27TH ANNUAL

Student Research Colloquium

April 1-5, 2024
Allen Chapman Student Union

THE UNIVERSITY of TULSA

TABLE OF CONTENTS

WELCOME

Welcome to the 2024 Meeting of
the 27th Annual TU Student Research Colloquium!

This event is a great opportunity for students to showcase their research as well as to learn more about what research is being conducted by fellow students at The University of Tulsa. We hope that this event exposes you to new ideas and topics, and that it inspires you to do your own research in the future.

This year we have a great turnout and we are proud to offer a diverse collection of research topics. We hope that you enjoy the opportunity to learn about the exciting research that Tulsa area students are undertaking.

Many people have contributed to this year's event and we would like to thank our sponsors and the many student, faculty, and administrative volunteers who help make these events possible.

2024 COMMITTEE MEMBERS:

Jennifer Airey, *Vice Provost for Faculty Affairs and Academic Initiatives &*
Dean of the Graduate School
Caitlin Getchell, *Director of Graduate Academic Policy and Student Success*
Richard Redner*, Faculty Representative*
Laura Stevens*, Faculty Representative*
Emily Esther, *Student Representative*
Nicholas Gala, *Student Representative*
Ciara Graham, *Student Representative*
Logan Guthrie, *Student Representative*
Bradford Kerst, *Student Representative*
Nathan Rendon, *Student Representative*
Caroline Schell, *Student Representative*

ABOUT THE TU STUDENT RESEARCH COLLOQUIUM

In 1998, The University of Tulsa established the first annual Student Research Colloquium in order to provide TU students with an opportunity to gain public speaking experience, learn about student research from fields outside their own academic discipline, and experience judging methods used by professional organizations for national and international meetings. The event is held during the Spring semester and is open to all TU undergraduate, graduate, and law students.

The Research Colloquium is organized by students from the Graduate Student Association and the Tulsa Undergraduate Research Challenge, in conjunction with the Graduate School. Student Co-Chairs and Graduate School administrators help facilitate the submission of abstracts, solicit donations from campus administrative offices and organizations, organize session schedules, compile event programs, secure student judges, and coordinate sessions during the event.

This year will mark the 27th Annual Student Research Colloquium, which has grown from a one-session event with 6 participants into a week-long event and an average of 175 student presentations a year. The Colloquium website is at http://www.utulsa.edu/research-colloquium and all inquiries can be emailed to research-colloquium@utulsa.edu.

Presentation topics may contain anything from original research or scholarship that a student may be conducting to work that has already been submitted for a classroom project over the previous fall semester. Some students have also used the Colloquium as an opportunity to present research proposals or scholarship in which they are contemplating doing an in-depth study, although topics do not have to cover experimental research. Departments are also encouraged to organize subject-specific symposia for inclusion during the Colloquium, to highlight particular student research topics from previous classes or encourage research into a topic of particular interest to their field.

To give students experience with judging methods typically used for national and international meetings, submitted presentations are judged according to criteria commonly used at scholarly professional meetings. Each session is overseen by a team of judges that includes faculty, area professionals, and students, plus a student serving as the session chair. Winners are announced at the Student Research Colloquium Awards Banquet and all the participants, as well as the advising professors for the student presenters, are invited to attend. There are cash awards for first, second, and third place, as well as awards for honorable mentions and the Video Competition.

From start to finish, the Colloquium is an amazing opportunity for students to gain a real understanding of what goes into a professional meeting, encouraging them to actively pursue interdisciplinary areas of research. The Colloquium continues to grow in size and scope, allowing TU students to expand their knowledge base of other fields and enabling the TU community to actively support our students in their endeavors.

GENERAL INFORMATION

REGISTRATION (Judged Oral Sessions Only)
Allen Chapman Student Union, Second Floor:

Days and hours are:

Monday, April 1	8:00 AM - 5:00 PM
Tuesday, April 2	8:00 AM - 5:00 PM
Wednesday, April 3	8:00 AM - 5:00 PM
Friday, April 5	8:00 AM - 5:00 PM

All participants are required to check in at the registration tables, where you will sign in and receive meeting materials.

PRESENTER/SESSION CHAIR GUIDELINES
Each participant competing for an oral presentation award has a 20-minute time slot (*not applicable for video competition presenters*). Presentations are a maximum of 15 minutes, followed by 3-5 minutes for a question and answer period. The next talk will begin after the completion of the Q & A portion.

Presenters need to report to the meeting room prior to the beginning of their session. A session is defined as the entire morning or afternoon period during which a presentation falls. We ask that participants not arrive just in time to give a presentation or leave immediately after their presentation. Such behavior shows a lack of professionalism. Speakers should attend their whole session. Please maintain the established schedule scrupulously in fairness to persons planning to attend sessions at specific times to hear particular speakers. We will pause for the period allotted if a scheduled speaker fails to appear. Please also note that refreshment breaks do not signal the end of a session.

Please contact the Colloquium Committee to discuss any problems with scheduling that may arise to see if the circumstances warrant a waiver for a portion of your session.

AUDIO/VISUAL REQUIREMENTS
The following items are provided for each session: LCD projector, screen, podium, and microphone. If you need special equipment other than that listed above, please check with the Colloquium Committee to make the necessary arrangements.

THE TWENTY-SEVENTH ANNUAL STUDENT RESEARCH COLLOQUIUM

CONFERENCE AT A GLANCE

SPECIAL TOPIC SYMPOSIA

TUESDAY, APRIL 2, 2024

- *TURC Spring Research Showcase, Oral Presentations* (Alcove)………………..…...3:30 – 7:00 PM
- *TURC Spring Research Showcase, Poster Session* (Great Hall A)……………..…..5:00 – 6:00 PM

WEDNESDAY, APRIL 3, 2024

- *Women in Science Careers Panel* (Great Hall B)…………..……………….…..…...5:30 – 7:00 PM

FRIDAY, APRIL 5. 2024

- *"Our Future is Where Our Past Is": New Research within TU Archaeology* (Great Hall B) ……...
………………………………………………………………………...……9:30 AM – 3:15 PM
- *A Year in the Archives: The 1922 Project, A Digital Humanities Multimedia Exhibit (*Alcove)……
…………………..…………………………………………………………..2:40 – 6:00 PM

GENERAL CONTRIBUTION SESSIONS

MONDAY, APRIL 1, 2024

- *Miscellaneous Sciences* (Alcove)……………………………….……….....……8:40 – 11:00 AM
- *Biology 1* (Great Hall B)…..……………………………………….......9:00 – 10:20 AM
- *Biology 2* (Great Hall B)…..…………………………………….....10:40 AM – 12:00 PM
- *Biology 3* (Alcove)…..……………………………………….…...…....12:20 – 1:40 PM
- *Computer Science and Cyber Security 1* (Great Hall B)…..…………………….......1:00 – 2:20 PM
- *Psychology* (Alcove)………………………………………………….……… 2:20 – 4:40 PM

TUESDAY, APRIL 2, 2024

- *Miscellaneous Engineering 1* (Alcove)…………………………………….……10:00 – 11:20 AM

WEDNESDAY, APRIL 3, 2024

- *Computer Science and Cyber Security 2* (Alcove)…..……………………….......9:00 – 10:20 AM
- *Miscellaneous Engineering 2* (Great Hall B)…….………………………… 10:00 – 11:40 AM
- *Miscellaneous Humanities* (Alcove)……………………………..…....…… 11:40 AM – 2:20 PM
- *General Poster Session* (Great Hall A)………………………………..……….3:00 – 4:00 PM

RESEARCH AWARDS BANQUET

TUESDAY, APRIL 9, 2024 (Great Hall C)…………………………………………………..5:30 – 7:30PM

ORAL PRESENTERS AT A GLANCE

LAST NAME	FIRST NAME	DATE	PRESENTATION TIME	ROOM
Abhari	Julian	Monday, April 01	1:00PM – 1:20PM	Great Hall B
Aderibigbe	Babatunde	Monday, April 01	10:00AM – 10:20AM	Alcove
Ala	Bala Saishree Krishna Yadav	Wednesday, April 03	11:00AM – 11:20AM	Great Hall B
Allison	Morgan	Wednesday, April 03	10:00AM – 10:20AM	Great Hall B
Beaird	Ethan	Monday, April 01	1:20PM – 1:40PM	Great Hall B
Bierbaum	Emily	Monday, April 01	9:40AM – 10:00AM	Great Hall B
Bolger	Corey	Wednesday, April 03	9:00AM – 9:20AM	Alcove
Brown	Ashton	Wednesday, April 03	12:40 PM – 1:00 PM	Alcove
Brue	Jacob	Wednesday, April 03	10:00AM – 10:20AM	Alcove
Cosby	Grace	Wednesday, April 03	1:40PM – 2:00PM	Alcove
Davis	Nicolette	Monday, April 01	4:20PM – 4:40PM	Alcove
Delaporte	Elise	Monday, April 01	12:40PM – 1:00PM	Alcove
Esther	Emily	Tuesday, April 02	10:00AM –10:20AM	Great Hall B
Ferguson	Connor	Monday, April 01	12:20PM – 12:40PM	Alcove
Fulgham	Brianna	Wednesday, April 03	11:40AM – 12:00PM	Alcove
Golden	Brenna	Monday, April 01	10:40AM – 11:00AM	Alcove
Golla	Ben	Tuesday, April 02	10:20AM – 10:40AM	Great Hall B
Gonzalez	Jalynne	Monday, April 01	3:00PM – 3:20PM	Alcove
Imran	Muhammad	Wednesday, April 03	9:20AM – 9:40AM	Alcove
Jindal	Salil	Monday, April 01	10:00AM – 10:20AM	Alcove
Kim	Yuhyeoi	Wednesday, April 03	2:00PM – 2:20PM	Alcove
Kresock	Elizabeth	Monday, April 01	1:00PM – 1:20PM	Great Hall B
Mennella	Kara	Monday, April 01	8:40AM – 9:00AM	Alcove
Mierow	Tanner	Monday, April 01	11:00AM – 11:20AM	Great Hall B
Moore	Sara	Wednesday, April 03	12:00PM – 12:20PM	Alcove
Mosavat	Mohamad	Wednesday, April 03	1:20PM – 1:40PM	Alcove
Naranjo	Daniel	Monday, April 01	1:00PM – 1:20PM	Alcove
Ndlovu	Maqhawe	Monday, April 01	11:40AM – 12:00PM	Great Hall B
Palomar	Gregory	Monday, April 01	9:00AM – 9:20AM	Great Hall B
Parab	Prasad	Wednesday, April 03	10:20AM – 10:40AM	Great Hall B
Paslay	Caleb	Monday, April 01	1:20PM – 1:40PM	Alcove
Phillips	Samantha	Monday, April 01	2:00PM – 2:20PM	Great Hall B
Qureshi	Muhammad	Monday, April 01	9:00AM – 9:20AM	Alcove
Rahin	Saima Ahmed	Wednesday, April 03	9:40AM – 10:00AM	Alcove
Ramasubramanian	Suriya Narayanan	Wednesday, April 03	10:40AM – 11:00AM	Great Hall B
Reeb	Hannah	Monday, April 01	10:40AM – 11:00AM	Great Hall B
Robinson	Phoebe	Monday, April 01	4:00PM – 4:20PM	Alcove

Shah	Deependra	Monday, April 01	10:20AM – 10:40AM	Alcove
Sisul	Mia	Wednesday, April 03	11:20AM – 11:40AM	Great Hall B
Stone	Allison	Monday, April 01	2:20PM – 2:40PM	Alcove
Tate	Acelynn	Monday, April 01	2:40PM – 3:00PM	Alcove
Thomason	Alex	Wednesday, April 03	12:20PM – 12:40PM	Alcove
Tilbury	Jack	Monday, April 01	1:40PM – 2:00PM	Great Hall B
Trame	Samantha	Monday, April 01	11:20AM – 11:40AM	Great Hall B
Ualiyeva	Gulnur	Tuesday, April 02	11:00AM – 11:20AM	Great Hall B
Valdelamar	Alexander	Tuesday, April 02	10:40AM – 11:00AM	Great Hall B
Waheed	Sakariyau	Monday, April 01	9:20AM – 9:40AM	Alcove
West	Amy	Monday, April 01	9:20AM – 9:40AM	Great Hall B
White	Glen	Monday, April 01	3:40PM – 4:00PM	Alcove

2023 ANNUAL STUDENT RESEARCH COLLOQUIUM
ORAL PRESENTATION
JUDGING CRITERIA

SPEAKER/PRESENTER:

DATE:

TIME:

ROOM:

20 minute oral presentation (includes 3 - 5 minute question period).

	BENCHMARK		DEVELOPMENTAL		MILESTONE		CAPSTONE	
UNSATISFACTORY	WEAK	BELOW AVERAGE	AVERAGE	ABOVE AVERAGE	GOOD	VERY GOOD	EXCELLENT	OUTSTANDING

PRIMARY CRITERIA

- **Central Message:** Allowed for easy identification of project's significance, both for those in the discipline and non-specialists, through a clear main point/thesis/"bottom line"/ "take-away" to presentation.

1	2	3	4	5	6	7	8	9

- **Organizational and Presentation of Ideas:** Sequenced and grouped ideas and supporting materials clearly, through the use of an introduction, interpretive discussion, and conclusion.

1	2	3	4	5	6	7	8	9

- **Use of Supporting Materials:** Provided examples, explanations, illustrations, statistics (when applicable), analogies, quotations from relevant authorities, and other kinds of information or analysis that supported the principal ideas of the presentation

1	2	3	4	5	6	7	8	9

- **Language:** Used vocabulary, terminology, and sentence structure, both in relation to the topic and the audience, were free from bias and were grammatically correct, and supported the effectiveness of the presentation.

1	2	3	4	5	6	7	8	9

- **Vocalization, Delivery, and Poise:** Addressed the audience, using adequate inflection and proper modulation of the volume of one's voice. Maintained regular eye contact and poised demeanor without any distracting or unnecessary physical movements.

1	2	3	4	5	6	7	8	9

SECONDARY CRITERIA

- **Abstract:** Written description adequately prepared audience for presentation of student's research

1	2	3	4	5	6	7	8	9

- **Timing:** Use of time was proportioned and balanced, finishing within the time limit, allowed time for questions and answers, and handled questions well

1	2	3	4	5	6	7	8	9

SUBTOTAL:_____

SESSION CHAIR: Speaker arrived late for session or left early without permission? (*9 point deduction*) YES NO

TOTAL:_____

JUDGE'S NAME _____ SIGNATURE _____

2023 ANNUAL STUDENT RESEARCH COLLOQUIUM
VIDEO PRESENTATION
JUDGING CRITERIA

PRESENTER:

DATE:

TIME:

ROOM:

	BENCHMARK		DEVELOPMENTAL		MILESTONE		CAPSTONE	
UNSATISFACTORY	WEAK	BELOW AVERAGE	AVERAGE	ABOVE AVERAGE	GOOD	VERY GOOD	EXCELLENT	OUTSTANDING

PRIMARY CRITERIA

- **Central Message:** Allowed for easy identification of project's significance, both for those in the discipline and non-specialists, through a clear main point/thesis/"bottom line"/ "take-away" to presentation.

1	2	3	4	5	6	7	8	9

- **Organizational and Presentation of Ideas:** Sequenced and grouped ideas and supporting materials clearly, through the use of an introduction, interpretive discussion, and conclusion.

1	2	3	4	5	6	7	8	9

- **Use of Supporting Materials:** Provided examples, explanations, illustrations, statistics (when applicable), analogies, quotations from relevant authorities, and other kinds of information or analysis that supported the principal ideas of the presentation.

1	2	3	4	5	6	7	8	9

- **Language:** Used vocabulary, terminology, and sentence structure, both in relation to the topic and the audience, were free from bias and were grammatically correct, and supported the effectiveness of the presentation.

1	2	3	4	5	6	7	8	9

- **Technical Quality, Originality, Creativity:** Emphasized new methods and unique insights to create a novel and interesting presentation or tell a compelling story about student research. Video production and editing is of good technical quality.

1	2	3	4	5	6	7	8	9

SECONDARY CRITERIA

- **Abstract:** Written description adequately prepared audience for presentation of student's research

1	2	3	4	5	6	7	8	9

- **Timing:** Use of time was proportioned and balanced

1	2	3	4	5	6	7	8	9

SUBTOTAL:_____

TOTAL:_____

JUDGE'S NAME _____ SIGNATURE _____

2024 TU STUDENT RESEARCH COLLOQUIUM
POSTER JUDGING CRITERIA

Poster Title: _____

Presenter(s): _____

Scale

5 – Exceeds High Expectations	Excellent in every way. Equal in quality to nationally presented and/or published papers.
4 – Exceeds Expectations	Above average. Adequate for presentation at state/regional meetings; additional work needed to qualify for national presentation.
3 – Meets Expectations	Average. Would need additional work for presentation at state/regional meetings.
2 – Partially Meets Expectations	Meets minimum expectations. Not of publishable or presentable quality.
1 – Developing	Did not meet minimum expectations. Not of publishable or presentable quality.

