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Welcome to the 2019 Joint Meeting of
the 22nd Annual TU Student Research Colloquium
and the 17th Annual OU-Tulsa Research Forum!

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 and the University of Oklahoma–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 had a great turnout from TU students and OU-Tulsa students. We are proud to offer such 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.

2019 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
Student Association
Third Floor Designs

2019 COMMITTEE MEMBERS:
Janet A. Haggerty, Associate Vice President for Research & Dean of the Graduate School
Nadia Hall, Coor. of Graduate Recruitment & Student Services
Caitlin Getchell, Recruitment and Student Services Specialist
Indreesh Badrinarayanan, Student Representative
Marjorie Bontemps, Student Representative
Emily Caselman, Student Representative
Shuddha Chowdhury, Student Representative
Ryley Johnson, Student Representative
Melissa Miller Student Representative
John Ostrander, Student Representative
Spenser Pulleyking, Student Representative

2019 COLLOQUIUM ARTWORK PROVIDED BY:
Strephon O’Brien
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 22nd 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 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 mention, plus awards for the Community Service, Poster, and Video sessions.

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.
ABOUT THE OU-TULSA RESEARCH FORUM

2019 OU-TULSA RESEARCH FORUM COMMITTEE:
Kent Teague, Ph.D., Assistant Vice President for Research, Forum Chair
Danielle Fousel
Sarah Beth Bell, M.A.
Krista Kezbers, Ph.D.
Heather Chancellor McIntosh, M.S., CRA

The OU-Tulsa Research Forum is a multidisciplinary event held annually at the OU-Tulsa Schusterman Center that showcases the research efforts of students, residents, and fellows from all of the colleges at the University of Oklahoma-Tulsa. The forum has grown from a small OU College of Medicine event in 2002, with only 14 abstract submissions focused on health research, to approximately 100 submissions per year, that involve the entire campus and all types of research performed at the University of Oklahoma-Tulsa. Participation by colleges located on the OU-Tulsa campus includes, Allied Health, Medicine, Architecture, Arts and Sciences, Engineering, Education, Nursing, and Public Health. In 2011, the OU-Tulsa research forum made a significant shift as it expanded beyond OU-Tulsa to also include research in a variety of fields from students at the University of Tulsa. It also became a part of the University of Tulsa Student Research Colloquium.

Participants from both universities are invited to meet new researchers with related research interests, develop mentor-student relationships, develop interdisciplinary dialogue, and enjoy the opportunity to learn of their colleague’s research efforts. Participants submit abstracts of their research for review by a faculty panel and acceptable abstracts are presented as posters. In-field and out-of-field judges assess the poster presentations and prizes are awarded to the top posters in each category.

Categories for submission include biomedical, education, engineering and applied research, quality improvement, and social/behavioral and community service.

The 2019 OU-Tulsa Research Forum will be held at the OU-Tulsa Schusterman Learning Center at 41st & Yale on Wednesday, April 3rd. Participants are asked to setup their posters between 9:00 a.m. to 11:00 a.m. and judging will commence at 2:00 p.m. Presenters must discuss their poster research with judges between 2:00 p.m. and 4:00 p.m.
GENERAL INFORMATION

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

Days and hours are:

Monday, April 1       8:00 AM - 5:00 PM
Tuesday, April 2      8:00 AM - 5:00 PM
Wednesday, April 3    8:00 AM - 5:00 PM
Thursday, April 4     8:00 AM - 5:00 PM
Friday, April 5       8:00 AM - 5:00 PM

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

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 Poster presenters). Presentations are a maximum of 15 minutes, followed by 3-5 minutes for a question and answer period. The next talk will begin after the completion of the Q & A portion.

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

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

AUDIO/VISUAL REQUIREMENTS
The following items are provided for each session: LCD projector, screen, podium, and microphone. If you need special equipment other than that listed above, please check with the Colloquium Committee to make the necessary arrangements.
THE TWENTY-FIRST ANNUAL STUDENT RESEARCH COLLOQUIUM
CONFERENCE AT A GLANCE

SPECIAL TOPIC SYMPOSIA

MONDAY, APRIL 1, 2019
- Applications of Psychology in the Work Place (Alcove) .................................................. 8:00 AM – 9:20 AM
- Topics in Occupational Health Psychology (Chouteau C) .................................................. 8:20 AM – 9:40 AM
- Through the Looking Glass: Topics in Anthropological, Archaeological, and Museological Research (Great Hall B) .................................................. 9:00 AM – 12:00 PM
- How the Great Flu Pandemic of 1918 Changed the United States (Great Hall B) .................. 12:50 PM – 3:00 PM

WEDNESDAY, APRIL 2, 2019
- Life, Love, and Invisibility: Regaining Sight through American Modernism (Alcove) ................. 9:00 AM – 11:20 AM
- Citizenship and Service in a Changing World (Great Hall B) ........................................... 11:00 AM – 12:20 PM
- Experimental Applications in Mechanical Engineering Research (Alcove) ............................. 12:40 PM – 2:20 PM

THURSDAY, APRIL 4, 2019
- Research Connect (Chouteau C) ....................................................................................... 1:00 PM – 3:40 PM

FRIDAY, APRIL 5, 2019
- Global Scholars Capstone Projects (Alcove) ........................................................................... 8:20 AM – 2:40 PM

GENERAL CONTRIBUTED SESSIONS

MONDAY, APRIL 1, 2019
- Industrial-Organizational Psychology (Alcove) ....................................................................... 9:40 AM – 11:00 AM
- Geosciences (Chouteau C) ....................................................................................................... 10:00 AM – 11:40 AM
- Biological Sciences I (Chouteau C) .......................................................................................... 1:00 PM – 3:40 PM

TUESDAY, APRIL 2, 2019
- Biological Sciences II (Chouteau C) ........................................................................................... 8:20 AM – 11:20 AM
- Nursing (Great Hall B) ............................................................................................................. 10:40 AM – 12:00 PM
- General Psychology (Chouteau C) ............................................................................................. 12:40 PM – 3:40 PM
- Applied Sciences (Great Hall B) ............................................................................................... 1:00 PM – 3:40 PM

WEDNESDAY, APRIL 3, 2019
- Petroleum Engineering (Great Hall B) ...................................................................................... 8:00 AM – 10:20 AM
- Health Sciences (Chouteau C) .................................................................................................. 9:20 AM – 11:40 AM
- Video Competition Viewing (Chouteau C) ................................................................................ 12:00 PM – 1:00 PM
- Chemical Engineering I (Great Hall B) ...................................................................................... 1:00 PM – 2:40 PM
- General Humanities I (Chouteau C) .......................................................................................... 1:20 PM – 3:00 PM
- College Poster Session (OU-Tulsa Schusterman Campus, Founders Hall) ......................... 2:00 PM – 4:00 PM
- Chemical Engineering II (Great Hall B) .................................................................................... 2:50 PM – 5:00 PM

THURSDAY, APRIL 4, 2019
- Computer Science I (Alcove) ................................................................................................... 10:00 AM – 12:00 PM
- Chemistry I (Great Hall B) ........................................................................................................ 1:00 PM – 2:40 PM
- General Humanities II (Alcove) ............................................................................................... 2:20 PM – 4:40 PM
- Chemistry II (Great Hall B) ....................................................................................................... 3:00 PM – 4:40 PM

FRIDAY, APRIL 5, 2019
- English (Chouteau C) ............................................................................................................... 8:00 AM – 9:40 AM
- Computer Science II (Chouteau C) ............................................................................................ 10:40 AM – 12:20 PM

RESEARCH AWARDS BANQUET
MONDAY, APRIL 8, 2019 (Great Hall A) .................................................................................... 6:00 PM – 8:00 PM
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# 2019 Community Service Symposium

## Judging Criteria

### Service Project Purpose & Significance
- **Purpose**: Presented both a summary of the community service project's purpose and the possible impact had or will have on the community and/or target demographic.  
  - 1 2 3 4 5 6 7 8 9 10
- **Innovativeness**: Provided a significant service to community and/or intended recipient through new and inventive methods. Addressed underrepresented areas of concern or population demographics not typically seen in local service projects.  
  - 1 2 3 4 5 6 7 8 9 10
- **Project Promotion/Continuation**: Offered goals and organization of service project to advance and/or perpetuate community and student involvement.  
  - 1 2 3 4 5 6 7 8 9 10
- **Community Collaboration**: Considered the needs and interests of the project’s targeted community/organization/individuals prior to implementation of service work. Determined the preferences of the targeted audience through research and collaboration with the affected community/individuals.  
  - 1 2 3 4 5 6 7 8 9 10

### Student Commitment & Learning Experience
- **Commitment**: Demonstrated level of commitment to community service project in terms of time and resources for planning, implementation, and/or promotion of project goals and services.  
  - 1 2 3 4 5 6 7 8 9 10
- **Learning Experience**: Explicated project’s impact on student's personal perspective, professional goals, and/or academic focus.  
  - 1 2 3 4 5 6 7 8 9 10

### Quality of Presentation
- **Organization & Presentation of Topic**: Presented both the purposes of the community service project and the scope of student involvement, and student showed the mutual impact on both student and service project alike.  
  - 1 2 3 4 5 6 7 8 9 10
- **Vocalization, Delivery, and Poise**: Addressed the audience with dynamic inflection, modulating vocal volume, poised demeanor, and expressiveness without any distracting or unnecessary physical actions.  
  - 1 2 3 4 5 6 7 8 9 10

---

**Subtotal**

**Bonus**: Challenges/Inconvenience Factor: Degree to which student overcame challenges or inconveniences experienced during the course of their involvement with the chosen community service project.  
(i.e., distance traveled, difficulties associated with the nature/behavior of service project's target audience/location)  
  - 1 2 3 4 5 6 7 8 9 10

**Total**

**Judge's Name** (print) ____________________________  **Signature** ____________________________

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11
# 2019 Annual Student Research Colloquium

## Video Presentation

### Judging Criteria

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### 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.

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

- **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.

- **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.

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

### Secondary Criteria

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

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

---

**SUBTOTAL:**

**TOTAL:**

**Judge’s Name:** __________________________  **Signature:** __________________________

12
2019 ANNUAL STUDENT RESEARCH COLLOQUIUM
ORAL PRESENTATION
JUDGING CRITERIA

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.

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

- **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.

- **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.

- **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.

SECONDARY CRITERIA

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

- **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 ___________________________
CHRONOLOGICAL SUMMARY

MONDAY MORNING, April 1, 2019

SPECIAL TOPIC SESSION: APPLICATIONS OF PSYCHOLOGY IN THE WORK PLACE
Monday, April 1 8:00 AM – 9:20 AM
Allen Chapman Student Union Level 2: Alcove

8:00 AM Wentling, Anna
FACTORS INFLUENCING TEAM SHARED MENTAL MODELS

8:20 AM Monsees, Sabrina
GENDER, LEADERSHIP STYLE, AND FOLLOWER BEHAVIOR IN AN INTERDEPENDENT TEAM TASK

8:40 AM Ozkum, Seren Burak
MEASUREMENT INVARIANCE IN BURNOUT: A MULTICULTURAL STUDY

9:00 AM Ayres, Thomas
PERCEPTIONS OF INEQUITY AND DYADIC EFFECTS ON PERCEIVED WORKLOAD AND TEAMWORK QUALITY

SPECIAL TOPIC SESSION: TOPICS IN OCCUPATIONAL HEALTH PSYCHOLOGY:
TOWARDS AN UNDERSTANDING OF WORK DEMANDS AND EMPLOYEE RECOVERY
Monday, April 1 8:20 AM – 9:40 AM
Allen Chapman Student Union Level 2: Chouteau

8:20 AM Ayres, Thomas
INFLUENCE OF LEADERS ON EMPLOYEE WELL-BEING: DOES WEEKEND RECOVERY MATTER?

8:40 AM Madrigal, Ilisssa
VIEWING CUTE ANIMAL IMAGES: USEFUL FOR RECOVERY OR NOT?

9:00 AM Dickie, Nicole
BURNOUT INHIBITING DIMENSIONS OF RECOVERY

9:20 AM Hockensmith, Kirby
IMPLIEDS OF WORK/LEISURE DEMAND CONGRUENCE: A CONCEPTUAL REVIEW
SPECIAL TOPIC SESSION: THROUGH THE LOOKING GLASS: TOPICS IN ANTHROPOLOGICAL, ARCHAEOLOGICAL, AND MUSEOLOGICAL RESEARCH
Monday, April 1
9:00 AM – 12:00 PM
Allen Chapman Student Union
Level 2: Great Hall B

9:00 AM Caselman, Emily
THE MAMMOTH SITE OF HOT SPRINGS, SD INC.: WHEN AN ACTIVE PALEONTOLOGICAL DIG AND A TOURIST ATTRACTION COLLIDE

9:20 AM Williams, Angela
IMPROVING AUTISM SPECTRUM DISORDER ACCESSIBILITY WITHIN MUSEUMS

9:40 AM Martinez Galicia, Marco
NATIONAL IDENTITY-BUILDING AND CULTURAL APPROPRIATION: EXHIBITION OF ARCHAEOLOGICAL AND HISTORIC MATERIALS AT THE MEXICAN NATIONAL MUSEUM OF ANTHROPOLOGY

10:00 AM Schumacher, Emily
HANDY DANDY DATING TOOLKIT: PIPE STEM AND CERAMIC SERIATION AT CHRISTIANSTED NATIONAL HISTORIC SITE

10:20 AM BREAK

10:40 AM Spjut, Ellica
DIFFUSION OF TECHNOLOGICAL TRAITS IN SOUTHWEST NATIVE AMERICAN GROUPS

11:00 AM Qualls, Zachary
SELF-DETERMINED POWER: CHANGES IN CHEROKEE CLOTHING FROM THE 18TH – 19TH CENTURY

11:20 AM Sorelle, Josie
APACHE GAAN MASKS: OBJECTS OF CULTURAL PATRIMONY UNDER NAGPRA

11:40 AM Haythorn, Richard
A STATISTICAL ANALYSIS OF THE SHAPE OF PALEOINDIAN ENDSCAPERS IN NORTHEASTERN NORTH AMERICA

CONTRIBUTED PAPERS: INDUSTRIAL-ORGANIZATIONAL PSYCHOLOGY
Monday, April 1
9:40 AM – 11:00 AM
Allen Chapman Student Union
Level 2: Alcove

9:40 AM Arnold, Bret
THE HISTORY AND APPLICATION OF JOB CHARACTERISTICS THEORY

10:00 AM Holt, Jacqueline
A DISCUSSION ON ORGANIZATIONAL GOSSIP
10:20 AM Royes, Josh  
INTRA-DYADIC EFFECTS OF ORGANIZATIONAL JUSTICE ON TEAM SATISFACTION

10:40 AM Barber, Samantha  
A QUALITATIVE ASSESSMENT OF TEAM LEARNING

CONTRIBUTED PAPERS: GEOSCIENCES
Monday, April 1  
10:00 AM – 11:40 AM
Allen Chapman Student Union  
Level 2: Chouteau

10:00 AM Bao, Yifei  
MICROSEISMIC LOCATION

10:20 AM Wang, Guan  
A COMBINED GRAZING AND FIRE MANAGEMENT MAY REVERSE WOODY SHRUB ENCROACHMENT IN DESERT GRASSLANDS

10:40 AM Haygood, Lauren  
TESTING AN ION CHROMATOGRAPHY TECHNIQUE TO SEPARATE RARE EARTH ELEMENTS FROM THE CALCIUM IN CARBONATE

11:00 AM Wang, Mengxiu  
FAST SWEEPING METHOD FOR CALCULATING FIRST-ARRIVAL TRAVELTIME IN AN ATTENUATING TITLED TRANSVERSELY ISOTROPIC MEDIUM

11:20 AM Zhao, Zhencong  
FREQUENCY-DOMAIN SEISMIC WAVEFIELD SIMULATION WITH IRREGULAR ROUGH TOPOGRAPHY

MONDAY AFTERNOON, APRIL 1, 2019

SPECIAL TOPIC SESSION: HOW THE GREAT FLU PANDEMIC OF 1918 CHANGED THE UNITED STATES
Monday, April 1  
12:50 PM – 3:00 PM
Allen Chapman Student Union  
Level 2: Great Hall B

12:50 PM Hegdale, Danielle  
HEROES WITHOUT AUTONOMY: WOMEN’S WORK OF THE SPANISH FLU PANDEMIC

1:10 PM Prebish, Lydia  
FLU JULIA: ONE WOMAN’S CRIMES DURING THE 1918 FLU PANDEMIC IN CHICAGO

1:30 PM Fortier, Anthony  
THE SHOW MUST GO ON: ORGANIZED ATHLETICS AND THE 1919 INFLUENZA PANDEMIC
1:50 PM  BREAK

2:00 PM  Lewis, John  
RACISM ENDEMIC IN A FLU PANDEMIC: AFRICAN-AMERICAN TROOPS IN THE GREAT WAR FIGHT THE FLU

2:20 PM  Tresch, Erin  
“WHO IS NOT HERE FOR DEMOCRACY?”: A STUDY OF AMERICAN PATRIOTIC SUPPRESSION AND SUPPORT DURING THE 1918 FLU PANDEMIC

2:40 PM  Wilson, Jazzmin  
“IT’S ALIVE!”: UNBURYING THE MEMORY OF THE 1918 INFLUENZA PANDEMIC IN EARLY AMERICAN HORROR

CONTRIBUTED PAPERS: BIOLOGICAL SCIENCES 1  
Monday, April 1  1:00 PM – 3:40 PM  
Allen Chapman Student Union  Level 2: Chouteau

1:00 PM  Karki, Anand  
RETAIL LIVER JUICES ENHANCE THE SURVIVABILITY OF CAMPYLOBACTER JEJUNI AND CAMPYLOBACTER COLI AT LOW TEMPERATURES

1:20 PM  Ledbetter, Nicholus  
TERRESTRIALITY CONSTRAINS SALAMANDER LIMB DIVERSIFICATION: IMPLICATIONS FOR THE EVOLUTION OF PENTADACTYLY

1:40 PM  Herrboldt, Madison  
THE IMPACT OF LIFE HISTORY ON MALE SALAMANDER REPRODUCTION

2:00 PM  Ford, Bart  
T-CELL SUBSETS ASSOCIATED WITH CYTOMEGALOVIRUS AND FAMILY HISTORY OF MOOD DISORDER

2:20 PM  BREAK

2:40 PM  Ballard, Kaylee  
INFLUENCE OF STAPHYLOCOCCUS AUREU CO-CONTAMINATION ON SURVIVAL OF CAMPYLOBACTER STRAINS AT LOW TEMPERATURE, BIOFILM FORMATION AND AEROTOLERANCE

3:00 PM  Lanham, Elizabeth  
PHYLOGENETIC ANALYSIS OF INDONESIAN AMETHYSTINE PYTHONS

3:20 PM  Greer, Cory  
SHONO-TYPE OXIDATION OF CARBAMATES
TUESDAY MORNING, April 2, 2019

CONTRIBUTED PAPERS: BIOLOGICAL SCIENCES 2
Tuesday, April 2       8:20 AM – 11:20 AM
Allen Chapman Student Union Level 2: Chouteau

8:20 AM Khanal, Vivek
  PHYLOGENETIC ANALYSIS OF FIRST COMPLETE GENOME OF CUCURBIT
  APHID-BORNE YELLOWS VIRUS FROM THE UNITED STATES

