Events:
- Oral presentations
- Video competition

What is it? An opportunity for University of Tulsa undergraduate, graduate and law students to gain public speaking experience, learn about research from fields outside their own academic discipline and experience judging methods used by professional organizations for national and international meetings and conferences.

- Research does not need to experimentally based.
- Cash prizes for winning presentations and videos!

For more information:
research-colloquium@utulsa.edu
graduate.utulsa.edu/research-colloquium
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Welcome to the 2022 Meeting of the 25th 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.

**2022 SPONSORS:**
- Office of Research & Sponsored Programs
- Graduate School
- Henry Kendall College of Arts and Sciences
- Collins College of Business Administration
- College of Engineering and Natural Sciences
- Oxley College of Health Sciences
- Tulsa Undergraduate Research Challenge
- Graduate Student Association

**2022 COMMITTEE MEMBERS:**
- Brenton McLaury, Vice Provost for Research & Dean of the Graduate School
- Lori Leonard, Associate Dean of the Graduate School
- Caitlin Getchell, Recruitment and Student Services Specialist
- Bonnie Medlicott, Graduate School Administrative Assistant
- Sai Praveen Adiraju, Student Representative
- Rachel Davis, Student Representative
- Emily Esther, Student Representative
- Kallyn Meyer, Student Representative
- Rosa Zavaleta, 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 25th 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, March 28   8:00 AM - 5:00 PM
- Tuesday, March 29   8:00 AM - 5:00 PM
- Wednesday, March 30  8:00 AM - 5:00 PM
- Thursday, March 31  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.

PRACTICE ROOM
The Administrative Conference Room is reserved as a set-up room for practice during the Colloquium. Access to the practice room is only available during the times the registration desk is staffed.

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.
SPECIAL TOPIC SYMPOSIA

TUESDAY, MARCH 29, 2022
- Global Perspectives and Interdisciplinary Methods: Current Research within TU Anthropology
  (Chouteau C) 1:00 PM – 5:00 PM

GENERAL CONTRIBUTED SESSIONS

MONDAY, MARCH 28, 2022
- Chemical Engineering (Alcove) 8:40 AM – 10:20 AM
- Miscellaneous (Chouteau C) 9:20 AM – 11:40 AM
- General Sciences (Chouteau C) 12:20 PM – 1:40 PM
- Psychology 1 (Chouteau C) 3:00 PM – 4:40 PM

TUESDAY, MARCH 29, 2022
- Biological Sciences 1 (Chouteau C) 8:40 AM – 11:00 AM

WEDNESDAY, MARCH 30, 2022
- Chemistry and Biochemistry 1 (Chouteau C) 8:20 AM – 10:00 AM
- Psychology 2 (Chouteau C) 10:00 AM – 11:40 AM
- Video Competition Viewing (Chouteau C) 12:00 PM – 1:00 PM

THURSDAY, MARCH 31, 2022
- Psychology 3 (Chouteau C) 10:20 AM – 11:40 AM
- Chemistry and Biochemistry 2 (Chouteau C) 1:20 PM – 2:40 PM
- Biological Sciences 2 (Chouteau C) 3:20 PM – 5:00 PM

RESEARCH AWARDS BANQUET
MONDAY, APRIL 4, 2022 (Great Hall C) 5:30 PM – 7:30 PM
SIEGEN/TU SCIENCE SLAM
CONFERENCE AT A GLANCE

TUESDAY, MARCH 29, 2022
- Kick-off Luncheon (invitation only) ........................................................................................................ 12:00 PM – 1:00 PM
- Workshop Liberal Arts and Humanities: Popular Archives/Mobile Archives (Holmes Student Center Multipurpose Room 3155) .......................................................................................................................... 2:00 PM – 3:30 PM
- Discuss with the Deans (invitation only) ...................................................................................................... 4:00 PM – 5:30 PM

WEDNESDAY, MARCH 30, 2022
- Workshop Fine Arts and Education: Music Production for Everybody? Exploring the Gender Digital Divide in Sound Cultures (Holmes Student Center Multipurpose Room 3155) .................................................................................................................. 10:00 AM – 11:30 AM
- Workshop Natural Sciences and Engineering: The Impact of Statistical Analyses, Uncertainty Quantification, and Data Driven Models on Science and Workforce in the 21st Century (Holmes Student Center Multipurpose Room 3155) .......................................................................................................................... 2:00 PM – 3:30 PM
- Science Slam and Award (ACSU, Great Hall A) ............................................................................................ 4:00 PM – 5:30 PM

THURSDAY, MARCH 31, 2022
- Workshop Economics: “German Mittelstand” and the Siegen Approach in Research, Teaching and Transfer (Holmes Student Center Multipurpose Room 3155) ........................................................................................................ 10:00 AM – 11:30 AM
- Workshop Life Sciences: (Digital) Transformation of Healthcare (Holmes Student Center Multipurpose Room 3155) ...................................................................................................................... 2:00 PM – 3:30 PM
- Farewell Reception (invitation only) ............................................................................................................. 5:00 PM – 7:00 PM
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2019 ANNUAL STUDENT RESEARCH COLLOQUIUM
ORAL PRESENTATION
JUDGING CRITERIA

Speaker/Presenter:
Date:
Time:
Room:
20 minute oral presentation (includes 3 - 5 minute question period).

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.

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

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- 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

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- 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.

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- Vocalization, Delivery, and Pose: 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.

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Secondary Criteria

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

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

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Subtotal: ___________

Session Chair: Speaker arrived late for session or left early without permission? (9 point deduction)  YES NO

Total: ___________

Judge’s Name ____________________ Signature ____________________
# 2019 Annual Student Research Colloquium

**Video Presentation Judging Criteria**

**Presenter:**
- Date: 
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CHRONOLOGICAL SUMMARY

MONDAY MORNING, MARCH 28, 2022

CHEMICAL ENGINEERING
Monday, March 28
Allen Chapman Student Union
8:40 AM – 10:20 AM
Level 2: Alcove

8:40 AM Daubert, Donovan
CLATHRATES FOR THE TRANSPORTATION AND STORAGE OF HYDROGEN: CHALLENGE OR SOLUTION?

9:00 AM Davis, Rachel
OPTIMIZATION AND MODELING OF CURING OF RESORCINOL ADDED PHENOLIC RESINS FOR THE FABRICATION OF PREPREGS, A PRECURSOR FOR COMPOSITES TO BE USED IN SOLAR PANEL RECEIVERS

9:20 AM Williams, Stanley
MODELLING OF THE OXIDATION OF MICROVASCULAR CARBON/CARBON COMPOSITES BY SUPER-CRITICAL CARBON DIOXIDE FLOW

9:40 AM Ramasubramanian, Suriya Narayanan
INVESTIGATION OF CORROSION RATE OF BIO-GRAPHENE COATED METALS

10:00 AM Alhejaili, Abdulaziz
EXPERIMENTAL INVESTIGATION OF THE EFFECT OF SALTS ON TBAB SEMICLATHRATE PHASE EQUILIBRIUM: APPLICATION TO PRODUCED WATER DESALINATION

MISCELLANEOUS
Monday, March 28
Allen Chapman Student Union
9:20 AM – 11:40 AM
Level 2: Chouteau C

9:20 AM Isbell, Evan
NITI COMPUTATIONAL ANALYSIS FOR CUSTOM STRUCTURE USE

9:40 AM Esther, Emily
NEW MATERIALS FOR PEROVSKITE SOLAR CELLS

10:00 AM Santos, Gabriel
DYNAMIC MICROSCOPIC STUDY OF WAX DEPOSITION: PARTICULATE DEPOSITION

10:20 AM BREAK
10:40 AM Power, Micheal  
AFFORDABILITY VS. INVESTMENT RETURNS FOR FIRST TIME BUYERS IN RESIDENTIAL HOUSING MARKET

11:00 AM Abhari, Julian  
MOBILE APPLICATION FOR CANCEROUS MOLE CLASSIFICATION USING MACHINE LEARNING ALGORITHMS

11:20 AM McKinney, Jackson  
INVESTORS IN RESIDENTIAL REAL ESTATE

MONDAY AFTERNOON, MARCH 28, 2022

GENERAL SCIENCES

Monday, March 28  
Allen Chapman Student Union

12:20 PM Jackson, Sarah  
RESTORATION PRIORITY OF WELL PADS IN THE PERMIAN BASIN OF WEST TEXAS AND EASTERN NEW MEXICO, USA

12:40 PM Mayberry, Grant  
DIELECTRIC PROPERTIES OF NANOSTRUCTURED ZNO USING IMPEDANCE SPECTROSCOPY

1:00 PM Thapa, Saroj  
LEAD HALIDE PEROVSKITES FOR GREEN LIGHTING TECHNOLOGY

1:20 PM Rathnasekara, Rusiri  
DYE-SENSITIZED SOLAR CELLS (DSSCs) BASED ON NANOSTRUCTURED Ag-DOPED ZnO ELECTRODES

PSYCHOLOGY 1

Monday, March 28  
Allen Chapman Student Union

3:00 PM Hanson, Ava  
REACTIONS TO DIFFERENT TYPES OF ONLINE HARASSMENT

3:20 PM Kegley, Molly and Beker, Kidist  
MATERNAL OXYTOCIN RECEPTOR SINGLE NUCLEOTIDE POLYMORPHISMS ARE RELATED TO BREASTFEEDING

3:40 PM Gentz, Amanda  
JOURNALISTS’ MORAL RESPONSES TO THE COVID-19 PANDEMIC
4:00 PM   Khalid, Neha
IMPLICIT BIAS IN HEALTHCARE

4:20 PM   Steed, Sydney
TEAM DYNAMICS IN MEDICINE

TUESDAY MORNING, MARCH 29, 2022

BIOLOGICAL SCIENCES 1
Tuesday, March 29                      8:40 AM – 11:00 AM
Allen Chapman Student Union            Level 2: Chouteau C

8:40 AM   Gilford, Clark
PROTECTING FRESH FOODS IN 2022: A LOOK AT VIRUSES IN CUCURBIT VEGETABLES

9:00 AM   Ferguson, Connor
AN ANALYSIS ON TOBACCO RINGSPOT VIRUS INFECTING COTTON IN OKLAHOMA

9:20 AM   Chavez, Montserrat
SCREENING FOR A HIGHLY VIRULENT FUNGI INFECTING COTTON FIELDS IN KANSAS

9:40 AM   BREAK

10:00 AM  Hansen Gonzalez, Meadow
A FACTOR REQUIRED FOR CAROTENOID UPTAKE INTO BIRD FEATHERS

10:20 AM  Paslay, Caleb
IDENTIFICATION OF A MAJOR AGRICULTURAL ADVERSARY IN OKLAHOMA AND ITS POTENTIAL IMPACT ON CROP PRODUCTION

10:40 AM  Smith, Dustin
A PROTEIN THAT FACILITATES CAROTENOID UPTAKE INTO AVIAN FEATHERS AND RETINAS
TUESDAY AFTERNOON, MARCH 29, 2022

SPECIAL TOPIC SESSION: GLOBAL PERSPECTIVES AND INTERDISCIPLINARY METHODS: CURRENT RESEARCH WITHIN TU ANTHROPOLOGY

Tuesday, March 29       1:00 PM – 5:00 PM
Allen Chapman Student Union Level 2: Chouteau C

1:00 PM     INTRODUCTION TO THE SESSION

1:05 PM     Valkai, Forrest
THE POTENTIAL FOR USING CERVIDS AS PROXIES FOR PALEOECOLOGICAL RECONSTRUCTION THROUGH STABLE ISOTOPE ANALYSIS: IMPLICATIONS FOR OUT OF AFRICA I

1:25 PM     Rogers, Abigale
PALEOECOLOGY OF THE CAUCASUS IN THE UPPER PALEOLITHIC: USING MICROMAMMALS AS CLIMATE INDICATORS FROM DZUDZUANA CAVE, GEORGIA

1:45 PM     Martinez Galicia, Marco
COST-EFFECTIVE PETROGRAPHIC ANALYSIS OF ARCHAEOLOGICAL CERAMICS: A STUDY CASE FROM THE CASAS GRANDES REGION IN CHIHUAHUA, MEXICO

2:05 PM     BREAK

2:15 PM     Fox, Elizabeth
CHOPPING VERSUS SCRAPPING STONE TOOL CUT MARKS ON ZOOLOGICAL REMAINS: A CONTEMPORARY MODEL FOR HOMINID BUTCHERY PRACTICES

2:35 PM     McGuire, Brooke
FORENSIC WEATHERING AND ABRASION MODELING: A LOOK INTO FORENSIC TAPHONOMY

2:55 PM     Kelley, Kathleen
THE PALEOECOLOGY OF YAHUAI CAVE IN GUANGXI, CHINA AT 120 KYA: IMPLICATIONS FOR EARLY MODERN HUMAN DISPERSAL INTO EAST ASIA

3:15 PM     BREAK

3:25 PM     Cook, Grace
STUDY OF NEANDERTHAL REPRESENTATION IN FICTION

3:45 PM     Miller, Emma
MICROMAMMALS IN THE LEVANT: AN EXPLORATION OF THE LIFE AND DESTRUCTION OF VADUM JACOB
4:05 PM  Schumacher, Emily
CONCEPTUALIZING MILITARY LANDSCAPES AND AN INTRODUCTION TO THE
CASE STUDY OF DANISH ST. CROIX