Scoring

The research supported and/or answered the objectives presented.	1	2	3	4	5
Poster layout is clear, accessible, and discipline appropriate.	1	2	3	4	5
Presenter conveyed the broader impact or intellectual significance of the research.	1	2	3	4	5
The poster indicated an understanding of the benefit of the research.	1	2	3	4	5
The poster explained the results well.	1	2	3	4	5
Responses to questions were knowledgeable and adequate. May award "0" if the presenter was not present.	1	2	3	4	5

Comments:

_____
_____
_____
_____

CHRONOLOGICAL SUMMARY

MONDAY MORNING, APRIL 01, 2024

MISCELLANEOUS SCIENCES
Monday, April 01, 8:40 AM – 11:00 AM
Allen Chapman Student Union, Level 2: Alcove

8:40 AM   Mennella, Kara
                SOUND TOLERANCE CONDITIONS IN mTBI POPULATION

9:00 AM   Qureshi, Muhammad
                LEWIS ACID CATALYZED UNUSUAL DIELS-ALDER REACTION

9:20 AM   Waheed, Sakariyau
                TARGETING MITOCHONDRIAL ATP PRODUCTION OF LUNG CARCINOMA
                USING ESSENTIAL OIL AS METABOLIC INHIBITOR

9:40 AM   BREAK

10:00 AM   Aderibigbe, Babatunde
                ANALYSES OF BOTH SEISMIC P-WAVE AND CONVERTED S-WAVE
                REFLECTION BEHAVIORS USING MULTICOMPONENT SEISMIC DATA IN THE
                MIDLAND BASIN, TEXAS

10:20 AM   Shah, Deependra
                REACTION OF DIMETHYL ETHER AND HYDROGEN PRODUCTION ON β-
                Mo2C: QUANTUM MECHANIC CALCULATIONS

10:40 AM   Golden, Brenna
                ANALYZING THE RELATIONSHIP BETWEEN PHONEMIC INVENTORY
                OVERLAP AND SPEECH-TO-TEXT TRANSCRIPTION ERRORS

BIOLOGY 1
Monday, April 01, 9:00 AM – 10:20 AM
Allen Chapman Student Union, Level 2: Great Hall B

9:00 AM   Palomar, Gregory
                SCREENING FOR POTYVIRUSES IN CUCURBIT CROPS OF OKLAHOMA

9:20 AM   West, Amy
                BODY MASS, COLONY SIZE, AND SURVIVAL IN CLIFF SWALLOWS

9:40 AM   Bierbaum, Emily
                IMPACT OF LIFE CYCLE VARIATION ON THE EXPRESSION OF VISUAL
                SYSTEM GENES IN EURYCEA

10:00 AM   Jindal, Salil
            THE PRESENCE OF THE TOMATO BROWN RUGOSE FRUIT VIRUS IN
            OKLAHOMA GROCERY STORES

BIOLOGY 2
Monday, April 01, 10:40 AM – 12:00 PM
Allen Chapman Student Union, Level 2: Great Hall B

10:40 AM   Reeb, Hannah
            THE EVOLUTION OF AN ANIMAL SIGNAL IN RELATION TO GROUP SIZE

11:00 AM   Mierow, Tanner
            AMPHIBIOUS COMPOUND EYES: ONTOGENETIC SHIFTS IN EYE
            MORPHOLOGY AND FUNCTION IN BELOSTOMA FLUMINEUM

11:20 AM   Trame, Samantha
            MORPHOLOGY AND PHYLOGENY OF THE EXTERNAL NASAL GLANDS

11:40 AM   Ndlovu, Maqhawe
            SYNTHESIS OF ENAMINO CARBONYL COMPOUNDS USING BALL MILLING
            METHOD

MONDAY AFTERNOON, APRIL 01, 2024

BIOLOGY 3
Monday, April 01, 12:20 PM – 1:40 PM
Allen Chapman Student Union, Level 2: Alcove

12:20 PM   Ferguson, Connor
            GENETIC DIVERSITY OF COTTON LEAFROLL DWARF VIRUS (CLRDV) FROM
            THE SOUTHWESTERN UNITED STATES

12:40 PM   Delaporte, Elise
            TRANSCRIPTOME ANALYSIS OF AEROTOLERANT AND AEROSENSITIVE
            CAMPYLOBACTER JEJUNI SURVIVAL UNDER AEROBIC CONDITIONS

1:00 PM   Naranjo, Daniel
            MACROPHOMINA PHASEOLINA, THE FUNGUS INFECTING SOYBEAN

1:20 PM   Paslay, Caleb
            CHARACTERIZATION OF THE COMPLETE GENOME OF THE ROSE ROSETTE
            VIRUS FROM OKLAHOMA; THE "MALADY OF ROSES"

COMPUTER SCIENCE AND CYBER SECURITY 1
Monday, April 01, 1:00 PM – 2:20 PM
Allen Chapman Student Union, Level 2: Great Hall B

1:00 PM   Abhari, Julian
MITIGATING RACIAL BIASES FOR MACHINE LEARNING BASED SKIN
CANCER DETECTION

1:20 PM   Beaird, Ethan
ADDRESSING PROCRASTINATION AND IMPROVING TASK COMPLETION
EFFICIENCY THROUGH AGENT-BASED INTERVENTIONS

1:40 PM   Tilbury, Jack
AUTOMATION IN SOCS: APPLICATION AREAS AND IMPLICATIONS ON
ANALYSTS

2:00 PM   Phillips, Samantha
LEVERAGING SITUATIONAL JUDGMENT TESTS TO MEASURE BEHAVIORAL
INFORMATION SECURITY

PSYCHOLOGY
Monday, April 01, 2:20 PM – 4:40 PM
Allen Chapman Student Union, Level 2: Alcove

2:20 PM   Stone, Allison
THE EFFECTS OF CANDID RESPONDING ACROSS ROLES WITHIN SELECTION
ASSESSMENT

2:40 PM   Tate, Acelynn
DO YOUR WORDS MATTER?: POSITIVE AND NEGATIVE BEHAVIORS IN
TEAM INTERACTIONS

3:00 PM   Gonzalez, Jalynne
EXPLORING EXPERIENCES OF INCLUSION

3:20 PM   BREAK

3:40 PM   White, Glen
QUALATATIVE DECRIPTION OF TEAM INTERACTIONS

4:00 PM   Robinson, Phoebe
TEAM COMMUNICATION AND TEAM PERFORMANCE OUTCOMES

4:20 PM   Davis, Nicolette
THEMATIC ANALYSIS: REFRAMING QUALITATIVE TECHNIQUES

TUESDAY MORNING, APRIL 02, 2024

MISCELLANEOUS ENGINEERING 1
Tuesday, April 02, 10:00 AM – 11:20 AM
Allen Chapman Student Union, Level 2: Alcove

10:00 AM	Esther, Emily AN INTRODUCTION TO THE IMPACT OF COMPUTATIONAL MODELING ON SOLAR CELL RESEARCH
10:20 AM	Golla, Ben CONIFEROUS CURIOSITIES: THE INFLUENCE OF FOREST STRUCTURE AND COMPOSITION ON TRANSPIRATION DYNAMICS AMONG DROUGHT-STRESSED CONIFER SPECIES IN SOUTHWESTERN COLORADO
10:40 AM	Valdelamar, Alexander CYCLING BEHAVIOR NEURAL NETWORK BASED CLASSIFICATION SYSTEM FOR CONVENTIONAL AC UNITS
11:00 AM	Ualiyeva, Gulnur EXPERIMENTAL CHARACTERIZATION OF GAS-LIQUID DOWNWARD FLOW

TUESDAY AFTERNOON, APRIL 02, 2024

TURC SPRING RESEARCH SHOWCASE, ORAL PRESENTATIONS 1
Tuesday, April 02, 3:30 – 4:45 PM
Allen Chapman Student Union, Level 2: Alcove

3:30 PM	Welcome from Laura Stevens, TURC Faculty Fellow
	Tyndall, Tanner AUTONOMOUS HEALING OF EPOXY USING MICROENCAPSULATION
	Gutierrez, Cecelia THE PSIG PROJECT: PEDAGOGY & STUDENT LIFE AT THE PRESBYTERIAN SCHOOL FOR INDIAN GIRLS
	Parrish, Christine CO2 TRANSPORT USING INLAND BARGES AND THE PORT OF CATOOSA
	Tran, Sarah A NEEDS ASSESSMENT OF THE REFUGEE COMMUNITY
	Shaw, Jack NON-INVASIVE MEASUREMENT OF ORGANIC MATERIALS

Tuesday, April 02, 5:00 – 6:00 PM
Allen Chapman Student Union, Level 2: Great Hall A

Poster Presentations, 5:00 – 6:00 PM

5:00 PM   Beaird, Ethan
FACILITATING HUMAN-ROBOT INTERACTION: A DIGITAL TWINS
APPROACH FOR NATURAL LANGUAGE PROCESSING AND
COMMUNICATION WITH SPOT

Bright, Matthew
REINFORCEMENT LEARNING TO THE RESCUE

Cox, Caitlyn; Terkonda, Anupam; Pastrana, Antonio; Hughes, Silas; Kirchhoff, Kaitlyn;
and Armstrong, Raye
ANALYSIS OF DEVELOPMENT INCENTIVES FOR THE CITY OF TULSA

Depalma, Christopher
CCUS Educational Sim

Gilstrap, Owen
There's a Beard on my Legs: Metaphors in Children

Green, Lakin
THE ROLE OF CLATHRIN ADAPTOR PROTEINS IN THE CENTROSOMES OF
C.ELEGANS

Grimes, Blaine
CCUS EDUCATIONAL SIM

Jeffries, Cameron
SYMBIOTIC RELATIONSHIP BETWEEN CRYPTOCENTRUS AND ALPHEUS

Lollis, Chris
HIGH SHEAR RATE SAXS OF COMPLEX FLUIDS

Luttberg, Henry and Kresock, Elizabeth
MACHINE LEARNING FEATURE SELECTION FOR NEURAL MECHANISMS OF
MAJOR DEPRESSIVE DISORDER

Nguyen, Teresa and Verma, Aditi
DIFFERENCES IN ATTITUDES TOWARD RAPE VICTIMS

Pavlik, Jess
MAPPING THE PROGRESSION OF AMPHIBIOUS VISION IN GIANT WATER
BUGS

Phillips, Sable
INVESTIGATING THE USE OF WASTE HEMP DERIVED BIOCHAR
ADSORBENTS FOR CONTAMINANTS IN OIL

Reeb, Hannah
THE EVOLUTION OF ANIMAL SIGNALS IN RELATION TO GROUP SIZE

Reed, Nathan
WHAT'S IN THE BAG: A CURSORY EXAMINATION OF FAUNAL REMAINS
FROM TOR HAMAR, JORDAN

Ridley, Abby; Ridley, Hannah
TELLING THE STORIES OF RACHEL CHECOTE, KATIE MONAHWEE, AND THE
PRESBYTERIAN SCHOOL FOR INDIAN GIRLS

Thompson, Elisabeth
SHRIMP EYE MORPHOLOGY

Walker, Cameron and Dezhnyuk, Maksim
DARK SKY, REMOTELY-OPERATED ASTRONOMICAL TELESCOPE IN
NORTHEAST OKLAHOMA – A FEASIBILITY STUDY

Williams, Connor; McKinney, Leyton; and Clough, Lily
MACHINE LEARNING FOR AUTONOMOUS DETECTION OF BIOSIGNATURES
IN THE SOLAR SYSTEM.

Zoellner, Sophia; Fite, Isabelle; and Clough, Lily
BLACKHOLES AND BOSE-EINSTEIN CONDENSATES IN D-DIMENSIONS

TURC SPRING RESEARCH SHOWCASE, ORAL PRESENTATIONS 2
Tuesday, April 02, 6:15 – 7:15 PM
Allen Chapman Student Union, Level 2: Alcove

6:15 PM   Jobe, Michael
            MEASURING THE DIELECTRIC PROPERTIES OF ZNO/BIFEO3 BILAYERS, A
            COMPUTATIONAL STUDY

            Vo, Jenny
            CHARACTERIZATION OF MYCOVIRUSES FROM MACROPHOMINA
            PHASEOLINA

            Long, Avin
            HEALING TI-64 FATIGUE CRACKS USING THE CU-TI EUTECTIC SYSTEM

COMPUTER SCIENCE AND CYBER SECURITY 2
Wednesday, April 03, 9:00 AM – 10:20 AM
Allen Chapman Student Union, Level 2: Alcove

9:00 AM   Bolger, Corey
               INCREASING PHISHING REPORTING THROUGH TARGETED INTERVENTIONS

9:20 AM   Imran, Muhammad
               A NEW SEIR MODEL FOR INFLUENZA-CORONA CO-INFECTION WITH
               TREATMENT AND HOSPITALIZATION COMPARTMENTS AND OPTIMAL
               CONTROL STRATEGIES

9:40 AM   Rahin, Saima Ahmed
               EMPOWERING DISABLED PEOPLE WITH CUTTING-EDGE EXTENDED
               INTELLIGENCE TECHNOLOGIES

10:00 AM   Brue, Jacob
               NOT ALL EXPLANATIONS ARE CREATED EQUAL: INVESTIGATING THE
               PITFALLS OF CURRENT XAI EVALUATION

MISCELLANEOUS ENGINEERING 2
Wednesday, April 03, 10:00 AM – 11:40 AM
Allen Chapman Student Union, Level 2: Great Hall B

10:00 AM   Allison, Morgan
               THE BIOMECHANICS OF SERVICE DOG HARNESSES

10:20 AM   Parab, Prasad
               IDENTIFICATION AND FUNCTIONAL ANALYSIS OF B-CAROTENE KETOLASE
               (BKT) VARIANTS FOR ENHANCED ASTAXANTHIN BIOSYNTHESIS IN
               HAEMATOCOCCUS

10:40 AM   Ramasubramanian, Suriya Narayanan
               PROBING THE DISTRIBUTION OF BIO-GRAPHENE LAYER ON COBALT FOIL
               USING RAMAN SPECTROSCOPY

11:00 AM   Ala, Bala Saishree Krishna Yadav
               IMPACT OF EXTREME PRESSURE ON WAX APPEARANCE TEMPERATURE:
               AN EXPERIMENTAL STUDY USING MODEL OIL AND METHANE GAS

11:20 AM   Sisul, Mia
               COMPARING CORROSION RATES OF BIO-GRAPHENE COATED IRON
               SAMPLES USING ELECTROCHEMICAL ANALYSIS AND RAMAN
               SPECTROSCOPY

WEDNESDAY AFTERNOON, APRIL 03, 2024

MISCELLANEOUS HUMANITIES
Wednesday, April 03, 11:40 AM – 2:20 PM
Allen Chapman Student Union, Level 2: Alcove

11:40 AM   Fulgham, Brianna
THE INTERFAITH VALUE OF ROCK CRYSTAL'S PELLUCIDITY

12:00 PM   Moore, Sara
IN SITU

12:20 PM   Thomason, Alex
CIVIL RIGHTS ACTIVISM IN EARLY OKLAHOMA, 1898-1929

12:40 PM   Brown, Ashton
IN SITU

1:00 PM   BREAK

1:20 PM   Mosavat, Mohamad
RACIAL PRIDE, PASSING, AND NEW NEGRO WOMAN IN JESSIE REDMON
FAUSET'S PLUM BUN

1:40 PM   Cosby, Grace
NEW WOMEN AUTHORS USING THE THIRD SPACE IN LITERATURE

2:00 PM   Kim, Yuhyeoi
THEATER OF VOYEURISM: ANTI-CATHOLICISM AND WOMEN AS
SPECTACLES IN THE MONK

FRIDAY MORNING, APRIL 05, 2024

"OUR FUTURE IS WHERE OUR PAST IS": NEW RESEARCH WITHIN TU ARCHAEOLOGY
Friday, April 05, 9:30 AM – 3:15 PM
Allen Chapman Student Union, Level 2: Great Hall B

9:30 AM   Introductory Remarks (*Dr. Miriam Belmaker, Undergraduate Advisor*)

Oral Presentations, 9:45 AM – 12:15 PM

9:45 AM   Williams, Patricia
THE POTENTIAL FOR USING LONG BONE MEASUREMENTS TO DETERMINE
BREED OF *GALLUS GALLUS DOMESTICUS* AND ITS IMPLICATIONS FOR THE
ARCHAEOLOGICAL RECORD

10:05 AM   Udwin, Ben
                WHAT LOCAL TULSA MEGAFAUNA BONES SAY ABOUT
                ZOOARCHAEOLOGICAL METHODOLOGY, PALEOINDIAN PREHISTORY, AND
                BONE TAPHONOMY IN FLUVIAL DEPOSITS

10:25 AM   Edwards, Timothy
                BRONZE AND IRON AGE URBAN ECOLOGY

10:55 AM   Break

11:15 AM   Taylor, Geordon A.
                PALEOENVIRONMENTAL RECONSTRUCTION OF EARLY MODERN HUMANS
                AND NEANDERTHALS DURING THE MIDDLE-EARLY UPPER PALEOLITHIC
                TRANSITION IN THE LEVANT: A GEOMETRIC MORPHOMETRIC ANALYSIS
                OF MODERN AND PALEOLITHIC *MICROTUS GUENTHERI* POPULATIONS

11:35 AM   Martinez, Marco
                INDIGENOUS LAND RIGHTS AND SEDENTARISM AMONG THE SUMA
                INDIANS OF THE CASAS GRANDES MISSION, NORTHERN NEW SPAIN.