8:40 AM Secrist, Kathryn
  INCIDENCE OF PEPPER MILD MOTTLE VIRUS IN OKLAHOMA DURING THE
  2017 AND 2018 GROWING SEASONS

9:00 AM Mokhtari, Samira
  SEARCH FOR GOOD VIRUSES IN FUNGI

9:20 AM Wijayasekara, Dulanjani
  BIOLOGICAL AND MOLECULAR CHARACTERIZATION OF A WILD MAIZE
  DWARF MOSAIC VIRUS IN JOHNSON GRASS IN OKLAHOMA

9:40 AM BREAK

10:00 AM Premkumar, Abhishek
  THE EFFECT OF CLIMATE CHANGE ON QUERCUS AND MORUS POLLEN IN
  TULSA, OKLAHOMA

10:20 AM Molina, David
  AMBROSIA AND POACEAE POLLEN AEROBIOLOGY IN TULSA, OKLAHOMA

10:40 AM Cantwell, Caleb
  IDENTIFICATION OF NON-PATHOGENIC AMOEBAE ISOLATED FROM FORT
  GIBSON LAKE AUGUST, 2018 BY PCR

11:00 AM Ferguson, Connor
  SEED TRANSMISSION OF GARLIC VIRUS C IN OKLAHOMA

CONTRIBUTED PAPERS: NURSING
Tuesday, April 2       10:40 AM – 12:00 PM
Allen Chapman Student Union Level 2: Great Hall B

10:40 AM Graham, Susan
  THE DANGERS OF STRANGULATION

11:00 AM Thomas, Jacob
  VALIDATION OF WEARABLE SENSOR TECHNOLOGY
11:20 AM Hannagan, Molly
INVESTIGATING PROCEDURAL PAIN OF HYALURONIC ACID KNEE INJECTION FOR THE TREATMENT OF OSTEOARTHRITIS

11:40 AM Trujillo, Francisca
CULTURALLY-ADAPTED DIABETES SELF MANAGEMENT EDUCATION

TUESDAY AFTERNOON, APRIL 2, 2019

CONTRIBUTED PAPERS: GENERAL PSYCHOLOGY
Tuesday, April 2  12:40 PM – 3:40 PM
Allen Chapman Student Union  Level 2: Chouteau

12:40 PM Toledo, Tyler
THE COST OF ANGER INHIBITION ON PAIN

1:00 PM Law, Rebekah
WORKPLACE RESILIENCE MEASURES: A CONTENT ANALYSIS

1:20 PM Mulligan, Ryan
THE EFFECTS OF POLYPHARMACY AND NUMBER OF MEDICAL AND PSYCHIATRIC COMORBIDITIES ON COGNITIVE PERFORMANCE IN MULTIPLE SCLEROSIS

1:40 PM Guzman, Daniel
PERFORMANCE AND SYMPTOM VALIDITY IN INPATIENT DEPRESSIVES

2:00 PM BREAK

2:20 PM Sitz, Amber
THE RELATIONSHIP BETWEEN WORD ASSOCIATION TASKS AND PSYCHOTIC INDICATORS

2:40 PM Durosky, Ariel
NEW YORK TIMES FRAMING OF SCHOOL SHOOTINGS: A COMPARISON BETWEEN COLUMBINE AND PARKLAND

3:00 PM Richardson, Julia
INVESTIGATING PRIMARY SUBSTANCE OF ABUSE AS A PREDICTOR OF DRUG TREATMENT PROGRAM OUTCOMES

3:20 PM Hoffmeister, Jordan
NEUROBEHAVIORAL CORRELATES OF EUPHORIC AND DYSPHORIC MOOD IN MULTIPLE SCLEROSIS
CONTRIBUTED PAPERS: APPLIED SCIENCES

Tuesday, April 2 1:00 PM – 3:40 PM
Allen Chapman Student Union Level 2: Great Hall B

1:00 PM Huang, Shiquing
GROUND COLLISION AVOIDANCE SYSTEM (GCAS) PARAMETRIC STUDY: VERTICAL MANOEUVRE

1:20 PM Bales, Charles
DEVELOPING ELECTRONIC CONTROL FOR MAINTAINING MOBILE FSO LINKS

1:40 PM Neupane, Ganga
COMPARISON OF FE- AND CO- DOPED ZNO NANOPARTICLES SYNTHESIZED BY MICROWAVE METHOD.

2:00 PM Rathnasekara, Rusiri
COMPARISON OF PLATIUNM (PT) COUNTER ELECTRODES DEPOSITED BY SPIN COATING METHOD AND ELECTROCHEMICAL METHOD FOR DYE-SENSITIZED SOLAR CELLS (DSSCS)

2:20 PM BREAK

2:40 PM Weindel, Alexandra
SEPARATING MEAL RELATED ANXIETY FROM GENERAL ANXIETY USING STATISTICAL MAPPING OF HEARTBEAT SENSATIONS

3:00 PM Mathur, Nitesh
AN ALGORITHM TO REVERSE THE GENERALIZED FACTORIALS PROCESS

3:20 PM Bled, Philippe
DECISION MODEL FOR APPLICATION OF MACHINE LEARNING METHODS IN FRAUD DETECTION

WEDNESDAY MORNING, APRIL 3, 2019

CONTRIBUTED PAPERS: PETROLEUM ENGINEERING

Wednesday, April 3 8:00 AM – 10:20 AM
Allen Chapman Student Union Level 2: Great Hall B

8:00 AM Abad, Alan
EFFECT OF TUBING PERTURBATIONS OVER LIQUID LIFT PERFORMANCE IN GAS WELLS

8:20 AM Buitrago Gomez, Lewis
DROPLET SPLASHING AT ELEVATED PRESSURE
8:40 AM  Avila Maclque, Nicolas  
DYNAMIC VOID FRACTION SENSOR FOR DOWNHOLE SEPARATOR EVALUATION

9:00 AM  BREAK

9:20 AM  Suminar, Kurniawan  
APPLICATION OF MACHINE LEARNING IN CUTTINGS TRANSPORT

9:40 AM  Suminar, Kurniawan  
COLLISION DETECTION IN CLUSTER WELL USING CUBIC SPACE METHOD

10:00 AM  Batra, Sikandar  
FACTORS AFFECTING HYDRAULIC SWEEP ‘PILLS’ EFFICIENCY IN HIGHLY INCLINED WELL BORES

SPECIAL TOPIC SESSION: LIFE, LOVE, AND INVISIBILITY: REGAINING SIGHT THROUGH AMERICAN MODERNISM  
Wednesday, April 3  
9:00 AM – 11:20 AM  
Allen Chapman Student Union  
Level 2: Alcove

9:00 AM  Smith Williams, James  
AN ANALYSIS OF TOXIC MASCULINITY IN KATE CHOPIN’S THE AWAKENING

9:20 AM  Williams, Abby  
SOCIETY AND SUBMERGED STANDARDS IN KATE CHOPIN’S THE AWAKENING

9:40 AM  Ndhlovu, Themba  
INVISIBLE MEN

10:00 AM  BREAK

10:20 AM  McLin, Sina  
WHAT’S LOVE GOT TO DO WITH IT: IDENTITY AND IRONY IN KATE CHOPIN’S THE AWAKENING

10:40 AM  Kvasnicka, Michael  
THE EMANATING THEME OF MORTALITY IN FAULKNER’S AS I LAY DYING

11:00 AM  Wennemyr, Fynn  
THE DAWNING OF MODERN LOVE IN ERNEST HEMINGWAY’S THE SUN ALSO RISES

CONTRIBUTED PAPERS: HEALTH SCIENCES  
Wednesday, April 3  
9:20 AM – 11:40 AM  
Allen Chapman Student Union  
Level 2: Chouteau

9:20 AM  Patrock, Victoria  
MICROFINANCE AND HEALTH: AN INTEGRATED APPROACH
9:40 AM Sinik, Megan
RELATIONSHIP BETWEEN PSYCHOTROPIC MEDICATION USE AND SUFFOCATION FEAR

10:00 AM Zandy, Rachel
SPATIAL ACCESS TO RESOURCES POST-ONSET OF APHASIA IN TULSA COUNTY

10:20 AM BREAK

10:40 AM Mayberry, Natalie
THE EFFECTIVENESS OF A ONE TIME TRAINING PROGRAM FOR LAW ENFORCEMENT OFFICERS ON ACQUIRED COMMUNICATION DISORDERS

11:00 AM Anderson, Erin
PARENTAL KNOWLEDGE OF DEVELOPMENTAL MILESTONES IN CHILDREN WITH COMMUNICATION DISORDERS AND MULTIPLE DISABILITIES

11:20 AM Nelson, Kathryn
ASSESSING LANGUAGE SKILLS OF INTERNATIONALLY-ADOPTED CHILDREN DURING THE SCHOOL-AGE YEARS

SPECIAL TOPIC SESSION: CITIZENSHIP AND SERVICE IN A CHANGING WORLD
Wednesday, April 3 11:00 AM – 12:20 PM
Allen Chapman Student Union Level 2: Great Hall B

11:00 AM Mayberry, Natalie
THE EFFECTIVENESS OF A ONE TIME TRAINING PROGRAM FOR LAW ENFORCEMENT OFFICERS ON ACQUIRED COMMUNICATION DISORDERS

11:20 AM Luper, Caden
EWB-TU INTERNATIONAL SANITATION PROJECT

11:40 AM Harrison, Joshua
EWB-TU CONVERSION OF WASTE VEGETABLE OIL INTO BIODIESEL FOR USE ON CAMPUS

12:00 PM Johnson, Kyle
KENDALL WHITTIER CREATIVE PLACEMAKING
WEDNESDAY AFTERNOON, APRIL 3, 2019

SPECIAL TOPIC SESSION: EXPERIMENTAL APPLICATIONS IN MECHANICAL ENGINEERING RESEARCH

Wednesday, April 3      12:40 PM – 2:20 PM
Allen Chapman Student Union     Level 2: Alcove

12:40 PM Akhtar, Musamma
DESIGNING AND BUILDING A GEAR BASED TENSILE MACHINE

1:00 PM Brown, Maximilian
DIGITAL IMAGE CORRELATION FOR HIGH SPEED AND HIGH STRAIN APPLICATIONS

1:20 PM Esther, Emily
AN ADJUSTABLE BALANCING PLATFORM TO IMPROVE CORE STABILITY IN CHILDREN WITH SPECIAL NEEDS

1:40 PM Stancil, Justin
DETERMINATION OF THE MECHANICAL PROPERTIES OF CERAMIC PARTICLES AT ELEVATED TEMPERATURES

2:00 PM Moses, Daniel
SELF HEALING IN POLYMER SEALS VIA LAMINATED VASCULAR NETWORKS

CONTRIBUTED PAPERS: CHEMICAL ENGINEERING 1

Wednesday, April 3      1:00 PM – 2:40 PM
Allen Chapman Student Union     Level 2: Great Hall B

1:00 PM Ramasubramanian, Vaidheeshwar
EFFECT OF ADDITION OF K, RH, AND FE OVER MO/HZSM-5 ON METHANE DEHYDROAROMATIZATION UNDER NON-OXIDATIVE CONDITIONS

1:20 PM Chaudhry, Muhammad
HYDROTHERMAL CARBONIZATION OF BIOMASS MODEL COMPOUNDS

1:40 PM Ng, Chee Yang
CARBON ENCAPSULATED IRON NANOPARTICLES FOR REMOVAL OF HEAVY METALS FROM AQUEOUS SOLUTIONS

2:00 PM Kundu, Rahul
INVESTIGATION OF BIOCHAR DISSOLUTION IN TETRALIN TO PRODUCE VALUE-ADDED CHEMICALS

2:20 PM Lignieres, Austin
INVESTIGATION OF BIOCHAR DISSOLUTION TO PRODUCE CHEMICALS AND FUELS
CONTRIBUTED PAPERS: GENERAL HUMANITIES 1  
Wednesday, April 3  
1:20 PM – 2:40 PM  
Allen Chapman Student Union  
Level 2: Chouteau  

1:20 PM  Seaver, Victoria  
NARRATIVE IN HUMAN RIGHTS LAW  

1:40 PM  Isaak, Alexandra  
HYBRIDITY IN TELEVISION GENRES: THE COP DRAMA AND SITUATIONAL COMEDY IN NBC’S BROOKLYN NINE-NINE  

2:00 PM  Brooks, Margaret  
DEFYING CATEGORIES: REPRESENTATIONS OF LUCIA RIJKER IN MEDIA  

2:20 PM  Clark, Julianne  
FLORA: A HISTORY OF WOMEN AND PLANTS  

CONTRIBUTED PAPERS: CHEMICAL ENGINEERING 2  
Wednesday, April 3  
2:50 PM – 5:00 PM  
Allen Chapman Student Union  
Level 2: Great Hall B  

2:50 PM  Li, Xiangpeng  
EFFECT OF STORAGE TEMPERATURE ON NUTRIENT COMPOSITION DEGRADATION IN CHLAMYDOMONAS REINHARDTII  

3:10 PM  Slavens, Shelyn  
EXPRESSION OF THE COFACTOR REGENERATION ENZYME PHOSPHITE DEHYDROGENASE IN THE CHLAMYDOMONAS REINHARDTII NUCLEAR GENOME  

3:30 PM  Trigo, Elio  
FOAM DRAINAGE EQUATION  

3:50 PM  BREAK  

4:00 PM  Zhang, Hanxiao  
PREDICTING PHASE EQUILIBRIA OF ASSOCIATING FLUIDS USING CPA EQUATION OF STATE  

4:20 PM  Doerfler, Jacob  
USING 3D PRINTING TO IMPROVE THE METHOD OF PROTOTYPING BIOSENSORS  

4:40 PM  Juarez, Luis  
WATER EFFECTS ON ROOM TEMPERATURE IONIC LIQUIDS (RTILS) DURING ELECTROCHEMICAL REDUCTION PROCESS OF CRYSTALLINE SILICON (C-SI) FROM SILICON DIOXIDE (SIO2)
THURSDAY MORNING, April 4, 2019

CONTRIBUTED PAPERS: COMPUTER SCIENCE 1
Thursday, April 4
Allen Chapman Student Union
10:00 AM – 12:00 PM
Level 2: Alcove

10:00 AM Macke, William
LEARNING COLLABORATIVE SHEPHERDING BEHAVIORS

10:20 AM Riley, Ian
THE EVALUATION OF SELF-IMPOSED REQUIREMENTS USING STOCHASTIC MULTI-PLAYER GAMES

10:40 AM Simpson, Geoffrey
BUSINESS EMAIL COMPROMISE: DATA ANALYSIS FROM THE FBI’S INTERNET CRIME COMPLAINT CENTER

11:00 AM BREAK

11:20 AM Shaw, Magera
FORWARD AND REVERSE LOCOMOTION IN C. ELEGANS

11:40 AM Habib, Abraham
A CYBER-PHYSICAL SYSTEM TESTBED FOR SECURITY EXPERIMENTATION AND DATA ACQUISITION

THURSDAY AFTERNOON, APRIL 4, 2019

SPECIAL TOPIC SESSION: RESEARCH CONNECT
Thursday, April 4
Allen Chapman Student Union
1:00 PM – 3:40 PM
Level 2: Chouteau

1:00 PM Williams, Henry
DIRECT CONTACT MEMBRANE DISTILLATION SYSTEM

1:20 PM Sedrez, Thiana
CFD SIMULATIONS AND EXPERIMENTS OF SAND EROSION FOR LIQUID-DOMINATED FLOWS IN ELBOWS IN SERIES

1:40 PM Asgharpour, Alireza
CFD SIMULATION OF SOLID PARTICLE EROSION

2:00 PM Badrinarayanan, Indreesh
HYDRODYNAMICS OF AN ALGAE BIOREACTOR – A CFD SIMULATION BASED STUDY

2:20 PM BREAK
2:40 PM  Kerst, Bradford
ACTIVE HEAD SUPPORT FOR CHILDREN WITH HYPOTONIA

3:00 PM  Pulleyking, Spenser
EXPLORING THE USE OF BIOMIMETIC THUMBS FOR ROBOTIC GRASPING AND MANIPULATION

3:20 PM  Tran, Emily
A MECHANICAL BUBBLE MACHINE FOR CHILDREN WITH SPECIAL NEEDS

CONTRIBUTED PAPERS: CHEMISTRY 1
Thursday, April 4  1:00 PM – 2:40 PM
Allen Chapman Student Union    Level 2: Great Hall B

1:00 PM  Baljak, Irene
EFFECT OF AMINO ACID DEPOSITION ON AU (111) - AN EC-STM STUDY

1:20 PM  Sheaff, Marjorie
IMPROVED ELECTROCHEMICAL PERFORMANCE OF FUSED FILAMENT FABRICATION 3D PRINTED ELECTRODES USING HYDROXIDE TREATMENT METHODS

1:40 PM  Gallegos, Jillian
VISIBLE-LIGHT PHOTOCATALYTIC APPROACH TOWARDS CHLORINATION OF ARENES

2:00 PM  Hanson, Andrew
IODINE-PROMOTED FORMATION OF N-SULFONYL IMINES AND N-ALKYSULFONAMIDES FROM ALDEHYDES AND HYPERVALENT IODINE REAGENTS

2:20 PM  Keyani, Feroz
ALPHA CHLORINATION OF CARBONYL USING TCCA AND BRILLIANT GREEN

CONTRIBUTED PAPERS: GENERAL HUMANITIES 2
Thursday, April 4  2:20 PM – 4:40 PM
Allen Chapman Student Union    Level 2: Alcove

2:20 PM  Tresch, Erin
“WHO HERE IS NOT FOR DEMOCRACY”: A STUDY OF AMERICAN PATRIOTIC SUPPRESSION AND SUPPORT DURING THE 1918 FLU PANDEMIC EVALUATION OF SELF-IMPOSED REQUIREMENTS USING STOCHASTIC MULTI-PLAYER GAMES

2:40 PM  Prolago, Piper
THE ROLE OF QUEENS IN HOMER'S "THE ODYSSEY"

3:00 PM  Haynes, Maureen
“STRUGGLING SILENTLY IS NOT ENOUGH:” THE POWER OF OKLAHOMA TEACHER EXPERIENCES AND PROTESTS
3:20 PM BREAK

3:40 PM Mortadha, Layla
ASSESSING EFFECTS OF PUBLIC ART ON COMMUNITY CAPACITY AND INDIVIDUAL HEALTH IN GREENWOOD

4:00 PM Fusco, Heath
MAKING A MAN: A DECONSTRUCTION OF THE GREEKS’ STATIC CONCEPTION OF MASCULINITY

4:20 PM Dewey, Jessica
DISPLAYING IDENTITY: ISABELLA D’ESTE’S GENDER NEGOTIATION IN THE STUDIOLO

CONTRIBUTED PAPERS: CHEMISTRY 2
Thursday, April 4 3:00 PM – 4:40 PM
Allen Chapman Student Union Level 2: Great Hall B

3:00 PM Hmeluk, Natalie
GREEN TEA REGULATION OF SUGAR METABOLISM

3:20 PM Boyd, Kennedy
INVESTIGATING THE EFFECTS OF AMINO ACIDS ON SILVER HALIDE THIN FILMS ON AU (111)

3:40 PM Harville, Lauren
THE THERMAL STABILITY OF NANO-ALLOYS ON AU (111)

4:00 PM Kaur, Rajdeep
DETERMINATION OF SPECIFIC AMINO ACIDS METABOLIZED BY CELLS WITH DEREGULATED P27KIP1 PROTEIN

4:20 PM Arledge, Samantha
AN ANALYSIS OF CORTISOL AND MAGNESIUM ON FLOAT-REST STUDIES

FRIDAY MORNING, April 5, 2019

CONTRIBUTED PAPERS: ENGLISH
Friday, April 5 8:00 AM – 9:40 AM
Allen Chapman Student Union Level 2: Chouteau