4:25 PM  Guthrie, Logan
STABLE ISOTOPES FROM RODENT TEETH AS CLIMATE PROXIES FOR LEVANTINE
PALEOECOLOGY

4:45 PM  CLOSING REMARKS

WEDNESDAY MORNING, MARCH 30, 2022

CHEMISTRY AND BIOCHEMISTRY 1
Wednesday, March 30  8:20 AM – 10:00 AM
Allen Chapman Student Union  Level 2: Chouteau C

8:20 AM  Morrison, Aaron
ASSOCIATION OF INTEROCEPTIVE ANTICIPATION WITH CARDIAC TISSUE
SENSITIVITY IN ANXIOUS AND HEALTHY INDIVIDUALS

8:40 AM  Smith, Ellie
CHARACTERIZING THE PHENOTYPIC EFFECTS OF A C. ELEGANS VPS-26
KNOCKOUT STRAIN

9:00 AM  Dierlam, Carter
STUDYING THE EFFECTS OF vps-26 GENE KNOCKOUT ON C. elegans CILIogenesis

9:20 AM  Okolie, Star
SCREENING NATURALLY DERIVED PRODUCTS FOR INHIBITORS OF CANCER
CELL METABOLISM

9:40 AM  Zanders, Levi
EXPANSION OF A SYNTHESIZED LIBRARY OF HETEROARYL N-BENZYL
SULFONAMIDES AND IN VITRO DETECTION OF ANTICANCER ACTIVITY

PSYCHOLOGY 2
Wednesday, March 30  10:00 AM – 11:40 AM
Allen Chapman Student Union  Level 2: Chouteau C

10:00 AM  Stephens, Kyle
THE TIME IS NOW: SCHOOL-BASED MENTAL HEALTH PROGRAMS AND TULSA
PUBLIC SCHOOLS
10:20 AM  Henson, Riley
TECHNOLOGY AND MOTIVATION

10:40 AM  Merchant, Zoey
FRAMING EFFECTS OF PTSD NEWS COVERAGE ON INDIVIDUAL ATTITUDES

11:00 AM  Keith, Madison
EXPERIENCES OF UNIVERSITY EMPLOYEES AFTER A FULL YEAR OF PANDEMIC PROTOCOLS

11:20 AM  Aleti, Vishwasri
DIVERSITY AND INCLUSIVE BEHAVIOR

WEDNESDAY AFTERNOON, MARCH 30, 2022

VIDEO COMPETITION
Wednesday, March 30  12:00 PM – 1:00 PM
Allen Chapman Student Union  Level 2: Chouteau C

12:00 PM  Brown, Rianne
SAMPLE DESIGN OF ADDITIVELY MANUFACTURED TI64 MICROLATTICES

12:05 PM  Caudle, Jenna
DEVELOPMENT OF NEW SYNTHETIC APPROACHES FOR THE INCORPORATION OF SULFONAMIDE UNITS INTO POLYCYCLIC HYDROCARBONS SCAFFOLDS

12:10 PM  Coronado, Rodolfo
FINDING A RELATIONSHIP BETWEEN THE DAMAGE CAUSED BY THERMAL AND MECHANICAL CYCLING OF NITINOL

12:15 PM  Daharsh, Emma
CHARACTERISTICS OF INCLUSIONS AND VOIDS IN NITI

12:20 PM  Dunn, Caroline
SYNTHESIS OF A LIBRARY OF 4-SUBSTITUTED BENZYLCIC N-SULFONYL INDOLE ANALOGS

12:25 PM  Habrock, Jackson
DIC CAMERA ACQUISITION

12:30 PM  Le-Huynh, Kassandra
UNDERSTANDING CRIMINAL SENTENCING IN THE WORLD’S PRISON CAPITAL

12:35 PM  Mathew, Danita
STUDYING THE EFFECT OF MICROCEPHALY ASSOCIATED CAPZA-1 MUTATION ON CENTRIOLE DUPLICATION
12:40 PM McCollum, Perry
ISOBARIC THERMAL FATIGUE OF NITINOL

12:45 PM Moussa, Reema
INVESTIGATION OF THE EFFECT OF ARYL SUBSTITUENTS ON THE BIOLOGICAL ACTIVITY OF N-ALKYL SULFONAMIDES DERIVED FROM POLYCYLIC HYDROCARBON SCAFFOLDS

12:50 PM Patrick, Logan
TU VR NURSING TRAINING SIMULATION

12:55 PM Peasley, Dale
DISCOVERY OF MODIFIABLE SOCIAL FACTORS OF LONGTERM TBI OUTCOME USING STATISTICAL LEARNING

1:00 PM Philo, John
EXPERIMENTAL DETERMINATION OF LIPOPHILICITY VALUES OF A LIBRARY OF POLYCYLIC HYDROCARBON SULFONAMIDES

THURSDAY MORNING, MARCH 31, 2022

PSYCHOLOGY 3
Thursday, March 31 10:20 AM – 11:40 AM
Allen Chapman Student Union Level 2: Chouteau C

10:20 AM Osborn, Seth
IMPORTANCE OF MEASURING TEAM LEARNING PROCESSES AND OUTCOMES ACROSS TIME

10:40 AM Boggs, Jacqueline
WORK DESIGN AND INDIVIDUAL OUTCOMES: EFFECTS OF AGE AND GENDER

11:00 AM Diamond, Pauleen
TRAUMA EXPOSURE, STRESS, AND RESILIENCY AMONG JOURNALISTS IN UKRAINE

11:20 AM Bell, Veronica
INVISIBLE DISABILITIES IN THE WORKPLACE
CHEMISTRY AND BIOCHEMISTRY 2
Thursday, March 31 1:20 PM – 2:40 PM
Allen Chapman Student Union Level 2: Chouteau C

1:20 PM  Cook, Emily
EXTREME ATOMIC-SCALE SURFACE ROUGHENING: AMINO ACIDS ON AG ON AU(111)

1:40 PM  Herndon, Deacon
ELECTRONICALLY MISMATCHED DIELS ALDER REACTION AT ROOM TEMPERATURE IN THE PRESENCE OF LITHIUM PERCHLORATE

2:00 PM  Cole, Tori
3D PRINTED ELECTRODES AND DEVICES FOR ELECTRO-ORGANIC SYNTHESIS

2:20 PM  Hussin, Allison
ELECTRO-ORGANIC SYNTHESIS USING 3D-PRINTED ELECTRODES

BIOLOGICAL SCIENCES 2
Thursday, March 31 3:20 PM – 5:00 PM
Allen Chapman Student Union Level 2: Chouteau C

3:20 PM  Mokhtari, Samira
FINDING GOOD VIRUSES IN A TIME THAT SARS-COV 2 RULES

3:40 PM  McLaury, Lindsay
MICROANATOMICAL DIFFERENCES OF OVIDUCTS IN FIVE SPECIES OF SALAMANDERS

4:00 PM  Blittschau, Benjamin
SURFACE STRAIN AND DAMAGE AROUND INCLUSIONS ON A NITINOL CARDIOVASCULAR-DEVICE-LIKE SAMPLE

4:20 PM  Gonzales, Desirae
VISUAL SYSTEM PLASTICITY IN OKLAHOMA LEPOMIS

4:40 PM  Flusche, Ann Marie
DETERMINING MATCHA TEA’S POTENTIAL FOR FIGHTING CANCER
Anthropology is a diverse discipline, focusing on neither a single time nor place. Within the United States, the discipline is considered a four-field science and subdivided into archaeology, biological anthropology, cultural anthropology, and linguistic anthropology. And though their materials and methods may vary, what unites anthropologists from all fields is their focus: humankind. Anthropologists seek to answer questions about humanity and humans’ closest relatives (living and extinct), such as the environments in which they evolved, the food in which they ate, their ability to create art, and more.

The research presented within this special topic symposium represents only a fraction of the breadth of anthropological research conducted by scholars across the globe and yet demonstrates the time depth of studies within the discipline and the interdisciplinary nature of anthropology as a whole. This session will focus on two fields—archaeology and biological anthropology—showcasing the ongoing contributions of undergraduate and graduate students within the Department of Anthropology to the discipline. Student talks will traverse the globe, featuring research from the Americas, the Levant, the Caucasus, and China. Time will be of no object, with one study aiming to reconstruct paleoenvironments more than 100,000 years in the past while another reaches even further back to 1.8 mya and the era of Homo erectus. Students will shed light on a Templar castle during the Crusades, discuss fictional depictions of Neanderthals in the twentieth and twenty-first centuries, and experiment with weathering and abrasion. Researchers will integrate new and diverse methods from multiple disciplines, such as stable isotopes, petrographic analysis, Geographic Information Systems, and microscopy and textural analysis. They will explore questions at various scales, from the site to the landscape, with bone, ceramics, and other materials. The session will end with closing remarks by Dr. Miriam Belmaker.
SUBMITTED PRESENTATION (ORAL) ABSTRACTS

Abhari, Julian and Nagaraju, Vidhyashree
AN OPEN SOURCE MOBILE APPLICATION FOR CANCEROUS MOLE CLASSIFICATION USING MACHINE LEARNING ALGORITHMS

According to the Skin Cancer Foundation, about two people die every hour from skin cancer, making it an alarming disease for humanity. However, there is hope when it comes to treating skin cancer, as according to the American Cancer Society, 99% of all skin cancer cases are curable if detected early enough. It becomes clear that we need an easy to use, convenient, and reliable way to check our moles for skin cancer and track them over time. We developed a free to use, open source, iOS app that can utilize the powerful cameras and CPU's of smartphones to detect skin cancer using fast yet robust machine learning algorithms. Using a public library of benign and malignant skin images, CreateML software, and various image augmentations, we created a model that achieved a testing accuracy of 85% with precision of 89% for malignant cases and 82% for benign cases. We then added this model to an app we developed that not only classifies images taken with the user’s phone, but also provides features to allow them to learn exactly what the classifier is expecting, save their single analysis for future viewing, build a personal archive of their moles to track change, and compare how their moles align with common skin cancer cases taken from the American Cancer Society

Aleti, Vishwasri and Narayan, Anupama
DIVERSITY AND INCLUSIVE BEHAVIOR

In the organizational literature, diversity has been used to describe the composition of groups or workforces. Diversity encompasses an infinite number of differences that can be perceived in a group; this includes but is not limited to race, gender, age, and nationality (Shemla, et al., 2016). Inclusion, which is needed when there is a diverse group of individuals, is a behavior that comes from three important characteristics: content/satisfaction of those in a group, belongingness as well as uniqueness, and being included in a group (Jansen, et al., 2014). Inclusion is defined as the degree to which employees feel part of essential organizational processes including influence over the decision-making process, involvement in critical work groups, and access to information and resources (Mor Barak, 2008; Roberson, 2006). There are different conceptualizations of management of diversity that incorporate the definitional distinction between diversity and inclusion. The purpose of this presentation is to showcase the importance of inclusive behaviors in a group setting. This will be done by understanding the complexities of inclusion, reviewing literature and research that have been written and conducted, and explaining future implications of this topic in team settings.

Alhejaili, Abdulaziz and Daraboina, Nagu
EXPERIMENTAL INVESTIGATION OF THE EFFECT OF SALTS ON TBAB SEMICLATHRATE PHASE EQUILIBRIUM: APPLICATION TO PRODUCED WATER DESALINATION

Produced water (PW) is the water associated with crude oil production. It presents a substantial environmental and economic problem in the oil and gas industry. Currently, the landfill is the primary disposal method. However, due to stringent environmental regulations, produced water needs to be treated before disposal. Hydrate based produced water desalination is a promising technology for treatment. Currently, there is an ongoing effort to identify a suitable hydrate former that can enhance the kinetics and lower operating conditions. In this study, the use of tetra-butyl ammonium bromide (TBAB) as a hydrate former for water desalination was investigated, the phase equilibrium of TBAB hydrate was obtained at different concentrations of TBAB using the dominant salts in produced water. While sodium chloride, calcium chloride, and magnesium chloride suppress the equilibrium temperature of TBAB hydrate, sodium sulfate has minimal effect. Despite the decrease in the equilibrium temperature, TBAB looks promising for produced water desalination using novel hydrate technology.
INVISIBLE DISABILITIES IN THE WORKPLACE

Disability as defined by WHO (2001, p.221) is “the umbrella term for impairments, activity limitations and participation restrictions”. It is a disability both in the context of the individual’s condition as well as contextual factors that disable them (WHO, 2001). Disability, then, is a term used for body or functional impairments, activity and capacity limitations, and participation restrictions (Vormholt et al., 2017) and can be visible or invisible. Invisible disabilities are those that can’t be directly seen and may have visible characteristics that can’t necessarily be tied to a disability (Santuzzi et al., 2014). Further, invisible disabilities can be physical (e.g., chronic pain, autoimmune disorders) and psychological (e.g., ADHD, anxiety, depression, and PTSD; Santuzzi et al., 2014). As they are disabilities, they often cause distress or affect a person’s daily life. This includes in the context of the workplace. Workers with invisible disabilities face unique challenges. This includes lower employment rates, discrimination in hiring, and stigmas around their disabilities (Dalgin & Bellini, 2008). The purpose of this presentation is to highlight some key research findings, practical implications, and areas for future research with specific focus on the topic/area of invisible disabilities.

SURFACE STRAIN AND DAMAGE AROUND INCLUSIONS ON A NITINOL CARDIOVASCULAR-DEVICE-LIKE SAMPLE

Nitinol is the primary material of choice for many medical implants. Due to its shape memory and super elastic properties, it makes a great choice for implants. Applications include orthodontic wires, orthopedic implants, colorectal surgery, and most famously, heart stents. These stents are placed in a blocked artery to expand it and restore the flow of blood. These cardiovascular implants are a common treatment for ischemic heart disease, the leading cause of death worldwide. The quest for a fatigue resistant nitinol implant has been going on for decades, but “follow-up procedures show stent fracture rates of up to 52% with some stent designs and nitinol source material” (Pelton 2019). My research goal is to further this quest.