11:55 AM   Schumacher, Emily R.
                UNEARTHING FORT LOUISE AUGUSTA: A HISTORICAL ARCHAEOLOGICAL
                EXAMINATION OF A DANISH WEST INDIAN FORTIFICATION

12:15 PM   Break

1:30 PM   "Know Your Anthropology" Trivia Game (*all are welcome, prizes included*)

Poster Presentations, 2:30 PM – 3:00 PM (*pizza courtesy of the Odell Foundation*)

2:30 PM   Jennings, Madeline
                ZOOARCHAEOLOGICAL EVIDENCE FOR EARLY HUMAN SUBSISTENCE
                PATTERNS DURING THE PRECONTACT OCCUPATION OF AMALIK BAY,
                ALASKA

                Castaño, Jessica
                APPEARANCE OF *HYLOBATES* SP. IN LATE PLEISTOCENE SOUTH CHINA:
                EXPLORING PRIMATE BIOCHRONOLOGY AND PALEOECOLOGY IN YAHUAI
                CAVE

                Guthrie, Logan
                VOLES (*MICROTUS GUENTHERI*) STABLE ISOTOPES AS PROXIES FOR
                PALEOENVIRONMENTS: IMPLICATIONS FOR MODERN HUMAN AND
                NEANDERTHAL INTERACTIONS IN THE MIDDLE PLEISTOCENE LEVANT

                Guthrie, Logan
                VOLES (*MICROTUS GUENTHERI*) STABLE ISOTOPES AS PROXIES OF MIS6
                PALEOENVIRONMENT: IMPLICATIONS FOR MODERN HUMAN AND
                NEANDERTHAL INTERACTIONS IN THE SOUTHERN LEVANT

Pugh, Zarieya and Guthrie, Logan
THE NOMENCLATURE OF *MICROTUS GUENTHERI*

3:00 PM   Summary Remarks (*Dr. Miriam Belmaker, Undergraduate Advisor*)

3:15 PM   Optional Tour of Harwell Hall and Anthropological Collections (*Dr. Miriam Belmaker, Curator of the Zooarchaeology and Paleoecology Collection and the Paleoanthropology and Human Osteology Collection*)

FRIDAY AFTERNOON, APRIL 05, 2024

A YEAR IN THE ARCHIVES: THE 1922 PROJECT, A DIGITAL HUMANITIES MULTIMEDIA EXHIBITION
Friday, April 05, 2:40 – 6:00 PM
Allen Chapman Student Union, Level 2: Alcove

Panel 1: Modernism and 1922 (60 minutes)

2:40 PM   Tyler Dick
            SYMPOSIUM INTRODUCTION PRESENTATION

3:00 PM   Blue, Nathan
            CANE'S EARLY READERS

3:20 PM   Lee, Seungho
            RE-READING 1922: JEAN RHYS'S MOTHERHOOD AND A SLICE OF
            ORDINARY LIFE

Panel 2 - Archival Voices: Listening to the People of 1922 (60 minutes)

3:40 PM   Graham, Ciara
            GENDERED CITIZENSHIP: TULSA WOMEN'S CLUB AND LILAH
            DENTON LINDSEY ARCHIVAL COLLECTIONS

4:00 PM   Mazzo, Abigale
            FROM THE 1922 ARCHIVE: TRADING IDENTITIES AND THE WHITE
            MYTH OF 'KNOWING NATIVE'

4:20 PM   Dick, Tyler
            LISTENING TO THE ARCHIVE: READING THE SOUNDS OF 1922

4:40 PM   BREAK

Roundtable – Treasures of the Archive: Exploring the McFarlin Library (60 minutes)

5:00 PM   Department of Special Collections and University Archives
                    Participants:
                    Prof. Jeffrey Drouin (Moderator)
                    Nathan Blue
                    Ciara Graham
                    Abigale Mazzo
                    Tyler Dick
                    Seungho Lee

SPECIAL TOPIC SYMPOSIA

TURC SPRING RESEARCH SHOWCASE
Tuesday, April 2, 3:30 – 7:30 PM (Great Hall A and Alcove)
Organizer: Laura Stevens

Tulsa Undergraduate Research Challenge (TURC) is an innovative program that enables undergraduates to conduct advanced research with the guidance of top TU professors. The Spring Research Showcase is an opportunity for TURC participants to share their research with TU's campus and the community.

TURC was founded in 1992 to encourage and support undergraduate students who engage in exciting research projects while also devoting substantial time toward serving the community. Its aim is to create leaders in scholarship, research, and public life through an emphasis on undergraduate research and community involvement.

WOMEN IN SCIENCE CAREERS PANEL
Wednesday, April 3, 5:30 – 7:00 PM (Alcove)
Organizer: Sue Pepin

Presented by the Oxley College of Health and Natural Sciences and the College of Engineering and Computer Sciences, join women faculty as they discuss career paths for women in the science profession. Panelists will include:

- Maria Ironside, Laureate Institute for Brain Research
- Katie Mika, Biological Science
- Alex Kingston, Biological Science
- Jennifer Stewart, Laureate Institute for Brain Research
- Soroor Karimi, Mechanical Engineering

"OUR FUTURE IS WHERE OUR PAST IS" – NEW RESEARCH IN ARCHAEOLOGY
Friday, April 5, 9:30 AM – 3:15 PM (Great Hall B)
Organizer: Emily Schumacher

How do we use primate bones to determine paleoecology? What does a Danish fort in St. Croix tell us about borders and frontiers? How does studying the demise of the Neanderthals provide a glimpse into our future under the current climate crisis?

Archaeological research at The University of Tulsa (TU) is innovative and interdisciplinary, intersecting with humanities, social and natural sciences, and engineering. A subfield of Anthropology, archaeology includes the study of the material culture of ancient peoples, cultures, and societies through the typological and technological analysis of pots, chipped stone tools or lithics, metal and glass artifacts, architecture, and art; human biological evolution through the study of skeletal remains of human ancestors and primates; climate change and human-animal interactions which are studied through animal bones found in archaeological sites and their unique chemical signatures.

This symposium will present the latest research by TU Anthropology students with fun and activities. A unique aspect of this symposium is experimental archaeology—one of the strengths of TU Anthropology—and a global focus. Showcasing research conducted in the United States, the Caribbean, Mexico, Israel, Jordan, and China from hundreds of thousands of years ago to as recent as the Napoleonic

Wars, this symposium will demonstrate that the present is the key to the past. However, our future is where our past is.

The symposium will also include a display of genuine archaeological artifacts, skulls, and bones you can touch. A "Know Your Archaeology" trivia game with prizes will take place between the oral presentations and posters.

A YEAR IN THE ARCHIVES: THE 1922 PROJECT, A DIGITAL HUMANITIES MULTIMEDIA EXHIBIT
Friday, April 5, 2:40 – 5:00 PM (Alcove)
Organizer: Jeffrey Drouin

The 1922 Project is a multimedia Digital Humanities project created by graduate students and postdoctoral fellows in TU's Department of English and Creative Writing in collaboration with the McFarlin Library Department of Special Collections and University Archives. This project was a year-long collective effort to explore materials from the year 1922 in our University Archives and then digitize, contextualize, and present these materials in the form of a virtual on-line exhibit and a series of poster presentations. These materials are organized thematically, covering topics like Native America; modernist literature; material and consumer culture; Tulsa Women's Clubs; and the sounds of an archive, all framed by the year 1922. The project provides a snapshot into life as it was just over a century ago in Tulsa and beyond, and draws connections across different cultural forms, materials, and institutions to piece together what life looked like and how we still feel these reverberations echo in our present moment of 2024.

This symposium will include:
- A panel of 10-15 minute presentations from each member of the project team on their research topic followed by a Q&A;
- An informational presentation on the field of Digital Humanities and its aims, methods in digitizing archival materials, and the new Center for Digital Humanities at TU;
- A roundtable moderated by the project chair Professor Jeffrey Drouin on the students' experiences of working in the archives in the McFarlin Library.

This symposium will highlight the treasure trove of materials available in TU's Special Collections Department and various methods for engaging in archival research at the University. Additionally, the symposium will help to promote the new Center for Digital Humanities founded in the 2023-2024 academic year to encourage students to begin exploring the emergent and innovative field of research and scholarship in the Digital Humanities. This symposium will thus foster interest in both the archives of the past as well as the archives of the future, a collaboration between preservation and innovation that are beginning to intersect in the present at the University of Tulsa.

Oxley College of Health and Natural Sciences and College of Engineering and Computer Science Presents a Panel Discussion on

Women Scientist Careers

Join women faculty as they discuss career paths for women in the science profession.
Panel will include:
Maria Ironside, Laureaute Institute for Brain Research
Katie Mika, Biological Science
Alex Kingston, Biological Science
Jennifer Stewart, Laureaute Institute for Brain Research
Soroor Karimi, Mechanical Engineering

Wednesday, April 3, 2024
5:30pm - 7:00pm
Student Union Alcove Room

Refreshments will be provided!

SUBMITTED PRESENTATION (ORAL) ABSTRACTS

Abhari, Julian
MITIGATING RACIAL BIASES FOR MACHINE LEARNING BASED SKIN CANCER DETECTION

Machine learning (ML) based skin cancer detection tools are an example of a transformative medical technology that could poten- tially democratize early detection for skin cancer cases for everyone. However, due to the dependency of datasets for training, ML based skin cancer detection always suffers from a systemic racial bias. Racial communities and ethnicity not well represented within the training datasets will not be able to use these tools, leading to health disparities being amplified. Based on empirical observations we posit that skin cancer training data is biased as it's dataset repre- sents mostly communities of lighter skin tones, despite skin cancer being far more lethal for people of color. In this paper we use do- main adaptation techniques by employing CycleGANs to mitigate racial biases existing within state of the art machine learning based skin cancer detection tools by adapting minority images to appear as the majority. Using our domain adaptation techniques to aug- ment our minority datasets, we are able to improve the accuracy, precision, recall, and F1 score of typical image classification machine learning models for skin cancer classification from the biased 50% accuracy rate to a 79% accuracy rate when testing on minority skin tone images. We evaluate and demonstrate a proof-of-concept smartphone application

Aderibigbe, Babatunde
ANALYSES OF BOTH SEISMIC P-WAVE AND CONVERTED S-WAVE REFLECTION BEHAVIORS USING MULTICOMPONENT SEISMIC DATA IN THE MIDLAND BASIN, TEXAS.

The Midland Basin, situated in the central region of the Permian Basin, is renowned for its prolific sedimentary formations containing vast hydrocarbon reserves. This area taps into multiple layers of oil-rich formations, including the Spraberry, Wolfcamp, and San Andreas formations, within a complex and faulted geological structure. These formations have been prolific producers of oil and gas for decades, with their interbedded shales and sandstones serving as both source rocks and reservoirs, augmented by their stacked nature which enhances productivity. Consequently, the Midland Basin remains a highly sought-after area for oil and gas exploration and production. Amplitude-variation-with-offset (AVO) and amplitude-variation-with-angle (AVA) analyses can reveal amplitude changes as the offset or incidence angle increases between source and receivers. AVA/AVO analysis can provide important information about reservoir properties such as lithology, porosity, and pore fluids. In this study, we utilize real seismic reflection data from the Midland Basin, alongside synthetics generated from well log data and Zoeppritz approximations, to evaluate and analyze the reflection behaviors of both P wave and Converted S wave. The research aims to compare the amplitude behaviors of P-P and P-SV waves as the angle of incidence increases and determine which seismic mode provides better characterization of the targeted reservoirs that may help to reduce exploration risk. The anticipated outcomes of this research are expected to significantly contribute to the fields of seismic exploration and development and offer valuable insights into reservoir characterization within the Midland Basin.

Ahmed Rahin, Saima
EMPOWERING DISABLED PEOPLE WITH CUTTING-EDGE EXTENDED INTELLIGENCE TECHNOLOGIES

This project explores the transformative potential of eXtended Intelligence (XI) technologies in empowering individuals with disabilities. XI, an evolution of Artificial Intelligence (AI), extends beyond traditional applications by integrating advanced technologies in eXtended Reality (XR) with human capabilities. By leveraging XI, disabled individuals can enhance their autonomy, accessibility, and overall quality of life. This project examines various XI applications, including assistive technologies, adaptive interfaces, and inclusive design principles, that play a crucial role in creating an inclusive and accessible environment for people with disabilities. Additionally, this project is targeting to address the ethical considerations and challenges associated with the widespread adoption of XI in the context of disability empowerment.

Ala, Bala Saishree Krishna Yadav
IMPACT OF EXTREME PRESSURE ON WAX APPEARANCE TEMPERATURE: AN EXPERIMENTAL STUDY USING MODEL OIL AND METHANE GAS

This research delves into the significant role of pressure in the precipitation and deposition of wax in crude oil, a phenomenon influenced by various paraffinic hydrocarbons. The study highlights how pressure critically determines the wax appearance temperature (WAT) or cloud point, impacting the solubility of heavier hydrocarbons. At higher pressures, these heavier molecules are more likely to remain dissolved, reducing wax deposition. Conversely, reduced pressure, typical in production and transportation, can induce precipitation of these components. The paper underscores the pressure dependency of crude oil's phase behavior, noting that high pressures can alter fluid phases, thereby influencing WAT. This behavior is crucial for understanding component interactions under different pressure conditions. The use of laboratory experiments, particularly Differential Scanning Calorimetry (DSC), is emphasized as a means to understand pressure's effect on wax deposition and to determine WAT under varying pressures. Understanding these dynamics is pivotal for the oil industry in developing effective strategies to address wax-related issues, such as developing additives, designing pipeline systems to handle varying pressures, and optimizing temperature and pressure conditions during production and transportation to minimize challenges related to wax deposition in fluctuating pressure conditions.

Allison, Morgan
THE BIOMECHANICS OF SERVICE DOG HARNESSES

Service dogs are a vital part of the lives of many persons with disabilities. Those with visual, hearing, or mobility impairments often utilize service dogs, as well as persons with a variety of medical conditions such as epilepsy, psychiatric conditions such as PTSD, and neurological conditions such as Parkinson's. Service dogs typically wear harnesses that vary with the size and breed of the dog and the nature of the disability of the person for whom the dog works – the handler. These harnesses come in a variety of different styles; each with perceived advantages and disadvantages. Limited research has been done to quantify the biomechanical performance of service-dog harnesses from the perspective of either the dog or the handler. My research will investigate biomechanical aspects of service-dog harnesses, including the effects of harness type on various aspects of gait including symmetry, ground reaction forces, and stride length and frequency. I will introduce and present the background and motivation of this project, describe research done by others, and outline my own plans to better understand the biomechanics of service-dog harnesses.

Beaird, Ethan
ADDRESSING PROCRASTINATION AND IMPROVING TASK COMPLETION EFFICIENCY THROUGH AGENT-BASED INTERVENTIONS

Procrastination, i.e., irrational delay, seriously and increasingly affects people's daily and professional lives in today's society where social media and easy access to entertainment options are plentiful. Psychology literature offers various types of interventions developed to reduce an individual's level of procrastination; however, only a limited number of people experiencing procrastination have access to such interventions. Leveraging agent technology as even a partial remedy to this widespread problem can be highly beneficial due to its ubiquitous nature. In this study, we develop a model of procrastination on task completion and two levels of agent-based interventions to assist individuals in overcoming procrastination. The effects of agent interventions on procrastination are evaluated through an extensive set of controlled experiments with participants recruited from Amazon Mechanical Turk. The agent engages the user using instances of given task types to develop a shared awareness of user preferences and capabilities. This preference model is then used both to choose effective interventions as well as measure and reward subsequent user performance. This model can also be leveraged to explain agent interventions to the user. We collect and use both task completion metric data and survey data to assess individuals' perceptions of procrastination, task completion satisfaction, and the usefulness of agent support. Our data analysis indicates that using agent-based interventions can effectively help people reduce procrastination.

Bierbaum, Emily; Toomey, Matthew; and Bonett, Ronald
IMPACT OF LIFE CYCLE VARIATION ON THE EXPRESSION OF VISUAL SYSTEM GENES IN EURYCEA

A commonly observed pattern in visual ecology is the tuning of the sensory system to available light in the environment. This is accomplished by the diversification of visual genes. Proteins involved in the visual system can reside in photoreceptors (opsins and retinal chromophores), or the lens (crystallins). Opsins vary in peak spectral sensitivity determined by wavelength to adapt to changing light environments, and the chromophore switch helps animals navigate turbid freshwater systems. Crystallin genes have undergone intensive duplication and deletion events to optimize the focusing power of the eye in different media (air and water). Within amphibians, salamanders offer a great resource to study visual systems because of their extreme habitat preferences and their diverse life cycle modes. The life cycles of salamanders not only include the typical metamorphic life history of a frog (aquatic juvenile, terrestrial adult), but also permanently aquatic and terrestrial lineages. Representatives occupy a plethora of habitats ranging from ponds, streams, swamps, and caves that vary in light environment and media type. As a consequence, their visual systems have undergone repeated transitions in visual media, often across development. I evaluated how different life cycle modes affect the visual system of salamanders in the genus Eurycea, by sequencing whole-eye transcriptomes for nine species. I collected expression data for larval and adults of multiple life histories to differentiate changes in gene expression from metamorphosis and ontogeny. These analyses allowed me to target instances of upregulation or downregulation that would shift spectral sensitivities and focusing power.

Blue, Nathan
THE 1992 PROJECT, *CANE'S* EARLY READERS

Jean Toomer's Cane (1923) reflects the serial form of the magazines that published its fragments—the first few in 1922. A study of the fragments' literary neighbors and contemporaneous readership before its unified publication as Cane will renew our understanding of the work's reputation as a "masterpiece" (Dahn 119). This portion of The 1922 Project will review a selection of art and literature published alongside Cane's

earliest fragments. Eurie Dahn covers the periodical history of Cane in depth but emphasizes the magazines' various missions over the thoughts and responses of their readership. Therefore, this portion will investigate correspondence sections in the magazines that address Cane or Toomer and his affiliates to reflect on the positive and negative attachments various audiences have to works contemporaneous with other avant-garde publications that defy prosaic and poetic norms. I will seek to answer: to what degree does the literary experimentation in Cane owe to its arrangement as a unified work in 1923, and how do they read differently as magazine pieces a year earlier? How do the various readers of magazines like Crisis, The Liberator, The Double Dealer, and The Little Review receive Cane's fragments opposed to its arrangement in 1923, or in contrast to other featured periodical pieces? My portion of the project seeks to continue Eurie Dahn's investigation into Cane's basis in periodicals, to highlight the literary hubs and communities that stir avant-garde readership, and to contemplate how editorship in magazines, and of one author's body of work, amount to an act of modern experimentation whose effects linger in our twenty-first century mediascape.