8:00 AM Farmen, Layne
BREAKING BREAD, SIPPING MANISCHEWITZ WINE: THE HERMENEUTICS OF LAURYN HILL
8:20 AM  Ellis, Gail
SOCIETAL TRENDS AND POLITICAL COMMENTARY IN SEVENTEENTH CENTURY FORTUNE-TELLING LITERATURE

8:40 AM  BREAK

9:00 AM  Hrncir, Destiny
EXPLORATIONS OF GRIEF

9:20 AM  Hurlock, Grant
EVOLUTION AND EXISTENTIALISM ON THE WORLD WAR II HOME FRONT

SPECIAL TOPIC SESSION: GLOBAL SCHOLARS 1
Friday, April 5  8:20 AM – 11:40 AM
Allen Chapman Student Union  Level 2: Alcove

8:20 AM  Gattu, Mrudula
MOTHER SCHOOLS: THE MISSING ALLY FOR COUNTERTERRORISM AND PREVENTING RADICALIZATION

8:40 AM  Hu, Allan
CYTOTOXIC EFFECT OF BLUE LIGHT ON MAMMALIAN CELLS

9:00 AM  Aycock, Lauren
AN EXAMINATION OF THE OBSTACLES HOLDING OKLAHOMA FROM ITS SOLAR ENERGY POTENTIAL

9:20 AM  Carter, Jamie
THE EFFECT OF INDUSTRIAL COMBUSTION ON POLLUTANT LEVELS IN THE ENVIRONMENT

9:40 AM  BREAK

10:00 AM  Sawyer, Mary
ABSTRACT FOR ATRG 4063

10:20 AM  Conn, Michaela
WHERE INNOVATION COMES UP SHORT: ROLE OF MARKETING AND STRATEGY IN SMALL BUSINESS TECHNOLOGY ADOPTION

10:40 AM  Bebermeyer, Anna
THE ROLE, IMPACT, AND PERCEPTION OF WOMEN IN THE SOUTH KOREAN AND BRAZILIAN BUSINESS SPHERE

11:00 AM  Johnson, Margaret
EVALUATING THE ROLE OF UNICEF IN COMBATING MALNUTRITION IN REGIONS OF ASIA AND AFRICA
11:20 AM Dabney, Hope
THE GLOBAL AUTISM PROJECT

CONTRIBUTED PAPERS: COMPUTER SCIENCE 2
Friday, April 5 10:40 AM – 12:20 PM
Allen Chapman Student Union Level 2: Chouteau

10:40 AM Valencia, Joseph
LTRDETECTOR: A MODERN TOOL SUITE TO DETECT LTR-RETROTRANSPOSONS

11:00 AM Pritchard, Shadow
ASSESSING NUTRIENT LEVELS IN PLANTS USING ELECTROMAGNETIC SENSORS

11:20 AM Velasco, Alfredo
HEBBPLOT: AN INTELLIGENT TOOL FOR LEARNING AND VISUALIZING CHROMATIN MARK SIGNATURES

11:40 AM James, Benjamin
MESHCLUST2: APPLICATION OF ALIGNMENT-FREE IDENTITY SCORES IN CLUSTERING LONG DNA SEQUENCES

12:00 PM Dees, Adam
SELECTING AND ORIENTING INFLUENCING AGENTS FOR EFFECTIVE FLOCK CONTROL

FRIDAY AFTERNOON, April 5, 2019

SPECIAL TOPIC SESSION: GLOBAL SCHOLARS 2
Friday, April 5 1:00 PM – 2:40 PM
Allen Chapman Student Union Level 2: Alcove

1:00 PM Bacani, Rigel Chaira
SUPPORT FOR THE STIGMATIZED: HOW HARM REDUCTION HELPS MORE THAN JUST INTRAVENOUS DRUG USERS

1:20 PM Meneely, Sophia
A CROSS-CULTURAL COMPARISON OF HIV/AIDS THROUGH MEDICAL, GOVERNMENTAL AND SOCIAL LENSES

1:40 PM Elmore, Darcy
DESERT FOODS: A CASE STUDY

2:00 PM Krusniak, Aaron
MAPPING EVICTION IN THE CITY OF TULSA

2:20 PM Lignieres, Austin
A COMPARISON OF MENTAL HEALTH CARE FOR VULNERABLE POPULATIONS IN MENDOZA, ARGENTINA, AND TULSA, OK, USA
APPLICATIONS OF PSYCHOLOGY IN THE WORKPLACE

Monday, April 1: 8:00 AM – 9:20 AM (Alcove)
Organizer: Dr. Anupama Narayan

Industrial-Organizational psychology is a field that utilizes scientific methodology to better understand the behavior of individuals working in organizational settings (Jex & Britt, 2014). However, the domain of I-O psychology stretches well beyond the physical boundaries of workplace because many of the factors that influence work behavior are not always found in the work environment. These factors include individual differences such as personality and motivation, national cultural influences, and team dynamics. The content presented in this symposium focus on diversity and cross-cultural issues, cross over effects of stress, and team learning.

TOPICS IN OCCUPATIONAL HEALTH PSYCHOLOGY: TOWARDS AN UNDERSTANDING OF WORK DEMANDS AND EMPLOYEE RECOVERY

Monday, April 1: 8:20 AM – 9:40 AM (Chouteau C)
Organizer: Thomas Ayres

Understanding the effects of work demands on employees has been a focal point of study in occupational health research (Demerouti et al., 2001; Griffin & Clarke, 2011). Individual employees can experience demands from their job in a variety of areas and use both personal and job resources to meet these demands (Schaufeli & Taris, 2014). Some of these organizational demands on employees include job task demands and leader’s influences. An additional demand employees experience comes from the non-work context. Indeed, balancing the demands that come from work and off-work has been shown to influence employee outcomes (Brummelhuis & Bakker, 2012). When these demands are met with resources at the disposal of the individual or become out of balance, employees can experience negative consequences such as burnout (Demerouti et al., 2001; Maslach, Schaufeli & Leiter, 2001; Meijan & Mulder, 1998; Schaufeli & Taris, 2014).

When resources are lost, employees are faced with a need to regain resources, or recover (Sonnentage, 2018). This mechanism to regain lost resources has important implications for how individuals deal with the loss of resources due to work and life demands. Individuals engage in many different activites that aid in recovery (Fritz, Sonnentag, & McInroe, 2010). However, the impact negative outcomes have (e.g., burnout) may inhibit the ability to recover. The series of studies and presentations in this colloquium focus around the demands put on individuals during work and off-work time, and how individuals recover from negative outcomes such as burnout. Specifically these presentations address 1) a conceptual review of work/family demand congruence and related implications, 2) a proposed experiment examining how looking at images can aid in resource recovery, 3) examining the potential inhibition of recovering from work stress due to negative health consequences of stress (e.g., burnout) and 4) examining the how recovery experiences (mechanisms to regain lost resources) influence the relationship between leadership (a potential job demand or resources) and employee well-being (both positive, e.g., engagement, and negative e.g., burnout).
THROUGH THE LOOKING GLASS: TOPICS IN ANTHROPOLOGICAL, ARCHAEOLOGICAL, AND MUSEOLOGICAL RESEARCH  
Monday, April 1: 9:00 AM – 12:00 PM (Great Hall B)  
Organizer: Emily Schumacher

Within the 4.5-billion-year history of Earth, it has only been in the last approximately 300,000 years that the human species, Homo sapiens, arose. And yet within this short few hundred thousands years, dispersal, technology, social learning, and ultimately human culture created a diverse and vibrant world that our early ancestors could perhaps only envision in their wildest dreams. Today, humans live in an ever connected, globalized, and mechanized world while maintaining an eye toward the future; however, we also strive to preserve the remnants of the past (art, languages, traditions, etc.) lest they be forgotten. It is this dual purpose that unites anthropological, archaeological, and museological research. And though each is unique in its emphasis and methodologies, these three fields collectively represent an effort to understand and preserve human culture and its myriad expressions for present as well as future generations.

This special topic symposium represents an exploration of significant themes within anthropological, archaeological, and museological research related to engaging, understanding, and preserving the human cultural past in the present while remaining cognizant of and preparing for the future. In this interdisciplinary session, speakers will cross time, boundaries, and methodologies as they shed light on pertinent issues and research within the fields of Anthropology, Archaeology, and Museum Science. Topics will include accessibility and education, ethics and identity, the importance of chronology, interpretive spaces, cultural diffusion, public engagement, and more.

HOW THE GREAT FLU PANDEMIC OF 1918 CHANGED THE UNITED STATES  
Monday, April 1: 12:50 PM – 3:00 PM (Great Hall B)  
Organizer: Dr. Jan Wilson

This symposium examines the impact on the United States of the great flu pandemic of 1918. The pandemic lasted just fifteen months but was the deadliest disease outbreak in human history, killing between fifty-million and one-hundred million people worldwide. It claimed more lives than those killed in combat in every war of the twentieth century combined. It killed more people in a year than AIDS has killed in forty years, more than the bubonic plague killed in a century. The impact of the pandemic on the United States alone is sobering to contemplate. More than twenty-five percent of the US population fell ill with the flu and some 670,000 Americans died, so many, in fact, that the average life span in the United States fell by twelve years in 1918.

Influenza dominated the front pages of newspapers across the nation during the fall of 1918 and lodged itself deeply in the experiences and memories of those who survived it. Curiously, however, this epidemic that devastated the United States and the world soon faded from public and historical memory. And the epidemic failed to capture the imagination of contemporary writers and artists. Hence, few people living today know anything about this catastrophic episode in human history. Even with today’s growing literature on the historical, epidemiological, and public health aspects of the pandemic, significant lacunae remain in our social and cultural understanding of this cataclysmic event.

This symposium attempts to resurrect the largely forgotten history of the 1918 flu pandemic. In their individual paper presentations, students will examine how Americans responded to the incursion of disease with measures used since ancient times, such as quarantines, social distancing, and the cessation of essential services. They will detail how public health professionals on the home front, including many volunteer nurses, deployed their limited medical arsenal as they tirelessly tended to the ill and attempted to contain the spread of disease. They will recount the personal tragedies that unfolded and irrevocably changed the lives of those who survived. They will analyze how fear and suspicion of minorities and immigrant communities grew.

In the wake of the pandemic, the nation faced the daunting task of healing itself and learning from this catastrophic experience. Schools, universities, and businesses closed, and people were encouraged to practice isolation. The Great Flu of 1918 claimed the lives of thousands across the nation, and it left a lasting impact on American society. This symposium seeks to explore the ways in which the flu pandemic reshaped American culture and left a lasting legacy on the nation’s collective memory.
communities prevailed in many cities and towns across the US. They will investigate how the pandemic unfolded across a wide spectrum of communities that were diverse in race, ethnicity, age, gender, and socioeconomic means, factors that greatly influenced wide disparities in suffering, morbidity, and mortality rates. And they will consider the extent to which the pandemic has lived on in American collective memory through the literary and filmic artifacts of the immediate post-WWI decades.

LIFE, LOVE, AND INVISIBILITY: REGAINING SIGHT THROUGH AMERICAN MODERNISM
Wednesday, April 3: 9:00 AM – 11:20 AM (Alcove)
Organizer: Dr. Stewart Habig

This session uses various American modernist literary texts to investigate the formation and persistence of contemporary social dynamics. The primary tool of the modernist author is irony, and this special topic symposium explores the ways in which William Faulkner, Kate Chopin, Ralph Ellison, and Ernest Hemingway infuse their writing with irony to expose the widespread toxicity produced by imbalanced gender dynamics, social inequities, and institutional racism. Faulkner plays with time and space in his novel *As I Lay Dying* to illustrate the impact of mortality on individual and communal identity formation. Likewise, Ellison encodes his novel with an aesthetic irony that indicts a mid-century American hegemony predicated on racism. Hemingway focuses on the individual to complicate contemporary notions of love and romance, while Kate Chopin’s feminist novella inspires an enthusiastic awakening among critics to the inequalities inherent within the 20th century Southern white patriarchy. Each of these presentations begins with in-depth textual analysis that situates their arguments within the relationship between the author and their novel. Their collective framework is then extended past the material page to contemporary social discourse, where sexism, racism, and socio-economic disparities unfortunately remain relevant societal issues. The connections between literature and these discursive forums speak to the importance of literary study and critical thinking as these texts help destabilize established perspectives that remain static despite our existence within an increasingly dynamic and globalized society. The irony employed by these authors politically undermines culturally accepted thoughts on love, romance, death, and race, and the presentations in this symposium analyze texts and their ironies to not only argue for these text’s contemporary relevance, but also for the intersectionality between analytical thinking, literature, and social awareness.

CITIZENSHIP AND SERVICE IN A CHANGING WORLD
Wednesday, April 3: 11:00 AM – 12:20 PM (Great Hall B)
Organizer: Caitlin Getchell (Graduate School)

“Citizenship and Service in a Changing World” is concerned with providing a forum for TU students to discuss and promote community service projects they have been involved in within the last 12 months. The University of Tulsa has always actively encouraged involvement in the community and this symposium will provide an opportunity for students to gain public-speaking experience while discussing their preferred community service organizations or projects to a larger audience.

EXPERIMENTAL APPLICATIONS IN MECHANICAL ENGINEERING RESEARCH
Wednesday, April 3: 12:40 PM – 2:20 PM (Alcove)
Organizer: Laura Waldman

Mechanical engineering, as a field, encompasses many topics, and the knowledge and techniques developed for engineering can be applied to problems from many other disciplines. The breadth of problems covered by mechanical engineering creates many opportunities for research projects for both graduate and undergraduate students. In this session, students will present
on their experimentally based engineering research. The applications of these projects include topics such as community service based projects, industry sponsored research, and studies for renewable energy projects, among others. Each presentation in this session will focus on the engineering analysis done by the student during the process of their research, but will also include the context necessary to understand the relevance and importance of this research. Students in this session range from juniors who are just beginning the process of research to graduate students who are nearing graduation who have more experience with the presentation of technical research. Each student presenting in this session, in order to more fully develop their technical communication ability, will be working with a graduate student mentor for additional practice in technical writing and presentation skills prior to the Colloquium. Because of the varied nature of mechanical engineering research, and the varied nature of the presentations in this session, the student presenters will have the opportunity to learn about areas of research outside of their own specialty. This session will be judged so that students will have the opportunity to present to and receive feedback from individuals who are not familiar with their fields.

**RESEARCH CONNECT**

**Thursday, April 4: 1:00 PM – 2:20 PM (Chouteau)**

Organizer: Indreesh Badrinarayanan

“An event created to give an opportunity for graduate students to present their ongoing research work to potential employers.”

In this event, graduate students will interact and give presentations to potential employers from national laboratories and R&D companies, who will also be a part of the judging panel for the presentations and give their feedback. Last year we had Dr. Pienkos from National Renewable Energy Laboratory (NREL). In the second edition of this event, the theme for this year's session is "Computational Fluid Dynamics for Engineers". Computational fluid dynamics (CFD) is the use of applied mathematics, physics and computational software to visualize how a gas or liquid flows -- as well as how the gas or liquid affects objects as it flows past. Computational fluid dynamics is based on the Navier-Stokes equations. These equations describe how the velocity, pressure, temperature, and density of a moving fluid are related.

This year, we have a speaker from Siemens PLM Software based in Houston, Texas whose expertise is in CFD (STAR-CCM+). The speaker will also conduct a free workshop and give a talk on "Modeling Turbulent Flow phenomena". It is a great opportunity to network and get to know the latest developments in CFD.

**GLOBAL SCHOLARS**

**Friday, April 5: 8:40 AM – 11:20 AM & 12:40 PM – 3:20 PM (Alcove)**

Organizer: Dr. Lara Foley

Students in the TU Global Scholars Program are required to complete a capstone project connecting work in their major field of study to the Global Scholars curriculum. Because Global Scholars is an interdisciplinary program, student project topics will vary considerably. What will connect the presentations in this symposium is that students will speak to the global applications or implications of the work they have done. This year students will present comparative studies Related to energy, transportation, business, counterterrorism and healthcare.
Abad, Alan  
**EFFECT OF TUBING PERTURBATIONS OVER LIQUID LIFT PERFORMANCE IN GAS WELLS**

Liquid loading is a major problem in gas well production where gas loses the ability to transport the liquid to the surface. The liquid accumulation increases the bottom hole pressure reducing the gas production. Any technique that can reduce the accumulation of liquid could increase the gas production of gas wells. This paper presents an experimental observation on the effect of tubing perturbations over the flow behavior in gas wells. An experimental campaign has been carried out to document the phenomenon. Experimental results and the final analysis are presented.

Akhtar, Musamma; Bolin, Ben; and Johnson, Sage  
**DESIGNING AND BUILDING A GEAR BASED TENSILE MACHINE**

The quality and performance of a material is important when deciding which material to use in a manufacturing setting. Tensile tests are a simple mechanical test that can be performed on a material to help determine the maximum strength or load the material can withstand before breaking. Dr. Steve Tipton in the Mechanical Engineering department requested a tensile machine in order to demonstrate the mechanisms of a tensile test to his students and allow students to learn engineering through hands-on experiments by letting students use this machine for classroom projects. This team designed and built this tensile machine according to the specifications provided by Dr. Tipton, so students could run the machine on their own, by cranking a handle connected to a gearbox. An LED screen, load cell and an Arduino were incorporated into the machine, so that data from the test could be stored and displayed. During testing, specimens would sometimes fail in such a way that the data would be invalid. This problem could be reduced by testing thicker specimens, however, sometimes it would still fail in the incorrect position. In the future generation of this machine the pin hole where the specimen is placed could be altered to improve this problem. Dr. Tipton was able to successfully use this tensile machine in his Mechanics of Materials course during the fall of 2018.

Aldredge, Samantha; William, Porter; Zhu, Remi; and Feinstein, Justin  
**AN ANALYSIS OF CORTISOL AND MAGNESIUM ON FLOAT-REST STUDIES**

Stress is necessary for the survival of all species. Too much or too little stress can be harmful; therefore, combative treatments have been performed to regulate this important physiological response. Through flotation in a 8ft-wide pool, filled with 2,000lbs of Epsom salts, participants enhance their interoceptive awareness. Interoception allows the body to renormalize heart rate, respiration, and the sense of wellbeing. Interoception also connects the skeletal system with the neurological system and further connects the visceral organs and vascular system. Previous studies with the Float-REST (Reduced Environmental Stimulation Therapy) pool shows that floatation normalizes heart rates and self-report data indicates that this treatment shows a significant change in participant’s depression and anxiety scores. This non-medical approach to treatment of stress has been shown to renormalize heart rate, respiration, and the sense of wellbeing. Recruitment was performed through Laurette Institute for Brain Research (LIBR) using the Tulsa 1000 participants and then limiting those participants down to participants diagnosed with anxiety disorders, depression, and post-traumatic stress disorder. For this double-blind, study participants were assigned a number and a Salimetrics chemical assay was performed on the participant’s saliva. Through the analysis of Cortisol and Magnesium levels in 20 healthy control participants and 30 anxiety diagnosed participants, we are able to discern if the Float-REST study changes levels in the body. Analysis of biochemical markers like cortisol and melatonin will provide more detailed information on how floatation may normalize an individual’s diurnal cycle. Other studies have indicated that individuals with depression and anxiety have disrupted sleep-wake cycles.
This research paper will examine the difference in knowledge level of typical childhood developmental milestones between parents of children with a communication disorder and parents of children with multiple disabilities. It has been proven that early intervention is key to a child’s improvement and success, including children with a communication disorder or multiple disabilities. Yet, these children’s impairments are often discovered later and thus treated later because parents are unaware of typical childhood developmental milestones, and thus unable to identify what is a normal or abnormal age for a child to develop certain skills. To answer the question of what parents of children with communication disorders and parents of children with multiple disabilities current knowledge level is of developmental milestones, a survey asking parents to recognize the appropriate age for a certain milestone was completed by 25 parents of children with a communication disorder and 25 parents of children with multiple disabilities. The study concludes that while parents of children with a communication disorder, have a slightly greater knowledge of developmental milestones than parents of children with multiple disabilities, both groups were only able to identify on average half of the milestones. These results reveal that while there was not a statistically significant different between both parental groups knowledge level, both groups could benefit from further parent education.