First, digital image correlation was used to observe the surface strain field for the device at prescribed deformations. A speckle pattern of black specks on a white is painted onto the sample using an airbrush. Then, the sample is attached to the grips of a fatigue tester. A FLIR camera is placed in front of the sample, which will be illuminated by low heat lights. The sample is displaced 0.1mm per picture taken until it reaches maximum 4.0mm displacement. These pictures are analyzed with computer software that tracks the displacement of each speck on the sample during displacement. The maximum displacement is the maximum strain on the device. In the next step of my project, I will use scanning electron microscopy to track the opening of inclusions after prescribed fatigue cycles.

WORK DESIGN AND INDIVIDUAL OUTCOMES: EFFECTS OF AGE AND GENDER

Demographic changes within the workforce have become increasingly important in most western-industrialized countries (Peeters & Groot, 2012), the rising over the workforce average age poses challenges for human resource practitioners and the implications of potential interventions requires more exploration. This research suggests that organizations can work to deal with this increasingly age diverse workforce by creating a positive, inclusive age climate (e.g., Boehm et al., 2014). Although understanding the moderating effects of age is, in itself, important, we recognize that our beliefs about aging are inherently gendered (Ainsworth, 2002) because gender definitions are conceptualized by culture (Bauer, 2014) and stereotypes related to aging women and aging men differ (Altilio & Mills, 2002). Some have contended that the relationship between age and gender cannot and should not be treated as separate because “older people are not just old, they are either men or women” (McMullin et al., 1995, p. 36). Therefore, we seek to better understand how/if the intersection of employee gender and age identities influences the relationship between job design related age-inclusive human resource practices (AIHRP) and critical employee outcomes (e.g., satisfaction, engagement, perceptions of inclusion) based upon their
intersectional age/gender identities. This presentation will discuss the current literature and a model for testing and understanding these relationships.

**Chavez, Montserrat; Mokhtari, Samira; and Ali, Akhtar**

**SCREENING FOR A HIGHLY VIRULENT FUNGI INFECTING COTTON FIELDS IN KANSA**

Soil-born fungal pathogens often cause wilt in cotton plants, depleting crop yield significantly, and thus the revenue of the multibillion-dollar cotton industry. Strains of fungi can be resistant to antifungal measures, making the specification of fungi found in crops of particular interest. Given plant wilting observed in Kansas cotton fields, we suspect that there are highly virulent races of fungal species previously unidentified in this area. Samples collected from the Kansas cotton fields were processed and surface sterilized. To obtain the fungal isolates, the samples were placed on growth media. The morphology of fungal cultures was observed, and DNA was extracted from fungal isolates. Polymerase chain reaction (PCR) was performed using specific primers previously associated with races of known fungi species. Sanger sequencing was performed on PCR products at the University of Tulsa. The results of sequencing indicate that collected cotton samples from Kansas are infected with unreported fungal races. The findings will raise awareness of the specific fungal pathogens infesting Kansas cotton fields for countermeasures and follow up research.

**Cole, Tori; Hussin, Allison; and LeBlanc, Gabriel**

**3D PRINTED ELECTRODES AND DEVICES FOR ELECTRO-ORGANIC SYNTHESIS**

3D printing is a rapid prototyping technique that allows for unique designs to be quickly developed for a wide variety of applications. Due to the ability to quickly share the digital designs and the availability of 3D printing hardware, the application of 3D printing for scientific research has grown rapidly. Because of the unique geometries involved in many electrochemical devices and the rapid rise of electrochemistry in organic synthesis, we are interested in studying how 3D printing can be used to facilitate the integration of these to chemical fields. In this research project 3D printed objects were made from natural and composite plastic materials to serve as both the electrode and the electrochemical device for use in proof-of-concept synthetic reactions. This project specifically focused on how the geometries of the 3D printed devices could increase the effective surface area to lower the required time for the reaction to proceed. Additionally, electrochemical devices were prepared to facilitate the activation process for 3D printed electrodes to allow for larger electrodes and shorter reaction times.

**Cook, Emily; Boyd, Kennedy; Paszkowiak, Maria; and Iski, Erin**

**EXTREME ATOMIC-SCALE SURFACE ROUGHENING: AMINO ACIDS ON Ag ON Au(111)**

Surface modification has been noted for its applications in solar cell production, microelectronics, and biosensor development. Thin films can alter a surface using a small amount of material and often have unique properties due to their thinness. Previous studies using electrochemical scanning tunneling microscopy (EC-STM) demonstrate atomically thin Ag films deposited with underpotential deposition (UPD) on Au(111) result in a thermally stable Ag layer at 1,000 K. Furthermore, the thin film properties can be controlled by varying the UPD potential at which the Ag is deposited. Another interesting system of study is amino acids on Au(111). EC-STM experiments demonstrated that the amino acids form monatomic Au islands whose area increases as a function of amino acid molecular weight. Upon increasing the surface temperature, these islands also increase in area and height.

To better understand the properties of Ag thin films, amino acids were used to probe their chemical stability. L-isoleucine on Ag on Au(111) resulted in drastic layer-by-layer surface roughening encompassing many layers of the metal. This interaction was especially interesting since similar studies on bare Au only resulted in growth on top of the surface, rather than the growth into and out of the surface in this system. It is hypothesized that the Ag layer alters the surface chemistry to allow the amino acids to chelate metal atoms and remove them into solution or move them across the surface to promote
extreme roughening. While surface roughening generally requires harsh conditions, amino acids on Ag can serve as a mild electrochemical method for modifying surfaces.

**Cook, Grace**

**NEANDERTHAL REPRESENTATION IN FICTION**

For many years Neanderthals in fiction were often introduced as “monstrous beings” or more “primitive” than modern humans; modern paleoanthropological research, however, indicates otherwise. In this study, I compare the portrayal of Neanderthals in works of fiction to what is known in the scientific literature. I focus specifically on Neanderthal representation in fiction from 1978 to 2017 through three main categories: how they are portrayed creating and using fire, if they are portrayed wearing material clothing or not, and how their physical appearances are depicted. The works that this presentation will be discussing are Dance of the Tiger by Björn Kurtén (1978), Clan of the Cave Bear by Jean M. Auel (1980), Neanderthal by John Darton (1996) and The Last Neanderthal by Claire Cameron (2017), and one film, Quest for Fire that was made in 1981. Through an analysis of these fictional works, this study will highlight key cultural and societal influences of the time and how these factors shaped the portrayal of Neanderthals in the novels compared with what is known scientifically about Neanderthals.

**Daubert, Donovan; Alhejaili, Aziz; and Daraboina, Nagu**

**CLATHRATES FOR THE TRANSPORTATION AND STORAGE OF HYDROGEN:**

Most of the energy produced in the world comes from fossil fuels, which are a leading contributor to climate change. Alternative fuel sources are considered to make energy sustainably. Wind, solar, and hydroelectric energy are currently the primary forms of alternative energy but are insufficient. This led researchers to explore another, more efficient form of fuel: Hydrogen. Utilizing hydrogen safely and effectively for humanity’s energy needs would unlock a potentially limitless fuel source. Additionally, hydrogen consumption is environmentally friendly, as the only byproduct is water. However, using hydrogen by itself is still unsafe and would require long-term infrastructure changes to be implemented as a primary fuel source. To mitigate this problem, hydrogen can be blended into preexisting natural gas lines as a vehicle for transportation. Recently, gas hydrates have shown promise to transport and store these mixtures. To implement such changes the rheological properties of hydrates need to be determined. This study will investigate the effect of hydrogen addition on the rheological characteristics of natural gas hydrate. Such data would pave the road for enhancing natural gas with hydrogen to increase its energy and lower its carbon footprint.

**Davis, Rachel; Cordeiro, Jose; Ramsurn, Hema; Keller, Michael; Otanicar, Todd; and Crunkleton, Daniel**

**OPTIMIZATION AND MODELING OF CURING OF RESORCINOL ADDED PHENOLIC RESINS FOR THE FABRICATION OF PREPREGS, A PRECURSOR FOR COMPOSITES TO BE USED IN SOLAR PANEL 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 carbon precursors 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. Synthesis 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. Voids formed within the composite by the release of vapors during curing of the phenolic resin limits the strength of the final composite. This work centers on the fabrication of the prepreg, which includes curing the phenolic resin around the carbon fiber structure. The addition of resorcinol is investigated because it decreases curing times. The curing kinetics of the phenolic resin with and without resorcinol is characterized and optimized.
through kinetic models and Differential Scanning Calorimetry (DSC) analysis. Prepregs are then evaluated in terms of the void content using optical microscopy.

Diamond, Pauleen and Newman, Elana

TRAUMA EXPOSURE, STRESS, AND RESILIENCY AMONG JOURNALISTS IN UKRAINE.

Journalists experience occupational demands that increase their exposure to potentially traumatic events (PTE) which may elevate their risk of burnout and posttraumatic stress disorder (PTSD). Prior research suggests that journalists are particularly resilient, however factors such as trauma exposure and occupational stress can affect their well-being and level of resilience. Journalists in emerging democracies, such as Ukraine, may be at an increased risk of burnout due to the added stress that can be accompanied by reporting in areas where freedom of the press is still under threat. Ukrainian journalists also face an increased risk of PTSD due to the sensitive political environment and misinformation campaigns that has elevated their exposure to surveillance, persecution, harassment, doxing, and other threats. Resiliency, burnout, and PTSD in journalists has been explored in prior research. However, less is known about how factors such as exposure to potentially traumatic events, level of control over certain work duties, attending safety trainings, alcohol use, and job satisfaction affect resiliency, burnout, and PTSD in journalists in emerging democracies, such as Ukraine. To analyze these factors, Ukrainian journalists are being recruited to complete an online survey of validated measures. Back-and-forth translations between English and Ukrainian were conducted using professional translators to create the survey. Given that data collection is still underway, and 29 more subjects are needed for sufficient power to run analyses, at minimum, preliminary descriptive information about exposure, work conditions, job satisfaction, alcohol use, resiliency, burnout, and PTSD on this population of journalists will be presented.

Dierlam, Carter and Iyer, Jyoti

STUDYING THE EFFECTS OF vps-26 GENE KNOCKOUT ON C. elegans CILIogenesis

The VPS26 gene plays an important part in the retromer complex in humans, which helps manage endosomal cargo. While it makes up part of the “core” of the retromer, there is not much known about the VPS26 gene. Caenorhabditis elegans (C. elegans) are microscopic worms that have many same genes as humans. Since the vps-26 gene is conserved between C. elegans and humans, we decided to use C. elegans as a model to study the function of this gene. Specifically, we utilized CRISPR/Cas9 genome editing to knockout the vps-26 gene in C. elegans. To confirm the mutation had been successfully introduced, PCR, restriction digest, and gel electrophoresis was performed after the mutated worms had produced progeny. Data from human studies indicate that VPS-26 is involved in ciliogenesis. Ciliogenesis is the process of generating cilia, which are hair-like projections that are involved in sending signals in the cell. Upon generating vps-26 knockout worms, we introduced a green fluorescent protein-tagged ciliary marker protein into this strain to visualize the cilia. We found that the depletion of vps-26 reduced the trafficking of proteins into the cilium. Therefore, like in humans, VPS-26 may also play a crucial role in ciliogenesis in worms.

Esther, Emily

NEW MATERIALS FOR PEROVSKITE SOLAR CELLS

Perovskite solar cells are some of the highest efficiency solar cells being studied by the research community. Perovskite solar cells have been shown to have an efficiency of over 25%. Unfortunately, perovskite solar cells are very unstable. Perovskite cells are susceptible to many things including moisture, high UV light, and excessive heat. High-efficiency perovskite cells are made from materials that include lead (Pb). As the perovskite cells become unstable, lead toxicity is released into the environment. Solar energy is meant to have a positive impact on the environment, but the instability and toxicity of high-efficiency perovskite cells keep them from being introduced commercially. Many researchers have focused on encapsulating the solar cells and altering the design of the perovskite cell itself, but this presentation will focus on research on replacing the lead in the material compound. The presentation will focus on three alternative materials that
replace lead in perovskite cells. The material and optical properties will be compared and discussed including bandgap energy and absorption coefficient.

**Ferguson, Connor and Ali, Akhtar**  
**AN ANALYSIS ON TOBACCO RINGSPOOT VIRUS INFECTING COTTON IN OKLAHOMA**

Cotton (Gossypium hirsutum L) is an important cash crop grown on 11.5 million acres nationally and almost half a million acres in Oklahoma in 2021. Oklahoma is the sixth largest cotton producer in the United States (US) and borders on other major cotton producing states such as Texas, Kansas, and New Mexico. A series of viruses have previously been reported infecting cotton including Cotton leafroll dwarf virus and viruses associated with Cotton Leafcurl Disease. During a survey of a grower’s field in Beckman County, typical virus-like symptoms such as yellowing, shortened internodes, and discoloration were noted. Thirteen symptomatic samples were brought back to the University of Tulsa where RNA was extracted followed by screening with Reverse Transcription-Polymerase Chain Reaction which failed to account for all of the symptomatic samples. Illumina High Throughput Sequencing at the Oklahoma State University Genomic Facility was performed on unknown samples to determine potential viral infection. After sequencing analysis was conducted, four nearly complete genomes of Tobacco Ringspot Virus (TRSV) were extracted from the symptomatic samples. To our knowledge, this represents the first natural infection of TRSV in cotton globally. NCBI BLAST analysis as well as MEGA-X phylogenetic analysis of the TRSV genomes indicated closest similarity to other TRSV isolates reported in the US. Further analysis will be required to determine potential specific genetic changes that allowed for the virus to infect cotton even when previous artificial attempts failed.