Bolger, Corey; Moore, Tyler; and Aurigemma, Sal
INCREASING PHISHING REPORTING THROUGH TARGETED INTERVENTIONS

Phishing plays a key role in many data breaches. According to the Verizon Data Breach Investigation Report 2023, phishing was among the top 3 ways in which attackers access organizations. In addition to this, the IBM Cost of a Data Breach 2023 report identified that the average time to detect and contain a cybersecurity incident was 277 days. These two facts suggest that it is worth the effort to assist users in better detecting and reporting of phishing emails. This research project is focused on using specific interventions to improve the quality and quantity of user reported phishing emails. Building upon previous work in the area, I will be using multiple interventions that have proven effective. These interventions vary from process and technology changes to a customized training designed to help end users understand their role in phishing detection and reporting. The goal of the research is to test the impact each of the interventions has on overall reporting rates for phishing emails.

Brown, Ashton
INSITU

The Mystic Marriage of Saint Catherine was painted by Domenico Beccafumi in 1538-1549, and was originally located in Dell'Orafo in the church of Santo Spirito in Sienna Italy. Two of the panels of this piece are now located in the Philbrook museum of Art. Photos of the original location of the panels were taken in the summer of 2022, and I received the photos in 2023. The photos were taken with a Canon Power Shot SX 100. My job is to recreate what the original location would look like if all the panels were still together in their original location. In this paper I will discuss the process I took using the photos given to me to recreate the panel location, using programs Reality Capture and Blender, as well as issues I encountered and how I overcame these issues. I will also discuss how my work has pushed our project forward and gave us information to further improve.

Brue, Jacob; Shymanski, Joe; and Sandip, Sal
NOT ALL EXPLANATIONS ARE CREATED EQUAL: INVESTIGATING THE PITFALLS OF CURRENT XAI EVALUATION

Explainable Artificial Intelligence (XAI) aims to create transparency in modern AI models by offering explanations of the models to human users. There are many ways in which researchers have attempted to evaluate the quality of these XAI models, such as user studies or proposed objective metrics like fidelity. However, these current XAI evaluation techniques are ad hoc at best and not incredibly generalizable. Thus,

most studies done within this field conduct simple user surveys to analyze the difference between no explanations and those generated by their proposed solution. We do not find this to be adequate evidence that the explanations generated are of good quality since we believe any kind of explanation will be better in most metrics when compared to none at all. Thus, our study looks to highlight this pitfall: most explanations, regardless of quality or correctness, will increase user satisfaction. We also propose that emphasis should be placed on actionable explanations. We demonstrate the validity of both of our claims using an agent assistant that helps teach some chess concepts to a user. The results of this study will act as a call to action in the field of XAI for more comprehensive evaluation techniques for future research in order to prove explanation quality beyond user satisfaction. Additionally, we present an analysis of the scenarios in which placebic or actionable explanations would be most useful.

Clough, Lily; Williams, Connor; McKinney, Leyton; and McKinney, Brett
DISTRIBUTED SYSTEMS MISSION APPLICATIONS OF MACHINE LEARNING FOR OCEAN WORLDS

Future NASA missions to icy ocean worlds such as Europa (e.g., Europa Clipper), Titan (e.g., Dragonfly), or Enceladus (e.g., Enceladus Orbilander) will collect mass spectrometry (MS) data from exospheres, atmospheres, and plume volatiles from these satellites to assess their geochemistry and potential for the existence of life. These remote missions face challenges related to limited bandwidth, communication, and power, highlighting the need for science autonomy to prioritize data for timely downlink. Previous work in our research lab used laboratory-generated ocean world seawater isotope ratio MS data to predict biosignatures using machine learning (ML) and provided a data-prioritization pipeline. We extend this work to distributed systems missions (DSM) by incorporating the ML and autonomous data quality control and prioritization code into an onboard decision-making platform. We demonstrate realistic data collection and real-time decision making using high-fidelity orbital telemetry simulations provided by NASA-Goddard Space Flight Center and instrument outputs. This interdisciplinary research incorporates principles of scientific programming, ML, planetary science (geosciences), and chemistry in support of science autonomy goals for future ocean worlds missions. Software integration for DSM ocean world missions will be illustrated using Raspberry Pi sensor arrays running through an onboard artificial intelligence research platform designed for decision-making AI capabilities. Sensors include temperature, humidity, CO_2, volatile organics, and reflected light spectrophotometers.

Cosby, Grace
NEW WOMEN AUTHORS USING THE THIRD SPACE IN LITERATURE

The New Woman is a prominent figure in literary studies, particularly in the Victorian Era. These women made use of literature to convey the circumstances of women in various stages of life that are all connected to the public sphere rather than the private sphere. This project will focus on the work of Ella Hepworth Dixon in *The Story of a Modern Woman* (1894) and Sarah Grand in *The Beth Book* (1897) as they portray salons and small gatherings as spaces for intellectual discussion and engagement with public concerns. These spaces are anticipatory of Homi Bhabha's concept of the third space of enunciation. Though they are set in private venues, these spaces are made public through the act of writing, including the writing of Mary Erle in *The Story of a Modern Woman*. Sarah Grand's *The Beth Book*, autobiographical in nature, shows the main character Beth to be a genius figure who frequently finds herself in groups of women sharing ideas about philosophy, literature, morality, and societal values. Beth encounters these groups during her childhood as she leads young girls and during her adult years as she engages with and comes to terms with their societal expectations. Dixon's Mary Erle is a gossip column writer who is sent to the salons to make their views on fashion and gossip known to the wider public, but

it makes the discussions of the women in the salons suddenly important to the wider public, including the women's views on society.

Davis, Nicolette
THEMATIC ANALYSIS: REFRAMING QUALITATIVE TECHNIQUES

Qualitative data analysis focuses on the classification and interpretation of linguistic (or visual/non-verbal; Smith, 2000) content to make statements about implicit and explicit dimensions and structures of meaning-making in the material and what is represented in it (Flick, 2009). Thematic analysis is a qualitative data analysis method for identifying, analyzing, and reporting patterns (themes) within data (Naeem et al., 2023). Despite its extensive use, there is no clear agreement about what thematic analysis is and how one should go about doing it (e.g., Boyatiz, 1998). Thus, the purpose of this presentation will be to provide key steps/processes used in thematic analysis while describing its strengths and weaknesses as a qualitative research technique.

Davis, Rachel; Cordeiro, Jose; Ramsurn, Hema; Keller, Michael; Otanicar, Todd; and Crunkleton, Daniel
CURING OF RESORCINOL ADDED PHENOLIC RESIN FOR THE FABRICATION OF PREPREGS: A PRECURSOR FOR COMPOSITES TO BE USED IN CONCENTRATED SOLAR RECEIVERS

Phenolic resins are thermosetting polymers that have a wide variety of applications. Because of their high carbon yield and aromatic nature, phenolic resins are commonly used as a carbon precursor for the fabrication of Carbon/Carbon (C/C) composites. Due to their high strength and thermal conductivity combined with low thermal expansion coefficient and density, a novel micro-vascular C/C composite for Concentrating Solar Power (CSP) systems is proposed in this research. Manufacturing starts from the fabrication of a prepreg, which is then carbonized to convert the resin into a carbon matrix, followed by densification, and graphitization. The mechanical and thermal properties of the finalized composite are highly dependent on the quality of the first produced prepreg. This work centers on the fabrication of the prepreg, which includes curing the phenolic resin around the carbon fiber structure. The curing kinetics and process of fabricating the phenolic resin are characterized and optimized through models and Differential Scanning Calorimetry (DSC) analysis. The addition of resorcinol decreases curing times, hence optimizing curing procedures. Prepregs are then evaluated in terms of the void content using optical microscopy. The 10 wt% resin resorcinol mixture was chosen as the optimal concentration for a CSP application.

Delaporte, Elise; Karki, Anand; and Fakhr, Mohamed
TRANSCRIPTOME ANALYSIS OF AEROTOLERANT AND AEROSENSITIVE *CAMPYLOBACTER JEJUNI* SURVIVAL UNDER AEROBIC CONDITIONS

Campylobacter remains a leading cause of foodborne illness around the globe. This microaerophilic microorganism encounters various stressors such as aerobic conditions and low temperature during retail meat processing and storage. In recent years, multiple studies have reported high prevalence of aerotolerant *Campylobacter* strains in various retail meats including poultry. While known to harbor genes involved in tolerance to oxidative stress, genes specific for *Campylobacter* aerotolerance during survival under aerobic conditions are yet to be identified. The objective of this study was to conduct transcriptomic analysis using RNA-Seq Illumina technology for the survival under aerobic conditions of two selected *Campylobacter jejuni* strains previously isolated from retail meats and sequenced in our laboratory. These strains possessed different aerotolerancy levels: *C. jejuni* T1-21 (aerosensitive) and *C.*

jejuni WP2-202 (aerotolerant). Strains were exposed to aerobic conditions in Mueller Hinton Broth media and triplicate samples were taken at 0, 0.5, 6, 12, and 24 hrs for RNA isolation. Directzol RNA miniprep kit was used for RNA isolation and DNA was removed using the Turbo DNA free kit. cDNA libraries prepared using TruSeq stranded mRNA library preparation kit (Illumina) was sequenced in a Hiseq 4000 platform and sequence reads were analyzed using the CLC Genomic Workbench 22. Results indicated that prolonged aerobic incubation induced significant expression of various genes among the two tested strains. More differentially expressed genes (DEGs) were observed in *C. jejuni* WP2-202 compared to *C. jejuni* T1-21. Despite the variation in genomic expression among the two *Campylobacter jejuni* strains, several genes including oxidative stress response genes and other stress response genes were found to be significantly upregulated at 12 hrs and 24 hrs compared to 0 hr. Higher number of genes related to inorganic iron transport and metabolism were found to be upregulated and more genes related to ribosomal proteins were downregulated for the two strains at most incubation times. The majority of upregulated genes for both strains belonged to categories with unknown functions. In conclusion, genomic expression of *Campylobacter jejuni* survival under aerobic condition varied among the two tested strains and appeared to be altered as time of incubation increases.

Dick, Tyler
LISTENING TO THE ARCHIVE: READING THE SOUNDS OF 1922

This paper explores a seemingly simple premise undergirded by complex issues of theory and praxis: how might we listen to an archive? As part of the larger *The 1922 Project: A Digital Humanities Multimedia Exhibition*, this paper explores different forms of material evidence that can help us piece together the sounds of 1922. Technological advancements rapidly expanding across the globe like automobiles, gramophones, and other machines were radically altering the soundscape of the planet. Modernity was not just palpable in cultural forms like books, film, fashion, and architecture; its noise surrounded everyone and filled spaces public, private, and imagined. Our archives provide a potential way to reconstruct what this new aural landscape may have sounded like in addition to the more standard preservation via sonic recording.
Exploring items like newspapers, theater bills, advertising, and other print traces of sound, this paper elucidates how aurality is textually inscribed and explores methods for thinking about the intersecting relationships of sound, text, and the archive. These myriad textual forms, when paired with recordings of these sounds housed in both physical and digital archives, together can help us recreate the soundscape of the past. These recreations can help us think about the way sound informs our lives, and how the everyday sounds we take for granted—like a revving car or music heard in passing—were reshaping the lives of people in 1922. As part of the overarching *1922 Project*, this paper adds another dimension to the project's exploration of life in 1922—one that is sometimes harder to trace in the archives, but none the less echoes forth to us in our present moment if we read, and listen, closely enough.

Edwards, Timothy
BRONZE AND IRON AGE URBAN ECOLOGY

Micromammal remains have proven to be very successful proxies for conducting zooarchaeological research and reconstructing paleoenvironmental conditions in the Levant. Their success as a palaeoecological proxy is due to their sensitivity to climatic change, specific ecological niche, and low rate of human interaction. While there is abundant research on micromammals from prehistoric periods of the Levant, little research has been done using micromammals as environmental proxies in historical periods most often represented by urban environments. These areas are crucial in understanding human social organization and humanity's impact on local ecosystems. To go about addressing these gaps, we sourced micromammal remains of individuals weighing less than 3 kg primarily from several Bronze and

Iron age sites located in northern Galilee of Israel. Using community structure and taphonomy, we reconstructed the ecology of the historic urban environment and the level and impact of human occupation on the local micromammal ecosystems.

Esther, Emily
AN INTRODUCTION TO THE IMPACT OF COMPUTATIONAL MODELING ON SOLAR CELL RESEARCH

Over the past two decades computational modeling to predict solar cell performance has grown in popularity. Researchers typically identify as being on either the computational modeling or experimental side of solar cell research but in truth, most researchers rely on both. Researchers can use computational modeling software as a roadmap for experimental work. Some researchers only bring in computational modeling afterwards to confirm their data but I believe it is important to start with computational work. The methodology presented in this presentation shows the importance of starting with the computational simulations to enhance the experimental work. Additional emphasis should be placed on computational work in the early stages of research. Continued investment in computational software is critical because it will lead to saving resources and time.

The importance of using computational modeling in the early stages of solar cell research will be presented in current work being performed at TU on perovskite solar cells. Perovskite cells could be the future of solar energy because their high efficiency. However, perovskites often contain large amounts of lead and they degrade in efficiency over time. Perovskite solar cells are highly susceptible to things like physical damage and moisture. When the cell is damaged, lead is released, with significant potential for environmental damage. Current computational work focuses on identifying promising lead-free and low-lead halide perovskites and then confirming their performance experimentally. Simulations using Setfos and SCAPS-1D will be compared and discussed.

Ferguson, Connor; and Akhtar Ali
GENETIC DIVERSITY OF COTTON LEAFROLL DWARF VIRUS (CLRDV) FROM THE SOUTHWESTERN UNITED STATES

Cotton leafroll dwarf virus (CLRDV) is an emerging virus in the United States (US) since its discovery in 2017 in Alabama. Now, the virus has been reported in more than a dozen states, including Oklahoma, Texas, and Kansas. The purpose of this study was to determine the genetic diversity among CLRDV isolates and their evolutionary relationship with previously reported isolates. Four complete genomes and 23 P0 genes of CLRDV isolates that were collected from Texas, Oklahoma, and Kansas from 2019 to 2021 were sequenced by high-throughput sequencing and PCR-derived Sanger sequencing. Phylogenetic analyses of the complete genomes revealed seven clades while based on the P0 gene, the isolates clustered in a large amount of polytomy. Based on the phylogenetic and amino acid analyses, the CLRDV isolates from Texas (TX clade) may support the multi-introduction event hypothesis into the US. Additionally, based on our analyses in this study, we propose that the Asian CLRDV isolates should be constituted as a novel strain of CLRDV.

Fulgham, Brianna
THE INTERFAITH VALUE OF ROCK CRYSTAL'S PELLUCIDITY

During the High Middle Ages, it was not uncommon for European Christian churches to make use of looted materials, including artifacts taken from Islamic Fatimid Egypt. One of these artifacts was a carved

rock crystal flask, later decorated with metal mounts and turned into a reliquary to hold the hair of the Virgin Mary. Muslim artists used the clarity and reflectiveness of rock crystal to evoke water, air, and light, all of which are used to represent divinity in both the Quran and the Christian Bible. This flask, as a sum of its parts, demonstrates how Muslims utilized materials for worship and how Christians recontextualized eastern elements to suit their own faith. This essay argues that the flask's religious transformation reveals how the process of appropriation often incorporates or shares the artwork's original symbolism and usage rather than obscuring them entirely.

Gilham, Alex; and Endsley, Nicki
DOES SOCIAL SUPPORT MODERATE THE RELATION BETWEEN UNINTENDED PREGNANCY AND POST-PARTUM DEPRESSION IN A HEALTH PROVIDER SHORTAGE AREA?

Postpartum depression (PPD) is a prevalent and impactful health concern for women and infants. A number of risk factors for PPD exist including lack of social support. Namely, the literature has shown that a lack of social support puts a woman at higher risk for developing PPD and that higher quality of social support can mitigate risk for developing PPD. Researchers suggest that this may be due to greater interpersonal resources to cope with novel stressors like new parenthood. Another risk factor for PPD is an unintended pregnancy. However, no known research assesses whether social support can moderate the relation between unintended pregnancy and PPD symptomatology. Furthermore, there may be unique barriers to social support and healthcare in more rural or underserved areas, which may explain why rates of postpartum depression may be higher. This may also explain why research has highlighted the need for studying postnatal mental health in rural US areas. Given existing literature and identified gaps, it is hypothesized that high levels of prenatal social support in the third trimester can moderate or decrease the relationship between unintended pregnancy and PPD symptomatology at 6 months postpartum and that this moderation relationship will be stronger for women in rural/underserved areas. To test hypotheses, we will use data from a health provider shortage area, the Infant Development and Health Outcomes in Mothers Study, and a public database, the Pregnancy Risk Assessment Monitoring System. This includes self-reported pregnancy planning, amount of social support, and PPD symptomatology.