Psychologists studying work motivation have long explored how to make everyday jobs inherently motivating. Job Characteristics Theory (JCT) includes a model of five job qualities that, when present, activate critical psychological states and improve employee motivation. Almost 40 years later, the model is still applied in job enrichment interventions to help employees derive meaning and energy from their work. However, workers and the workplace have changed considerably since the model’s inception. This oral presentation covers the evolution of JCT through the 20th to 21st century before discussing current modifications of the model, trends of development, and the application of current research. It outlines the five original job characteristics that are empirically linked to positive motivational and attitudinal outcomes, acknowledges new characteristics that have gained considerable empirical support, and reviews how this research is applied to improve job performance and motivation of employees today.

Solid particle erosion is of most important issues in oil and gas industry since it causes various components and pipeline fittings to be damaged and as a result causes significant costs due the failures of the pipe components. Several parameters are effective in solid particle erosion behavior such as the velocity of the carrying fluid (or fluids in gas-liquid flows), pipe orientations, particle sizes and so on. These variety of effective parameters on erosion behavior makes it a highly complex problem which is very expensive to be considered experimentally. CFD is a powerful tool to solve this issue via simulating the solid particle erosion behavior in the pipeline. In the present study CFD simulation processes and results of gas-solid and gas-liquid-solid flows are presented along with the drawbacks and challenges in performing simulations. The results have been compared to the experimental data available in Erosion/Corrosion Research Center data base. In some of them CFD was successful to capture the phenomena and in part of them some discrepancies are seen which will be discussed.

After reservoir pressure depletes, oil wells required the use of external energy to maintain an economical production. This energy can be provided by pumping systems. The performance of such systems are affected not only by the amount of gas but also for the intermittence of the gas and liquid flow. Downhole separators are used to separate some of the gas entering
in the pump. Traditional the evaluation of these separators is carried out with homogenous flow at the inlet. In reality, the gas and liquid flow rate fluctuates at the inlet of the separator. Thus, the separator performance should include the attenuation of these fluctuations. The first step to include this effect is the design of sensor capable of measure the dynamic behavior of the inlet void fraction. This paper present the design and evaluation of a conductivity sensor that can be used for this applications. Experimental facility, results and calibration procedures are provided.

Aycock, Lauren

AN EXAMINATION OF THE OBSTACLES HOLDING OKLAHOMA FROM ITS SOLAR ENERGY POTENTIAL

Oklahoma consistently ranks in the top ten states when looking at sun index yet is always in the bottom ten states for solar energy production. This presentation analyzes the policies, regulations, and cultural factors that cause the gap between capability and production. It examines local policies and statistics, as well as several case studies of cities with similar predicaments, and cities that have been very successful in solar energy implementation. Through the identification and comparison of the political opposition to solar in Oklahoma, strategies can be identified to suggest future improvement.

Ayers, Thomas

INFLUENCE OF LEADERS ON EMPLOYEE WELL-BEING: DOES WEEKEND RECOVERY MATTER?

Leadership has been a focal point of research for over 60 years (Lord et al., 2017). Leadership is understood to be a process in which an individual, the leader, influences others usually towards a common goal (Northouse, 2017). The effect of this process of influence on employee well-being has been examined (Arnold, 2017; Harms et al., 2017; Tepper, 2004). Indeed, transformational leadership, the process of inspiring and motivating others to perform at a higher capacity (Podsakoff et al., 1990), has been shown to decrease employee burnout and increase well-being (Arnold, 2017). Conversely, abusive supervision has been shown to increase employee burnout (Tepper 2007; Tepper et al., 2017). These relationships can be understood through the Job-Demands Resources (JDR) model of employee well-being (Dememrouti, et al., 2001). In this model two process occur in which the demands put on the employee by the job and the resources available to them influence their psychological states of burnout and engagement which lead to negative or positive health outcomes (Schaufeli & Taris, 2014). Leadership can be understood as creating more demands (abusive supervision) or providing resources (transformational leadership). The role employee’s weekend recovery experiences have not been examined within this relationship. Indeed, recovery experiences have been viewed as moderators of the Demands/Resources and psychological well-being relationship (Moreno-Jimenez et al., 2012). This study examines the moderating influence of weekend recovery experiences on the relationships between two types of leadership, transformational and abusive supervision, with two markers of employee well-being, burnout, and engagement.

Ayers, Thomas

PERCEPTIONS OF INEQUALITY AND DYADIC EFFECTS ON PERCEIVED WORKLOAD AND TEAMWORK QUALITY

Members in a team affect each other in multiple ways. The goal of this study is to explore how one members stress (actor) can affect another members (partner) outcomes (perceived workload and team work quality) using the actor-partner interdependence model (APIM; Kenny 1996; Kenny and Cook 1999). APIM can help study relational effects between team members and takes into consideration the interdependence of the observations. Through two types of effects, actor and partner effects, the extent to which a variable of interest for one individual can influence their own outcome and the outcome of their partner can be measured and explicated. The equity theory of motivation posits that when individual is faced with inequity in their environment they are motivated to reduce the inequity (Adams, 1963). These feelings of inequity have been shown to elevate individual stress (McKenna, 1987). Some research has indicated that stress can cross over from one partner to another (e.g., Neff & Karney, 2007) and thus affect partner outcomes. This dyadic examination provides an understanding of the relational dynamics between team members during times of distress. Further, quantifying the effect that perceptions
of inequity has on these stress and team effectiveness outcome relationships expands our understanding of the effects of inequity to provide a nuanced understanding of relational aspects that can affect individual and team outcomes.

**Bacani, Rigel Chaira**

**SUPPORT FOR THE STIGMATIZED: HOW HARM REDUCTION HELPS MORE THAN JUST INTRAVENOUS DRUG USERS**

Marginalized populations face not only the risks of harm that come with their position, but also intense perceived and enacted stigma and a resulting lack of access to care. This leads to disastrous effects that have led to public health issues worldwide. Harm reduction strategies have shown an effectiveness in mitigating these harms not only for marginalized populations but also for their communities, by changing the goal of treatments and care from recovery to a bettering of quality of life. This talk reviews the availability of harm reduction and the impact on communities here in Tulsa and in Copenhagen, Denmark. It's important to showcase the effectiveness of these strategies in both local contexts in the United States and abroad in the EU, to discuss the impact on healthcare systems in addition to the marginalized populations that they target. Despite the differences in healthcare systems, effective strategies can be put into place and utilized by marginalized populations in both situations.

**Badrinarayanan, Indreesh; Crunkleton, Daniel; and Johannes, Tyler**

**HYDRODYNAMICS OF AN ALGAE BIOREACTOR – A CFD SIMULATION BASED STUDY**

Long range space travel requires novel paradigms for life support. Microalgae are ideal organisms for biologically based life support systems because they convert harmful carbon dioxide into biomass and oxygen. A photobioreactor is a bioreactor that utilizes a light source to cultivate phototrophic microorganisms. Most of the photobioreactors are bubble column based reactors to ensure air or CO₂ is supplied to the cells. The gas-liquid flow in these reactors is inherently unsteady and can be characterized by the presence of gas bubbles. A thorough knowledge of the bioreactor hydrodynamics is thus needed for its rational design and optimization. However, due to the complexity of the flow involved, these reactors are not fully understood which has created an interest among researchers in the past decades. Among available simulation approaches, the volume of fluid (VOF) is one of the well-known methods for volume tracking in which motion of all the phases is modelled by solving a single set of transport equations with appropriate jump boundary conditions at the interface. In this study CFD simulations were performed to understand the hydrodynamics of gas-liquid (two phase) flow prevalent in the simplified 2D bioreactor. The Volume of Fluid (VOF) model was used to track the interface and study the effects of superficial gas velocity, distributor size on the flow pattern within the reactor. Also, the effect of microgravity on the bubble chain rising through the reactor was studied.

**Bales, Charles**

**DEVELOPING ELECTRONIC CONTROL FOR MAINTAINING MOBILE FSO LINKS**

Current free-space optical (FSO) systems have difficulty tracking moving transceivers and nodes due to a limited field of view (FOV) for the receiver's power collecting optics. Commercial FSO systems have an FOV of at most ±0.5°, requiring complex mechanical systems for alignment, with little room for error. The need for high pointing accuracy and the size, weight, and power required for the mechanical alignment systems precludes the use of FSO systems for mobile communication applications. A new design developed by Dr. LoPresti implements a fiber-bundle technology that increases receiver FOV to at least ±7° and to a current maximum of ±15°. A downside is that the bundle, while collecting a large percentage of the input power, has a large diameter which makes coupling of the collected power to an output fiber optic cable difficult. The summer research project focused on exploring the use of photonic lanterns to increase power collection and output coupling of optical power to an optical fiber as a transceiver moves. The research involved the design, implementation, and testing of an FSO receiver incorporating a photonic lantern. It consisted of evaluating a photonic lantern system under development at NASA Glenn Research Center to characterize its performance as a function of position and angle with respect to the transmitter. The research will additionally measure the signal power and signal quality as a function
of angular and lateral misalignment. Modifications to the design will likely occur to optimize coupling of optical power to the fiber for further research efforts.

Baljak, Irene; Boyd, Kennedy; Iski, Erin; Harville, Lauren; and Phillips, Jesse

**EFFECT OF AMINO ACID DEPOSITION ON Au(111)-AN EC-STM STUDY**

This research project is focused on observing how the surface of a Au(111) crystal is altered upon the deposition of amino acid molecules and the role of the amino acid side chain in the interaction. An electrochemical scanning tunneling microscope (EC-STM), which combines STM with electrochemistry to observe the surface under liquid and with potential control, was used. Valine, isoleucine, phenylalanine and tyrosine were imaged, along with BOC-isoleucine and isoleucine ethyl ester. The amino acids were chosen for the polar or nonpolar nature of the side chain. Two modified isoleucine forms were chosen to observe the role of the amino and carboxyl groups present in the molecular backbone of all amino acids. The results from the study indicated that all amino acids assisted in the formation of metal islands on the surface, which correlates well with recent Ultra-High Vacuum STM (UHV STM) studies. This observation reinforces the hypothesis that the Au surface is involved in the molecular assembly process and that amino acid molecules are capable of trapping moving Au atoms on the surface. Our lab plans to extend the research to a different metal and to observe the role of a charged side chain in the interaction, by using charged amino acids, such as lysine. This research aims to bring more clarity on the role of metal surfaces in the formation of polypeptides, to provide a better understanding of amino acid structure and biosynthesis, and to help in providing tools for the development of new biocatalysts, biosensors, and materials.

Ballard, Kaylee; Kakhr, Mohamed; Harper, Claudia; and Karki, Anand

**INFLUENCE OF STAPHYLOCOCCUS AUREUS CO-CONTAMINATION ON SURVIVAL OF CAMPYLOBACTER STRAINS AT LOW TEMPERATURE, BIOFILM FORMATION AND AEROTOLERANCE**

Campylobacteriosis remains a leading diarrheal illness in developed countries including the USA. High prevalence of *Campylobacter* has been found in retail meat and liver products. Most samples tested also contained *Staphylococcus aureus*. Polymicrobial presence of *Campylobacter* with *Staphylococcus* has shown enhanced biofilm formation and prolonged survival of *Campylobacter* in adverse conditions. This study investigates the influence of *Staphylococcus aureus* on the survival of *Campylobacter* strains at low temperature used in retail storage. Two strains of *S. aureus* (B4-59C and B6-55A) were incubated in MHB for 24 hours at variable temperatures (4°C, 25°C and 37°C). After 24 hours, *S. aureus* broths were filter sterilized and used as test media for *Campylobacter* survival. Six strains of *Campylobacter* [C. jejuni (T1-21, NCTC11168, OD2-67) and C. coli (HC2-48, WA3-33, ZV1-224)] were incubated in freshly prepared MHB and filter sterilized *S. aureus* grown media at 4°C up to 120 hours. Visible count for *Campylobacter* strains were taken every twenty-four hours. Higher survival for prolonged time of all *Campylobacter* strains was found in *S. aureus* grown media than the MHB media control. This indicates that some extracellular metabolites of *S. aureus* strains produced during growth or survival at low temperatures can enhance the survival of *Campylobacter* strains. Biofilm and aerotolerance assays were also performed. Enhanced aerotolerance of some *Campylobacter* strains was found but there was no consistent influence on biofilm formation. Our results suggest that the presence of *Staphylococcus aureus* in retail meat and liver products might enhance the survival of *Campylobacter* strains at low temperature.

Bao, Yifei; Chen, Jing; Chen, Jingyi; and Wu, Hao

**A NEW METHOD TO ESTIMATE MICROSEISMIC LOCATION USING WAVEFORM INFORMATION**

For modern seismology, the earthquake location is a fundamental problem in seismology. In particular, there are also significant interests in micro-earthquake which has many applications in exploration seismology. Thus, the location of the microseismic that is generated by the hydraulic fracture and focal mechanism can provide great help for understanding the efficacy of hydraulic fracture treatments, like identify which fractures are contributing to production and characterize stress-strain field. We develop a new method that can inverse the location of the microseismic, which is much faster compared with the conventional method. Furthermore, our new method can work with the initial model that is limited accuracy. A well-known problem of the waveform misfit function under the L2 norm is the cycle skipping problem and this can lead to
a very small convergence domain of the conventional waveform inversion method. In our new method, we need to solve two simple sub-optimization problems regarding determination of origin time and receivers before the waveform inversion. By introducing this new strategy, we greatly expand the convergence domain of the waveform inversion method. Thus, with our method, we can overcome the shortage of conventional waveform method and calculate the result rapidly.

Barber, Samantha

QUALITATIVE ASSESSMENT OF TEAM LEARNING

Teams in the workplace and in education are increasingly relied upon to adapt to changing situations and solve some of the most challenging issues facing a given organization or discipline. To effectively perform this duty, teams must be able to learn as a group through the performance of their given task. Team learning is the relatively permanent change in the group’s knowledge or skills in regard to a task and is not simply a change in the knowledge of every group member, but of the group as a whole (Raes et al., 2015). Therefore, team learning is determined by actions of the group and not just of individuals within the group. Transcriptions of interactions from teams in an interdependent space simulator task have been used to analyze novel evolutions of other team interactions but not as of yet team learning. Transcriptions of team member interactions were coded for various aspects of team learning. Insight gleaned from the results were interpreted in the context of science and practice.

Batra, Sikandar; Ozbayoglu, Evert; Rodriguez, Flavio; and Takach, Nicholas

FACTORS AFFECTING HYDRAULIC SWEEPS ‘PILLS’ EFFICIENCY IN HIGHLY INCLINED WELL BORES

Sweep pills in a drilling operation are used to transport and erode cutting (rock fragments) beds formed on the walls of a directional (inclined) well. Sweep pills are a special type of designer drilling fluid. There is no general synthesis of a sweep pill as each directional well is distinct. The objective of this research project is to create a computer program that predicts the efficiency of a sweep pill when the pill is applied in a varied set of conditions. The computer model strives to provide drilling engineers a low-cost outlet to accurately and efficiently test the potency of their pre-designed sweep pills in a field simulation. The computer model is based on various mathematical models. Furthermore, the computer program will not only test conventional water-based sweep pills but also oil-based sweep pills. Through the help of empirical data, we intend to evaluate the accuracy of the computer model. We plan to obtain the empirical data using the small indoor flow loop (“SIFL”) found in the labs of The University of Tulsa Drilling Research Projects (TUDRP). Currently, we are in the preliminary stages of creating the computer program. The computer program in its present state can only run simulations for sweep pills that are used in the context of lab conditions. In terms of obtaining empirical data, we are currently setting the small indoor flow loop and synthesizing sweep pill samples to the specifications we require.

Bebermeyer, Anna

THE ROLE, IMPACT, AND PERCEPTION OF WOMEN IN THE SOUTH KOREAN AND BRAZILIAN BUSINESS SPHERE

Despite being torn apart by war 65 years ago, South Korea is a thriving developed country with a total national literacy rate of 97 percent that consistently ranks as the most innovative country in the world. Women in South Korea are highly educated, but this is not reflected in female engagement in the workforce. On the other side of the world, Brazil is a developing country where gains for gender equality are being made. However, female engagement in the business world still lags significantly behind men. Using economic and case analysis, my paper examines the current state of women within the Korean and Brazilian workforce, the cause and effect of the situation of inequality, and the similarities and differences between the countries.
Bled, Philippe

DECISION MODEL FOR APPLICATION OF MACHINE LEARNING METHODS IN FRAUD DETECTION

Fraudulent transactions are a major expense for businesses and a hassle for customers. The development of machine learning and artificial neural networks can provide an improved solution to the problem of fraud. When applying these algorithms, we must keep in mind that they are tuned to improve the rate of detection, reducing false positives and false negatives. However, business and human decision processes weight the cost and benefits of making a choice not only how likely we are to be accurate. Our research proposes to create decision making process for automated algorithms (machine learning or artificial neural networks) employing probability and economic theory to find optimal decisions. In the case of fraud detection our goal is to minimize losses due to fraud.

Boyd, Kennedy; Baljak, Irene; Harville, Lauren; Iski, Erin; LeBlanc, Gabriel; and Phillips, Jesse

INVESTIGATING THE EFFECTS OF AMINO ACIDS ON SILVER HALIDE THIN FILMS ON Au(111)

The application of a single monolayer of silver to a Au(111) surface was a previous study in the Iski Lab. The Ag monolayer was applied to the surface via underpotential deposition (UPD). Using this technique, the group was able to successfully apply a Ag monolayer onto a Au(111) surface using a silver chloride solution. The presence of the monolayer was confirmed using Cyclic Voltammetry (CV) and Electrochemical Scanning Tunneling Microscopy (EC-STM). CV was used to measure changes in the potential of the surface before and after the application of silver. The single Ag layer was proven to be thermally stable up to 1,000 K. Importantly, the effect of the Ag monolayer on other surface properties can be further explored. The Iski Research Group has also previously studied the effects of amino acids on a Au(111) surface. The amino acid molecules encapsulate the free gold atoms present on the surface at room temperature into islands. By doing so, the amino acids are changing the surface energetics of the system. As the Ag layer is established to exhibit thermally stable characteristics, the amino acids can be used to test the chemical resistance of the layer. Preliminary results indicate that the stable Ag layer is not chemically resistant to the perturbative properties of amino acids. This project has overall goals of understanding thin film growth and the associated properties of those thin films under different conditions.