**Flusche, Ann**  
**DETERMINING MATCHA TEA’S POTENTIAL FOR FIGHTING CANCER**

Matcha green tea is recognized for its potential antioxidant and weight loss properties. Recently, a study followed the metabolic effects of Matcha on breast cancer cells. The results showed that Matcha reduces mitochondrial metabolism, as well as glycolysis, maintaining cancer cells in a metabolically quiescent state. However, the underlying molecular mechanisms behind its proposed effects remain largely unknown. Our lab discovered that metabolic pathways utilized for cancer survival are inhibited when Matcha is present. In addition, Matcha targets metabolism by blocking hexokinase phosphorylation of glucose, leading us to hypothesize that Matcha’s anti-cancer activity may be due to inhibition of glucose metabolism. Immortalized cancer cells are glucose addicted, utilizing aerobic glycolysis (Warburg effect) to produce sufficient ATP. To test our hypothesis, we cultured HEK – 293 cells (which follow the Warburg effect), varied the growth media composition to force use of specific metabolic pathways, incubated the cells with varied Matcha concentrations, and measured Adenosine Triphosphate (ATP) production using the CellTiter GloTM Assay. We observed a dose-dependent decrease in ATP production when media with glucose and Matcha was introduced, but we saw no effect when the cells were treated with the galactose media and Matcha. Our results suggest that Matcha is a positive inhibitor of ATP production in cancer cells by targeting glucose metabolism, which may be important to understanding the novel therapeutic potential of Matcha in chemotherapy treatment. In the future, we plan to identify the component that is inhibiting hexokinase as well as test our work in tissue-specific cancer cell cultures.

**Fox, Elizabeth**  
**CHOPPING VERSUS SCRAPPING STONE TOOL CUT MARKS ON ZOOLOGICAL REMAINS: A CONTEMPORARY MODEL FOR HOMINID BUTCHERY PRACTICES**

The goal of this study is to address the hominid hunting vs. scavenging debate. In recent years, the long-accepted theory that hominids were hunters has been challenged by those who believe they used a passive scavenging approach for meat acquisition. It has been suggested that rather than actively seeking out animals to kill and butcher, hominids foraged for animal carcasses and removed the leftover meat from previous carnivore activities. It is argued that two types of stone tool
cut marks may be seen on zoological remains depending on the meat acquisition strategy that was used by hominids. In the case of hunting, chopping marks would be seen on the long bones as a result of limb disarticulation. However, in the case of passive scavenging, the bones would exhibit scraping marks as a result of the removal of small amounts of leftover tissue. There is little previous exploration into the microstructures of chopping and scraping marks. In order to assess the possible morphological differences between the two, an experimental approach is employed in which the stone tool cut marks on the long bones of an experimentally butchered bison are examined. This study utilizes Sensofar confocal microscopy in order to determine textural differences of chopping and scraping marks.

Gentz, Amanda and Newman, Elana

JOURNALISTS’ MORAL RESPONSES TO THE COVID-19 PANDEMIC

Ethical issues related to racial/economic equality, governmental oversight, personal safety, and individual autonomy raised during the COVID-19 pandemic may negatively impact mental health. Journalists may be particularly susceptible to adverse pandemic-related psychological outcomes since they document pandemic-related death, economic disadvantage, problematic policies, lack of preparedness, and marginalization. Thus, exposing journalists to such morally egregious situations may result in adverse mental health outcomes. Such situations may result in moral injury reactions (MI), negative reactions to morally injurious events (witnessing/perpetrating moral violations or betrayal by authority). Journalists may also experience moral outrage reactions, anger that arises from witnessing a 3rd party’s actions harm an individual. However, little research examines journalists’ experiences during the pandemic. In the current descriptive study, journalists’ experiences with the pandemic, moral injury reactions, moral outrage reactions, and posttraumatic stress disorder (PTSD) symptoms were examined.

A sample of 157 working journalists, on average, experienced 18.75 types of pandemic effects (range=2-40). The most prevalent events were increased workload, limited contact with loved ones due to fear of infection, and impacts on physical health (e.g., less physical activity, less medical attention). On average, journalists seldom experienced morally injurious events (M=2.39, SD=.75, range=1-5) but highly endorsed moral outrage (M=4.48, SD=.69, range=1-5). Further, 36% indicated PTSD symptoms severe enough to likely meet criteria for diagnosis. These results suggest journalists commonly experienced moral outrage reactions and PTSD symptoms during the pandemic. Further research is needed to understand how moral reactions relate to mental health outcomes.

Gilford, Clark; Fripp, Rebecca; and Ali, Akhtar

PROTECTING FRESH FOODS IN 2022: A LOOK AT VIRUSES IN CUCURBIT VEGETABLES

The damages caused by plant viruses is severe, impacting the economy by billions of dollars per year. The purpose of our research is to update viral infection of crops across Oklahoma, screen viruses against plants to ascertain susceptibility, and discover viruses that either have new occurrence in this state or that have not been reported anywhere.

The methods we use mechanical inoculation, total ribonucleic acid (RNA) extraction, deoxyribonucleic acid (DNA) extraction, specific reverse transcription/polymerase chain reaction (RT/PCR), gel purification, ligation, transformation, plasmid extraction, Illumina sequencing, Sanger sequencing, virus-like particle (VLP) extraction, agarose gel electrophoresis, SDS PAGE gel electrophoresis, rolling cycle amplification. We have screened field samples from various regions of Oklahoma for three Potyviruses: Papaya ringspot virus (PRSV), watermelon mosaic virus (WMV), and zucchini yellow-mosaic virus (ZYMV). There are a total of 81 samples, 42 of which tested positive for at least one virus. Diagnostic confirmation comes by gel electrophoresis, though we will sequence for final confirmation. We have been maintaining inoculum plants for select field samples. At least one plant appears to have unique mosaic symptoms and unique electron microscopy images. We have finished varietal screening for 15 plants (5 pumpkin, 5 squash, 5 watermelon) with varying susceptibility. With assistance from Ms. Fripp, 9 more are underway, and we aspire to screen an additional 36 varieties by the end of the spring. New viruses are also being investigated.
Gonzales, Desirae and Toomey, Matthew
VISUAL SYSTEM PLASTICITY IN OKLAHOMA LEPOMIS

Vision plays a central role in the lives of many fishes: guiding foraging, predator avoidance, mate choice, and other essential behaviors. Effective and reliable vision in the aquatic environment is challenging because the spectrum and intensity of light can vary dramatically among habitats. Many fish have evolved mechanisms of visual system plasticity (retinoid switching) that are hypothesized to accommodate variations in the light environment by changing photoreceptor sensitivity. Retinoids are a key determinant of visual sensitivity and switching from an A1 to an A2 retinoid shifts the sensitivity of the visual system toward longer (red) wavelengths of light. The goal of my project was to determine if and how sunfish (Lepomis) adjust their visual sensitivities to accommodate the light environments of local Oklahoma creeks. To do this, I sampled sunfish from three locations that varied in the spectrum and intensity of ambient light, collected eye tissue, and used high-performance liquid chromatography to analyze the retinoid composition of the eyes. Despite wide variation in the light environment, all the fish analyzed used only the A2 retinoid in their visual systems. This contrasts with other species that inhabit the same waters (e.g. red shiners) that show considerable variation in A1 and A2 retinoid usage. These differences might reflect difference in eye size and diet. Red shiners tend to have smaller eyes and are omnivorous, while sunfish have relatively large eyes and are carnivorous.

Guthrie, Logan
STABLE ISOTOPES FROM RODENT TEETH AS CLIMATE PROXIES FOR LEVANTINE PALEOEKOLOGY

Recent studies indicate that Neanderthals and modern humans may have both been equally adapted for a wide range of habitats and environments. This research is the first time that rodents have been used as proxies for climate change to reconstruct the paleoenvironment of the Levant during the Middle Pleistocene at the four archaeological sites of Rantis, Hayonim, Amud, and Mughr El Hamama. This lends new paleoecological data in hopes of better understanding interactions between the two hominin species. Forty samples were chosen from each site (10 per site), and preserved using stereoscopic microscope images before being destroyed in the analysis, identifying species for each mandible or set of teeth chosen. Species identified included the levant vole, mouse, and squirrel. After cataloging all of the samples through stereo microscopic images, each sample was sent to the University of Arkansas for a carbon and oxygen stable isotope analysis. The results from each site were compared to each other as well as modern isotope results in the Levant using statistical models. These preliminary results indicate that these rodents consumed primarily a diet of C4 plants, indicating a cold environment, in contrast to the C3 plants that are found in the Levant today. It seems that the Levant during the Last Glacial was a cold and dry environment, with modern humans and Neanderthals living as separate groups in different habitats 160,000 years ago, but began to live in common groups sometime by 45,000 years ago.

Hansen Gonzalez, Meadow; Carneiro, Miguel; and Toomey, Matthew
A FACTOR REQUIRED FOR CAROTENOID UPTAKE INTO BIRD FEATHERS

The bright plumage color of birds is a celebrated example of biological diversity, yet we are only beginning to understand the genetic and biochemical mechanisms of color expression. Much of the red, orange and yellow plumage of birds is produced through the metabolism and deposition of diet-derived carotenoid pigments. We have investigated a unique color variant of the domesticated canary (Serinus canaria) called the white dominant canary. Typical canaries have brilliant yellow carotenoid-pigmented plumage, but the white dominant canary is pure white and their feathers largely lack carotenoids indicating that this breed harbors a defect in the uptake of carotenoid pigments into the feathers. Through whole genome resequencing, we have identified a mutation in a member of the ATP-binding cassette transporter gene family that is associated with the white dominant phenotype. We will present studies investigating the specific functional role of this transporter in feather-specific carotenoid coloration.
Hanson, Ava; Slaughter, Autumn; and Newman, Elana  
REATIONS TO DIFFERENT TYPES OF ONLINE HARASSMENT

Online harassment (OH) has detrimental consequences on wellbeing. Types of OH have been classified across a severity continuum, based on poorly explained theory and limited quantitative data, from least to most severe, respectively as: (1) offensive name-calling, (2) purposeful embarrassment, (3) passive threat, (4) vague threat, (5) specific threat, (6) sexual harassment, and (7) sustained harassment. However, to our knowledge, no researchers have examined if these proposed differences in severity translate to differences in the reactions experienced by victims. The present study explores if victims’ emotions and appraisals of OH vary by OH type. We hypothesize that more severe forms of OH will predict higher rated, or more intense, reactions. Ninety undergraduates rated their reactions (perceived threat, perceived harm, and negative affect) in response to different types of OH fake tweets. ANOVA results indicated a statistically significant effect of OH type on endorsed ratings of perceived threat, perceived harm, and negative affect. Tweets depicting purposeful embarrassment, vague threat, specific threat, and sexual harassment produced highest ratings of perceived threat, perceived harm, and negative affect. Results indicate that there are differences in responses to different types of OH. Pairwise comparisons showed that purposeful embarrassment produced a higher sense of threat ($p = .01$) than sustained harassment, the most severe form of harassment. Therefore, unlike previously thought, purposeful embarrassment may be a more severe classification of OH than sustained harassment. Future research should consider theoretical models and empirical investigation for understanding OH severity.

Henson, Riley and Narayan, Anupama  
TECHNOLOGY & MOTIVATION

In response to the changing socio-economic context, the nature of work and education is rapidly changing with the influx of new digital technologies (Trenerry et al., 2021). This rapid advancement has raised questions about the effects of these changes on human outcomes such as motivation, learning, well-being, and performance in various contexts. Despite increasing academic attention on how technology is affecting tasks and occupations (e.g., Schwab, 2015), there is less understanding of how humans (e.g., students and workers) can effectively and timely adapt to these technological changes. A primary focus, then, is to understand what we know from existing research to help understand how to best equip humans to handle such technological changes and be effective in their lives. Thus, in this presentation, I will provide an overview of technology, specifically relevant for school and work environments, by focusing on the concept of virtuality and widely used models/theories of technology and human interactions. Other than reviewing some existing literature, I will further provide implications of these findings for science and practice.

Herndon, Deacon  
ELECTRONICALLY MISMATCHED DIELS ALDER REACTION AT ROOM TEMPERATURE IN THE PRESENCE OF LITHIUM PERCHLORATE

According to frontier molecular orbital (FMO) modeling, the Diels Alder (DA) coupling reaction requires the electronic matching of substrates to proceed. This is to say, one substrate must contain an electron-donating group, and the other must contain an electron-withdrawing group. This requirement limits the substrate scope of the DA reaction, and past efforts to overcome this challenge have been arduous. However, the Hussaini lab has observed the electronically mismatched coupling of dienes and dienophiles in the presence of lithium perchlorate at room temperature in nitromethane. At this time, the mechanism of this reaction is unknown. As such, we will be presenting our mechanistic hypotheses and initial findings regarding our investigation of this reaction.
Hussin, Allison  
**ELECTRO-ORGANIC SYNTHESIS USING 3D-PRINTED ELECTRODES**  

Introduction: Electro-organic synthesis is a very promising field of research, with the use of electricity allowing experiments to be carried out in a safer, inexpensive, more controlled way. However, many challenges face this line of work, such as the expensive equipment needed, rigid electrodes used for experiments, and limited reaction area. 3D printing can help alleviate some of these issues by offering more flexibility in the design and utilization of electrodes.