Golden, Brenna
ANALYZING THE RELATIONSHIP BETWEEN PHONEMIC INVENTORY OVERLAP AND SPEECH-TO-TEXT TRANSCRIPTION ERRORS

Currently assessments of the intelligibility of speech in the field of Speech and Language Pathology are highly subjective, which impacts the accuracy of evaluations and progress tracking. Considering the prevalence of accented speech in the United States, exploring the possibility of using speech-to-text software as an objective tool to assess intelligibility has the potential address this issue. Using speech-to-text software to analyze accented speech supports the use of implementing more objective and standardized measures of intelligibility in the field of Speech and Language Pathology, which would directly improve the quality of care that clients are receiving through more accurate initial assessments and progress tracking. Theoretically, a higher phonemic overlap between English and another language would mean that the speaker of the non-English language is more intelligible in comparison to speakers whose first language has a smaller phonemic overlap. This would hypothetically lead to fewer errors in subsequent speech-to-text transcriptions. To test this theory, audio files of multiple languages with an identical script will be pulled from an online accented speech bank and run through two different speech-to-text software programs. Supplemental information on country of origin, region, sex, age, age of English onset, and length of English residency if applicable is collected. Each audio file will be played three times per speech-to-text transcription software (Microsoft Word and Otter AI), and then errors are

counted at the word level. If an error appears across all three transcriptions, then it is counted toward the total amount of transcription errors for that audio file. An analysis will be done comparing the phonemic overlap between each language and English and the average transcription accuracy. Other supplemental factors such as the age of English onset and length of English residency and their impact on transcription accuracy will also be assessed. There will be a control group of English speakers to set a baseline for speech-to-text transcription accuracy and all other audio files will be organized based on first language and country of origin.

Golla, Ben; Breckheimer, Ian
THE INFLUENCE OF FOREST STRUCTURE AND COMPOSITION ON TRANSPIRATION RATES AMONG DROUGHT-STRESSED CONIFER SPECIES IN THE UPPER EAST RIVER WATERSHED

Despite the ecological significance of prominent coniferous forests surrounding RMBL, there are few comprehensive studies on these systems, particularly regarding transpiration dynamics. Their critical role in carbon sequestration, microclimate dynamics, and water resource management in the Upper Colorado River Basin render them subjects of great research interest. With that being said, sustained drought conditions throughout the region are changing energy fluxes within these forests and bringing into question their resilience in increasingly water-limited circumstances. Examining the physiological adaptations and water-use strategies among different conifer species will aid in our understanding of the ways in which forests contribute to a balanced energy budget in the face of changing climatic conditions. The specific focus of this study is Engelmann Spruce (Picea engelmannii), Subalpine Fir (Abies lasiocarpa), and Lodgepole Pine (Pinus contorta), three dominant conifers within the Upper East River Watershed. This research aims to investigate the variation in transpiration rates among drought stressed conifers in stands with varying species composition and forest structure. The work combines stem-scale trait measurements and high-resolution aerial imagery with unmanned aerial vehicles (drones) to study transpiration dynamics at a landscape level.

Gonzalez, Jalynne; Narayan, Anupama
EXPLORING EXPERIENCES OF INCLUSION

How individuals personally define and experience inclusion varies. Despite the existence of unique perspectives, two common themes emerge from the inclusion literature: the need for belonging and uniqueness (Shore et al., 2011). Individuals experience inclusion when their need for belongingness is met, and their uniqueness is valued. Current research on experiences of inclusion is limited, given the complexities of gathering such contextually rich data from many participants. The typical reliance on self-report measures, while valuable, constrains participants from sharing important details about their experiences. Using interviews is beneficial for gathering specific details about individuals' lived experiences and their experiences of inclusion. The purpose of this presentation is to provide an overview of the project, the development of the coding scheme, and to highlight the learnings gained from the process.

Graham, Ciara
THE 1922 PROJECT – GENDERED CITIZENSHIP: TULSA WOMEN'S CLUB AND LILAH DENTON LINDSEY ARCHIVAL COLLECTIONS

Throughout nineteenth century America, the establishment of women's clubs signaled a shift in the ways women could influence life beyond the home. As these developed, they extended to addressing social

issues such as health and childcare and encouraging further education. However, with this emerging sense of influence on their communities came an evolving network of power that meant membership of these clubs was exclusive. The Tulsa Women's Club papers in collaboration with the Lilah Denton Linsdey, president of the club in the early twentieth century, collection gives archivists insight into the intricate ways in which these materials contribute to the construction of American women's identity. The 1922 Tulsa Women's Club history book records, as one example, demonstrates the civic engagement, advocacy for social reforms, and the cultivation of networks that fostered collective action. The speeches written by Lindsey in the 1920s further indicate how women negotiated (and produced) their identities within the confines of societal expectations, navigating complex intersections of gender, race, and class amongst a backdrop of republican ideals. By analyzing the content and tone of the documents produced by these clubs, this research underscores the significance of women's club records and associated documents as invaluable repositories of women's voices and contributions to the construction of American citizenship. Thus, the archives of women's club records and the documents written by the women who subscribed to them indicate how a sense of Americanness, through womanhood, was built.

Imran, Muhammad; McKinney, Brett A.; Butt, Azhar Iqbal Kashif
A NEW SEIR MODEL FOR INFLUENZA-CORONA CO-INFECTION WITH TREATMENT AND HOSPITALIZATION COMPARTMENTS AND OPTIMAL CONTROL STRATEGIES

The co-infection of corona and influenza viruses has emerged as a significant threat to global public health due to their shared modes of transmission and overlapping clinical symptoms. This article presents a novel mathematical model that addresses the dynamics of this co-infection by extending the SEIR (Susceptible-Exposed-Infectious-Recovered) framework to incorporate treatment and hospitalization compartments. The population is divided into eight compartments, with infectious individuals further categorized into influenza infectious, corona infectious, and co-infection cases. The proposed mathematical model is constrained to adhere to fundamental epidemiological properties, such as non-negativity and boundedness within a feasible region. Additionally, the model is demonstrated to be well-posed with a unique solution. Equilibrium points, including the disease-free and endemic equilibria, are identified, and various properties related to these equilibrium points, such as the basic reproduction number, are determined. Local and global sensitivity analyses are performed to identify the parameters that most influence disease dynamics and the reproduction number. Knowing the most influential parameters crucial for understanding their impact on the co-infection's spread and severity. Furthermore, an optimal control problem is defined to minimize disease transmission and control strategy costs. The study identifies the most effective control rates for mitigating the spread of the co-infection. The results illustrate the effectiveness of the implemented control strategies in managing the co-infection's impact on the population's health. This mathematical modeling and control strategy framework provides valuable tools for understanding and combating the dual threat of corona and influenza co-infection, helping public health authorities and policy makers make informed decisions in the face of these intertwined epidemics.

Lee, Seungho
Re-Reading 1922: Jean Rhys's Motherhood and A Slice of Ordinary Life

1922 stands out as the significant moment of modernist art in the history of literature. Notably, on February 2nd in Paris, James Joyce's *Ulysses* was published, marking the peak of what is often termed as high modernism. In *Reading 1922*, Michael North adds significance to 1922, demonstrating that this is the year that key modernist figures including Ezra Pound, Virginia Woolf, and D. H. Lawrence started to ponder on the end of the old world and expressed their anxiety and hope towards the dawning of the new world in the correspondingly new and unprecedented forms of writing. While 1922 undoubtedly marks the significant moment in the history of the Western society and art, this paper redirects the focus to moments of ordinary

life by drawing upon the Jean Rhys archive at TU's Special Collections. The 1922 Paris witnesses not only the publication of James Joyce's brainchild, but also the birth of Jean Rhys's daughter, Maryvonne. The moments of Rhys's rarely-discussed motherhood are captured in the two photos of her holding her new-born daughter, one alone and the other with someone who looks like her friend, both archived in the Special Collections. While the Rhys in Paris was typically imagined as a flaneuse, an artist roaming the Parisian streets filled with cafes and shops and registering all these impressions as a woman writer from abroad, she was also a mother in the city she was foreign to and the city that she calls sinister. This paper, drawing upon the Jean Rhys Archive of the TU Special Collections, aims to re-read the year 1922 not only as the year of the extraordinary accomplishments of the modernist work and life, but as the year of the ordinary life in the modern world with birth, life, death, family, and friends.

Naranjo, Daniel and Ali, Akhtar
MACROPHOMINA PHASEOLINA, THE FUNGUS INFECTING SOYBEAN

The fungal pathogen Macrophomina phaseolina is the causal agent of charcoal rot disease in soybeans and cause significant losses to the quality and quantity of the soybean yield. Furthermore, fungi themselves can be affected by viruses commonly referred to as mycoviruses, such infections can either remain latent without easily detectable symptoms, impair fungal fitness and pathogenicity, or exacerbate them.
The ongoing research has been focused on an isolate of M. phaseolina that was named MP8. Screening of the fungal mycelia for dsRNAs molecules suggested the presence of mycoviruses and was further confirmed using high-throughput sequencing (HTS), and bioinformatics tools. The results showed that the MP8 isolate contained a total of 6 possible mycoviruses. The mycoviral presence was further confirmed by RT-PCR using specific primers followed by Sanger sequencing of PCR products The next step is to explore several treatments of fungal mycelia to produce a virus-free MP8 isolate which will serve as an isogenic line for control purposes. All these results and future goals will be discussed in this study. The overall objective of this study is to characterize mycoviruses that could potentially help mitigate the destructive effects of their fungal host.

Ndlovu, Maqhawe
SYNTHESIS OF ENAMINO CARBONYL COMPOUNDS USING BALL MILLING

Abstract: Enamino carbonyl compounds consist of a conjugated system of an amino group linked through an alkene to a carbonyl group. Enamino carbonyls are important building blocks in organic synthesis. They are useful in the development of natural and therapeutic products, peptidomimetics, and catalysis ligands. The amine-alkene-carbonyl conjugated system exhibits both nucleophilic and electrophilic properties. This distinct characteristic provides a highly reactive center that can be used as a pharmacophore for compounds in drug discovery and development. Several synthetic methods are available for these molecules, and developing novel and more efficient methods remains an important area of research.
The Eschenmoser coupling reaction has been extensively employed in constructing enamino carbonyl compounds. The reaction couples a thioamide and an a-halo carbonyl compound in the presence of a base and is known to work well with a range of various substrates. The main limitation of Eschenmoser coupling reactions is long reaction times. The Eschenmoser coupling reactions under heterogeneous conditions could benefit from ball milling as this provides mechanical force or high-energy grinding, reducing the particle size and providing better mass and heat transfer. This presentation discusses the effects of mechanochemistry or mechanical grinding on reaction times and substrate scope.

Palomar, Gregory and Ali, Akhtar
SCREENING FOR POTYVIRUSES IN CUCURBITS CROPS OF OKLAHOMA

Cucurbits such as squash, pumpkin, and watermelon are grown commercially throughout Oklahoma and contribute millions of dollars to the state economy annually. The aim of this study is to find what viruses are affecting cucurbits and how these diseases may be combatted. In 2023, we surveyed cucurbit fields in Bixby, Oklahoma, and collected samples of leaves from cucurbits that were showing typical virus-like symptoms. We isolated total RNA from the collected leaves and used them in reverse transcription polymerase chain reaction (RT-PCR) using primers for three potyviruses: papaya ringspot virus (PRSV-W), watermelon mosaic virus (WMV) and zucchini yellow mosaic virus (ZYMV). PCR products were run alongside positive and negative controls on an agarose gel. The images were then analyzed for the three known viruses. The results will be further discussed in the presentation.

Parab, Prasad; Toomey, Matthew; Johannes, Tyler; and Buchheim, Mark
IDENTIFICATION AND FUNCTIONAL ANALYSIS OF B-CAROTENE KETOLASE (BKT) VARIANTS FOR ENHANCED ASTAXANTHIN BIOSYNTHESIS IN HAEMATOCOCCUS

Astaxanthin is a valuable carotenoid with a range of applications in the food, pharmaceutical, and cosmetic industries due to its potent antioxidant properties. While it is naturally produced by certain microorganisms and flowering plants, slow growth rates and difficulties in extraction limit their utility. Therefore, there is a demand for more efficient production methods. The green alga Haematococcus accumulates large amounts of astaxanthin in its immobile (akinete) stage. The biosynthesis of astaxanthin in Haematococcus is comprised of at least seven enzymatic steps with the β-carotene ketolase (bkt) enzyme. Recent genome sequencing of Haematococcus pluvialis has uncovered up to six distinct copies of the bkt gene in the nuclear genome. It is hypothesized that these variant copies may have unique functional roles in astaxanthin production. Our preliminary analyses of various isolates of Haematococcus have revealed up to a ten-fold variation in astaxanthin accumulation among the isolates. We selected six isolates and cloned the bkt variants within each to determine if and how they contribute to variation in astaxanthin production. We assayed bkt activity in E. coli through co-expression with a heterologous zeaxanthin biosynthesis pathway and measurement of the resulting astaxanthin products. Our study offers an opportunity to identify specific bkt variants with enhanced catalytic activity and facilitate the development of more efficient strategies for industrial-scale production of this high-value pigment.

Paslay, Caleb and Ali, Akhtar
CHARACTERIZATION OF THE COMPLETE GENOME OF THE ROSE ROSETTE VIRUS FROM OKLAHOMA; THE "MALADY OF ROSES"

Roset rosette virus (RRV), or Emaravirus rosae, is a notorious plant virus associated with Rose Rosette Disease (RRD) in both wild and cultivated roses. RRD is one of the most destructive diseases of roses in the United States (US) and affects the quality and vigor of rose plants. Most cultivated rose plants appear to die within 3-5 years post-infection. Apart from the death of the rose plant, RRD results in witches' broom appearance, excessive thorniness, and flower deformation. These symptoms decrease the aesthetic value of garden roses. Unfortunately, there are no resistant cultivars available to prevent infection by RRV. Efforts are underway to investigate germplasm capable of resisting the virus or vector (Phyllocoptes fructiphilus). RRD has been investigated since the 1940's, but the causal agent has only been characterized at the molecular level since 2011. Following the initial characterization of the RRV genome, attempts have been made to characterize other isolates of RRV throughout the United States and world. In the fall of 2023, rose plants with RRD symptoms were collected in Oklahoma. This study is attempting to further understand the molecular diversity associated with RRV. Preliminary evidence suggests that the Oklahoma isolates of

RRV are increasingly divergent from other reported isolates. This is intriguing, as it may provide insight concerning virus diversity, ecology, and evolution. Knowledge pertaining to the RRV genome is essential for evaluating the current variation present in nature and for the incorporation of better management strategies.

Phillips, Samantha; Bradley Brummel, Aurigemma; and Moore, Tyler
LEVERAGING SITUATIONAL JUDGMENT TESTS TO MEASURE BEHAVIORAL INFORMATION SECURITY

Situational Judgement Tests (SJTs) are a multidimensional measurement method commonly used in the context of employment decisions and widely researched in the field of industrial and organizational (I-O) psychology. However, the use of SJTs in the field of information system (IS) security is limited. Applying SJT research from the field of I-O psychology to IS security research, particularly research with behavioral components, could prove beneficial. SJT items typically present participants with realistic hypothetical work/job-related situations and potential response items. Furthermore, SJTs are quite customizable because they can be presented in a variety of formats, how the response instructions are worded influences the measurement, and the scoring key can be built in a variety of ways. The use of SJTs in IS security research could provide researchers with a new measurement tool for a wide range of research goals. One such use case, that is currently part of ongoing research, is utilizing SJTs to measure the underlying assumptions employees have about the information security culture within their organization. The goal of the research is to use SJTs to determine how the underlying assumptions of an organization's information security culture is aligned among Hofstede's six organizational culture dimensions and determine the behavioral tendency of employees regarding desirable and undesirable security behavior. The SJT data will be combined with additional data collection methods to obtain an in depth understanding of an organization's information security culture.

Qureshi, Muhammad
LEWIS ACID CATALYZED UNUSUAL DIELS-ALDER REACTION

The Diels-Alder reaction is an organic reaction that is used to convert a conjugated diene (a molecule with two alternate double bonds) and a dienophile (an alkene) into a cyclohexene derivative (cyclic organic compound). It was first introduced by Diels and Alder in 1928. Due to its synthetic utility and usefulness in organic synthesis, they received a Noble Prize for chemistry in 1950. A traditional thermal Diels-Alder reaction requires either of its reactants (conjugated diene or dienophile) to be attached to an electron-rich group. At the same time, the other reactant should have an attachment to the electron-poor group. This electronic arrangement between the reactants is considered as the reaction between electronically matched partners. The reaction between electronically mismatched partners is difficult. Only a few methods exist that can perform this reaction. However, these have limited substrate scope due to the mechanism (oxidation) they employ, as the two reactants must have significantly different oxidation potentials. Our method will employ a different mechanism (Lewis acid-catalyzed) and, therefore, will not have such limitations. Furthermore, as Lewis acids are abundantly available, it will provide the easiest, economical, and sustainable method for synthesizing the cyclohexene derivatives in a good yield by simple Lewis acids catalyst.