Brooks, Margaret

DEFYING CATEGORIES: REPRESENTATIONS OF LUCIA RIJKER IN MEDIA

Women’s boxing has been undervalued throughout the history of the sport. Boxing is traditionally a male homosocial sphere, and women boxers are seen as a threat to the sport’s inherent masculinity. Because of this, women boxers are often belittled and sexually objectified to reassert patriarchal dominance, and few have been able to attain the status and respect of their male counterparts. Lucia Rijker is one woman that has managed to establish herself as a competent boxer despite her gender. My research examines media representations of Rijker across several mediums. I argue that Rijker defies the labels and categorization that female athletes are ordinarily subjected to. While she identifies as a woman and is subjected to feminine coding, Rijker is not limited to a feminine characterization and can operate within the ordinarily protected masculine sphere of boxing without substantial scrutiny. Rather than being relegated to one gendered role, Rijker is presented as multifaceted, highly skilled, and autonomous. While it is tempting to see Rijker’s media presence as indicative of a new trend in the way women athletes are represented, Rijker appears to be an anomaly. Rijker is able to freely embody different facets of gender and sexuality, but the same treatment is rarely enjoyed by other women in her profession.

Brown, Max

DIGITAL IMAGE CORRELATION FOR HIGH SPEED AND HIGH STAIN APPLICATIONS

Digital Image Correlation (DIC) is a method for measuring deformations or displacements on an object’s surface using one or more cameras. DIC is a useful tool for measuring the strain on objects when used where other strain measurement methods would be impractical or less convenient. In this work, DIC is explored for two applications. The first use of DIC is measuring the strain on polyethylene (PE) pipes bent in simulation of the pipe installation process, and the usefulness of using DIC with a high speed camera. The typical strains experienced by a PE pipe are investigated so that the antennas molded to the
pipe, used for underground location, can be designed to survive these strains. The second application of this research explores the use of DIC with a high speed camera. The high frame rate of the camera would allow for DIC to be used in high strain rate testing and fracture testing. It was necessary for a method to be developed for converting the high speed camera footage into a format compatible with the DIC software.

Buitrago, L; Pereyra, E; Holmstrom, S; and Shirazi, S
DROPLET SPLASHING AT ELEVATED PRESSURE

A liquid droplet impacting a surface will commonly generate smaller droplets while splashing. Although this area has been broadly studied in the past, there is still not a clear understanding on the role of the surrounding gas pressure over the characteristics of daughter or secondary splashing droplets. Among many different industry applications, this phenomenon demands particular attention from those in charge of designing oil-gas separation equipment. In this study, distilled water and isopar oil droplets falling through air are being studied experimentally using a high-speed video imaging system. The effects of system parameters such as gas pressure, parent drop diameter, impact speed, type of impact surface and fluid properties (density, viscosity and surface tension) on a single droplet impingement are being investigated. Construction of a high-pressure rated chamber was required as part of the definition of an experimental program to measure the minimum droplet size generated by impinging under a pressurized environment. Image analysis technique is shown to be an effective technique for identification of splashing transition and characterization of secondary droplets. Initial experimental observations allowed to describe the evolution of parent droplets shape (aspect ratio) after pinch off. Droplet size distributions are generated to understand the effect of pressure on the population of secondary droplets. The use of dimensionless parameters is being considered to generalize the behavior of splashing droplets at elevated pressure.

Cantwell, Caleb
IDENTIFICATION OF NON-PATHOGENIC AMOEBAE ISOLATED FROM FORT GIBSON LAKE AUGUST, 2018 BY PCR

A survey was conducted at Taylor Ferry, Fort Gibson Lake, Oklahoma to evaluate the presence, isolate, and identify non-pathogenic amoebae from the lake water. In total, 10 samples of 10mL of lake water were collected. Through microscopic evaluation, each sample has been shown to contain amoebae. Once found, measures were performed to isolate and grow only the non-pathogenic amoebae. After isolation of non-pathogenic amoebae, DNA extraction was performed. The DNA was analyzed by PCR using species specific primers to identify the species of the amoebae. Results and conclusions of this work are yet to be determined.

Carter, Jamie
THE EFFECT OF INDUSTRIAL COMBUSTION ON POLLUTANT LEVELS IN THE ENVIRONMENT

This presentation will focus on the effect of industrial combustion on the environment. Combustion is used in many industries. It is important to understand the effect of widespread combustion on the environment. The goal of this research is find the effect of combustion on pollutant levels due to combustion and how they can be reduced.

Caselman, Emily
THE MAMMOTH SITE OF HOT SPRINGS, SD INC.: WHEN AN ACTIVE PALEONTOLOGICAL DIG SITE AND A TOURIST ATTRACTION COLLIDE

Have you ever wondered what happens when an active Paleontological Dig Site and a Tourist Attraction are housed in one building? The Mammoth Site of Hot Springs, SD Inc. does just that. They manage to balance being a active dig site, a research center, a museum, and a tourist hot-spot, all while remaining highly successful. Nestled at the edge of the Black Hills, less than an hour from Mount Rushmore and Crazy Horse, The Mammoth Site offers a unique experience to nearly 150,000 visitors every year. They put people directly in the middle of an active site, while teaching them about the
importance of preservation. While they are outstanding at what they do, it doesn’t come without its challenges. During this presentation, I give a brief summary of The Mammoth site, and share my own personal experience as an intern in summer 2018. I discuss the importance of sites like this, and how they serve to educate the public on both history and preservation. In closing, I discuss the application of knowledge gained at The Mammoth Site to my personal and professional goals.

Chaudhry, Muhammad; Kundu, Rahul; and Ramsurn, Hema
HYDROTHERMAL CARBONIZATION OF BIOMASS MODEL COMPOUNDS

Biomass has been found by researchers to be a good source of biofuel, an alternative to fossil fuels to mitigate climate change. Three major compounds (biopolymers) can be found in biomass (cellulose, hemicellulose, and lignin) which can be converted to biochar, a carbon rich solid by using hydrothermal carbonization (HTC). Biochar is similar to low grade in terms of carbon, hydrogen, and oxygen content. In HTC, the chosen biomass model compounds (cellulose and lignin) were mixed with water and heated to 230°C to 350°C in a closed batch reactor. It was observed that with increase in HTC temperature, the yield of biochar decreased while the carbon content increased. The resulting biochar can be used for several applications including fuel production, soil remediation, catalyst preparation etc. Along with formation og biochar, furanic (from cellulose) and phenolic (from lignin) compounds, known as biocrude (soluble in acetone) were also produced. These compounds were characterized by gas chromatography and mass spectrometry (GC-MS).

Clark, Julianne
FLORA: A HISTORY OF WOMEN AND PLANTS

Scientific illustrations of plants demonstrate the skills of individual artists and created not only accurate but also very beautiful imagery. Often bound in large volumes, these illustrations were historically prized by noble benefactors for both their aesthetic quality and their informative collection of knowledge. Nature and landscape photography employed a new technology for similar purposes. Both forms of art were closely connected with voyage of exploration and the resulting attempts to catalog and understand botanical diversity around the globe. While exploration and fields of science were dominated by men, women have made many important contributions, especially in botanical illustration and photography. Though women may not have had as much opportunity to create or ability to express ideas, they nevertheless created work of equal value and quality to that of their male contemporaries. Today, women continue to explore new horizons within the field of botany, pushing the boundaries for what is possible both scientifically and artistically. This presentation will illuminate the role of women in botany throughout history with specific examples, while highlighting connections between art and science within this particular field of study.

Conn, Michaela
WHERE INNOVATION COMES UP SHORT: ROLE OF MARKETING AND STRATEGY IN SMALL BUSINESS TECHNOLOGY ADOPTION

Increased innovation and adoption of technology is transforming the global business environment and consumers’ daily lives. Small businesses are especially susceptible. Consumer expectations and the pressure for continuous innovation are driving small businesses to look to technology as a means for providing business solutions with no forethought as to the strategy and implementation of the technology. This pressure often results in the premature adoption of technology thus creating an abundance of technology which is either not being used to its full potential or is not being utilized at all. Using an app developed for a local non-profit for reference, the problems encountered by small businesses and the role of marketing will be examined in relation to their contribution to the successful utilization of this technology. Implications for small businesses on a global scale looking to use technology as a means of spreading information about their cause, product or service will also be presented.
Dabney, Hope
THE GLOBAL AUTISM PROJECT

April is Autism Awareness Month. Every year, people in the autism community use this month to attempt to educate more of the world on what autism really is and what it means. The Center for Disease Control reported that as of 2014, the prevalence of autism spectrum disorders has increased to 1 in 59, as opposed to 1 in 125 in 2004. However, autism does not only exist in the United States, where resources are vast and support services are well-established. “Autism knows no borders,” is the slogan of a group called the Global Autism Project. “Fortunately, neither do we” is the other half. This non-profit organization is working worldwide to have a sustainable impact on how developing countries manage children with autism. Through connections made between my time in the Global Scholars program and my education in Speech-Language Pathology, this program and the important work they are doing in the world today has been inspirational for my future career within this field.

Dees, Adam; Hale, James; and Sen, Sandip
SELECTING AND ORIENTING INFLUENCING AGENTS FOR EFFECTIVE FLOCK CONTROL

Flocks are composed of two types of agents: leaders and followers. Leaders are under the control of an algorithm whose purpose is to direct the entire flock toward a particular direction, while followers are subject to simple rules which keep them in unison with nearby agents. Ultimately, the behavior of followers toward neighboring agents are composed of three parts: repulsion which prevents collision, orientation which aligns them with the flock, and attraction which prevents isolation from the flock. Prior research has focused on a single ruleset for follower agents, and a single object of study: either the initial position or algorithm of leaders. This effort is a cohesion of all three, by demonstrating and analyzing the results of the combination of follower models, initial leader placement, and leader algorithms. Our key performance metric is ‘convergence time,’ which is the time it takes for leader agents to successfully orient the flock to the desired direction. Analysis focuses on the general trends, such as the most cooperative follower models, and the particularities, such as certain synergistic/dissonant combinations of leader placement and procedure. Alongside older methods, new algorithms and placement patterns are introduced. Applications relate to better understanding and potentially influencing flocking animals such as birds, insects, fish, and sheep. Solving the extremely costly problem of bird flocks flying in the airspace of airports is of particular importance, which has already seen real application and success.

Dewey, Jessica
DISPLAYING IDENTITY: ISABELLA D’ESTE’S GENDER NEGOTIATION IN THE STUDIOLO

The ideal of a studiolo during the Renaissance was one dominated by elite men who were educated in humanist traditions as a place for self-reflection and display. The connection between objects and the patron was strengthened throughout the studiolo, as the objects were seen as an extension of the patron himself. Select members of the court or its visitors, were allowed access to the studiolo in an attempt by the beholder to display the private identity that they are displaying. In this paper, I will be discussing the ways in which the studiolo allowed for the patron to create their own identity through a collection of objects as well as the way that these chosen objects interact with Judith Butler’s ideal of a performative gender. The concept of a performative gender is structured around the actions that one makes based on the social implications surrounding them. Butler argues that gender is something that one puts on, much like a performance, with an everchanging script that is modified by each individual that performs the part. I will be arguing that Isabella d’Este negotiates her gender through the characteristics that she is performs throughout the context of collecting for the studiolo, that the way gender is performed is directly related to the actions and objects surrounding the studiolo, from the process of procuring an item to the ways in which one displays their individuality within the studiolo.
Dickie, Nicole

BURNOUT INHIBITING DIMENSIONS OF RECOVERY

Burnout is defined as “a psychological syndrome in response to chronic interpersonal stressors on the job” (Maslach, Schaufeli, & Leiter, 2001). According to the job demands-resources model, an individual experiencing job demands along with a lack of resources can result in burnout (Demerouti, Bakker, Nachreiner, and Schaufeli, 2001). Recovery experiences can help to buffer against job demands and allow individuals to regain resources; however, recent research shows that individuals who are burned out actually have the most difficult time recovering, which has been dubbed the “recovery paradox” (Sonnentag, 2018). This study explores the recovery paradox by investigating burnout as a predictor of two dimensions of recovery: psychological detachment and relaxation. It is hypothesized that higher levels of burnout predict a decrease in psychological detachment and relaxation over a weekend. Along with that, this study also looks at personality dimensions as moderators of the aforementioned relationship. This study focuses on conscientiousness, neuroticism, and proactive personality.

Doerfler, Jacob

USING 3D PRINTING TO IMPROVE THE METHOD OF PROTOTYPING BIOSENSORS

Biosensors are useful devices that can utilize the physiological response of enzymes and other biological material in order to provide a quantitative analysis of specific biomolecules. The unique properties of biosensors provide great selectivity while remaining inexpensive. A problem with the creation of new biosensors is that the process for prototyping them is often lengthy and expensive, using precious metal electrodes and expensive enzymes for a potential negative result. Tackling this task is relatively daunting, as it would require one to find a way to produce a cheaper, moldable electrode that still provides enough conductivity to sufficiently translate the response. In this research, we looked to 3D printing as a possible solution due to its ability to generate precise, inexpensive, and reproducible modeling. Experiments were carried out on conductive Protopasta™ 3D printed electrodes that showed promising results for conductivity and cost after a pretreatment of the electrodes. Interestingly, we found that the pretreatment process generated a more porous, conductive surface while maintaining structural integrity for the electrodes. Various strategies were explored to interface the printed electrode with the enzyme Horseradish Peroxidase for the detection of hydrogen peroxide. We determined that an entrapment method provided better detection and stability of the sensor compared to simple adsorption strategies.

Durosky, Ariel

NEW YORK TIMES FRAMING OF SCHOOL SHOOTINGS: A COMPARISON BETWEEN COLUMBINE AND PARKLAND

Media profoundly influences public views (McCombs & Shaw, 1972). In relation to school shootings, specific framing (the way in which a story is told) can incite fear (Addington, 3002; Kaminski et al., 2010), inspire copycats (Langman, 2018), and prompt similar events (Towers et al., 2015). In order to study media effects, the New York Times is often used due to its wide distribution and influence (Altheide, 2009; Chyi & McCombs, 2004; Muchert & Carr, 2006). Chyi and McCombs (2004) developed a two-dimensional measurement scheme to examine framing in print media. Adopting this coding scheme (with some modifications), the present study will analyze New York Times articles 30-days following the 2018 Marjory Stoneman Douglas High School shootings in Parkland, Florida. Results will be compared to published results of the 1999 Columbine shootings found by Chyi and McCombs (2004) to investigate frame changes over time. I expect societal framing (stories focusing on national impact) will be the most common frame used in Parkland articles. In comparison to Columbine, Parkland will have a higher percentage of individual framing (stories focusing on persons such as victims, perpetrators, etc.). I also anticipate that over the 30-day lifespan, Parkland societal framing will decline, as individual, community, and regional framing increase. Framing changes over time in Parkland coverage will be examined using Chi-square analyses. Comparisons to Columbine coverage will be descriptive. I expect to analyze and present findings; however, in the event of unanticipated problems, progress to date will be presented.
Ellis, Gail
SOCIETAL TRENDS AND POLITICAL COMMENTARY IN SEVENTEENTH CENTURY FOURTUNE-TELLING LITERATURE

Although the 1689 pamphlet “The Welsh Fortune Teller” purports to offer a vision of the future, author Sheffery Morgan diverges from his occult purpose to offer support for William III and the Glorious Revolution. He declares:

“Resolving against all of the Romans to stand,
Under the protection of William our king,
And pay our allegiance in everything;
And Protestant boys, with a thundering noise,
Has routed Tyrconnel, and all his dear-joys,
Then all these three kingdoms will flourish again,
And we shall be blest with a prosperous reign (1).

Subtitled an “Observation of the Stars, as he (the author) sat upon a Mountain in Wales,” Morgan’s tract represents a kind of fortune-telling literature prominent in late seventeenth-century England. In such writings, astrological predictions offer an excuse and a cover for often-explicit political commentary. Taking as my central examples “The Welsh Fortune Teller,” along with “The English Fortune Teller or a New Almanac” 1642, I will argue that fortune telling, astrological readings and other related writings on magic became intertwined with political commentary in the later seventeenth century. Towards the end of the century, however, the tone of these pamphlets changed, becoming markedly less political. I will therefore conclude the paper with a discussion of the 1699 pamphlet “Aristotle’s Legacy,” which is representative of a late-century move towards “scientific” theories of prediction rather than a focus on current events.

Elmore, Darcy
DESERT FOODS: A CASE STUDY

Through my time as a global scholar, I was involved with a group of students that developed an innovative idea for a social enterprise, or a business that maximizes social impact, which addressed the systemic issues of food insecurity and food waste within our local Tulsa community. Our idea was a business (Desert Foods) that sold a dehydrated snack food product that lasts much longer and retains almost the same amount of nutrients as fresh fruits and vegetables. We found a local food insecurity expert, who encouraged us to prototype our idea in her kitchen. We entered a few business start-up competitions, obtained a small grant from the university to purchase a professional dehydrator, were accepted into the local summer farmer’s market, and most importantly successfully prototyped a few recipes. We got a lot of support from administrators, professors, local Tulsans, as well as support from the very community we were trying to help, which made it seem like this was a very viable business idea. This presentation will be an in depth look at Desert Foods--how it came to be, what worked about the idea, what did not, and any plans for Desert Foods going forward. Additionally, there will be a section dedicated to the invaluable lessons of failure, relationship building, team management, innovation, and problem solving I experienced while working on Desert Foods, and why the University of Tulsa should continue to support students with similar innovative endeavors, and suggestions for how they can do so more effectively.

Esther, Emily
AN ADJUSTABLE BALANCING PLATFORM TO IMPROVE CORE STABILITY IN CHILDREN WITH SPECIAL NEEDS

A child’s ability to balance is dependent on the strength of the core muscles. Many children with special needs suffer from low muscle tone as it is a symptom of many disabilities. By strengthening the core muscles through therapy, a child with a physical disability can improve their ability to walk, their posture, and their upper body movement. The Little Light House is a school in the Tulsa community for children with special needs from birth to age six. The therapists requested a small, balancing platform that will encourage their students to work on engaging their core muscles outside of dedicated occupational therapy time. While in the classroom working on other activities such as reading or art, the student will have an option to sit or stand on the balancing platform, engaging their core muscles throughout the day. Because The Little Light House serves children with a wide array of disabilities, the balancing platform was designed to have adjustable levels
of difficulty so it would benefit the most students. The final product was lightweight, had a low production cost, met child safety standards, and was easily adjustable.

Farman, Layne
BREAKING BREAD, SIPPING MANISCHEWITZ WINE: THE HERMENEUTICS OF LAURYN HILL

“The Miseducation of Lauryn Hill” is, as Pitchfork’s Carvell Wallace states, “a declaration of independence.” The simple scope of this breakaway was from rap collective The Fugees, but the revolution of Lauryn Hill spirals further out: a “break-up letter” from men and “bullshit,” and a “love letter to the liberated self, the maternal self, and to God” (Wallace). This essay will discuss how Lauryn Hill bends and shifts religious texts, "Othering" them in Nathaniel Mackey’s terms in order to claim agency in an industry where she is marginalized. Within the Christian tradition, Hill becomes the virgin Mary, makes invocations to God with the words of Christ on the cross, gives birth to Zion, and marches there. But Hill remixes religion even further, blending all three Abrahamic traditions, along with Rastafari and Buddhism. She takes communion with kosher wine, prays like a “Sunni,” speaks in tongues, and “graffiti(s) the tomb of Nefertiti.” I could discuss the entire album, but this piece will hone in mostly on songs “To Zion,” “Lost Ones,” “Final Hour,” and “Forgive Them Father.” In recent memory, criticism of Hill persists, with a long line of controversies, diatribes, aired grievances and complaints from fans. The purpose of this research is to investigate and explain Hill’s contribution to African American poetry through her productive “othering.” More somberly, I want to elucidate the consequences of seizing agency in this way from patriarchal structures.