Aims: The aims of this work were to determine the best activation methods to maximize the efficiency of 3D-printed electrodes as compared to standard glassy carbon, gold, or silver electrodes and to prove these 3D-printed electrodes can carry out a synthesis reaction.

Methods: Electrodes were soaked in KCl, NaOH, and NaBH4 at differing times and concentrations. Chronoamperometry experiments were carried out to determine the optimal activation method by measuring end current values. The ACT-mediated electrochemical oxidation of solketal was used as a proof-of-concept reaction for electro-organic synthesis. Synthesis trials were carried out using both a potentiostat and ElectraSyn device. Reaction products were characterized using 1H-NMR.

Results and Conclusion: Electrodes activated using a battery-powered 1M KCl method over a 24-hour period had the highest end current after multiple trials; a 1-hour 4M NaOH soak showed similar results. All activation methods had higher end currents as compared to unactivated electrodes. Further synthesis trials are still being carried out in our laboratory.

Isbell, Evan  
**NITI COMPUTATIONAL ANALYSIS FOR CUSTOM STRUCTURE USE**  

This summer was my second doing TURC research. My second project was initiated by my interest in shape memory alloys (specifically NiTi). These metals can carry large stresses, like other metal alloys, but can also bend and spring back like rubber. I used its interesting properties to attempt to create a custom material model using a user material subroutine to utilize NiTi in the software, ANSYS. I did this by using ANSYS’s custom coding language and Fortran. However, I was not entirely successful. We decided to continue onwards anyways.

Currently, I am constructing a NiTi tube that utilizes multiple buckling instances. I used Solidworks, Excel, and MATLAB to optimize the dimensions of the columns using previous work and column slenderness ratios. When the samples based on this research come in I will attempt to create a buckle-unbuckle-buckle phenomena. A phase change can occur under enough stress and if buckling occurs at this phase change, then the model will recover and unbuckle, then proceed to buckle under further strain. This model is made accurate by use of truss structuring techniques accompanied by imperfections inputted manually in the computational analysis.
Jackson, Sarah; Field, Cameron; and Li, Junran

RESTORATION PRIORITY OF WELL PADS IN THE PERMIAN BASIN OF WEST TEXAS AND EASTERN NEW MEXICO, USA

In the Permian Basin of West Texas and Southeastern New Mexico, many well pads have been produced from the exponential growth of oil and gas activity since the start of the shale revolution. These well pads and associated access road and pipeline construction consume 3 to 7 acres of land for every well pad constructed. Well pad restoration is viewed as the most effective solution to reversing the environmental impact associated with their construction. The objective of this study is to develop a method of determining where restoration efforts should be prioritized in the Permian Basin. Factors we considered include land cover/use, soil fragility index, wind erodibility index, hydrological soil groups, K-factor, spatial density, and proximity to surface hydrography. Each factor has its own score distribution produced from normalized and scaled data values, and a weighting factor incorporates these components into a restoration priority equation to produce a total score. This equation is applied to a dataset of over 10,000 wells in the Permian Basin, and statistically analyzed to determine the equation’s effectiveness. Final scores ranged from 35.2-133.5 for this dataset, and well pads with restoration priority scores ≥103 (exceeding 1.5 standard deviations from the mean) are identified as a high restoration priority group. Similar median and average final priority scores and a small negative skew of -0.1437 indicate the distribution is close to perfectly normal, indicating an effective equation. Priority scores are mapped using GIS software, revealing that well pads in high restoration priority classes occur in discrete clusters.

Kegley, Molly; Beker, Kidist; Swanson, Alexis; Aubuchon-Endsley, Nicki; and Saltmiras, Isabella

MATERNAL OXYTOCIN RECEPTOR SINGLE NUCLEOTIDE POLYMORPHISMS ARE RELATED TO BREASTFEEDING

Oxytocin is a hormone released by the pituitary gland to increase contractions and stimulate the production of milk in women. The hormone also triggers the bond between a mother and an infant and may also play a role in empathy, stress, and trust. Recent studies have investigated genetic differences in the oxytocin receptor (OXTR) gene in relation to early mother-infant interactions with mixed results. The current study used a US sample gathered from the Infant Development and Healthy Outcomes in Mothers (Idaho Mom Study) to examine relationships between breastfeeding and multiple OXTR gene SNPs (rs53576, rs2254298, rs1042778). Using real-time quantitative PCR (qPCR) for genotyping, SNPs were extracted from saliva samples collected from pregnant women (n=106) between 33-37 weeks gestation. A modified version of the Pregnancy Risk Assessment Monitoring System (PRAMS) was given at 6, 10, 14, and 18 months postpartum to determine breastfeeding presence and frequency. For each SNP, four Chi-Square Tests of Association and four ANOVAs were conducted to examine maternal allelic variability in relation to breastfeeding. Regarding breastfeeding presence, more women heterozygous for rs1042778 (χ²(1)=3.86; p=.049) and rs53576 (χ²(1)=5.56; p=.018) breastfed at 6 months and this pattern persisted through 18 months for women heterozygous for rs53576 (χ²(1)=5.88; p=.015). In terms of breastfeeding frequency, women heterozygous for rs1042778 breastfed more frequently at 10 months than those homozygous for rs1042778 (F(2,26)=5.36, p=.012). These results indicate that some maternal OXTR gene SNPs are related to long-term breastfeeding behavior, with heterozygous women engaging in more breastfeeding.

Keith, Madison; Gentz, Amanda; Newman, Elana; and Ragsdale, Jennifer

EXPERIENCES OF UNIVERSITY EMPLOYEES AFTER A FULL YEAR OF PANDEMIC PROTOCOLS

Due to the COVID-19 pandemic, higher education faced an uncertain future as educational delivery and university services pivoted online. In the face of ongoing stressors caused by these changes, university employees may have experienced distress or may have adapted and learned to cope with these challenges over time. Further, it is unclear if pandemic effects were universal, or if certain groups within higher education experienced differential impacts. In the current exploratory study, the different experiences of university employees (faculty vs staff, men vs women, White vs racial-ethnic minorities) across various indicators of work stressors, well-being, job performance, and overall pandemic effects are examined at the end of a full academic year of pandemic operations (April-May 2021). Specifically, we looked at employee’s perceptions
of organizational decision making and communication (procedural and interactional justice), perceptions of world meaningfulness and predictability (sense of coherence), negative reactions to moral violations (moral injury), exhaustion due to work stress (burnout), workload, and life impacts of COVID-19. All employees at a small private university were invited to participate in the online study. First, procedural justice, interactional justice, and moral injury were worse for faculty, whereas more general COVID-19 impacts were worse for university staff (p<.001). Second, women reported higher workload, higher burnout, and broader life-impacts of the pandemic than men (p<.05). Finally, racial-ethnic minorities showed significantly higher sense of coherence than White employees (p<.05). These findings suggest the lingering pandemic effects vary for different groups in higher education.

Kelley, Kathleen
THE PALEOECOLOGY OF YAHUAI CAVE IN GUANGXI, CHINA AT 120 KYA: IMPLICATIONS FOR EARLY MODERN HUMAN DISPERSAL INTO EAST ASIA

One of the main questions in human evolution is the dispersal of modern humans across a range of ecological niches. Given that today South China is situated in a tropical environment, the question remains, if early modern humans dispersing into this region could penetrate the rainforest to forage for food and if the environment in that area was suitable for early hominins to seek out during their exodus out of Africa around 100kya. As a case study we present the small mammal remains from Yahuai Cave, Guangxi, China, dated to around 120,000 years ago as they dispersed into East Asia. The study aims to identify the paleoecology of the area by utilizing Middle Range and Niche Construction theories to make an analogous comparison between extant and the extinct micromammals around the region of the Yahuai cave. Reconstruction of the paleoecology will include a three-step process: taxonomic identification, quantification and a taphonomic study. The study will look at similar comparisons at other sites that were along the path of hominin’s exit, to further solidify the paleoecological finding and the probability that early hominins would have utilized this novel ecosystem.

Khalid, Neha and Narayan, Anupama
IMPLICIT BIAS IN HEALTHCARE

The COVID-19 pandemic has brought many issues to light, ranging from educational disparities to systematic health and social inequalities affecting minoritized racial groups (Smith et al 2021). These specific disparities such as the access to COVID-19 vaccines are a recent development, but unfortunately, healthcare disparities have been around for years. In the past, there have been instances of extreme lack of care towards minority groups such as in the Tuskegee experiments, in which African American were withheld the treatment for Syphilis to study the disease’s long-term effects on the body or the Eugenics movement. Although these extreme instances no longer occur today, race continues to impact the quality of healthcare delivered in the form of unconscious bias. Unconscious or implicit bias describes associations or attitudes that reflexively alter our perceptions, thereby affecting behavior, interactions, and decision-making (Marcelin et al 2019). In this presentation, I will discuss how implicit bias influences physicians in the heath care system as well as provide examples as to how this bias has led to increasing health disparities throughout the COVID-19 pandemic. Additionally, I will discuss strategies that have been discussed in the literature that can be implemented to mitigate this bias as well as how future physicians can be trained to be more aware of their unconscious bias.

Martinez Galicia, Marco
COST-EFFECTIVE PETROGRAPHIC ANALYSIS OF ARCHAEOLOGICAL CERAMICS: A STUDY CASE FROM THE CASAS GRANDES REGION IN CHIHUAHUA, MEXICO

Archaeologists use various methods to analyze ceramic materials to understand the origin of their raw materials, manufacturing techniques, and their relationship to other forms of material culture. One of these widely-employed methods is petrographic analysis, used to study the composition of a ceramic fragment to generate inferences about its origin vessel. This type of analysis includes the observation, quantification, and characterization of mineral and organic inclusions in thin
ceramic sections, slices of a ceramic fragment a few micrometers thick that can be analyzed using a petrographic microscope. However, thin sections are moderately expensive and require the intervention of a specialized company or specialist to produce them. In addition, not all petrographic characterization requires the level of detail observed in a thin section. A second and less frequently used technique is “thick sectioning” which produces fragments a few millimeters thick with a smooth cross-section useful for general petrographic observation and quantification of mineral inclusions. Unlike thin sections, thick sections are relatively inexpensive, easy to produce with simple training, and only require a digital microscope for inclusion analysis. This paper presents a study case of the usefulness of thick section petrographic analysis of domestic wares produced by an Indigenous community during the 15th and 17th centuries.

Mayberry, Grant
DIELECTRIC PROPERTIES OF NANOSTRUCTURED ZNO USING IMPEDANCE SPECTROSCOPY

Nanostructured ZnO has been investigated as an n-type semiconductor for third-generation photovoltaics. In this study, we focus on the dielectric, and in turn the optical properties of 21.9 nm spherical ZnO nanoparticles at room temperature, in both powder form and suspension in a liquid. The dielectric properties determined from this method can then be used to model a nanomaterial’s optical absorption properties in photovoltaics or other electronic devices. Impedance spectra in the frequency range of 100Hz-5.1 MHz were used to investigate the frequency-dependent dielectric properties of ZnO nanoparticles. ZnO particles used in this study were suspended in variable volume fractions up to ~1% in deionized (DI) water and unrefined organic coconut oil and sonicated for variable durations before and during the experiment. Small volumes of the resulting suspension were injected sequentially into a dielectric cell for measuring frequency response. Dry particle tests were also conducted similarly. Impedance data suggests that the dielectric behavior of ZnO in a host fluid is highly dependent on sonication before and during the test, is a much stronger dipole in more polar fluids, and has a perceived dielectric constant much larger in a suspension than as a dry particle.

McGuire, Brooke
FORENSIC WEATHERING AND ABRASION MODELING: A LOOK INTO FORENSIC TAPHONOMY

Using bones that are a viable comparison for human remains, the administration of a number of different “treatments” will be conducted in order to understand forensic taphonomy of bones when placed in different stressful situations. All of the treatments that were administered were based on different environments that human remains may be disposed of within. They included: still water, running water, buried completely in soil, and two different rock tumbler simulations in order to better understand the impact of kinetic energy on the surface of the remains. Before and after putting them through these stressors, they will be examined and photographed for visual comparison, and impressions will be taken to look at texture analysis. A comparison to human remains was conducted at the end in order to provide a true comparison for the treatments that were done to the cow (Bos taurus) bones to human remains.

McKinney, Jackson
INVESTORS IN RESIDENTIAL REAL ESTATE

Multiple market forces contribute to overpricing of single-family homes, such as interest rates and housing supply. Another concern is the growth of investors’ holdings as a percentage of the total inventory of single-family homes due to access to cheap capital. This growth could lead to supply constraints and upward pricing pressure on homes, making them unaffordable for many. I will analyze data from a mid-sized city as the test market. The data will consist of property transfers and a home price index. I will test the association between the growth in investor ownership of single-family homes and the level of growth of home prices and share of affordable homes in this market.
McLaury, Lindsay and Trujano Alvarez, Ana

MICROANATOMICAL DIFFERENCES OF OVIDUCTS IN FIVE SPECIES OF SALAMANDERS

Many female amphibians, including salamanders, have differentiated oviducts that produce jelly coat layers to protect their eggs. This coating is formed of glycoproteins secreted by epithelial cells of the oviduct. Several studies identified histological differences in the microanatomy of the oviduct in different species with different life cycle modes. However, a few are focused on those of females with different ovipositional strategies (clutches, single eggs, and both). The aim of this study is to compare the microanatomy of the oviduct from five species of salamanders (Ambystoma texanum, Eurycea subfluvicola, Necturus beyeri, Salamandra salamandra, and Pleurodeles waltl) with different life cycles and ovipositional strategies. I used museum specimens of female reproductive salamanders. The oviducts were dissected, measured, photographed, and sectioned for three morphological regions: Pars recta, Pars convolute, and Caudal part. Tissue sections of the oviduct were stained and measured. I used photos to identify the type of epithelial cells in each section, the length of the oviduct, diameter of the oviduct, length of the cytoplasm, and the nuclear area of the oviduct tissue. A One-Way ANOVA was performed using SPSS. There are significant differences in the microanatomy of most species analyzed, but that of P. waltl and N. beyeri were similar. The oviduct of salamanders with a single egg strategy has cells with smaller cytoplasm and nucleus than those with a clutch strategy. In viviparous species, the type of cells, length of the cytoplasm and nuclear size of the oviduct is significantly different to oviparous salamanders.