Ramasubramanian, Suriya Narayanan; Sisul, Mia; Hema Ramsurn
PROBING THE DISTRIBUTION OF BIO-GRAPHENE LAYER ON COBALT FOIL USING RAMAN SPECTROSCOPY

Graphene, the thinnest 2D material, was synthesized on cobalt foil via carbon dissolution and precipitation process utilizing biochar as a carbon precursor. Biochar was placed on the cobalt foil and heated to 1000 °C in an electric quartz tube furnace. At this temperature, carbon atoms from biochar dissolved into the cobalt, forming stable carbides. Upon cooling, the carbides become unstable and precipitate, resulting in graphene formation at the eutectic temperature. Unlike the traditional CVD process, this study observed simultaneous growth of graphene on both sides of the cobalt foil. XRD characterization confirmed the presence of graphene on cobalt foils, and Raman spectroscopy identified the number of graphene layers formed. Initially, graphene synthesis with biochar (B) left some uncovered areas on the cobalt foil. To improve cobalt foil and biochar contact, a stainless-steel plate (W) was used on the biochar (B+W). Enhanced contact favored carbon precipitation on the side without biochar due to the enhanced concentration gradient. Placing biochar on both sides of the metal foil (2B) reduced the concentration gradient, forming a monolayer on both sides due to low carbon solubility (0.3 wt% at 1000 °C). Additional weight with biochar on both sides further enhanced contact. The synthesized graphene was then thoroughly analyzed using Raman spectroscopy at various points to comprehend the graphene layer distribution on cobalt foils.

Reeb, Hannah; Brown, Charles; Toomey, Matthew
THE EVOLUTION OF AN ANIMAL SIGNAL IN RELATION TO GROUP SIZE

The cliff swallow (Petrochelidon pyrrhonota) is a colonial bird known to live within a highly variable social environment– colony sizes range from 2 to 6000 nests. Adult cliff swallows feature a prominent white forehead patch, which I hypothesize is a signal of nest occupancy, useful in mitigating costly nest intrusion interactions within dense social environments. I predicted that more extensive patches (i.e. brighter, larger) should enhance this function and be associated with birds that nest in larger colonies, or that spend more time in the nest. Additionally, given the general ecological trend towards higher frequencies of large colonies, and the known heritable propensity for colony size in this species, I predicted that the signal should be selected for and inherited over time. To test these predictions, I measured both the brightness and size of the forehead patch in preserved specimens in relation to the sex, colony size, and year of collection of the birds. I used reflectance spectroscopy to quantify the brightness of the forehead patch and discern the contrast between adjacent plumage pigments, and imaging software to quantify the size and shape of the patch. My findings are the first to place signal evolution in the context of a variably social colonial species, revealing a new facet of social evolution.

Robinson, Phoebe
TEAM COMMUNICATION AND TEAM PERFORMANCE OUTCOMES

Although team communication is known to be important for effective team performance, the nuances of this relationship in real time are unclear. Thus, research analyzing specific communication patterns in teams communicating across time is required to better understand this relationship. This study qualitatively reviews communication behaviors during team interactions within short-term, interdependent teams in order to determine how communication patterns vary among teams with different performance outcomes. This allows for a time-based understanding of how teams with effective and ineffective performance vary in their communication behaviors.

Schumacher, Emily
UNEARTHING FORT LOUISE AUGUSTA: A HISTORICAL ARCHAEOLOGICAL EXAMINATION OF A DANISH WEST INDIAN FORTIFICATION

Archaeological and historical research into the colonial fortifications of the Caribbean typically emphasize the immense and monumental. These fortresses present an image of control and domination by a colonial power and capture the imagination. In contrast, the smaller and less visually striking fortifications are often left out of analyses and their stories forgotten. Here, I present an overview and results of the 2022 archaeological investigation of Fort Louise Augusta, a small Danish point battery on the coast of St. Croix in the former Danish West Indies (modern U.S. Virgin Islands). This research sheds light on the use and history of Fort Louise Augusta and its place within the wider military landscape of St. Croix. In so doing, this research highlights the importance of including more minor fortifications in archaeological research.

Shah, Deependra; Wang, Sanwu
REACTION OF DIMETHYL ETHER AND HYDROGEN PRODUCTION ON β-Mo2C: QUANTUM MECHANIC CALCULATIONS

Hydrogen is one of the most promising energy and fuel sources for fuel-cell-powered appliances. Stable and efficient hydrogen production is the focus for the production of this alternative energy source. In this work, we investigate the reaction mechanism of dimethyl ether on β-Mo_2C for hydrogen production using first-principles quantum-mechanical calculations, based on supercell models and density functional theory. The decomposition of dimethyl ether into CO and hydrogen on the β-Mo_2C (100) surface is a focus. The adsorption energies and configurations of dimethyl ether and the intermediates (CH_3-O, CH_3, CH_2, CO, O and H) are systematically calculated. The adsorption energies of dimethyl ether, CH_3-O, CH_3, CH_2, H, C, H_2, O are determined to be -1.66 eV, -4.11 eV, -2.95 eV, -5.13 eV, -3.11 eV, -7.84 eV,-5.17 eV and - 7.55 eV respectively. The most stable configuration of dimethyl ether, CH_3O, CH_3 and CH_2 is found at the top site with oxygen pointing towards the surface, at the hollow site where carbon is not present in the second layer, at the top site when carbon is pointing towards the surface, and at the bridge site where carbon is not present in the second layer respectively. Furthermore, the reaction energies involving dissociation of CH_3-O-CH_3 are determined. The calculated results are consistent with the available experimental data.

Shymanski, Joe; Brue, Jacob; and Sandip, Sal
NOT ALL EXPLANATIONS ARE CREATED EQUAL: INVESTIGATING THE PITFALLS OF CURRENT XAI EVALUATION

Explainable Artificial Intelligence (XAI) aims to create transparency in modern AI models by offering explanations of the models to human users. There are many ways in which researchers have attempted to evaluate the quality of these XAI models, such as user studies or proposed objective metrics like fidelity. However, these current XAI evaluation techniques are ad hoc at best and not incredibly generalizable. Thus, most studies done within this field conduct simple user surveys to analyze the difference between no explanations and those generated by their proposed solution. We do not find this to be adequate evidence that the explanations generated are of good quality since we believe any kind of explanation will be better in most metrics when compared to none at all. Thus, our study looks to highlight this pitfall: most explanations, regardless of quality or correctness, will increase user satisfaction. We also propose that emphasis should be placed on actionable explanations. We demonstrate the validity of both of our claims using an agent assistant that helps teach some chess concepts to a user. The results of this study will act as a call to action in the field of XAI for more comprehensive evaluation techniques for future research in

order to prove explanation quality beyond user satisfaction. Additionally, we present an analysis of the scenarios in which placebic or actionable explanations would be most useful.

Sisul, Mia; Ramasubramanian, Suriya Narayanan; Hema Ramsurn
COMPARING CORROSION RATES OF BIO-GRAPHENE COATED IRON SAMPLES USING ELECTROCHEMICAL ANALYSIS AND RAMAN SPECTROSCOPY

Graphene, a repeating pattern of hexagonally arranged carbon of one to five atoms thickness, has been heavily researched due to its great strength, thinness, and electrical conductivity. In this study, graphene was synthesized onto iron foil substrates using biochar from biomass model compounds as a precursor to test its corrosion-resistant properties. The corrosion rates of the samples were tested to investigate the optimal coating conditions for corrosion resistance.

One way corrosion resistance can be measured is by using an electrochemical cell (E-cell). Micro-galvanic corrosion occurring at the metal surface can be determined using an E-cell with a 3.5 wt% NaCl electrolyte solution, mimicking seawater. Electrochemical Impedance Spectroscopy (EIS) is then performed using a potentiostat to measure the metal's corrosion at different voltages. Linear Polarizing Resistance tests can then be performed to calculate the metal sample's corrosion rate in millimeters per year.

To enhance the corrosion resistance through better coverage, samples were prepared using different coating conditions such as amount of biochar used, the presence of a weight on top of the sample to enhance solid-solid contact, and increasing the number of runs through the coating process. Raman spectroscopy tests were performed at specific points on each iron foil to determine the number of layers of graphene formed in different areas. These tests revealed that samples with multiple graphene layers showed better corrosion resistance whereas monolayer graphene samples had higher corrosion rates. Relationships were then drawn between the coating conditions and the number of graphene layers formed on each sample.

Stone, Allison; Ugeto-Reyes, Gustavo
THE EFFECTS OF CANDID RESPONDING ACROSS ROLES WITHIN SELECTION ASSESSMENT

Socially desirable responding remains a major concern for both scientists and practitioners. Using signaling theory, this study examined how applicants with socially desirable responding tendencies may be rewarded within assessments but may have a worse assessment experience. A sample of 485,829 job applicants for a national retail chain's selection system across four hierarchically distributed roles was examined. Candid response patterns were found to be associated with lower scores on the selection assessments, but also more positive feedback and shorter assessment taking times.

Tate, Acelynn
DO YOUR WORDS MATTER? POSITIVE AND NEGATIVE BEHAVIORS IN TEAM INTERACTION

This project bridges industrial-organizational psychology and developmental psychology by analyzing supportive and non-supportive interactions within teams and groups. This project crafted a coding scheme to analyze social normative supportive behaviors; The coding scheme contains eight codes correlating to negative and positive emotional or instrumental support behaviors. Two pilot codes were done on deidentified transcript data of triad interdependent team tasks to test the efficacy of the codes. Discussion includes the coding scheme's limitations, implications, and future applications in industrial-organizational and developmental psychology.

Taylor, Geordon
PALEOENVIRONMENTAL RECONSTRUCTION OF EARLY MODERN HUMANS AND NEADNERTHALS DURING THE MIDDLE-EARLY UPPER PALEOLITHIC TRANSITION IN THE LEVANT: A GEOMETRIC MORPHOMETRIC ANALYSIS OF MODERN AND PALEOLITHIC MICROTUS GUENTHERI POPULATIONS

The Levant during the Middle-Upper Paleolithic Transition (MP-EUP) offers a unique and pivotal temporospatial background for studying the evolutionary trajectories of Homo sapiens and Homo neanderthalensis. Many questions remain unanswered concerning cultural and biological adaptations to Levantine environments and the degree of interaction between these two hominin species. This study focuses on the paleoenvironmental reconstruction of ecological niches inhabited by Homo sapiens and Homo neanderthalensis in the Levant during the MP-EUP transition by means of a geometric morphometric analysis of modern and Paleolithic Microtus guentheri (M.g.) populations–specifically the shape of the first lower molar (m1). By studying Microtus, a taxon that is hyper-sensitive to ecological and climatic variations, this research aims to: (1) evaluate intraspecific taxonomic homogeneity in Levantine M.g. samples, (2) correlate tooth shape variability with dietary shifts prompted by climate change, and (3) deduce the specific paleoecological conditions that existed in the Levant during the MP-EUP transition, including available resources and environmental pressures. This research highlights Microtus as a critical indicator species for paleoenvironmental reconstruction and expands upon other paleoecological studies of how early modern humans and Neanderthals adapted to the Levantine region and why the latter ultimately met demise. Moreover, this research can be applied broadly, as a direct method for paleoenvironmental reconstruction efforts and archaeological questions related to the Levantine region and indirectly to anywhere in the world where archaeological contexts contain similar microfaunal assemblages and can also aid in addressing contemporary environmental challenges related to climate forecasting, biodiversity, ecosystems, and human adaptation.

Thomason, Alex
CIVIL RIGHTS ACTIVISM IN EARLY OKLAHOMA, 1898-1929

This study explores how and in what ways African Americans in Indian Territory and later Oklahoma combined legal action under the Reconstruction Amendments with grassroots activism to assert their right to social and political equality during the late nineteenth and early twentieth centuries. Using Harvard Law School's Caselaw Access Project, court records housed at the University of Tulsa College of Law's B.C. Franklin Legal Clinic, and secondary historical scholarship, I catalog and examine state court decisions in which Black litigants allege civil rights violations under the Fourteenth and Fifteenth Amendments, lawsuits that survivors 1921 Tulsa Race Massacre filed against the City of Tulsa, and other accounts of civil rights activism in Oklahoma. As revealed by this inquiry, Black Oklahomans challenged and protested discriminatory jury trials, various segregation ordinances, unequal school funding mechanisms, the exclusion of African Americans from school boards, the failure of localities to abide by the Supreme Court's "separate but equal" doctrine, the disenfranchisement of African American voters, and the City of Tulsa's complicity and participation in the Tulsa Race Massacre. This research demonstrates that many African Americans in Oklahoma, including those from Tulsa's Greenwood District, frequently engaged in civil rights activism, legal and otherwise, and asserted their right to equality in law and practice. Through lawsuits and community organizing, Black Oklahomans fought the white power structure that sought to deny them their rights, a testament to their resilience in the face of systematic opposition.

Tilbury, Jack; Flowerday, Stephen
AUTOMATION IN SOCs: APPLICATION AREAS AND IMPLICATIONS ON ANALYSIS

The overwhelming volume and complexity of alerts in Security Operation Centers (SOCs) necessitates automation. This study aimed to identify the current and proposed application areas of automation in SOCs and discussed its implications on security analysts. Literature from four databases was selected (ScienceDirect, IEEE Xplore, ACM Digital Library, and Scopus) resulting in 599 articles. The screening process resulted in 66 articles being read in full. The final 48 articles, ranging from 2013 to 2023, were reviewed by two researchers. Thematic analysis was conducted which resulted in three thematic maps being produced. A quantifiable analysis and discussion of themes followed. The use of automation throughout the incident response lifecycle was recognized, with a noticeable focus in the detection and response phases. Results showcased the prominence of AI and ML solutions toward SOCs. Evidence showed overwhelming support for the human-in-the-loop component, regardless of automation bias, complacency, and trust emerging as human factor implications.

Trame, Samantha; Siegal, Dustin; Bonett, Ronald
MORPHOLOGY AND PHYLOGENY OF THE EXTERNAL NASALGLANDS

Pheromones are used in chemosensory communication across many taxa in varying habitats conveying a wide range of topics. Salamanders possess a variety of pheromones to use in chemosensory communication for general communication between conspecifics or for use in their multi-sensory courtship ritual. Pheromones used in the courtship rituals are typically produced by a group of glands referred to as courtship glands, which are typically only found in males. The most well studied of these glands are the mental and caudal courtship glands in salamanders, which exhibit periods of hypertrophy and atrophy inside and outside of the mating season, respectively. A similar pattern can be seen in the external nasal gland found in Plethodontid salamanders; however, unlike most known courtship glands the external nasal gland is also found in female individuals. The hypertrophy of the glands is more pronounced in males, and seasonal variation in epithelial height of external nasal glands of males is significantly correlated to that of seasonal variation in mental gland epithelial height. This gland is likely a courtship pheromone producing gland and can be found in a variety of plethodontid species and characteristics of the gland appear to change dependent on the life history of the species being analyzed. This has been evident in other courtship pheromone producing glands and perhaps may be a cause of speciation in the largest family of salamanders, Plethodontidae.

Ualiyeva, Gulnur; Pereyra, Eduardo; Sarica, Cem; Coutinho, R.
EXPERIMENTAL CHARACTERIZATION OF GAS-LIQUID DOWNARD FLOW

There is an increasing interest in downward gas-liquid flow owing to the recent need for longer pipelines across hilly terrains, lazy wave risers, injection of chemicals, and mixtures of CO_2 with impurities. Unfortunately, there is limited experimental data and modeling available in the literature for downward multiphase flows with steep inclinations (steeper than -10 degrees). Moreover, a large discrepancy has been reported between previously acquired test data and models for liquid holdup and pressure gradient.

This paper contributes to the literature with a complete set of two-phase flow measurements including flow pattern, liquid holdup, pressure gradient, and wall-shear stresses. Low-viscosity oil and air in a 2-in downward inclined pipeline (-15 and -30 degrees) have been used. Liquid and gas superficial velocities are varied from 0.1 to 1.6 m/s and 3 to 5 m/s, respectively. In addition, the experimental results are compared to the predictions of existing mechanistic models for pressure gradient, liquid holdup, and wall-shear stress. Analysis of the discrepancies is presented, identifying potential improvements in current models.

Valdelemar, Alexander
CYCLING BEHAVIOR NEURAL NETWORK BASED CLASSIFICATION SYSTEM FOR CONVENTIONAL AC UNIT

The use of air conditioning (AC) units has become an essential aspect of modern living, however inefficient cycling behavior of these units can result in increased energy consumption, higher operating costs, and decreased equipment lifespan. This study presents a neural network model for cycling behavior classification in conventional AC units, that aims to identify abnormal cycling behavior and provide insights into optimizing energy efficiency. Using a variety of predictors such as temperature, humidity, and cycling attributes of the AC unit, the neural network model can classify units into different categories based on their cycling behavior. The proposed model has the potential to contribute to the industry by providing a sophisticated low-cost solution that identifies units that exhibit abnormal cycling behavior, benefiting both consumers and the environment by reducing energy consumption and operating costs while extending the lifespan of the equipment. This study highlights the importance of optimizing compressor cycling behavior in AC systems and demonstrates the advantages of using a neural network model to detect early signs of inefficient cycling behavior.

Vo, Jennifer
CHARACTERIZATION OF MYCOVIRUSES FROM MACROPHOMINA PHASEOLINA

The soil-borne fungus Macrophomina phaseolina poses a significant threat to soybean production worldwide by causing charcoal rot disease, leading to substantial yield losses and plant mortality. Traditional management strategies, predominantly reliant on fungicides, face challenges and growing concerns over resistance development and environmental pollution. This project explores the prospect of mycoviruses as an eco-friendly alternative for the biological control of M. phaseolina. Mycoviruses (viruses infecting fungi), particularly those exhibiting hypovirulence, can suppress the growth and spore production of their fungal hosts, offering a promising avenue for disease management. During the TURC summer program in 2023, pathogenicity testing was conducted on seventeen mycovirus strains isolated from M. phaseolina. Soybean plants grown to the V2 stage were inoculated with fungal cultures harboring mycoviruses and monitored for stem necrosis for disease progression. Fungal re-isolation, dsRNA extraction, primer design, and RT-PCR were then employed to characterize mycovirus effects. This comprehensive methodology seeks to establish a foundation for mycovirology as a critical field in sustainable agriculture. The significance of this work lies in its potential to offer a long-term, environmentally sustainable replacement to chemical fungicides by leveraging biological mechanisms inherent to mycoviruses. Through inhibiting M. phaseolina growth, this strategy aims to reduce soybean loss and contribute to the global effort in sustainable crop management and disease control.