Ferguson, Connor; Wijayasekara, Dulanjani; and Ali, Akhtar
SEED TRANSMISSION OF GARLIC VIRUS C IN OKLAHOMA

Garlic (Allium sativum) is an extremely important crop globally with increasing importance as a medicinal crop. Approximately 23 viruses are known to infect garlic causing detrimental symptoms and severe yield reduction. In the US garlic is mostly produced in the Pacific Northwestern States of Washington, Oregon, and California and contributed 390 million dollars in 2017. Our lab is the only one that is attempting to identify garlic viruses in Oklahoma. While garlic production in Oklahoma is more locally based, it is still important to monitor the spread of garlic viruses through the seed, due to potential spread of the viruses to previously uninfected areas within the state or other states. Some garlic viruses in single infection cause little to no symptoms, but when in a mixed viral infection, they can cause debilitating symptoms. We have collected garlic bulbs from a grower’s field in Cherokee county Oklahoma during the 2018 growing season. These bulbs were dried for a few months at room temperature, planted in 6-inch plastic pots, and were germinated in growth chambers. Typical virus-like symptoms were observed on young germinated seedlings. Symptomatic leaves were used in RNA extraction and tested for the presence of Garlic Virus C (GVC). The primers covered nucleotides 7115-7894 which covered the coat protein (CP) gene which is 7102 to 7881 nucleotide region. These results confirmed that GVC is seed-transmitted in garlic.

Ford, Bart; Teague, T. Kent; Bodurka, Jerzy; Paulus, Martin; Yolken, Robert; and Savitz, Jonathan
T-CELL SUBSETS ASSOCIATED WITH CYTOMEGALOVIRUS AND FAMILY HISTORY OF MOOD DISORDER

Background: Major depressive disorder (MDD) is a risk factor for medical morbidity that may be related to suppressed adaptive immunity. Immunosenescence is characterized by the loss of naïve T-cells and the reciprocal accumulation of memory T-cells together with the loss of co-stimulatory molecules on T-cells, impairing adaptive immunity. This study tested whether MDD influences age-related reduction of T-cell co-stimulatory molecules in the context of cytomegalovirus (CMV) infection. Methods: In volunteers with MDD (n=72), volunteers with a first-degree relative but no personal history of mood disorder (HR, n=46), or volunteers with no personal or family history of mood disorder (HC, n=54), CMV antibodies were determined by immunosorbert assay. Flow cytometry on PBMCs was used to quantify the frequency of CD27/CD28 cells within T-cell subsets, naïve, effector memory, central memory and terminally-differentiated effector memory. Results: ANCOVA models controlling for age and sex showed that CMV was associated with increased T-cell
immunosenescence. Diagnosis was not related to loss of co-stimulatory molecules, but HR was associated with an increased frequency of CD8+ T-cells and reduced CCR7 expression on CD8+ T-cells compared to HC. **Conclusions:** We find an association between CMV infection and age-related T-cell phenotypes but no significant effect of MDD. Reduced CD8+ cytotoxicity and proliferative response has been reported previously in MDD without evaluating the effect of CMV. Since depression is associated with other CMV risk factors, such as low socioeconomic status and early life stress, this study highlights CMV’s importance as a cofactor in comparative studies of T-cell function.

**Fortier, Anthony**  
**THE SHOW MUST GO ON: ORGANIZED ATHLETICS AND THE 1918 INFLUENZA PANDEMIC**

*The Show Must Go On: Organized Athletics and the 1918 Influenza Pandemic* will be presented as a part of the Special Topic Symposium, *How the Great Flu Pandemic of 1918 Changed the United States*, chaired by Dr. Jan Wilson. This individual project explores the relationship between sport and the flu before, during, and after the Pandemic. The research examines how athletics in the United States at the beginning of the 20th century was rapidly changing, and how this affected flu-time decision making. The project argues that organized athletics were able to continue during the Pandemic based upon the unique role that sport played in society. The research draws almost exclusively from primary source material, specifically newspaper articles found through the University of Michigan “Influenza Encyclopedia” database. Information presented in the project is also supplemented by various illustrations, government documents, and scientific studies among other secondary sources.

**Fusco, Heath**  
**MAKING A MAN: A DECONSTRUCTION OF THE GREEKS’ STATIC CONCEPTION OF MASCUlINITY**

As adolescent boys journey into manhood, they are subjected to many external influences, both positive and negative. Trained to be strong, suppress their emotions, and assume the role of the caretaker in their family structures, they are lauded for physical might, mental prowess, and sexual confidence. A static and scrutinious view of masculinity has roots in the views of the Ancient Greeks, who praised the likes of Achilles, Odysseus, and Menelaus. In Homer’s *Odyssey*, Euripides’ *Hippolytus*, and Aristophanes’ *Clouds*, young men each seek to navigate past these social obstacles as they grow in age, power, and regard. In addition, Plato’s *Republic* and *Symposium* comment on the romantic and sexual expectations of young men, especially in regards to the system of pederasty practiced by the Greeks. This paper explores the framework under which young men in Greek society grew up, in particular focusing on three lenses of social pressure applied during their adolescence. First, I examine the pressures applied by *parenthood*, referencing complicated and honored family structures such as the constant comparison between Telemachus and his father Odysseus. Next, I consider the role of *politics*, specifically the strict adherence to rigid political structures demanded of young men in their journey to adulthood. Finally, I reflect on the pressures of *promiscuity*, the pressures on young Greek men to embrace sexuality at a young age, especially in regards to the system of pederasty. Ultimately, I conclude that these three influences collectively demonstrate a static, and accordingly toxic, conception of masculinity in Greek society.

**Gallegos, Jillian and Pitzel, Amy**  
**VISIBLE-LIGHT PHOTOCATALYTIC APPROACH TOWARDS CHLORINATION OF ARENES**

Chlorinated arenes and heteroarenes serve as valuable intermediates and end-targets in a wide variety of synthetic applications. Chlorination using relatively stable and widely available “N-Cl” reagents such as N-chlorosuccinimide (NCS) typically requires activation with a strong Bronsted or Lewis acid. Our research group has recently developed a photoredox, visible-light-promoted approach to amplify the electrophilicity of N-chlorosuccinimide (NCS) without the need for acidic conditions. Our progress toward the discovery of an organic dye photocatalyst for use with NCS and the subsequent optimization of reaction conditions with regard to arene and heteroarene chlorination will be presented.
Gattu, Mrudula

MOTHER SCHOOLS: THE MISSING ALLY FOR COUNTERTERRORISM AND PREVENTING RADICALIZATION

“Mothers are on the forefront of a new security paradigm,” is the motto that which Women without Borders founder and chairperson, Edit Schlaffer, states as she practices preventing radicalization leading to violence. The aftermath of the 9/11 attacks, the London bombings, the attacks that occurred in Mumbai, and the countless ones that are occurring as we speak across Pakistan and the Middle East, started to make us question the global society that we are involved in and the the people that are getting affected. The question that we are asking and trying to resolve is that of why such acts are continuing to happen and why the younger population in the Middle East are being targeted as potential violent extremists. With mother’s being the center point of all families in this culture, they have a lot in stake and are struggling to raise and guide their children amidst all the influence and turmoil that they are surrounded by. From the curriculum that is taught in the schools, to the textbooks that the children read, the amount of radicalization and brainwashing of the children that occur in these towns is immense. The kids attend classes that discourse about pro-ISIS by conditioning them with pictures of bombs, guns, tanks, machine guns, warplanes, and other war symbols. These children start to learn not to feel any emotion or sympathy and thus are being trained, mentally and physically, to become jihad activists. Children that are as young as eight years of age start off their education in these so called caliphate school systems and are thus trapped in their teachings. ISIS has invested largely in ensuring that the younger generation is well trained and equipped with knowledge about the caliphate so that they can attempt to out-live the existing caliphate ideology. In an attempt to stop such radicalization of violent extremist teachings to the children, mother’s have been a great security model. Many of these youngsters are at a confused state of mind, with whether to follow the caliphate and their radicalized principles or to take a step back and to listen to the voice of reason. The amount of effect that the mother’s have in channeling their children’s emotions in a productive way seems like an efficient manner to handle this issue. Women without Borders initiated a program called “Mother Schools” where the mothers of local communities in the Middle East are educated and trained to be resilient to the radicalization that is brought into their families. These Mother Schools will assist in sensitizing the mothers of the children that might be at risk of being persuaded into radicalized propaganda and thus will be able to respond before it is too late. Mothers are truly the secret ally.

Graham, Susan

THE DANGERS OF STRANGULATION

Strangulation is a condition when blood flow to the brain is cut off by restriction. This restriction around the neck can increase episodes of hypoxia, anoxic brain injuries, thyroid cartilage injuries, carotid injuries, and vertebral artery injuries (Strack & Gwinn, 2018). Because of sustaining such injuries, a patient can also suffer from another condition called post-traumatic stress disorder (PTSD). These injuries are all hard to assess and diagnose due to external visibility being minimal for 24-48 hrs. (Strack & Gwinn, 2014). This presentation is a student’s Doctor of Nursing Practice (DNP) Quality Improvement (QI) research project related to the education of 25 emergency department (ED) nurses and providers to the dangers of strangulation, examines this project’s phenomenon of interest, explores the research plan and methodology, and relates its significance to DNP prepared Advanced Practice Nurses. The National Training Institute of Strangulation and Prevention (NTISP) has a medical board and peer reviewed assessment tool with a protocol that provides the new gold standard for radiographic studies for assessing strangulation patients presenting to the ED (Strack & Gwinn, 2018). This project was a combination of providing that screening tool education to nurses, and providing resources for ED providers to utilize when treating potential life-threatening injuries related to strangulation. This DNP project was answering the question: (P)For nurses and providers working in the ED, (I) will providing formal education about the dangers of strangulation and resources from the NTISP, (O) improve nursing and provider knowledge related to assessing the signs, symptoms, and dangers of strangulation?

Carbamate functional groups such as the heterocyclic piperidine (Fig. 1) and proline (Fig. 2) molecules are widely used in both the pharmaceutical industry and the agrochemical industry. Our original goal for this project was to use piperidine molecules for the electrochemical shono-type oxidation, however due to issues with our results we reverted to using proline which has already been reported in the literature in an attempt to rectify our methods.

Using electrochemistry, we attempted to oxidize and attach functional nucleophiles to a modified proline molecule in the hopes of creating a di-substituted proline compound (Fig. 3). This process usually involves multi-step reactions and the use of transition metals. However, electrosynthesis can provide a clean, atomic economical, and scalable reaction. To do this we first created a modified proline compound by attaching a protecting group and converting the carboxylic acid to an ester.

Finally, our plan was to use another electrochemical oxidation to remove the 1,3,5-TMB and substitute it with a variety of different nucleophiles creating a functionalized pyrrolidine product (Scheme 2).
Introduction. Bigler (2014) asserted that performance validity test (PVT) failures reflect fatigue, pain, and depression rather than poor effort. In contrast, Green et al. (2001) asserted that PVT failure in depressed individuals reflects poor effort, and forgetfulness in such patients reflects poor effort rather than genuine impairment. This study empirically evaluated these assertions in non-compensation-seeking depressed inpatients.

Methods. Participants included 53 depressed inpatients admitted to a psychiatric ward. The participants underwent a battery that included the California Verbal Learning Test-II and the Minnesota Multiphasic Personality Inventory-2-RF. Performance validity was assessed with the Word Memory Test (WMT).

Results. WMT scores were used to determine performance validity according to criteria in the test manual. Of the 53 patients, 42% (n=22) failed the WMT, implying poor effort. Regarding CVLT-II impairment, 42% (n=22) of the sample achieved T-scores lower than 40. Of these, 23% (n=5) failed the WMT, whereas 77% (n=17) had impaired memory but exerted normal effort on the WMT. Using a p<.05 criterion, poor effort on the WMT was significantly correlated to CVLT impairment (r=.3). Correlations revealed that MMPI-2-RF scales pertaining to anxiety and persecutory ideation were significantly related to WMT performance (r’s=-.3). However, MMPI-2-RF validity scales pertaining to exaggerated symptoms (F, Fp) achieved significance (r’s=-.3).

Conclusions. Authentic memory impairment occurred in approximately 32% of the inpatient depressives. Clinicians should recognize the risk of such impairment, and address it in treatment plans to mitigate morbidity for patients. Such impairment notwithstanding, approximately one third of patients who manifest poor memory performance exert invalid test effort. Poor effort correlated anxious mood and exaggerated symptom severity. Thus, as depressed patients exaggerate symptoms, they are prone to exert poor effort on neuropsychological testing.

Habib, Abraham
A CYBER-PHYSICAL SYSTEM TESTBED FOR SECURITY EXPERIMENTATION AND DATA ACQUISITION

Cyber-Physical Systems (CPS) are systems which integrate computational, networking, and physical components within a single functional environment. They play an important role in critical infrastructure, government, and everyday life. CPSs encumber many requirements, such as robustness, safety and security, Quality of Service (QoS), and trust. As CPSs typically combine a wide variety of hardware, software, digital, and analog technologies, engineering these requirements through analysis, verification, and controls can be incredibly challenging. With respect to security, the science of protecting CPSs from blended attacks (combining attacks on digital and physical aspects) is yet to be developed. On this security front, a much-needed component is a suitable test environment in which to pursue lines of experimentation and exploration. Our research introduces a testbed allowing researchers to experiment on blended attack and defense scenarios in CPSs through gamification. The testbed features many different systems, both cyber and physical, that are fully instrumented for data analysis and assessment. Our gamified CPS testbed is ultimately a capture the flag game where teams try to: (A) capture the objective, and (B) hack each other. The instrumented testbed allows us to monitor all aspects of the game as it is happening including all attack vectors to analyze and assess an attack. The data extracted from the testbed provides a ground truth against which to test theories and validate simulations.

Hannagan, Molly
INVESTIGATING PROCEDURAL PAIN OF HYALURONIC ACID KNEE INJECTION FOR THE TREATMENT OF OSTEOARTHRITIS

Background: Intra-articular injection of hyaluronic acid is an effective treatment for osteoarthritis of the knee with beneficial effects on pain and function in patients that have failed to respond to conservative non-pharmacological treatments (Bellamy et al., 2006). The injections provide the most benefit when needle is placed directly into the intra-articular space. Unfortunately, inaccurate needle placement can lead to hyaluronic acid being placed in extra-articular tissue or adjacent structures resulting in adverse events, decreased benefit and increased pain (Berkoff, Miller, & Block, 2012). In a busy outpatient orthopedic clinic, two surgeons have observed that when performing ultrasound guided needle placement
for hyaluronic acid knee injections that their patients tolerated the procedure better and experienced less pain. Currently, hyaluronic acid knee injection is performed by both traditional anatomic palpation needle placement and ultrasound guided needle placement. The decision to use anatomic palpation or ultrasound guidance for needle placement currently is based on provider preference. There is no one preferred standard of care.

**Objective:** The purpose of the research is to determine in adult patients undergoing hyaluronic acid knee injection for the treatment of osteoarthritis: Is there a significant difference in procedural pain when using ultrasound guided needle placement when compared to anatomic landmark palpation needle placement?

**Methods:** A nonrandomized control trial with a convenience sample of adult patients with OA grades 1–4 and a body mass index (BMI) <40, undergoing hyaluronic acid intra-articular knee injection to treat osteoarthritis. The research will compare the visual analog scale (VAS) pain scores, between ultrasound guided needle placement and traditional anatomic landmark palpation needle placement, to determine if there is a significant difference in procedural pain with injection.

Hanson, Andrew; Lamar, Angus; Hopkins, Megan; and Brandeburg, Zach

**IODINE-PROMOTED FORMATION OF N-SULFONYL IMINES AND N-ALKYL SULFONAMIDES FROM ALDEHYDES AND HYPERVALENT IODINE REAGENTS**

Our research group has developed a mild synthetic method to install N-sulfonyl units, which are employed within the drug discovery field as bioisosteres in a variety of pharmaceuticals and bioactive compounds, directly into aldehyde functionality under non-traditional conditions. The resulting Nsulfonylimines can be employed as valuable intermediates in a wide range of synthetic applications. Our recent progress towards the exploration of the steric and electronic limitations of the substrate scope of the aryl aldehydes will be presented.

Harrison, Joshua; Mally, Bethany; Henderson, Chlo; Doerfler, Jake; McFerron, Nick; and Islam, Naveed

**EWB-TU CONVERSION OF WASTE VEGETABLE OIL INTO BIODIESEL FOR USE ON CAMPUS**

A pressing issue facing society is the prevalence of fossil fuels, which may become unsustainable in the future. The diesel fuel used to power heavy machinery for the Physical Plant’s construction and groundbreaking equipment is one such fuel, and should fossil fuels ever encounter large issues, their operational costs could become much greater. To help diversify the fuels used on campus we are undertaking a project to convert waste vegetable oil (WVO) to biodiesel using a transesterification process. The process will use oil from Pat Case Dining Center to supply the needs of the Physical Plant in an effort to increase the sustainability of the fuel source. A reactor has been designed and is being constructed to provide this service. Project progress and problems are addressed at weekly meetings, with additional meetings to work on aspects that demand more time, such as construction or procedural writeups. One of the main problems addressed so far was a safety concern of electric and temperature hazards in the reactor, for which we rewired the reactor and installed a thermocouple. We also lacked familiarity with collegiate lab expectations, so we learned proper procedural development from our faculty advisor, ensuring proper safety protocols are followed.

Harville, Lauren

**THE THERMAL STABILITY OF SILVER HALIDE NANO-ALLOYS ON Au(111)**

The Iski Research Group has previously studied the thermal stability of a single monolayer of Ag on a Au(111) crystal using Electrochemical Scanning Tunneling Microscopy (EC-STM). The monolayers are applied using an electrochemical phenomenon known as Underpotential Deposition (UPD). UPD prevents the application of more than one metal layer which is critical for this study because it is based on examining the properties of nano-alloys as opposed to bulk alloys. The potentials at which UPD events occur are understood with the help of an electrochemical technique called Cyclic Voltammetry (CV). Using all these techniques has allowed Dr. Iski’s research group to discover that AgCl has two distinct UPD potentials each corresponding to a unique chemical mechanism. One potential involves a bare silver ion reducing to the surface (Region 1), and the other potential (Region 2) involves a formula unit reducing to the surface. Deposition in Region 2 for AgCl has already been studied and it was found that nano-alloys formed in Region 2 produce a thermally stable monolayer up to 1,000 K. Interestingly, in contrast, a nano-alloy deposited in Region 1 is not thermally stable. This study
can be further extended to other silver halides, such as AgBr, to continue to investigate the effect of deposition potential on the thermal stability of the system. This work demonstrates the ability to control surface thermal properties via a precise control on electrochemical depositions. Control of this nature is key to using surfaces in a myriad of applications including extreme environmental conditions.