Merchant, Zoey; Martinez, Darian; and Gentz, Amanda

FRAMING EFFECTS OF PTSD NEWS COVERAGE ON INDIVIDUAL ATTITUDES

Framing theory posits the way information is presented in the news, or framed, can impact individual attitudes and behaviors. Framing of mental health disorders, such as posttraumatic stress disorder (PTSD), in news coverage may contribute to the public’s negative attitudes towards individuals with PTSD and PTSD treatment. Prior research found that news often frames PTSD negatively, highlighting symptoms and negative outcomes (e.g., court involvement). Thus, symptom frames, which focus on PTSD symptoms, may contribute to negative perceptions leading people to believe it is not possible to recover from PTSD or that people with PTSD are dangerous. On the other hand, treatment frames, which focus on recovery from PTSD, may not contribute to negative perceptions. Thus, we hypothesize that exposure to symptom-framed articles will increase negative perceptions towards PTSD and decrease confidence in PTSD treatment’s effectiveness compared to exposure to treatment-framed articles. Further, this study will explore if the number of articles read impacts attitudes, as prior research has not determined if frequency of exposure impacts framing effects.

Using a 2 X 2 factorial design, undergraduates will complete an online survey where they will be randomly assigned to view treatment-framed or symptom-framed news stories while also varying the number of articles presented (1 versus 5). After viewing the presented article(s), participants will rate their personal perceptions towards individuals with PTSD, how they believe people with PTSD are treated, and their beliefs about PTSD treatment's effectiveness. Our results may help inform best practices for reporting on PTSD to reduce negative perceptions.

Miller, Emma

MICROMAMMALS IN THE LEVANT: AN EXPLORATION OF THE LIFE AND DESTRUCTION OF VADUM JACOB AND ITS TEMPLAR KNIGHTS

Erected in 1179 AD, Vadum Jacob, a Frankish fortress, was devastated by Muslim forces, before being destroyed by an earthquake soon after in 1202 AD. This research sheds light on the fortress through the analysis of micromammal remains found during excavation. This will be the first case of such an assemblage being used to extrapolate a deeper understanding of a Crusades site. In this study, a collection of micromammals originating from owl pellets found at Vadum Jacob, are used to fill in missing information about the castle, including the timeline of its habitation. Sorting, photographing and analyzing the assemblage, the remains provide insight into the use of the castle, the site formation process and the paleo ecology of the region, through the use of isotope analysis. The breakage patterns of the remains and the raptor from which they
originated suggest an absence of human involvement in the site after the siege and earthquake, a conclusion to be compared to the timeline in the historical record.

Mokhtari, Samira

FINDING GOOD VIRUSES IN A TIME THAT SARS-COV 2 RULES

Mycoviruses are viruses that can infect major taxa of the fungal kingdom. Mycoviruses’ effects on their host vary from being deleterious to advantageous. They might increase the virulence, or they can reduce the pathogenicity of their fungal host. The hypovirulence effect has been under much attention recently as they can be used as a potential biological control agent instead of fungicides. All mycoviruses have double-stranded RNA (dsRNA) in their life cycle as their replicative form. Fusarium is a genus of phytopathogenic fungi that cause various diseases in humans and Fusarium wilt disease in important agricultural crops. Here, we collected cotton samples showing wilting symptoms from two states in the US; Kansas, and Texas. Collected samples were surface sterilized in the lab and grown on a potato dextrose agar media. To screen for mycoviruses, the fungal cultures were freeze-dried, and dsRNA was extracted. The presence of the bands on gel electrophoresis confirmed the mycovirus infection. Sequencing was performed on the sample to identify the mycovirus. The virulence assay was performed on cotton samples in the greenhouse, Oliphant Hall, The University of Tulsa. The results suggested that the cotton plants that were infected with a virus-infected fungus had shown less virulence in comparison to virus-free fungus-infected plants and led to a healthier cotton plant. Thereby, we can suggest that the mycovirus infecting the isolated Fusarium from the collected Cotton pant has a hypovirulence effect.

Morrison, Aaron; Adamic, Emily; and Khalsa, Sahib

ASSOCIATION OF INTEROCEPTIVE ANTICIPATION WITH CARDIAC TISSUE SENSITIVITY IN ANXIOUS AND HEALTHY INDIVIDUALS

Anticipatory responses to potential threats, such as increases in heart rate, are implicated in the pathophysiology of anxiety. Anticipatory heart rate modulations may be driven by the central nervous system directly (e.g., via vagal input) or indirectly via adrenal secretion of adrenaline, which then binds to cardiac adrenergic receptors. The degree to which peripheral tissue sensitivity to adrenaline plays a role in cardiovascular responses during anticipatory processing is unknown. We hypothesized that endogenous cardiac responses during anticipation would be elevated in anxious individuals and associated with peripheral adrenergic sensitivity. We investigated endogenous responses in relationship to peripheral sensitivity in a transdiagnostic sample of 70 individuals with anxiety, depression, or eating disorders who reported clinical levels of anxiety and 57 non-anxious healthy comparisons using double-blind, randomized intravenous infusions of the adrenaline analogue isoproterenol (0.5 and 2.0 micrograms). We defined endogenous anticipatory responses as those occurring during immediately before infusion administration and compared this to the peak magnitude of isoproterenol-induced heart rate change. Endogenous heart rate responses were significantly elevated during the preparatory period compared to baseline (t=7.60, df=126, p<0.001). However, patients and healthy comparisons showed no group differences in endogenous response (t=0.127, df=122, p=0.9). This endogenous response was related to peripheral sensitivity at both 0.5 and 2.0mcg doses (R’s=0.754 and 0.710, p’s<0.001), indicating that anticipatory cardiac responses to potential threat were associated with peripheral sensitivity within the cardiac tissue. These findings illustrate that peripheral cardiovascular sensitivity contributes to anticipatory interoceptive responses in both anxious and non-anxious individuals.

Okolie, Star and Sheaff, Robert

SCREENING NATURALLY DERIVED PRODUCTS FOR INHIBITORS OF CANCER CELL METABOLISM

Many living organisms have evolved complex biochemical pathways to synthesize a diverse array of biologically active small molecules. These compounds provide a rich source of potential therapeutic candidates for treating human diseases like cancer. An increasing number of natural products have become commercially available, many of which are anecdotally purported to have medicinal or anticancer properties, although their mechanism of action is rarely known. A variety of commercially obtained natural products (mainly plant based) as well as medicinal herbs from Nigeria were obtained and
soluble compounds extracted using different solvents. Cancer cells exhibit a variety of genetic and molecular alterations, such as altered cell metabolism, that are possible drug targets. The natural product extracts were therefore screened for cytotoxicity towards a cancer cell line using a fluorescence-based assay in which only living cells can convert resazurin to resorufin. The extracts were also screened for their ability to specifically target cancer cell metabolism by measuring their effects on ATP levels using the CellTiterGlo assay. Results identified a subset of natural products that contain compounds that are cytotoxic, while others appeared to directly inhibit cell metabolism. Future work will seek to isolate the bioactive compounds, determine their structure, and identify their cellular targets. This work has the potential to identify novel biologically active small molecules that have therapeutic potential.

Osborn, Seth and Narayan, Anupama
IMPORTANCE OF MEASURING TEAM LEARNING PROCESSES AND OUTCOMES ACROSS TIME

Team learning is now recognized as crucial for team and organizational success (Shuffler, Salas, & Rosen, 2020), largely because organizations are increasingly shifting to use of team-driven projects to achieve organizational objectives. Team learning refers to collective acquisition of knowledge and corresponding change in team members’ behavior based on that knowledge (Edmondson, 2002). This concept can be split into its behavioral components (team learning processes) and its state components (team learning outcomes; Edmondson et al., 2007). Accordingly, much research on this topic up until now has focused either on cataloguing learning behaviors or examining team and environmental factors that relate to learning outcomes. But what remain conspicuously absent from the literature are measurements of team learning that track the progression from a team’s initial collective knowledge state to a state of increased knowledge (Wiese & Burke, 2019). The purpose of this presentation is to briefly review the nature of team learning, why it matters, what research to date has shown, and how novel approaches to measuring team learning are needed in order to advance research and practice on this issue. In particular, the presentation will include brief descriptions of various team learning behaviors, such as sharing, co-construction, reflexivity, and boundary crossing, as well as team learning outcomes such as learning curves.

Paslay, Caleb
IDENTIFICATION OF A MAJOR AGRICULTURAL ADVERSARY IN OKLAHOMA AND ITS POTENTIAL IMPACT ON CROP PRODUCTION

Agriculturally important crops are impacted by a variety of pathogens throughout a given growing season. Of those pathogens Tomato yellow leaf curl virus (TYLCV) is considered as one of the most detrimental to the health of plants. This DNA virus is studied all over the world because of its potential to devastate crop production and its wide-spread prevalence. In 2011, TYLCV was referred to as a top 10 plant virus, rated by plant pathologist around the world and was number 3 on that list. TYLCV was identified in Oklahoma infecting both pepper and tomato crops within Tulsa county throughout the 2021 growing season. Sequencing analysis was performed using Ilumina sequencing and Sanger sequencing. This is valuable information because TYLCV has not yet been reported within the state of Oklahoma. It has been reported within the US and many other countries around the world. TYLCV has been referred to as a “top 10 virus”, rated by pathologist around the world and was number 3 on that list. This is important to consider when discerning the effects of this virus. With a greater understanding about this virus, scientists and farmers could devise strategies that would decrease the rate of infection, and therefore increase agricultural yields. Further study of this virus and its characteristics are fundamental to devising such strategies which include, development of resistant plant varieties, biological and physical control measures, and education about this virus.
Power, Michael
AFFORDABILITY VERSUS INVESTMENT RETURNS FOR FIRST TIME BUYERS IN RESIDENTIAL HOUSING MARKET

My research project will aim to investigate the growth in Residential Housing Markets in large cities across America, to gain insight into profitable opportunities for first time buyers over the medium term. The research project will specifically analyse the accessibility & attainability vs. return trade-off for first time buyers. The overall goal of this research project is to consider factors that could help 1st time buyers to profit on their residential investments by unearthing potential correlations & growth hubs whilst accounting for the dynamic & evolving nature of the current 1st time buyer’s market characteristics.

Ramasubramanian, Suriya; Sisul, Mia; LeBlanc, Gabriel; and Ramsurn, Hema
INVESTIGATION OF CORROSION RATE OF BIO-GRAFHENE COATED METALS

Hydrothermal carbonization of cellulose biochar was carried out at 3000 C and 8.5 MPa in subcritical water to form bio-crude, biogas and biochar, a carbon rich solid residue. In this study, biochar was used as the graphene precursor to coat metals like cobalt and iron. The solid carbon source was placed on the metal foils and heated to 10000 C using a quartz tube furnace. Graphene was formed on both sides of the metal foils by carbon dissolution and precipitation mechanism. Usually, at the high temperatures, the carbon atoms from biochar dissolve into the metals and form stable carbides, which upon cooling, could become unstable and precipitate to form graphene at the eutectic temperature. Cobalt follows this trend and forms cobalt carbide which is unstable at room temperature and dissociates into graphene. Due to the absence of carbides over the surface, graphene coated cobalt can theoretically provide a better corrosion resistance. On the other hand, iron forms a stable iron carbide and thus there is competition between carbide formation and graphene precipitation. Due to the presence of iron and iron carbide on the surface, micro-galvanic corrosion can take place which can increase the corrosion rate of iron. Electrochemical Impedance Spectroscopy is employed to measure the corrosion resistance of metals and coating in the presence of an electrolyte. Linear Polarizing Resistance is used to generate tafel plots which are extrapolated to determine the corrosion current density from which the corrosion rates of bare and graphene coated metals are calculated and compared.