Waheed, Sakariyau; Sheaff, Robert
TARGETING MITOCHONDRIAL ATP PRODUCTION OF LUNG CARCINOMA USING ESSENTIAL OIL AS METABOLIC INHIBITOR

Genetic damage to the DNA of cells lining the airways, often triggered by factors like cigarette smoking or exposure to harmful chemicals, is a primary cause of lung cancer. In the quest to identify effective methods for detecting, treating, and managing lung carcinoma, cardamom oil was examined for its potential anticancer properties, given its known chemotherapeutic properties. The oil underwent purification and compound identification using thin-layer chromatography (TLC) and Gas chromatography-mass spectroscopy (GC-MS). Purification in two separate columns yielded percentages of 53.64% and 96.70% respectively. The biological activity of the oil was assessed using a rapid assay involving a one-hour exposure in L-15 media, known as Cell Titer Glow, with 2-deoxyglucose and Rotenone serving as control

substances targeting glycolysis and mitochondria inhibition respectively. The fraction from column 2 demonstrated superior activity compared to rotenone (the positive control) in A549 cells, indicating its potential as an agent for maximum ATP inhibition leading to cell death. Specificity tests revealed that the active fraction and terpinyl acetate (at 50 mM concentration) exhibited similar effects on mitochondria ATP production, showing no significant difference in the absence (83.80% and 82.32% respectively) or presence (32.00% and 32.00% respectively) of glucose. Moreover, the active fraction and terpinyl acetate displayed similar mass spectra on GC-MS, suggesting their structural similarity. This investigation raises pertinent questions regarding the effectiveness of natural products as anticancer agents.

West, Amy
BODY MASS, COLONY SIZE AND SURVIVAL IN CLIFF SWALLOWS

An optimal body mass can promote greater rates of survival in birds. However, body mass can fluctuate over the course of a year to reflect energetic requirements of different stages of the life cycle. Additionally, the optimal body mass may change from year to year depending on environmental conditions resulting in either fluctuating or stabilizing selection on body mass within a population. We examined the effects of body mass on survival in a colonially nesting bird, the Cliff Swallow (Petrochelidon pyrrhonota), over the course of 20 years to see 1) if there is an optimal body mass and how it may have changed over time and 2) if colony size and weather interacts with body mass to influence survival. Over the course of the 20 years, we found that with the exception of a few years with atypical weather, Cliff Swallows of varying body mass had similar survival outcomes, unless their weight was extremely high or low. In general, body mass seemed to be under stabilizing selection. Birds in small colonies tended to have lower survival rates regardless of body mass. Years with a higher rainfall in June tended to result in lower survival with birds of intermediate masses doing better, suggesting that annual weather conditions can be a driver of variation in body mass of birds.

White, Glen
QUALATATIVE DESCRIPTION OF TEAM INTERACTIONS

In an interdependent team, team members can affect each other in multiple ways. The purpose this study is to qualitatively review and describe how teammates influence the behaviors of one another as they interact and how this impacts the team performance. Beneficial, detrimental, and neutral team members were defined. Transcriptions of 3 member teams working on an interdependent, collaborative, immersive, team task in a laboratory context were reviewed to identify behavior between these three types of team members.

Williams, Connor; McKinney, Leyton; Clough, Lily; and McKinney, Brett
DISTRIBUTED SYSTEMS MISSION APPLICATIONS OF MACHINE LEARNING FOR OCEAN WORLDS

Future NASA missions to icy ocean worlds such as Europa (e.g., Europa Clipper), Titan (e.g., Dragonfly), or Enceladus (e.g., Enceladus Orbilander) will collect mass spectrometry (MS) data from exospheres, atmospheres, and plume volatiles from these satellites to assess their geochemistry and potential for the existence of life. These remote missions face challenges related to limited bandwidth, communication, and power, highlighting the need for science autonomy to prioritize data for timely downlink. Previous work in our research lab used laboratory-generated ocean world seawater isotope ratio MS data to predict biosignatures using machine learning (ML) and provided a data-prioritization pipeline. We extend this work to distributed systems missions (DSM) by incorporating the ML and autonomous data quality control and prioritization code into an onboard decision-making platform. We demonstrate realistic data collection and

real-time decision making using high-fidelity orbital telemetry simulations provided by NASA-Goddard Space Flight Center and instrument outputs. This interdisciplinary research incorporates principles of scientific programming, ML, planetary science (geosciences), and chemistry in support of science autonomy goals for future ocean worlds missions. Software integration for DSM ocean world missions will be illustrated using Raspberry Pi sensor arrays running through an onboard artificial intelligence research platform designed for decision-making AI capabilities. Sensors include temperature, humidity, CO_2, volatile organics, and reflected light spectrophotometers.

Williams, Patricia; Bellmaker, Miriam
THE POTENTIAL FOR USING LONG BONE MEASUREMENTS TO DETERMINE BREED OF GALLUS GALLUS DOMESTICUS AND ITS IMPLICATIONS FOR THE ARCHAEOLOGICAL RECORD

Poultry remains are often found in archaeological excavations and while the species can usually be identified, there has been little research on breed identification or purpose (egg productions vs. meat production). This research aims to determine if differences exist between the long bone measurements of modern chicken breeds which can be useful for the archaeological record. We collected specimens of modern breeds (Silkie n=9; Ameraucana n=8; and OEG n=6), skeletonized them, and took measurements of the femur, tibiotarsus, and tarsometatarsus according to published guidelines. Preliminary results show the femur greatest length (GL) could distinguish among breeds (ANOVA F=4.409 df=2 p-value=.0251; Tukey's pairwise comparison indicated that femur FL could distinguish between OEG and Ameraucana (p-value=0.03) and between OEG and Silkie (p-value=0.05). There is no difference between Ameraucana and Silkie. A principal component analysis on 12 linear measurements and 7 ratios shows that the 1st PC (68% of the variance) separates between the Ameraucana and OEG/Silkie group, and the 2nd PCA (31% of the variance) separates between OEG and the Silkie/Ameraucana group. While results are tentative, they suggest the potential of using the long bone size and shape to differentiate between poultry breeds.

SUBMITTED PRESENTATION (POSTER) ABSTRACTS

Ahmed Rahin, Saima
EMPOWERING DISABLED PEOPLE WITH CUTTING-EDGE EXTENDED INTELLIGENCE TECHNOLOGIES

This project explores the transformative potential of eXtended Intelligence (XI) technologies in empowering individuals with disabilities. XI, an evolution of Artificial Intelligence (AI), extends beyond traditional applications by integrating advanced technologies in eXtended Reality (XR) with human capabilities. By leveraging XI, disabled individuals can enhance their autonomy, accessibility, and overall quality of life. This project examines various XI applications, including assistive technologies, adaptive interfaces, and inclusive design principles, that play a crucial role in creating an inclusive and accessible environment for people with disabilities. Additionally, this project is targeting to address the ethical considerations and challenges associated with the widespread adoption of XI in the context of disability empowerment.

Alred, Cameron
PERFORMANCE IMPROVEMENT OF DISCRETE MUSCLE-LIKE ACTUATORS

In the development of novel robotic actuators, mechanical performance is a significant goal. For muscle-inspired actuators, which contract, these factors include maximum stress, maximum strain, and strain rate. We demonstrate a new design for discrete, solenoid-driven muscle-inspired actuators which improves over prior work in these metrics. The design uses a monolithic housing with tightly packed, thermally bonded solenoids and introduces a ferrous core piece.

Beaird, Ethan and Hart, Jacob
A DIGITAL TWINS APPROACH FOR NATURAL LANGUAGE PROCESSING AND COMMUNICATION WITH SPOT

Much of historical Human-Robot Interaction (HRI) literature is rooted in physical interactions and safe mechanisms for human-robot environments; however, recent developments in Natural Language Processing (NLP) and Large-Language Models (LLMs) facilitate an expansion of HRI into verbal communication. By leveraging these advances in NLP and LLMs, humans can easily and effectively communicate with robots through human language in a natural and intuitive manner. This presentation introduces a novel approach to HRI through the use of digital twins and conversational agents to interface with Boston Dynamics' autonomous mobile robot Spot. Digital twins are virtual representations of physical entities and systems; by connecting conversational agents to digital twins of Spot or other robots, we create scalable and elastic models that enable verbal interaction in a variety of domains, including but not limited to virtual reality (VR).

Castaño, Jessica
APPEARANCE OF NYCTICEBUS COUCANG IN LATE PLEISTOCENE SOUTH CHINA: EXPLORING PRIMATE BIOCHRONOLOGY AND PALEOECOLOGY IN YAHUAI CAVE

Understanding the biochronological and biogeographic distribution of primates in south China is critical for paleoenvironmental reconstruction of the region ca. 120,000 years ago. Primates can serve as a valuable proxy in understanding past environmental conditions that may have impacted human migration in the region, and the presence of a particular primate species in a specific area can indicate ecological corridors or barriers that may have influenced human movement. In this paper, we discuss the appearance of small primates and their significance to the site in Yahuai, Guangxi Zhuang Autonomous Region, South China. We analyzed the small fraction of bone remains wet-sieved through a fine mesh retrieved from area A dated to ~120,000 - 40,000 bp to identify primate dental and postcranial fragments. Identification was done using a comparison of specimens from the University of Tulsa paleoecological and zooarchaeological collection and augmented by data from the literature. Preliminary results of the large fauna analysis suggest the dominance of *Macaca mulatta* (rhesus macaque); however, our wet sieving revealed the presence of the small-size *Nycticebus coucang* (slow loris) previously unknown from the site. *Nycticebus coucang* are nocturnal strepsirrhines currently facing habitat loss due to anthropogenic pressures with a scarce fossil record. Results will discuss the importance of small primates in understanding the biogeography, biochronology, and taphonomy of the site, and how this finding elucidates slow loris evolution.

Fite, Isabelle; Zoellner, Sophia; and Brett McKinney**
BOSE-EINSTEIN CONDENSATE VORTICES AND BLACK HOLES IN D DIMENSIONS

Bose-Einstein condensates (BECs) are atomic gases that collapse into a macroscopic quantum state of matter when cooled to ultracold temperatures, on the order of nano-Kelvins. The Gross-Pitaevksii Equation (GPE) provides an accurate mean-field description of these BECs. In this theoretical and computational study, we use dimensional perturbation theory to study the GPE model of BECs in arbitrary spatial dimensions (including fractional dimensions or dimensions greater than three). We derive vortex solutions of rotating BECs in arbitrary spatial dimensions using the GPE, generalized to hypercylindrical dimensions. Using the recently proposed idea of black hole vorticity, we discuss the potential for modeling a rotating black hole with vortex structure as a condensate of gravitons and extend that idea to D dimensions.

Guthrie, Logan
VOLES (*MICROTUS GUENTHERI*) STABLE ISOTOPES AS PROXIES OF MIS6 PALEOENVIRONMENT: IMPLICATIONS FOR MODERN HUMAN AND NEANDERTHAL INTERACTIONS IN THE SOUTHERN LEVANT

The environmental context of modern humans and Neanderthals in the Southern Levant has implications for understanding how these species interacted within a small geographic region with a sharp ecotone. In general, Neanderthals were believed to have inhabited cooler and more humid periods (MIS 6, MIS 4), while modern humans, were thought to occupy the warmer and dryer periods (MIS 5e). Previous studies have relied on rodent community structure as a means of reconstructing the environment. These studies found that the high abundance of voles indicated an open and dry environment. However, recent discoveries of Homo sapiens remains in Misliya Cave (ca. 200 - 170 ka) and micromammal community structure here pointed to a variable climate rather than a hot/dry or cold/humid one. To further this discussion, stable isotope analyses of Microtus guentheri from Rantis (n = 9) and Hayonim E (n = 21) were conducted and compared to modern vole stable isotopes from across Israel (n = 39). Results suggest that Hayonim (d13C = -9.19 ± 1.70; d18O = 11.85 ± 14.33) and Rantis (d13C = -9.86 ± 0.25; d18O =

26.68 ± 0.24) were cooler and more humid than today (d13C = -15.47 ± 1.28; d18O = -1.38 ± 1.1). These results indicate that the climate and environment across the ecotone of the southern Levant were complex and that there was a more nuanced relationship between hominin species and preferred habitats. Moreover, it is necessary to look beyond community structure for a robust paleoecological indicator.

Jennings, Madeline
ZOOARCHAEOLOGICAL EVIDENCE FOR EARLY HUMAN SUBSISTENCE PATTERNS DURING THE PRECONTACT OCCUPATION OF AMALIK BAY, ALASKA

Limited research has been done concerning the zooarchaeological evidence for specific subsistence patterns of Amalik Bay, Alaska. Excavation and survey of the Amalik Bay, Alaska, conducted in 2008, 2021, and 2022 recovered faunal remains associated with cultural materials from sites XMK-00020, XMK-00028, and XMK-00001 thought to have origins in the Takli Cottonwood phase (1800-1500 BP). Of note are multiple bone tools produced on antler. Remains were identified to the lowest taxonomic level possible and taphonomic post-depositional modifications were recorded using the comparative zooarchaeological and paleoecological collection at the University of Tulsa. A selection of samples of these materials were taken for 14C dating, to be included in the results. Zooarchaeological results indicate that faunal materials consist of a range of species, both terrestrial and marine, in a variety of taphonomic degrees of preservation. Specifically, human utilization and consumption included a high percentage of medium size waterfowl (supported as integral by past research for 7500-4100 BP), caribou and seals. These results shed light on bone utilization and subsistence patterns within these Alaskan residential sites.

Jindal, Salil and Ali, Akhtar
THE PRESENCE OF THE TOMATO BROWN RUGOSE FRUIT VIRUS IN OKLAHOMA GROCERY STORES

Tomato brown rugose fruit virus (ToBRFV) is a new emerging virus that infects tomatoes and causes significant losses in tomato yields worldwide. The virus has been reported infecting tomatoes in other states in the United States (US) but was not reported previously in Oklahoma. In 2023, seven tomato fruit samples showing typical virus-like symptoms such as marbling and mosaic were collected from a local store in Tulsa, Oklahoma. The collected tomato fruit samples were subjected to virus-like particle (VLP) purification to isolate the virus. The VLP product was run on SDS-PAGE gel, and a typical coat protein band of around 17 kDa was observed. Typical rod-shaped virus particles were observed when VLP was examined by electron microscopy. Total RNA was extracted from these fruits using the TRI-Reagent® method and was used in the RT-PCR assay using specific primers against the ToBRFV. The PCR product of the expected size was obtained from all the samples, which were further confirmed by Sanger sequencing. Sequence results confirmed the presence of ToBRFV in these samples. This study reports for the first time the presence of ToBRFV in tomatoes in Oklahoma.

Kim, Yuhyeoi
THEATER OF VOYEURISM: ANTI-CATHOLICISM AND WOMEN AS SPECTACLES IN THE MONK

From the view of women who sought freedom and independence, the era of Matthew Gregory 'Monk' Lewis' The Monk (1796) was also the time of emancipation and economic opportunity for autonomy. Many women writers including Mary Robinson started to raise their voice and share their experience as an actress and public figure to criticize how the double standard of honor in English society put women into the abysmal situation by blaming their wantonness and vanity while acclaiming their artistic talent and beauty

at the same time. The presence of strong historic women figures exudes in The Monk's morally complex and captivating women characters such as Matilda, Agnes, Elvira and Antonia. This essay explores how anti-theatricality of The Monk both criticizes and promotes the idea of women as spectacle, with horror induced by the Catholic idolatry and tyranny, and in women characters' agency with active role in the narrative focusing on the larger idea of women's role and position in the Gothic novel as subgenre of Romanticism.

Kresock, Elizabeth; Luttbeg, Henry; Dawkins, Bryan; Li, Yijie (Jamie); Kuplicki, Rayus; and McKinney, B. A.
CENTRALITY-BASED NEAREST-NEIGHBOR PROJECTED-DISTANCE REGRESSION (C-NPDR) FEATURE SELECTION FOR CORRELATION PREDICTORS WITH APPLICATION TO A RESTING-STATE FMRI

Nearest-neighbor projected-distance regression (NPDR) is a metric-based machine learning feature selection algorithm that uses distances between samples and projected differences between variables to identify variables or features that may interact to affect the prediction of complex outcomes. Typical bioinformatics data consists of separate variables of interest like genes or proteins. Contrastingly, resting-state functional MRI (rs-fMRI) data is composed of time-series for a set of brain Regions of Interest (ROIs) for each subject. These within-brain time-series can be transformed into correlations between pairs of ROIs, and these pairs can be used as input variables of interest for feature selection. Straightforward feature selection would return the most significant pairs of ROIs; however, it would be beneficial to know the importance of individual ROIs. We extend NPDR to compute the importance of individual ROIs from correlation-based features. We present correlation-difference and centrality-based versions of NPDR. The centrality-based NPDR can be coupled with any centrality method and with importance scores other than NPDR, such as random forest importance. We develop a new simulation method using random network theory to generate artificial correlation data predictors with differences in correlation that affect class prediction. We compare feature selection methods based on detecting functional simulated ROIs, and we apply the new centrality NPDR approach to a resting-state fMRI study of major depressive disorder (MDD) and healthy controls. We determine that the brain regions that are the most interactive in MDD patients include the middle temporal gyrus, the inferior temporal gyrus, and the dorsal entorhinal cortex.