Haygood, Lauren and Theiling, Bethany
TESTING AN ION CHROMATOGRAPHY TECHNIQUE TO SEPARATE RARE EARTH ELEMENTS FROM THE CALCIUM IN CARBONATE

An unanswered question in the Geosciences is “where are the rare earth elements (REEs) housed in carbonate bearing rocks (e.g. limestone)?” If we understand how REEs are incorporated, we will know how to reliably use them. Carbonate bearing minerals are generally composed of CaCO₃. There are two likely hypotheses for how REEs are associated with carbonates: (1) REEs can substitute for the calcium (Ca²⁺) in carbonates, and therefore REEs in the ocean could illustrate the ocean chemistry; (2) REEs are adsorbed on the surface of clays, and so reflect input of weathered material. Our first step towards answering this question was to test various ion chromatography techniques in an attempt to separate REEs from Ca²⁺ in carbonates. We took an ICP standard of 10 µg/L and added in a 100 µL spike of Indium, which is an ideal spike because it is in very low concentrations in Earth materials, in order to quantify REE concentrations. We experimented with the strength and volume of acids, as well as the volume and timing of cation exchange columns to determine the most effective method. Five methods were completed using various lengths of columns. Our samples were collected in different volumes of acid and made into 20ppb solutions, which were then analyzed using an ICP-OES (Inductively Coupled Plasma Optical Emission Spectrometer). Our results show that the columns that eluted the slowest had the highest accuracy. Our results also show heavy REEs (HREEs) require a longer elution time than light REEs (LREEs).

Haynes, Maureen
STRUGGLING SILENTLY IS NOT ENOUGH: THE POWER OF OKLAHOMA TEACHER EXPERIENCES AND PROTESTS

The issues surrounding public education in the state of Oklahoma have recently been the subject of great local and national attention. In April of 2018, Oklahoma teachers began what would ultimately be a two-week protest in support of better pay, conditions, and attention for public education. The goal of this research project was to highlight and connect the narrative experiences of Oklahoma public school teachers to better understand the problems they face. Using in-depth interviews one to four hours in duration with ten teachers, this study focused on their day-to-day lives in and out of the classroom, their identities interactions, and how things have (or haven’t) changed after major protests. Interviews spanned time from six months before the walk-out to eight months after its occurrence. The themes that emerged from these teachers’ narratives were connected and reflected a great deal of pride in the profession, difficulty in the current political environment, and dedication to students.

Haythorn, Richard
A STATISTICAL ANALYSIS OF THE SHAPE OF PALEOINDIAN ENDCAPERS IN NORTHEASTERN NORTH AMERICA

This presentation is a statistical analysis of endscrapers found in northeastern North America with the goal of determining whether there are any significant differences to the endscrapers in this region. Four sites representing three technological traditions and in three regions within northeastern North America were selected to provide both for changes over time and distance. The analysis is a size-shape analysis, looking at how the size of the scraper relates to its overall shape. This presentation will be looking at endscrapers in two contexts that might induce changes; geographic location and cultural affiliation. This will allow for the endscrapers to be looked at through both a human dependent and a human independent lens.
Hegdale, D.; Fortier, Anthony; Lewis, John; Prebish, Lydia; Tresch, Erin; and Wilson, Jazzmin

HOW THE GREAT FLU PANDEMIC OF 1918 CHANGED THE UNITED STATES

Since the empire of England, bending the steely boundary of power possessed by white, upper and middle-class men in the early 1900s in the US was a near impossible feat. At least in part, scholars had attributed the 1918 Spanish Flu Pandemic as a nail in the coffin for the success of women’s suffrage. As with nearly every victory for women, the negatives of the win were often in the blind spot. Despite females suddenly and very visibly participating in public life by their own direction, my paper deciphered examples of continued and systemic control by powerful white men primarily in urban centers. Women continued to be called “girls” or by their husband’s name. Organizations successfully ran by women were silently headed by men. Men dictated the practice of nursing, etc. Women were not as independent as future populations had chosen to see them.

Herrboldt, Madison

THE IMPACT OF LIFE HISTORY ON MALE SALAMANDER REPRODUCTION

Many temperate organisms exhibit seasonal reproductive cycles. The stability and stochasticity of their environment influences this cyclical nature of reproduction. The reproductive cycle of temperate salamanders is seasonal and some species possess multiple life histories that occupy disparate habitats. In this study we test how life history influences the seasonal reproductive cycle of male Oklahoma salamanders, *Eurycea tynerensis*. There are metamorphic populations of *Eurycea tynerensis* that have a larval stage that undergoes metamorphosis to become a terrestrial adult as well as paedomorphic populations that retain aquatic larval characteristics into adulthood. We analyzed the seasonal cycle of spermatogenesis, reproductive gland development, and pheromone expression in these different life histories. The Oklahoma salamander develops courtship glands during the breeding season that help deliver pheromones to increase female receptivity. We integrated morphological analysis through gland histology and gene expression profiles to understand the seasonal variation that may result from different life histories. To quantify histological changes we used imaging software and investigated them under a statistical framework. Target genes were identified using previous transcriptome analysis to generate gene expression profiles utilizing qPCR. We predicted that paedomorphic salamanders will have a longer reproductive window as well as start the cycle earlier. This study represents an integrative approach to understanding the impacts of habitat stability on seasonal reproductive cycles.

Hmeluk, Natalie and Sheaff, Robert

GREEN TEA REGULATION OF SUGAR METABOLISM

The potential and diverse health benefits of green tea range from weight control to cancer prevention. Studies have argued that green teas like matcha (a popular powdered form) support metabolic health, but the mechanism underlying these claims remains elusive. In order to better understand how matcha might influence human health, we studied its effects on metabolism in a cell culture model system. Immortalized mammalian cells typically operate under aerobic glycolysis, known as the Warburg effect, wherein they metabolize glucose to lactate even in the presence of oxygen. Enhanced glucose uptake is thought to produce sufficient ATP while also allowing production of biomass needed for cell proliferation. However, they can be forced to use different nutrients and metabolic pathways by varying the media composition. Commercially available matcha was dissolved in water and titrated on mammalian cells for various times. Carbon sources in the media such as amino acids and the type/concentration of sugar were varied to alter metabolic pathways being utilized. ATP production was measured using the CellTiterGlo™ assay from Promega. The well-known metabolic inhibitors 2-deoxyglucose (2DG; inhibits glycolysis) and rotenone (inhibits complex I of the electron transport chain) were used as controls. Results suggest that matcha inhibits the first step in glycolysis where glucose coming into the cell is phosphorylated by hexokinase. These results provide further insight into how matcha might provide health benefits (weight loss, cancer prevention) via modulation of glucose metabolism.
Hockensmith, Kirby
IMPLICATIONS OF WORK/LEISURE DEMAND CONGRUENCE: A CONCEPTUAL REVIEW

Examining how job demands (i.e. characteristics of an individual’s job that require sustained physical or mental effort) are related to outcomes of import to both organizations and their employees has been widely studied in the field of occupational health psychology. However, the workplace is not the only life domain that requires sustained effort on the part of an individual. Different leisure activities people participate in over the weekend can also lead to similarly taxing demands during off-work time periods. The congruence of the amount of demands in the work domain and the amount of demands in the leisure domain could have implications for both work outcomes (e.g. engagement) and well-being outcomes (e.g. weekend recovery and burnout) such that varying degrees of congruence may lead to either positive or negative outcomes for individuals. This research proposal will utilize theoretical evidence to establish conceptual linkages between the degree of work/leisure demand congruence faced by individuals and its relation to various work and well-being related outcomes. Preliminary hypotheses in relation to these linkages will also be presented.

Hoffmeister, Jordan
NEUROBEHAVIORAL CORRELATES OF EUPHORIC AND DYSPHORIC MOOD IN MULTIPLE SCLEROSIS

Objective: Cognitive dysfunction is present in between 43-70% of people with multiple sclerosis (MS). Additionally, depression is a common comorbidity, with prevalence as high as 50%. Studies on the effects of depression on cognitive performance in MS are mixed. However, few studies have investigated potential effects of positive affect on cognitive performance in MS. The current study investigated the effects of euphoric and dysphoric mood across multiple cognitive domains in people with MS.

Participants and Methods: Participants included 96 people with MS and 48 healthy people. They were primarily female (75%), and Caucasian (90.3%). Participants were administered the Chicago Multidimensional Depression Inventory (CMDI) to assess negative and positive affect. Participants were administered a battery of cognitive tests assessing domains of: retrospective, prospective, and working memory, verbal fluency and reasoning, information processing speed, and planning.

Results: Multiple regression analyses were run to determine whether positive or negative affect was most associated with cognitive performance. Demographic and MS-specific disease factors were entered as control variables. Tolerances were acceptable and ranged from .60 to .99. Positive affect accounted for significant variance in domains of retrospective memory, verbal fluency, and information processing ($r$’s ranged from .18 to .26). Negative affect failed to account for significant variance on any of the neuropsychological indices.

Conclusions: Overall, positive affect explained more unique variance than negative affect in multiple domains of cognitive performance. These data imply that the presence of negative affect is not as much of a morbidity risk as the absence of positive affect (i.e., anhedonia). Such data conform with existing research involving major depressive disorder showing that anhedonia may be a risk factor for cognitive impairment among individuals with primary mood disorder.

Holt, Jacqueline
A DISCUSSION ON ORGANIZATIONAL GOSSIP

Broadly defined, gossip is the exchange of evaluative information about an absent third party (Foster, 2004). Understanding gossip in various contexts expands understanding and knowledge across disciplines, as gossip is a concept used not only in psychology but also in business, sociology, and even evolutionary studies (Dunbar, 2004). The purpose of this presentation is to consolidate and clarify research on gossip in organizational contexts by identifying key antecedents and outcomes for better understanding and management of these behaviors. For example, what is gossip?
Grief is puzzling. Although Elizabeth Kübler-Ross has famously urged us to see it as a series of stages, we often, mistakenly, take it for granted that she depicts grief as a linear process. Perhaps what is most striking about Kübler-Ross’ model, though, is the determination at large to accept her “stages of grief” as a 5-point plan for how one ought to grieve. It is as if the intended structure matters only inasmuch as it meets a long-existing but often unspoken demand to somehow make sense of the common experience of mourning. And yet countless other accounts of loss attest to just the opposite: grief simply cannot be measured on a scale from “Denial” to “Acceptance.” In conjunction with my work this year as an Oklahoma Center for the Humanities student fellow, I have been developing a project focused around literature grappling with the individual human experiences of grief and mourning. As I continue my research, I will examine modern writers such as Joan Didion, C.S. Lewis and Vera Brittain in juxtaposition with classic authors such as Shakespeare and St. Augustine, observing the ways in which their experiences working out grief converge across cultures and epochs, and diverge across individual temperaments and experiences. I will further examine how the act of writing serves for these authors as a fundamental process of mourning, as well as its felt insufficiencies as a means of expression. Sorrow cannot, borrowing from Lewis’ experience, be “mapped”, and perhaps the greatest task of grief, the answer to the riddling “ought” felt innately by many mourners, is simply to know it.

Hu, Allan
CYTOTOXIC EFFECT OF BLUE LIGHT ON MAMMALIAN CELLS

Ultraviolet irradiation has long been found to be cytotoxic toward mammalian cells. More recently, however, it was discovered that some wavelengths of visible light exhibit a similar effect, yet the exact mechanism of action is unknown. The goal of this research was to determine if different wavelengths of visible light are targeting cellular metabolism (as measured by ATP production), and to see if there are potential chemotherapeutic uses of light in conjunction with existing chemotherapeutic agents.

Hurlock, Grant
EVOLUTION AND EXISTENTIALISM ON THE WORLD WAR II HOME FRONT

A most immediate concern, given England's ill-prepared status for suddenly finding itself at war in 1939 was the need to build up its manufacturing production of military hardware as rapidly as possible. As male factory hands were called away to active military service, women were recruited to take their places, and stories were turned out to encourage this process of familiarizing new workers with expectations of factory life. I investigate such a novel showing how an author models this new role through use of a young female protagonist whose behavior and attitude are machined by events and relationships to turn her out an efficient munitions maker. Anything Can Happen is a 1942 work by Marjorie Irene Appleton, which describes the life of a young factory worker named Ivy Maud Barnes, employed at a munitions plant making gun parts to be used in the war against Germany. Appleton's novel fits among similar works, such as Inez Holden's 1941 Night Shift, Monica Dickens's 1944 Edward's Fancy and J.B. Priestley's 1945 Daylight on Saturday. As Ivy cuts and mills gun parts throughout the workday, she is motivated and preoccupied by thoughts of personal events in her background as well as mate-selection considerations. The reader is led through a series of extended flashbacks in which Ivy's working-class character of cultural conservatism is shocked by the chaotic onslaught of wartime events into an existential crisis encapsulated in the catchphrase that is also the novel's title.

Isaak, Alexandra
HYBRIDITY IN TELEVISION GENRES: THE COP GENRE AND SITUATIONAL COMEDY IN NBC’S BROOKLYN NINE-NINE

The cop drama has been a popular staple in American television for decades. As it is currently recognized, tropes and elements date back to the show Dragnet in the 1950s. However, as Dr. Jonathan Nichols-Pethick notes in his book TV Cops:
The Contemporary American Television Police Drama, the cop drama is often mixed with other genres in television, such as the MTV music video and the melodrama. Doing so allows for nuanced representations of crime, cops, and citizenship. The FOX/NBC show *Brooklyn Nine-Nine* is one of the first shows to combine elements of the cop drama with those of the situational comedy, making it an important artifact to study. I will examine episodes from *Brooklyn Nine-Nine*’s first season, along with promotional videos and posters distributed by FOX before the series premiere. Examining these sources will give light to the way in which the combination of cop drama and comedy constructs representations of cops and criminals that is different from other 21st century television shows. While the ideology of inclusion and equal representation exists within the show, tropes of the older cop dramas also exist as to not ostracize audiences. I will also refer to *The Wire* (David Simon, 2002) and *Homicide: Life on the Street* (Tom Fontana, 1993-1999), because of the nuanced way they represent crime and heroism when compared to *Brooklyn Nine-Nine*.

Bibliography:

James, Benjamin
**MESHCLUST2: APPLICATION OF ALIGNMENT-FREE IDENTITY SCORES IN CLUSTERING LONG DNA SEQUENCES**

Grouping sequences into similar clusters is an important part of sequence analysis. Widely used clustering tools sacrifice quality for speed. Previously, we developed MeShClust, which utilizes k-mer counts in an alignment-assisted classifier and the mean-shift algorithm for clustering DNA sequences. Although MeShClust outperformed related tools in terms of cluster quality, the alignment algorithm used for generating training data for the classifier was not scalable to longer sequences. In contrast, MeShClust2 generates semi-synthetic sequence pairs with known mutation rates, avoiding alignment algorithms. MeShClust2 clustered 3600 bacterial genomes, providing a utility for clustering long sequences using identity scores for the first time.

Johnson, Margaret
**EVALUATING THE ROLE OF UNICEF IN COMBATING MALNUTRITION IN REGIONS OF ASIA AND AFRICA**

Severe acute malnutrition is defined by the United Nations International Children’s Emergency Fund as the “most extreme form of under nutrition.” More specifically, children plagued with malnutrition have a very low weight for their age. Their height also does not reach full potential and is classified as “stunted.” These children also have a muscle mass which is almost non-existent. Children who are victim to severe acute malnutrition are nine times more likely to die before they reach the age of five. Overall, malnourished children have a much lower quality of life. UNICEF is an agency of the United Nations whose mission is “to provide long-term humanitarian and developmental assistance to children and mothers.” One of the more specific goals of UNICEF is to target the nutrition, or rather lack of nutrition, in children in areas with populations in very critical health conditions. These regions are categorized as emergency health areas sometimes. Some of the manners in which UNICEF responds to the problem of malnutrition are through processes such as improving dietary diversity, providing supplementation and supporting salt iodization. With the progress that has been made in a very short nine-year period of time, there is a lot of confidence in the programs enacted and supported by UNICEF. While there is hope, the momentum that the programs have already gathered cannot be slowed or stopped for risk of the program’s effectiveness decreasing and the rate of malnutrition increasing again.
Johnson, Kyle and Gottsch, Sam
KENDALL WHITTIER CREATIVE PLACEMAKING

Film Department Professor, Jeff Van Hanken, introduced us to an emerging and still developing field, Creative Placemaking. The goal of Creative Placemaking is to utilize the arts, culture and creativity to positively impact a community's interest, while also trying to make progress towards social change and diversity at large. This semester, we set out to identify a local community where our Creative Placemaking project could effectively maximize the potential of a space. After research and site analysis, we determined Kendall Whittier elementary to be a suitable location to reach our desired goals. We presented our research and provided visual examples to the students of other placemaking projects that have already been implemented, and then asked the students to express their opinions on what they would like to see in their community (school). The next step in our creative process is to take the feedback of the students, contact a local artist(s) for him/her to discover how we can best apply our creative project to the space we have identified for the project. The goal is to not just have an artist create something of his/her own, but to create something with as much participation from the stakeholders (students) as possible. Ultimately, this will allow the students to feel more appreciation and positively about the space because they know that they had an impact in the creative/development process. This research project is ongoing and progress will be made regularly in the coming weeks as the semester continues and concludes in week 15. We hope to continue our research and collect data as the project is implemented and observed.

Juarez, Luis; Sharp, James; and LeBlanc, Gabriel
WATER EFFECTS ON ROOM TEMPERATURE IONIC LIQUIDS (RTILS) DURING ELECTROCHEMICAL REDUCTION PROCESS OF CRISTALLINE SILICON (C-Si) FROM SILICON DIOXIDE (SiO2)

Crystalline Silica or Silicon Dioxide (SiO2) is one of the most abundant materials in nature. It is present in the earth’s crust as stone, soil, and sand. On the other hand, Crystalline Silicon (c-Si) is used for the manufacturing of many optoelectronic technologies, including solar cells, and is a difficult material to obtain from SiO2. The main reason for this complexity is the stability of SiO2 coupled with the high purification standards for practical applications (11N for electronics manufacturing; 6N for solar cells). In theory, a potential method to reduce the cost and time it takes to obtain c-Si from SiO2 is to use Room Temperature Ionic Liquids (RTILs) to suspend SiO2 particles while an electrodeposition process takes place. Two potential RTIL have been identified for this process. However, initial results found that water has a significant impact on the RTIL properties that hinders the electrochemical process. Methods for minimizing water contamination were explored and preliminary test with the SiO2 have shown some promise. Future research will focus on exploring other RTIL candidates based on these initial studies to optimize this strategy.

Karki, Anand; Wells, Harrington; and Fakhr, Mohamed
RETAIL LIVER JUICES ENHANCE THE SURVIVABILITY OF CAMPYLOBACTER JEJUNI AND CAMPYLOBACTER COLI AT LOW TEMPERATURES

The high prevalence of Campylobacter spp. in retail liver products was previously reported and has been linked to several outbreaks of campylobacteriosis. The main objective of this study was to investigate the influence of retail liver juices on the survivability of several strains of C. jejuni and C. coli, which were previously isolated from various retail meats at 4°C. All tested Campylobacter strains showed higher survival in beef liver juice (BLJ) and chicken liver juice (CLJ) as compared to beef and chicken juices (BJ and CJ) or Mueller Hinton broth (MHB) at 4°C. Overall, C. jejuni strains showed greater survival in retail liver and meat juices as compared to C. coli. CLJ enhanced biofilm formation of most C. coli strains and supported growth in favorable conditions. When diluted, retail liver and meat juices enhanced survival of Campylobacter strains at low temperatures and increased aerotolerance. In conclusion, beef and chicken liver juices enhanced the survival of C. jejuni and C. coli strains at low temperatures, which helps explain the high prevalence of Campylobacter spp. in retail liver products.
Kaur, Rajdeep

**DETERMINATION OF SPECIFIC AMINO ACIDS METABOLIZED BY CELLS WITH DEREGULATED p27Kip1 PROTEIN**

Through previous studies on immortalized mouse fibroblasts, it has been shown that the cells lacking in tumor suppressor p27Kip1 can switch their metabolism between glucose and amino acids. The metabolic switch is observed when these cells (designated -/-) are subjected to conditions with low glucose. In such conditions the cells stop going through glycolysis and start doing only TCA cycle by using amino acids as a carbon source to produce maximum ATP. We hypothesize that deregulation of p27 protein provides a growth advantage to tumors by maximizing nutrient uptake. But the specific amino acids that aid the survival of cancer cells remain unclear. Therefore my research focuses on determining the primary amino acid(s) utilized by tumor cells. To find those relevant amino acids, the cells were cultured in Dulbecco’s Modified Eagle Medium (DMEM) specifically constituted with individual amino acids. The amount of ATP values produced in these conditions was measured using Cell Titer Glo™ and compared to the normal fibroblasts (designated +/-) used as a control.

