conditions than physical experiments permit.

This project compares the isochoric specific heat capacity (CV) generated by our Python simulation against accepted NIST standard values for dry air. It will also identify the thermodynamic thresholds where the simulation fails to reflect reality. Finally, we will evaluate if adding a Rotational Entropy (SR) is sufficient to correct the derivations found in the standard ideal gas law.



Credits

Design and layout: William Kelly

All text, except abstracts, was written by William Kelly, Tierney Steelberg, Garrett Collins, and probably a couple more people over the years. Abstracts may have been edited for brevity and clarity. We are grateful to all who read the final product in advance and noted any errors.

Image credits

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Page 18 (left): Mohammad Agha Mohammadi

Page 18 (right): Nataly Aguilar

Page 19: Hannah Ajayi

Page 20: Natalia Alfaro Diaz

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Page 24: Maeve Dunkerley

Page 25: Isaac Garbia

Page 26: Aprilia Grimaldo-Welsh and Gabriel Peña

Page 27: Wyatt Hawks, Robin Tucker, and Aiden Shimpi

Page 28: Joseph Lambert, Christopher Anderson, Aiden Shimpi, and Gabriel Peña

Page 30: Charlie Miller, Max Bender, and Nova Hightower

Page 32: Rebecca Pierre

Page 33: Ryan Shoenthal, Ahmaad Abdul-Haqq, Tori Collins, Timothy Rundle, and Amziel Chioke

Page 34: [Medway Fine Printmakers](#)

Page 37 (top): Smithsonian Environmental Research Center via [Wikipedia](#)

Page 37 (bottom): ZyQuan Williams

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Thank you to all who presented, attended, and volunteered!

We'll see you in 2027!