Rathnasekara, Rusiri and Parameswar, Hari
DYE-SENSITIZED SOLAR CELLS (DSSCs) BASED ON NANOSTRUCTURED Ag- DOPED ZnO ELECTRODES

In this work, Silver (Ag) - doped ZnO nanoparticles from 0% to 20% concentration of doping were synthesized by the microwave method. The morphological properties were observed through Transmission Electron Microscopy (TEM). TEM images showed that the diameter of nanoparticles increased from 7.67 nm to 18.53 nm with increasing Ag concentration. X-ray Diffraction (XRD), and Energy Dispersive X-ray (EDX) techniques confirmed the formation of Ag nanoparticles. UV-Visible spectroscopy and Photoluminescence (PL) were employed to determine the optical properties of undoped and Ag-doped ZnO samples. With increasing doping concentration, the bandgap of Ag-doped ZnO particles decreased from 3.22 eV to 2.89 eV. Cyclic-Voltammetry (C-V) results revealed that the position of the conduction band and valence band considerably changed with the doping concentration and 5% Ag-doped ZnO particles have the most negative conduction band edge with respectively to N719 dye’s conduction band level compared with other doping percentages. Current-Voltage measurements showed that the best solar cell performance was exhibited by the 5% Ag-doped ZnO DSSCs with a conversion efficiency (ƞ) of 6.19 %, the open-circuit voltage (Voc) of 0.58 V, short circuit current density (Jsc) of 19.12 mA/cm2 and fill factor of 55.08%. We will discuss the performance of the dye-sensitized solar cell based on 5% Ag-ZnO electrode.
Rogers, Abigale
PALEOECOLOGY OF THE CAUCASUS IN THE UPPER PALEOLITHIC: USING MICROMAMMALS AS CLIMATE INDICATORS FROM DZUDZUANA CAVE, GEORGIA

Paleoecology, the study and reconstruction of past environments and ecosystems, requires much more analysis than one might think. The observation and analyzation of Dzudzuana Cave in Georgia in the Upper Paleolithic is a challenge to put back together. With options, we turn to the next best ecological determinator: micromammals. Micro fauna such as the voles that are found in the Dzudzuana Cave site are excellent indicators of environmental and climatic change. This is due to the evolutionary adaptation that many rodents have that allows them to reproduce, mature, and repeat several times a year. Because of this trait, it is very easy to see changes in the population of fossils that anthropologists recover from the cave site. Since their natural lifespans are much shorter and they are significantly lower in the natural food chain, their fast reproductive rates reveal a lot about these ancient populations. The dentition of the skulls, especially the molars, serve as a good species indicator. However, the most important part about it is that those teeth preserve isotopes that when tests reveal the types of plants these micromammals would have been consuming. This then reveals what kind of environment this area would have been and the bigger question of whether early Homo sapiens and Homo neanderthalensis would have lived in this area of the Georgia in the Upper Paleolithic. I will be talking about the presence of these carbon isotopes in my sample population and whether the environment would have been feasible for early human life.

Santos, Gabriel; Daraboina, Nagu; and Sarica, Cem
DYNAMIC MICROSCOPIC STUDY OF WAX DEPOSITION: PARTICULATE DEPOSITION

This study presents a continuing effort to unravel the wax deposition mechanisms using a state-of-the-art microscopic in situ visualization technique. The investigation focuses on understanding the effect of the flow rate on the particulate deposition mechanism. The existence of the particulate deposition mechanism is proven by the presence of wax crystals at a distance more significant than the mass transfer boundary layer thickness calculated from the film mass transfer theory, reinforcing that molecular diffusion is not the only one responsible for wax deposition. The flow rate study presents a direct relation between the flow regime and the particulate deposition mechanism. The lower the Reynolds number, the stronger this mechanism is observed. Under laminar and transition flow regimes, the deposit thickness and growth rate of the deposit are considerably greater than those calculated under the turbulent flow regime. The number of available crystals at the boundary layer for different flow rates is qualitatively analyzed. It is concluded that, under laminar and transition conditions, a larger number of crystals is available for deposition compared to turbulent cases. This effect can be explained by the larger induced shear forces on the flow at higher Reynolds numbers.

Schumacher, Emily
CONCEPTUALIZING MILITARY LANDSCAPES AND AN INTRODUCTION TO THE CASE STUDY OF DANISH ST. CROIX

Castles, fortresses, and other fortifications do not exist within a vacuum; they are dynamic spaces that shape and were shaped by numerous forces—including the lands they were built upon. In studying these structures, however, scholars often take one of two routes: they either 1) focus on a fort’s role in a particular historical event and/or its association with notable figures of the past, or 2) divorce the fort from the very landscape it inhabits for the purpose of site reconstruction. Here I offer a third avenue of fortifications research that is slowly gaining recognition across multiple disciplines—that of the role of the military in the development and patterning of landscapes over time—and present the concept of the military landscape. I then introduce the case study of St. Croix, in which I discuss the application of the lens of the military landscape to elucidate the impetus for the fortification of the island throughout its time as a Danish colony and present preliminary results from my ongoing research.
Smith, Dustin; Corbo, Joseph; Carneiro, Miguel; and Toomey, Matthrew
A PROTEIN THAT FACILITATES CAROTENOID UPTAKE INTO AVIAN FEATHERS AND RETINAS

Carotenoids pigment the brilliantly colored feathers of birds and play an essential role in tuning the spectral sensitivities of the bird eye. There is growing evidence that these traits share mechanisms of carotenoid uptake and metabolism. Here, we investigated the wild-type parrot finch (Erythrura psittacea) which has striking ketocarotenoid-based red throat and rump plumage and compared it to a parrot finch mutant that has yellow feathers and markedly reduced levels of ketocarotenoid pigments in both feathers and retinas. We used whole-genome resequencing to define the genetic basis of the yellow phenotype. We found that these birds have a mutation in a member of the Tetratricopeptide repeat protein gene family. We will present our functional analysis of this protein; discuss its role in carotenoid uptake, and mechanistic links between these traits.

Smith, Ellie and Iyer, Jyoti
CHARACTERIZING THE PHENOTYPC EFFECTS OF A C. ELEGANS VPS-26 KNOCKOUT STRAIN

VPS-26 is a component of the retromer complex. The retromer complex is involved in protein sorting in the trans-Golgi network. Previous studies have associated decreased vps-26 expression with late-onset Alzheimer’s disease and Parkinson’s disease. Caenorhabditis elegans (C. elegans) is a multicellular eukaryotic organism. Because vps-26 is conserved in all eukaryotic organisms, the function of vps-26 is conserved between humans and worms. During the TURC program last summer, we studied the function of vps-26 in C. elegans. Firstly, we performed a western blot analysis to confirm that our already existing vps-26 knockdown strain has no VPS-26 protein expression. Next, we characterized the vps-26 knockout strain. More specifically, we evaluated if brood size, embryonic viability, vulval development, or body length was altered in the vps-26 knockout strain. We determined the embryonic viability was unaffected in the vps-26 knockout worms. This suggests that depleting vps-26 does not impact the ability of an embryo to develop into an adult. However, the average brood size, vulval development, and body length were abnormal in the vps-26 knockout strain. Additionally, worms lacking VPS-26 had a smaller average brood size and exhibited abnormal vulval development. More specifically, they had a bulging vulva. Because the vulva is important for egg laying, the bulging vulva likely prevented proper egg laying which may explain the smaller brood size. Finally, the vps-26 knockout strain had a smaller average body length. Thus, through our studies, we determined that VPS-26 is important in regulating brood size, vulval development, and body length in C. elegans.

Steed, Sydney
TEAM DYNAMICS IN MEDICINE

Teams are an increasingly ever-present component of the occupational setting. The theories of applied team psychology can be housed into three tenets: 1) team tasks and structure, 2) member characteristics and team composition, and 3) team processes and emergent states (Mathieu, 2017). Health care is arguably the industry that is the most dependent on the quality of teamwork. In 2003, the Institute of Medicine Committee on Health Professions Education Summit formally stated that teamwork skills are a core competency of professional education in healthcare graduate and continuing professional programs (Eastman, 2003). Further, obstetrics is a field in medicine in which teamwork is particularly crucial. Quality of teamwork in labor and delivery units has been shown to influence maternal, fetal, and legal risks (Cortnewaite et al, 2013). The purpose of this literature review-based presentation is to gain a strong understanding of applied team research with an emphasis on its application in medicine, particularly obstetrics.

Stephens, Kyle
THE TIME IS NOW: SCHOOL-BASED MENTAL HEALTH PROGRAMS AND TULSA PUBLIC SCHOOLS

A major problem in the United States is that we separate physical and mental health, something less common in other counties (Barican et al., 2021; Fielding, 2020). While not all physical illness is linked with mental health, things such as
heart attacks are influenced by stress (Barican et al., 2021). As more is learned about mental health, it is increasingly apparent how important it is to teach about mental health from a young age. Yet most schools do not address mental health, and this leads to confusion (Montanez 2015). In this research presentation, I will review current school-based mental health curricula, explain why schools are an ideal place to implement this type of program, provide ideas about financing this initiative, share ethical issues, explain ways to evaluate the effectiveness and address how to overcome barriers to implementing this program. I specifically present evidence concerning why the city of Tulsa should implement the FRIENDS curriculum on mental health to help lessen issues of depression and anxiety. This plan would greatly benefit Tulsan’s because, “Tulsa Public Schools staff come across a suicide note nearly once a day from elementary or middle-school students, and Tulsans with chronic severe mental illness die 27 years earlier on average than all Oklahomans” (Jones, 2018). By reducing stigma and providing education, more Tulsan’s can get access to the care they need, which increases life expectancy, life quality, and has spillover effects that benefit all of Tulsa even those who may not have a mental illness.

Thapa, Saroj; Chandra, Gopi; Zhu, Hongyang; and Zhu, Peifen
LEAD HALIDE PEROVSKITES FOR GREEN LIGHTING TECHNOLOGY

The advent of low-cost solution-processable semiconducting lead halide perovskite nanocrystals (NCs) of the form CsPbX3 (x=Cl−, Br−, I−) has shed a new hope on revolutionizing the global lighting technology due to their peerless luminescence properties such as high color purity and near-unity photoluminescence quantum yield (PLQY). Behind the success story of these materials, the presence of lead (Pb2+) in the structures seriously impedes their industrial use because of its toxic nature (lead poisoning) which is a direct threat to human health and the environment. This study emphasizes minimizing the effect of lead poisoning by doping the non-toxic and earth-abundant Zn2+ in CsPbX3 and transforming them into much lead–reduced Cs4PbBr6 structures. The use of Zn2+ has helped to reduce the quantity of Pb2+ at most by 15% without compromising the luminescence properties. All these lead–reduced structures exhibit direct and tunable bandgap, high color purity, and high PLQY. Consequently, these NCs were used as a color conversion layer in white light-emitting diodes yielding the white light emission of superior color qualities that are suitable for human eyesight.

Valkai, Forrest
THE POTENTIAL FOR USING CERVIDS AS PROXIES FOR PALEOECOLOGICAL RECONSTRUCTION THROUGH STABLE ISOTOPE ANALYSIS: IMPLICATIONS FOR OUT OF AFRICA

Approximately 1.8 million years ago, Homo erectus moved through the Levantine corridor to spread throughout Europe and Asia. 'Ubeidiya, a 1.5-million-year-old archaeological site in northeast Israel, provides some of the earliest evidence of this dispersal. The details of the environment of the region at the time would provide a great deal of insight into the lives of our ancestors but are largely unknown. The analysis of the differential fractionation of stable isotopes is a powerful tool for paleoecological and paleoclimate reconstruction. The usefulness of cervids as proxies for this kind of reconstruction, however, is debated due to their foraging habits as variable browsers and grazers. In this study, I first develop a modern model to see if stable isotopes can distinguish between deer populations. I sample the tooth enamel from the M3 of multiple modern cervid populations to test for the δ13C and δ18O content. These data, when combined with data from GIS, will allow me to build an isotopic map of different cervid environments which can then be compared to samples taken from fossil cervids excavated from 'Ubeidiya. Preliminary results will provide support for using cervids as a robust paleoecological proxies and could be a large step along the way to reconstructing the environment in which our ancestors lived and gaining a better understanding of H. erectus's movement out of Africa.
By concentrating sunlight into a single receiver, CSP (Concentrated Solar Power) systems use a working fluid that is heated and later converted into electricity. The use of supercritical carbon dioxide (sCO2) Brayton-cycles in place of the conventional steam turbines provides higher thermal to electricity efficiencies. In light of this, the use of sCO2 as the heat transfer fluid in gas receivers is being investigated. Conventional solar receivers are subjected to thermal stresses due to daily startup operations, and thus prone to thermal fatigue failures. In this research, the use of a novel micro-vascular Carbon/Carbon composite for a modular gas receiver is being proposed, which has a lower coefficient of thermal expansion that prevents thermal fatigue. Each composite module has an embedded micro-channel network through which sCO2 will be flowing. A known chemical reaction between sCO2 and the composite is triggered at the expected high operating temperatures (above 600°C), causing mass loss. In this presentation, a CFD (Computational Fluid Dynamics) analysis of sCO2 flow in a C/C composite micro-channel is performed. Using literature kinetic data, the reaction at the channel’s surface is simulated to model the effects of the surface reaction, ultimately assisting in setting operational temperature limits and evaluating the efficacy of protective coatings to decrease mass loss. These results are verified with a mesh independence analysis. Next, thermogravimetric analysis (TGA) is performed on samples prepared in-lab to experimentally calculate composite kinetic data for future use in further CFD experimentation.