Martinez, Marco
INDIGENOUS LAND RIGHTS AND SEDENTARISM AMONG THE SUMA INDIANS OF THE CASAS GRANDES MISSION, NORTHERN NEW SPAIN.

The Casas Grandes Valley, located in modern-day Northwest Mexico, was home to diverse Indigenous societies living in an environment characterized by a reliable water source and floodplains. Spanish documents from the seventeenth century are the only historical sources of information regarding the social organization and material culture of these societies, especially in the Casas Grandes Mission, a town of Suma majority. However, said historical documents argued in 1667 CE that the Suma and other Indigenous nations in the valley and surrounding regions were hunter-gatherer groups that lacked attachment to the valley, as was the Spanish conclusion for many Indigenous nations in Northern New Spain, an area populated by several hunter-gatherer societies. The Spanish based this conclusion on the belief that subsistence practices like farming and husbandry required continued presence in a particular portion of land, establishing land claims over generations as opposed to subsistence practices that deviated from them. Nonetheless, in 1687 CE, the Indigenous inhabitants of the Casas Grandes Mission produced a document claiming ancestral ownership of the Casas Grandes Valley, requesting the establishment of formal boundaries of a smaller portion for their exclusive use. By contrasting these descriptions to current archaeological research performed on six Casas Grandes Suma households dated to the mid-seventeenth

century, this paper argues that both the historical descriptions and archaeological evidence support the hypothesis that the Casas Grandes Suma had material culture product of sedentarism, likely combined with seasonal hunting-gathering, a subsistence strategy that Spanish administrators misjudged for the absence of sedentarism.

Mazzo, Abigale
FROM THE 1922 ARCHIVE: TRADING IDENTITIES AND THE WHITE MYTH OF 'KNOWING NATIVE'

The pamphlet has a long and controversial history as one of the first affordable and easily accessible modes of printing and has played a pivotal role in shaping and influencing American society through propaganda. "Thirty Years Among the Red Men" (1922) details the life and experience of W.R. Black, a white man and shop owner living among Native Americans in Watonga, Oklahoma. Describing him as, "the most interesting Indian trader I ever met," and "one of the few men who knows Indians," the author, W.N. Bunker, idealizes Black's interactions with Indigenous peoples through a lens of white exceptionalism. Bunker employs a blend of patronizing and romanticized language to depict the items in Black's shop, simultaneously denigrating Native American traditions while perpetuating the myth of the "Noble Savage." This presentation aims to dissect the pamphlet's language and imagery to expose the racist and sentimentalized perspectives on Native American culture as conveyed by Bunker. Through an analysis of Bunker's portrayal of Black, the merchandise within his shop, the depiction of sacred Native American traditions, and the juxtaposition of W.R. Black with Native American figures on the pamphlet, Bunker constructs a narrative that reinforces prevailing American ideologies concerning Indigenous peoples. This narrative also crafts a hybrid identity for Black, maintaining his white privilege while appropriating elements of the Native American experience. By scrutinizing the text and imagery of the pamphlet, we can uncover the insidious ways in which it contributes to the ongoing marginalization and exploitation of Native American cultures and peoples.

Mennella, Kara
INVESTIGATING SOUND TOLERANCE CONDITIONS IN CONCUSSIONS: A PROPOSAL FOR COMPREHENSIVE ASSESSMENT AND TREATMENT DEVELOPMENT

Mild traumatic brain injuries (mTBIs), commonly referred to as concussions, are the leading type of traumatic brain injury. Most mTBIs occur due to falls, sports injuries, or motor vehicle accidents. While many physical symptoms are assessed and treated, auditory symptoms are often ignored. Some individuals with concussions experience auditory symptoms, including sound tolerance conditions which significantly impact patients' well-being. Sound tolerance conditions includes hyperacusis, misophonia, phonobobia, and noise sensitivity. Current clinical practices lack adequate awareness and testing measures for these conditions, and some current assessments are unreliable, posing a tremendous challenge. Without sufficient assessments, clinicians are hindered from developing and using effective treatment strategies. The following research aims to conduct a systematic literature review to explore sound tolerance conditions in mTBI and propose the development of a comprehensive test battery, used for assessment. Furthermore, this proposal attempts to investigate treatment approaches based on the conditions identified. By integrating assessment and treatment strategies into clinical practice guidelines for mTBI patiens, this research aims to improve the quality of life for such individuals. This research underscores the urgent need for recognition and management of sound tolerance conditions in mTBI patients.

Mierow, Tanner; Feller, Kathryn D; and Kingston, Alexandra C N
AMPHIBIOUS COMPOUND EYES: SHIFTS IN EYE MORPHOLOGY AND FUNCTION IN B. FLUMINEUM

Belostomatids (Hemiptera: Belostomatidae), or giant water bugs, are insects that use vision to capture prey and navigate to new bodies of water. Belostomatids are fully aquatic as nymphs but transition to an amphibious lifestyle as adults. Since vision is ecologically important to belostomatids at all stages, we hypothesized that the visual system shifts, through changes to the corneal optics, to support the visual needs of aquatic nymphs and amphibious adults. To test this hypothesis, we examined compound eye morphology, optical performance, and visually-guided behaviors of Belostoma flumineum throughout ontogeny. We used SEM, TEM, and light microscopy to characterize changes in corneal morphology. To quantify the focusing power of the cornea throughout ontogeny, we used a modified hanging drop method to measure focal lengths of eyes in air and water. Finally, we used a modified optomotor assay to examine how observed changes in eye morphology throughout ontogeny affect visually-guided behaviors. We discovered differences in eye morphology and optical performance across ontogeny in B. flumineum. Nymphal instars have convex corneas that optimally focus light onto the retina underwater, supporting visually-guided behaviors best in water but not in air. Adults have flattened corneas with similar focusing power in air and water, providing similar optical performance for visually-guided behaviors in both aquatic and terrestrial environments. Here, we show the first example of an amphibious visual system in an invertebrate.

Moore, Sara
IN SITU

In Situ means "in the natural or original position or place". The majority of paintings found in altarpieces from Catholic churches have been divided up over history and reside all across the world in museums. They are rarely together and rarely in their original location. The TURC project, In Situ, recognizes the benefits that can be gained from viewing an altarpiece in its entirety in its original location. Although this is not possible in the physical world, through an XR Experience, a viewer can see what the original altarpiece would have looked like in its space, allowing viewers a better idea of the original use of the altarpiece and intentions of the artist and commissioner. In Situ is a research project in which we research the dispersed parts of an altarpiece in Italy. Our goal is to create an XR Experience of the "Mystic Marriage of Saint Catherine of Siena with Saints" by Beccafumi. Our research was started in previous semesters in which a group went to Italy to photograph a different space in which to digitally reconstruct an altarpiece, and now we are learning from their experience to create a better XR experience. The oral presentation will consist of a review of the past work done by previous students, the work we have been doing in preparation of our trip to Italy, and our plans of how to accurately photograph the space and paintings. We will also discuss our future plans of digitally reconstructing the space through 3D modeling and the current work that is being done to reconstruct the space.

Mosavat, Seyedmohammad
RACIAL PRIDE, PASSING, AND NEW NEGRO WOMAN IN JESSIE REDMON FAUSET'S PLUM BUN

This paper examines the interplay of race, gender, and domesticity within Jessie Redmon Fauset's Plum Bun, aiming to distinguish the emancipatory objectives of the "New Negro Woman" from those of her contemporary white counterpart, the "New Woman". Focusing on themes such as racial identity, passing, and female homosociality, my analysis traces the herione's journey from embracing "passing" as a strategy for societal acceptance to grappling with her racial identity and seeking empathy and companionship. Despite finding pride in her lighter skin color which qualifies her to "pass" and develop homosocial bonds

instructing her the New-Womanish rules of social presence, the heroine's marital aspirations for a wealthy white husband serves as an obstacle in seeing her as a New Woman. For, marriage holds little appeal for this feminist figure who prioritizes heterosexual relationships that maintain her elevated status as the object of desire. Despite her awareness of the rules of this cat-and-mouse game, Angela, as a woman of color unable to deny her black blood, feels compelled to seek refuge in the heteropatriarchal institution of marriage, consenting to a domestic role which safeguards her social standing in a white supremacist society. Consequently, despite the disappointments in her heterosexual relationships, Angela cannot be categorized as a New Woman, as her emancipatory ideals are tempered by social empathy and racial pride: the former permeates her character throughout the novel, even when she feigns ignorance of her background, while the latter is a sentiment she belatedly embraces in her pursuit of companionship respecting her origins.

Pavlik, Jess; Mierow, Tanner; and Kingston, Alexandra
CONSERVED LENS MORPHOLOGY ACROSS TRUE AQUATIC BUGS (HEMIPTERA: NEPOMORPHA)

Many aquatic insects are amphibious as adults, flying to new bodies of water to hunt or reproduce. Within this group, adult giant water bugs (Insecta: Hemiptera: Belostomatidae) rely on vision to navigate between freshwater sources. To achieve functional vision in both air and water, the compound eyes of adult giant water bugs have external lens surfaces that are flattened and internal lens surfaces that are round. Vision in nymphs is specialized for use in water, and they have lenses that are rounded on both surfaces. I investigated the transition of the visual system from fully aquatic to amphibious vision in each developmental stage of Belastoma fluminium using semi-thin sections ($1-2\mu m$). To compare amphibious vision among aquatic insects, I also investigated closely related Hemipterans (Infraorder Nepomorpha: Nepidae, Notonectidae, Naucoridae, Gelastocoridae, and Corixidae), a Hemipteran out group (Infraorder Gerromorpha: Gerridae), and an insect out group (Order Coleoptera: Dytiscidae). As B. fluminium transition from larval to adult stages, the external surface of the lens flattens, while the internal surface of the lens remains curved. This trend was conserved across Nepomorpha with the exception of Corixidae and was absent in the out groups. Therefore, we suggest that the flattening of the external lens surface is an evolutionary trend in Nepomorpha that supports these animals' visual capabilities as they transition from an aquatic to semi-aquatic lifestyle over ontogeny.

Phillips, Sable
INVESTIGATING THE USE OF BIOCHAR DERIVED ADSORBENTS FOR CONTAMINENTS IN WATER AND OIL

Crystallization of minerals (Ca^{2+}, SO_4^{2-} etc.) present in water can cause organic scaling, which directly interferes with oil and gas production, impedes fluid flow, and adds costs due to treatment and removal processes. Therefore, it is important to reduce, if not eliminate, scale formation in pipelines. Our goal is to find a more cost-effective and environmentally friendly way to approach this issue by using different carbon-based adsorbents to remove scaling ions. This work will test cellulose, lignin and hemp derived bio-adsorbents since this biomass is abundant in Oklahoma. The in-house prepared adsorbents tested will be cellulose biochar, lignin biochar, hemp biochar and their activated counterparts. A Flame Atomic Absorption Spectrometer (FAAS) and Inductive Coupled Plasma (ICP) will be used to analyze the ions in the solutions. First a calibration curve will be generated for the concentration range. After 24 hours, the adsorbents will be separated from the solution which will then be analyzed using FAAS and ICP to determine the amount adsorbed. Our preliminary results show that the hemp biochar was not as effective and upon analysis, it was found that its ash content was very high. We will therefore investigate the effect of ash content on adsorption capacity. It is suspected that the local hemp may have high ash content due to

the growth environment (soil, fertilizers added) and the ash may thus be "blocking" the accessibility to the adsorption sites. Thus, an acid reflux will be set up to remove the ash to improve the adsorption capacity.

Pugh, Zarieya and Guthrie, Logan
THE NOMENCLATURE OF MICROTUS GUENTHERI

A persevering issue in zooarchaeology when researching Microtus guentheri (the Levant vole) is that there are many different names used to identify this singular species of Rodentia. When American paleontologists identify a species in the fossil record they commonly use the Linnaean taxonomy naming system. Sometimes referred to as Günther's vole, M. guentheri is native to a large geographical range including regions such as the Levant, Turkey, and Bulgaria among others. Often the species has region-dependent name differences. Through literary review, we have identified that several journals use a wide range of nomenclature to describe the Microtus guentheri species, making it difficult for researchers today to determine if they are all referring to the same vole species in modern and archaeological contexts. An important method for taxonomic identification of Microtus species is their molar morphology, given their teeth are adapted for specialized diets. Based on comparison of dental morphology and review of the most pertinent literature, we conclude that M. guentheri should be standardized across research for this vole species to prevent nomenclature inconsistency and allow for easier species identification in academic discussions.

Stokes, Cheyenne
REDUCING COUGHING ON EMERGENCE WITH MEDICATION ADMINISTRATION

When an endotracheal tube is in place coughing occurs. The act of coughing presents a potential risk for post-surgery complications, ranging from mild to severe. It is common practice to administer medication to mitigate coughing. Utilization of medication, including fentanyl, lidocaine, remifentanil, and dexmedetomidine, assists with cough attenuation. This project aimed to implement best practices to decrease coughing during emergence from general anesthesia. The PICOT question used to guide this evidence-based research was "In surgical patients (patient), how does the administration of medications (lidocaine, fentanyl, remifentanil, or dexmedetomidine) (intervention) compared to no medication administered (comparison) affect the chances of coughing (outcome) during emergence from anesthesia (time)?"

Following a systematic review and synthesis of relevant articles, project implementation at a primary health facility ensued. The literature denoted that administering any of the four studied medications increased the probability of cough reduction. Implementation was completed by a pretest, an evidence-based educational poster presentation, and a posttest to measure the effectiveness of the presentation. Dr. Kolcaba's Comfort Theory provided the conceptual framework to guide this evidence-based change project. The Awareness, Desire, Knowledge, Ability, and Reinforcement (ADKAR) model provided the change management framework.

The sample consisted of fourteen participants (anesthesiologists, certified registered nurse anesthetists, anesthesia assistants, and resident registered nurse anesthetists). The primary investigators analyzed the results, which showed an increase from 71% to 93% ($p = 0.18$) in participants' willingness to use intravenous medications to reduce coughing on emergence. The cost of the medications was assessed. Cough reduction reduces the risk of adverse events and improves patient satisfaction. The providers were encouraged to take a screenshot of the poster for later reference and sustainment.

Udwin, Benjamin
WHAT LOCAL TULSA MEGAFAUNA BONES SAY ABOUTZOOARCHAEOLIGICAL METHODOLOGY, PALEOINDIAN PREHISTORY, AND BONE TAPHONOMY IN FLUVIAL DEPOSITS

For the last 60 years Zooarcheologists have used mandibular molar eruption and tooth wear rates of Bison to determine not just the age at death but also the seasonality of potential bison kills. These methods claim to elucidate specific traits of Paleoindian hunting behavior but recent studies question whether the methodology is sufficiently accurate. Further research in bison dietary variation, tooth wear inconsistency over lifespan, intraspecies variation, and seasonality bias is necessary. Despite each of the five most used methods relying on different morphological parameters and age gradients, if accurate then the results of each method, applied to the same sample (N30) of a fluvial assemblage from the Arkansas River, should agree. Along with age at death determination, methods for gauging morphology, sex, diet, and bone survivability are applied to predictions of bison species phylogeny in the fossil record and taphonomy in fluvial Holocene and Pleistocene deposits. These results can be improved contextually by comparing them to the entirety of bison bone and species representation within the fluvial assemblage. Lastly, three dimensional scans of the sample set will provide more accurate measurements, less bias, and opportunity for further testing and review.

West, Amy
MIGRATORY TRACK FROM A CLIFF SWALLOW AND THE EFFECT OF GEOLOCATORS ON SURVIVAL

In the last decade, geolocators have been implemented to track birds and have provided insights into the migration patterns of small birds not previously available. These devices have been assumed to have minimal impact on survival, although formal survival analyses are often not conducted when geolocators are used. We deployed geolocators on 29 Cliff Swallows and compared their survival rates over two subsequent seasons to 95 birds caught at the same time and site but that had standard aluminum bands only. We found that birds with geolocators had an annual survival probability of 0.07, compared to 0.60 for birds without geolocators. Although this result should be interpreted with caution due to small sample sizes, it suggests that geolocators may affect survival of small aerial species insectivores. We recovered one geolocator with usable data. The migratory track for this bird indicated several interesting phenomena including stopover behavior, more rapid movement in spring than in fall, and significant over-water travel during spring migration.

SUBMITTED VIDEO ABSTRACTS

Ahmed Rahin, Saima
EMPOWERING DISABLED PEOPLE WITH CUTTING-EDGE EXTENDED INTELLIGENCE TECHNOLOGIES

This project explores the transformative potential of eXtended Intelligence (XI) technologies in empowering individuals with disabilities. XI, an evolution of Artificial Intelligence (AI), extends beyond traditional applications by integrating advanced technologies in eXtended Reality (XR) with human capabilities. By leveraging XI, disabled individuals can enhance their autonomy, accessibility, and overall quality of life. This project examines various XI applications, including assistive technologies, adaptive interfaces, and inclusive design principles, that play a crucial role in creating an inclusive and accessible environment for people with disabilities. Additionally, this project is targeting to address the ethical considerations and challenges associated with the widespread adoption of XI in the context of disability empowerment.