Zanders, Levi; Swierkosz, Alistair; Sheaff, Robert; and Lamar, Angus
EXPANSION OF A SYNTHESIZED LIBRARY OF HETEROARYL N-BENZYL SULFONAMIDES AND IN VITRO DETECTION OF ANTICANCER ACTIVITY

The synthesis of novel compounds and identification of biological activity is at the foundation of medicinal chemistry and the pursuit of new pharmaceuticals. Previous research in our laboratory established an initial library of biologically active heteroaryl N-benzyl sulfonamides. It was observed that an indole core most frequently led to activity amongst the heteroarenes that were prepared. In an effort to synthesize compounds that improve upon our initial set of active compounds, an expanded library of indole sulfonamides was synthesized and cytotoxicity screening was performed to determine biological activity. The results of the library expansion and the in vitro screening assays will be presented and discussed.
Brown, Rianne
SAMPLE DESIGN OF ADDITIVELY MANUFACTURED Ti64 MICROLATTICES

Additive Manufacturing (AM) is a revolutionary manufacturing method that produces geometrically complex parts with high strength to weight and stiffness to weight ratios. The ability to print parts with interior lattice structures provides significant cost and weight savings. Unfortunately, the rough as-built surface textures of AM components are detrimental to their fatigue performance. This research is investigating the use of atomic layer deposition to activate a eutectic reaction on the interior and exterior surfaces of AM parts to decrease the melting point of these surfaces. The parts are then heated, melting the surfaces and reducing the surface roughness without compromising the part geometry or damaging its structural integrity, thus reducing stress concentration factors and improving the overall fatigue life of the component. The scope of the summer TURC project included designing dogbone and single unit cell samples (pictured below) for which loading is distributed symmetrically through each strut of the sample. These samples were additively manufactured out of Ti-6Al-4V (Ti64) using direct metal laser sintering in January 2022. Throughout the spring semester, the surfaces of a portion of the samples will be treated, and a fatigue campaign will be conducted on all samples. The comparison of the fatigue performance of as-built versus treated samples with simple geometries is the first step in verifying the validity of the hypothesis that chemically surface-treated microlattice samples will perform under cyclic loading before fracture for longer than untreated samples, due to the decrease in surface flaws that act as stress concentration factors.

Caudle, Jenna; Moussa, Reema; Philo, John; Witt, Ryan; and Lama, Angus
DEVELOPMENT OF NEW SYNTHETIC APPROACHES FOR THE INCORPORATION OF SULFONAMIDE UNITS INTO POLYCYCLIC HYDROCARBONS SCAFFOLD

Polycyclic hydrocarbons are frequently viewed within medicinal chemistry as valuable bioisosteres of aryl or alkyl units that can increase the degree of lipophilicity of a potential drug molecule. One of the challenges associated with the synthesis of targets that contain a polycyclic hydrocarbon unit lies within the available tools for modification or installation of functionality into the relatively unreactive hydrocarbon framework. Our research group has recently developed a non-metal promoted method for incorporation of a sulfonamide unit into a polycyclic hydrocarbon framework. Our progress toward the development of a library of N-alkyl sulfonamides derived from a polycyclic hydrocarbon core will be presented and discussed.

Coronado, Rodolfo
FINDING A RELATIONSHIP BETWEEN THE DAMAGE CAUSED BY THERMAL AND MECHANICAL CYCLING OF NITINOL.

Nitinol is a shape memory alloy (SMA). SMA’s are used in the medical, civil, and aerospace industries because of their unique properties (super elasticity and the shape memory effect). Functional fatigue is a common failure mechanism in nitinol components. This research aims to provide some insight on the thermo-mechanical fatigue properties of nitinol so that components can be better designed to resist fatigue. Specifically, this research aims to find how the damage caused by thermal cycling is different from the damage caused by mechanical cycling. If a relationship is found between mechanical and thermal fatigue, then mechanical cycling could be used to estimate fatigue performance for thermal cycling. The benefit of this is that mechanical cycling is much faster than thermal cycling. This research was done during the summer through TURC. There were few quantitative results because of the limited time frame.
Daharsh, Emma and Lepage, William
CHARACTERISTICS OF INCLUSIONS AND VOIDS IN NiTi

Nickel-titanium alloy (NiTi) is a shape-memory alloy that is vital for self-expanding and transcatheter implants. For cardiovascular devices made of NiTi, such as heart valve cages and stents, the fatigue performance of NiTi is critical to understand. However, our control and predictions of fatigue life in NiTi are complicated by nonmetallic defects called inclusions. Inclusions and their associated voids are known sources of cracks and failures. This project explores the 3D shapes and distributions of inclusions and voids in NiTi. While inclusions are embedded in the metal and typical microscopy can only see the “tip of the iceberg” of inclusions, this work uses focused ion beam (FIB) milling to cut into the inclusions and see their 3D shapes. My work located and imaged inclusions, then revealed their sub-surface features using series of FIB cuts progressing through the inclusions. My data will complement work that is capturing microscopic images of cracks initiating at inclusions during fatigue testing and will also inform data analyses and statistical predictions on the inclusions themselves. Ultimately, this work will lead to a deeper understanding of the fatigue behavior of NiTi to predict failures with greater accuracy.

Dunn, Caroline
SYNTHESIS OF A LIBRARY OF 4-SUBSTITUTED BENZYLIC N-SULFONYL INDOLE ANALOGS

The installation of chemical functionality is a fundamental pursuit in organic synthesis. Our research group has recently developed novel methods for the direct incorporation of a sulfonamide unit to a variety of different scaffolds in order to produce libraries of compounds to test for biological activity. In order to expand the set of compounds under investigation, a series of sulfonamide-containing analogs were synthesized using a 4-substituted indole core. Our progress toward the expansion of the set of bioactive indole sulfonamides will be presented.

Habrock, Jackson
DIGITAL IMAGE CORRELATION CAMERA ACQUISITION SOFTWARE

Digital image correlation (DIC) is a surface displacement measurement technique that allows users to create pictures of deformations of solid objects. These pictures of local material deformations are useful in numerous applications in materials science. A major part of this technique is the acquisition of images of the specimen. This project is rooted within this detail, aiming to create a functional digital image correlation software. Ultimately, our goal for this program is to be able to share it with the science community, making in an open-sourced application. Thus, users can download and use without charge or license. With the help and guidance of Dr. William LePage, as well as Dr. Phil Reu of Sandia National Laboratory, this summer was a huge step for this program. Over the course of this project, I have been able to continue to learn the LabView program, initialize Dr. LePage’s cameras into the program, establish functional software and hardware triggering, add new functions including camera rotation and gain/exposure control, and establish full camera synchronization. We have yet to publish this program and are still working towards that last step.

Le-Huynh, Kassandra
UNDERSTANDING CRIMINAL SENTENCING IN THE WORLD’S PRISION CAPITAL

With increasing demands for change in the criminal justice system since the summer of 2020, there have been questions raised about our current criminal justice system. Although many of the protests have surrounded police brutality, there are many who wonder if justice will be served due to perceived racial bias in the justice system. Recent studies have found a clear racial bias, yet yielded mixed findings about how and why disparities in sentencing occur. The research seeks to add to the current literature by attempting to answer these questions. The research uses multivariate regressions to look at possible disparities in sentencing based on race, gender, age, as well as policy impacts in Oklahoma at the federal and state level. It is also the first study that will comprehensively analyze criminal sentencing data from the Department of Corrections.
at the Oklahoma state level. Oklahoma is an especially unique area for research for several reasons. In 2018, the state of Oklahoma was named the World’s Prison Capital due to the state’s exceptionally high per-capita incarceration rate. Although the state's incarceration rate has decreased over the past few years, it remains one of the highest in the country. The state is also home to some of the deadliest police forces in the country and impressive progress in criminal justice reforms such as State Questions 750 and 751. With these factors in mind, research on the impacts of policies and practices in Oklahoma could yield many insights into the current criminal justice system.

Mathew, Danita

STUDYING THE EFFECT OF MICROCEPHALY ASSOCIATED CAPZA-1 MUTATION ON CENTRIOLE DUPLICATION

Centrosomes are microtubule-based organelles required for proper cell division. Each centrosome consists of two centrioles, the numbers of which must be tightly regulated through the process of centriole duplication. Abnormal centriole numbers can arise from improper function of core centriole duplication proteins, causing diseases like primary microcephaly (MCPH). One of these core centriole duplication proteins is SAS-6. A mutation in SAS-6 was associated with the neurodevelopmental disorder MCPH in a Pakistani family. The Iyer lab re-created this MCPH-associated sas-6 mutation in C. elegans using CRISPR/Cas9 editing. The mutation was found to cause defects in centriole duplication in C. elegans. Intriguingly, the individuals that exhibited MCPH due to the sas-6 mutation also harbored a mutation in a neighboring gene called CAPZA1. However, the contribution of this gene mutation to MCPH and centriole duplication was not investigated in this study. We wondered whether CAPZA1 mutation coupled with the sas-6 mutation would affect centriole duplication in C. elegans. To study the effect of the CAPZA1 mutation on centriole duplication in a MCPH background, we created a strain with mutations in both sas-6 and CAPZA1. We utilized techniques such as live imaging, brood count assays, and embryonic viability assays to study the effect of the CAPZA1 mutation on C. elegans. We determined that the CAPZA1 mutation did not contribute to the incidence of MCPH in the Pakistani family.

McCollum, Gage

ISOBARIC THERMAL FATIGUE OF NITINOL

The purpose of this research is to investigate the validity of Linear Elastic Fracture Mechanics (LEFM) and other analytical prediction methods for Shape Memory Alloys (SMAs) through fatigue and fracture testing at constant loads over thermal cycles ranging from above the martensite desist temperature and below the martensite finish temperature. The nitinol specimens are heated to above the martensite desist temperature, given a constant load, and then cooled down to below the martensite finish temperature and reheated to the original temperature. The load is then increased and the temperature is cycled again. Displacement field data is collected via in situ Digital Image Correlation (DIC) during the thermal cycles in order to further analyze the crack tip opening displacement (CTOD). The J-integral of the displacement field is to be compared with the stress intensity (K) from LEFM, and this comparison is to serve as the basis for conclusions regarding how or at what temperatures nitinol does or does not obey LEFM. The work completed during the TURC timeline and that is reflected here is the preparation to collect the displacement field data. This work includes the creation of camera mounts for DIC, the education in and practice of specimen speckling, the designing of new specimens adhering to the ASTM E647 standard, and the incorporation and refinement of a thermal control subsystem to an already existing apparatus designed for constant loading of specimens. No quantitative data is presented due to the TURC time constraint. This research is ongoing.
Moussa, Reema; Flusche, Ann Marie; Caudle, Jenna; and Philo, John

INVESTIGATION OF THE EFFECT OF ARYL SUBSTITUENTS ON THE BIOLOGICAL ACTIVITY OF N-ALKYL SULFONAMIDES DERIVED FROM POLYCYCLIC HYDROCARBON SCAFFOLDS

As a class of therapeutics, sulfonamides have exhibited a wide variety of biological applications including antibacterial, anticancer, and anti-inflammatory activities. The incorporation of sulfonamide functionality into a molecular scaffold is a valuable goal within the realm of medicinal synthetic chemistry. In order to prepare a library of compounds that contain a sulfonamide unit attached to a polycyclic hydrocarbon (PH) core to test for biological activity, we have synthesized a number of PH-containing analogs by variation of the aryl component of the installed sulfonamide unit. The compounds were then subjected to a screening against mammalian cell lines to determine their biological activity and cytotoxicity and the results of this study will be presented and discussed.

Patrick, Logan and Sharp, Jacob

TU VR NURSING TRAINING SIMULATION

The aim of this research is to develop a virtual reality (VR) nursing training simulation that can be implemented into the Oxley College of Health Sciences nursing education curriculum. “VR technology is increasingly being used in healthcare education and practice” [1]. Traditionally nursing students go through high-fidelity live simulations on mannequins during their curriculum; but given time and cost constraints can only attempt them once, increasing student stress. VR training in curriculum “provide[s] an objective evaluation that may not require the need of human evaluators.”[2] The prototype VR nursing training simulations was developed as a tool for nursing students to practice the expected order of actions and analyze procedure errors, prior to the live simulation, reducing stress and providing supplemental training outside of the classroom. The developed prototype allows for users to run the simulation in both VR and traditional 3D game environment, allowing more access to nursing students who do not have access to a VR headset. The simulation is also self-contained, allowing students to attempt a simulation quickly and receive a report detailing mistakes in missed or out-of-order steps. A non-linear “objective tree” system was designed to allow out-of-order execution of simulation steps while still providing useful feedback and scoring of a students’ performance, and easing creation of simulation scenes. Current “studies in healthcare support the value of VR” [3] and it is the goal of our research team to further develop a VR nursing training simulation in order to establish it as a vital part of the nursing curriculum.

Peasly, Dale; Sen, Sandip; and Wilson, Laura

DISCOVERY OF MODIFIABLE SOCIAL FACTORS OF LONGTERM TBI OUTCOME USING STATISTICAL LEARNING

Traumatic brain injuries (TBIs) are a major cause of disability and early mortality. TBIs can cause significant changes in cognitive functioning and lead to symptoms such as depression and anxiety, and because of this physiological treatment is often advised. Changes in the social behavior of those who have sustained a TBI are well documented. Less understood are the social determinants of TBI outcome. The TBI Model Systems (TBIMS) National Database (ND) collects data on patients with TBIs from centers around the U.S. The database contains information at the time of injury and several follow-up periods. TBIMS ND has data on social factors and a measurement of outcome known as the Extended Glasgow Outcome Scale (GOSE). GOSE provides a measurement of disability from death to full recovery by categorizing the recovery into one of eight outcomes. Through Techniques such as Kaplan–Meier Method and the Cox Proportional Hazard Model we examine the effect that social factors have on outcome using sex as a moderating factor.
Numerous approaches have been developed recently to predict physicochemical properties using open-source programs such as OSIRIS Property Explorer and SwissADME. Recently in our laboratory, a library of polycyclic hydrocarbon sulfonamides have been synthesized and the in vitro biological activity was determined against a series of cell lines. In addition, an in silico assessment of the drug-likeness and physicochemical properties of the compounds was conducted using open-source programs. The results from a comparison of the in silico predictions to data experimentally obtained regarding the lipophilicity values (clogP) of the compounds will be presented and discussed.