Kerst, Bradford

**ACTIVE HEAD SUPPORT FOR CHILDREN WITH HYPOTONIA**

The goal of this research is to determine the degree to which an active assistance head support helps children with hypotonia (underdeveloped muscle tone) develop strength compared to a static head support. Data is being collected from a force sensor in combination with a Head Pod static support. The data shows how much the Head Pod is assisting the subject, and we expect the data to show less reliance on the support as the study progresses. A motion capture system will be used with data from the force sensor to make a biomechanical model of the neck and head for children with hypotonia to help therapists and researchers understand first how hypotonia affects various individuals from a biomechanics standpoint. After making the biomechanical model, we plan to build a rehabilitation robot to assist as needed. Using the active head support, we hope to learn how the robotic head support builds muscle strength in comparison to the static head support currently available on the market.

Keyani, Feroz and Nguyen, Huy

**ALPHA CHLORINATION OF CARBONYL USING TCCA AND BRILLIANT GREEN**

Chlorination of hydrocarbons is a synthetically valuable transformation for the production of end-targets and intermediates in pharmaceuticals, agrochemicals, and advanced materials. Our research group has recently discovered a mild, atom-economical method for chlorinating substrates alpha to carbonyl groups that traditionally require harsh reaction conditions using a visible-light-promoted photocatalytic approach. In the present study, the reactivity of a variety of aromatic ketones have been investigated, and our progress towards the scope of reaction will be presented.

Khanal, Vivek and Ali, Akhtar

**PHYLOGENETIC ANALYSIS OF FIRST COMPLETE GENOME OF CUCURBIT APHID-BORNE YELLOWS VIRUS FROM THE UNITED STATES**

*Cucurbit aphid-borne yellows virus* (CABYV) (family *Luteoviridae*, genus *Polerovirus*) was first described in France in 1992 and since then has been reported from various countries of the world. In the United States (US) it was first reported in 1993 but no complete genome sequence of the virus was available until we recently published it. In this study, a CABYV BL-4 isolate collected from Blaine county of Oklahoma during 2017 growing season and the first complete genome was sequenced. Seven pairs of overlapping primers were designed based on sequences from the GenBank. All the seven fragments were amplified by reverse-transcription polymerase chain reaction (RT-PCR) with total RNA form virus-infected tissues as a template. Expected PCR products were purified by Exosap method and sequenced directly. Sequences from all seven fragments were assembled by ClustalW, while both 5’ and 3’ rapid amplification of cDNA ends (RACE) was performed to check if there are any additional nucleotide sequences. The genome of CABYV BL-4 isolate was 5679 nucleotides long containing six overlapping open reading frames. The genome also contains intergenic non-coding region
of 199 nucleotides which is the characteristic of virus species in *Luteoviridae*. The BLASTn analysis showed that highest nucleotide sequence identity was with Chinese Beijing isolate (97%). Forty-three complete genome deposited in the GenBank were used to construct a phylogeny of CABYV by maximum likelihood method. The isolates were clustered together loosely based on their geographical location and recombination event. Interestingly, BL-4 isolate clustered together with Asian (Chinese, South Korean and Japanese) isolates.

**Krusniak, Aaron**

**MAPPING EVICTION IN THE CITY OF TULSA**

According to data from the Eviction Lab at Princeton University, the City of Tulsa has the 11th highest eviction rate in the country. In 2016 alone, there were over 6,000 evictions in Tulsa, or the equivalent of about 17 households being evicted each day. In addition to creating higher levels of transiency and volatility in the housing market, eviction can also become a discriminatory or predatory practice and for many tenants, eviction could very well mean homelessness. In order to better understand and address eviction in our city, this project aims to create a “heat map” which visualizes where evictions have occurred in Tulsa for approximately the past decade. To accomplish this, several datasets (including publicly available utility billing data, data from the County Assessor, and court filings collected by the Oklahoma Policy Institute) have been chained together, under the hypothesis that a high turnover in utility accounts for a given property might be one indicator of eviction or, more broadly, unstable housing situations. This data doesn’t tell the whole story; informal eviction, as well as many other factors also lead to unstable housing. However, this research builds on the work previously completed by the Tulsa Urban Data Pioneers, and represents a further step toward being able to combat unfair eviction practices by knowing when and where eviction occur.

**Kundu, Rahul**

**INVESTIGATION OF BIOCHAR DISSOLUTION IN TETRALIN TO PRODUCE VALUE-ADDED CHEMICALS**

Due to the threat of global warming and its effects, emphasis on renewable fuels have increased in the recent times. To replace fossil fuels, which has been a major contributor to the global warming, production of bio-fuel from biomass has been explored by various researchers. Biomass consists of 30-35 wt% cellulose, 15-35 wt% hemicellulose and 20-35 wt% lignin. Biochar is a carbon rich hydrocarbon produced from biomass and biomass model compounds by hydrothermal carbonization. Biochar produced by hydrothermal carbonization requires low temperature, has higher carbon recovery, low ash content and has more surface oxygen containing groups when compared to other methods. In our research, we have studied the dissolution of biochar in a hydrogen donating solvent (tetralin) by dissolution at 400 °C where the thermal breakdown of hydrocarbon bonds form radicals, which are stabilized by the hydrogen donated by the tetralin. It was observed that the biochar produced from different biomass model compounds behave differently during dissolution. It was observed that the dissolution of biochar depended on (a) biomass model compound (b) presence of biocrude and (c) the hydrothermal carbonization temperature. The products mainly consisted of pre-asphaltenes (tetrahydrofuran soluble), asphaltenes (toluene soluble) and oil (hexane soluble) and were characterized by gas chromatography-mass spectroscopy analysis.

**Kvasnicka, Michael**

**THE EMANATING THEME OF MORTALITY IN FAULKNER’S AS I LAY DYING**

This presentation will discuss the theme of mortality and immortality in William Faulkner’s novel *As I Lay Dying*. The novel takes place in Faulkner’s fictional setting Yoknapatawpha County, Mississippi, where Addie Bundren has just died and her family vows to honor her final wish of being buried in her hometown of Jefferson, Mississippi. The various trials and triumphs during the transportation of her body force her family to confront their own mortality. The novel then extends these questions by asking the reader to think about the mortality of authors and consider whether an author is connected to their work in a way that allows them to be immortalized by its continued study. The concept of mortality is an idea that many people struggle with today, and this applies to this novel in an intriguing way since William Faulkner is dead, yet his
works live on. This means that, in a way, he possesses a type of immortality. The use of characterization, identity, and symbolism to portray the effects and meaning of death in Faulkner’s fictional world allow the reader to question the relationship between authors and their works, and if by studying their works, we revive the authors.

Lanham, Elizabeth

PHYLOGENETIC ANALYSIS OF INODONESIAN AMETHYSTINE PYTHONS

Modern molecular techniques have transformed the ways by which species are delineated, creating a taxonomic revolution that has resulted in the separation or combining of species and furthering our understanding of global biodiversity. Indonesia, a biodiversity hotspot, consists of almost seventeen thousand islands. On one island, West Papua, the New Guinea Highlands separate the northern and southern regions. Previous studies have verified the role the Highlands play in speciation through vicariance. On this island, Amethystine pythons are widespread, but show morphological, behavioral, and reproductive differentiation between the northern and southern regions. Through DNA sequencing, we gathered data from pythons collected from different localities across West Papua and its surrounding islands, allowing intra-island locality comparisons with other known species inhabiting the surrounding islands. Sequencing of two mitochondrial and two nuclear genes, revealed species level differentiation for populations in the north, south, and also the west of the island. Previously classified as one species, *Simalia amethystina*, this new data warrants a taxonomic revision, resulting in a three-way split. The northern populations will now be known as *S. borealis*, the western populations will be renamed, *S. jakati* (a name that it held until it was collapsed into *S. amethystina* several decades ago), and the southern populations will remain as *S. amethystina*. This taxonomic revision now implicates management and conservation consideration, as these pythons are now restricted species with smaller population sizes and increased susceptibility to the negative effects of climate change, deforestation, and collection for the pet trade.

Law, Rebekah and Fisher, David

WORKPLACE RESILIENCE MEASURES: A CONTENT ANALYSIS

The workplace is full of acute and chronic stressors that pose problems for individuals and organizations. What enables people to overcome these difficulties? Why do some individuals seem undisturbed or bounce back quickly after adversity? Potential answers to these questions can be found in the literature on resilience, but this literature base is also plagued by definitional and conceptual confusion. As a result, there have been various resilience measures developed that all purportedly measure the same construct, but even from a brief look at the item content, one can see that these measures focus on different things. This is problematic when comparing research findings across studies and creates potential for uninformed applications of the resilience concept. In light of these problems, this study aims to clarify what different aspects of the resilience phenomena various common measures capture. This goal was accomplished by having subject matter experts categorize the items from 11 measures of resilience into one of three aspects of resilience described in literature: resilience as a (1) trait/resource, (2) process, or (3) outcome. The results of this content analysis makes three major contributions. First, the finding will provide information on how well existing scales/items match various conceptualizations of resilience. Second, the results will facilitate comparisons across studies that employ different measures of resilience. Third, and perhaps most importantly, this study aims to provide practitioners with what scales/items would be most appropriate for different domains of applied practice, such as personnel selection, training, intervention evaluation, and performance appraisal.

Ledbetter, Nicholus and Bonett, Ronald

TERRESTRIALITY CONSTRAINS SALAMANDER LIMB DIVERSIFICATION: IMPLICATIONS FOR THE EVOLUTION OF PENTADACTYLY

Patterns of phenotypic evolution can abruptly shift as species move between adaptive zones. Extant salamanders display three distinct life cycle strategies that range from aquatic-to-terrestrial (biphasic), to fully aquatic (paedomorphic), to fully terrestrial (direct development). Life cycle variation is associated with changes in body form such as loss of digits, limb reduction, or body elongation. However, the relationships among these traits and life cycle strategy remain unresolved. Here
we use a Bayesian modeling approach to test whether life cycle transitions in salamanders have influenced rates, optima, and integration of primary locomotory structures (limbs and trunk). We show that paedomorphic salamanders have elevated rates of limb evolution with optima shifted toward smaller size and fewer digits compared to all other salamanders. Rate of hindlimb digit evolution is shown to decrease in a gradient as life cycles become more terrestrial. Paedomorphs have a higher correlation between hindlimb digit loss and increases in vertebral number, as well as reduced correlations between limb lengths. Our results support the idea that terrestrial plantigrade locomotion constrains limb evolution and, when lifted, leads to higher rates of trait diversification and shifts in optima and integration. The basic tetrapod body form of most salamanders and the independent losses of terrestrial life stages provide an important framework for understanding the evolutionary and developmental mechanisms behind major shifts in ecological zones as seen among early tetrapods during their transition from water to land.

Lewis, John
RACISM ENDEMIC IN A FLU PANDEMIC: AFRICAN-AMERICAN TROOPS IN THE GREAT WAR FIGHT THE FLU

The effects of the influenza pandemic on African-American troops during World War I is the central focus of this project. During the war, African-Americans were essentially second class citizens. This status was present in no small degree in the army when the flu struck. This project examines the experience of African-American soldiers during the flu pandemic of 1918 by recontextualizing it as a Jim Crow, rather than purely a military, or even a medical, experience. Through the examination of newspaper articles, letter and telegraph correspondence, personal memoirs, official military epidemic reports, and other military publications, this project demonstrates that the prevailing Jim Crow attitudes and conditions within the United States Army and government adversely affected African-American service men medically. While Jim Crow segregation within camps led to a lower infection rate of flu for black troops, their poor treatment at the hands of a Jim Crow military system led to much higher rates of deadly pneumonia if the flu was contracted. Furthermore, a study of military Jim Crow reveals the difficulty that African-American medical professionals faced as they tried to enter the service.

Li, Xiangpeng and Johannes, Tyler
EFFECT OF STORAGE TEMPERATURE ON NUTRIENT COMPOSITION DEGRADATION IN CHLAMYDOMONAS REINHARDTII

Postharvest loss is an important problem in algae cultivation and food industry. The prevention of the degradation of polyunsaturated fatty acids (PUFA), in particular, is of great interest because of PUFAs potential applications in biofuels and nutraceuticals markets. In this study, the degradation of lipids from the green alga *Chlamydomonas reinhardtii* was checked under four storage temperatures (-80ºC, -20ºC, 4ºC and 20ºC). Methods of preservation with algae concentrates and culture were also investigated. Contrary to the previously published work that showed the lipid content remained unchanged during storage at low temperatures (1ºC or 4ºC) in short period of time (1 week to 1 month), the present study showed that the lipid content declined significantly in the first 24 hours under the four storage temperatures tested. The degradation of protein content and carbohydrate content was also determined. The degradation rate was slower for protein and carbohydrate compared to that of lipid.

Lignieres, Austin
A COMPARISON OF MENTAL HEALTH CARE FOR VULNERABLE POPULATIONS IN MENDOZA, ARGENTINA AND TULSA, OK, USA

Considering different countries of the world, there are many differences in healthcare systems, especially in terms of health services for vulnerable populations such as people experiencing homelessness. Each country has its own opinions about what constitutes an efficient healthcare system, and during my time studying abroad in Argentina I learned about the social determinants of health and identified the important aspects of a healthcare system. In the nation of Argentina, there is a universal healthcare system in which all people have free access to public health services. A very prevalent issue in Mendoza and in the world is access to mental health care services. In my time in Mendoza,
I specifically researched access to mental health care services for people living on the streets. These people live in a very difficult situation and, because of the stress in their daily lives, they are in desperate need of professional medical support. On the other hand, Tulsa, Oklahoma has a quite different healthcare system in which all people must pay for medical services. Mental health issues are important in Tulsa, but there is a more extreme stigma associated with mental health problems and with people experiencing homelessness. In this project, I compared access to mental health services for people experiencing homelessness in Mendoza, Argentina and Tulsa, Oklahoma, and also explored mental health systems, stigmas, and solutions for members of vulnerable populations.

**Lignieres, Austin**  
INVESTIGATION OF BIOCHAR DISSOLUTION TO PRODUCE CHEMICALS AND FUELS

The need for renewable energy across the world has increased recently due to the effects of global warming. One of the primary alternatives that researchers are investigating in order to replace fossil fuels and mitigate the effects of global warming is the production of bio-fuels from biomass. Biomass consists of 30-35 wt% cellulose, 15-35 wt% hemicellulose, and 20-35 wt% lignin. In our research, biochar was produced from cellulose by hydrothermal carbonization. In this hydrothermal carbonization process, the biomass model compound (cellulose) was mixed with water and heated to 220 °C in a closed batch reactor to form biochar, a carbon rich compound. We have studied the kinetics of the dissolution reaction of biochar with a hydrogen donating solvent (tetralin) at various temperatures between 200 and 400 °C. The thermal breakdown of hydrocarbon bonds (in biochar) form radicals, which are stabilized by the hydrogen donated by the tetralin. It was observed that the dissolution of biochar depended on the temperature of the reaction and the length of time that the reaction was allowed to take place. The products formed during biochar dissolution were analyzed using gas chromatography-mass spectroscopy and mainly consisted of pre-asphaltenes (tetrahydrofuran soluble), asphaltenes (toluene soluble) and oil (hexane soluble).

**Luper, Caden; Ford, Laura; Gross, Donny; Holtmann, Margaret; Leong, Ryan; and Royal, Chris**  
EWB-TU INTERNATIONAL SANITATION PROJECT

The rural community of Machacamarca-Micacuni, Bolivia has limited access to latrines and showers, resulting in unsanitary conditions for the residents. The University of Tulsa chapter of Engineers without Borders is attempting to remedy the problem. Over the previous two years the chapter has completed two trips to the community: an initial assessment trip and an implementation trip. The assessment trip consisted of data collection and surveying to determine if the trip was feasible. On the first implementation trip, which took place over the previous Thanksgiving break, two latrine/shower structures were constructed. Each structure consists of a shower that is gravity fed from water up the mountain and a latrine that is flushed using water drained from the shower. The goal is to build increasing number of latrine/shower structures on future implementation trips to further improve the community’s access to proper sanitation practices. Community members are involved in every aspect of the construction so that in the future the community can independently maintain their own structures. As well as building the structures the goal of the project is to develop proper sanitation practices and basic hygiene within the community in order to improve their quality of life. While still in the early stages, as result of this trip, we have a design approved by EWB-USA that has been successfully constructed. Over the next year the families will give us feedback on the structures that we will use to ensure necessary changes are made before more are constructed.

**Macke, William**  
LEARNING COLLABORATIVE SHEPHERDING BEHAVIORS

Shepherding is a classic example of multi-agent behavior. In simple scenarios the problem consists of one agent, the “shepherd”, guiding multiple other agents, the “sheep”, towards some sort of common destination. In more complicated cases, the problem may have multiple shepherds working together to guide the sheep. While there has been extensive work to determine effective strategies for guiding sheep to destinations, little work has been done to investigate how such behaviors can be learned by shepherding agents. This work investigates how “sheepdog” agents learn collaborative behaviors in diverse environments. We use a multi-agent reinforcement learning framework to experiment with various
shepherding scenarios. Sheepdogs are modeled as learning agents, whereas the sheep follow simple behaviors in response to separation, alignment and cohesive forces. In particular we investigate how information about other shepherds and communication affect learning outcomes. We demonstrate that the sheepdogs were capable of learning a range of collaborative behavior both with and without direct communication.

Madrigal, Ilissa

VIEWING CUTE ANIMAL IMAGES: USEFUL FOR RECOVERY OR NOT?

In researching what contributes to the well-being of employees, work stress and recovery have continued to be areas of interest. Recovery can be defined as the relief needed to restore such resources (Meijman & Mulder, 1998; Sonnentag & Zijlstra, 2006). The actions that an individual may choose to engage in for recovery purposes may range from high-effort activities to low-effort activities (Fritz, Sonnentag, & McInroe, 2010). Activities considered to be restorative improve peoples’ moods, indicated by higher positive affect and lower negative affect (Sonnentag, Venz, & Casper, 2017). In a study by Nittono, Yano, and Moriya (2012), researchers found that viewing cute images activated a “cuteness-triggered positive emotion” when viewing cute images, resulting in participants performing attention-focused tasks more carefully. Social media has given people free and frequent access to cute images. There are unique categories for cute animal images (i.e. “#cutecatsofinstagram”) with thousands of images and videos and millions of followers (e.g., @cats_of_instagram has 9.9 million followers). The proposed experiment will investigate a low-effort activity of viewing cute animal images and its influence on resource recovery that could potentially be used during work breaks.

Martinez Galicia, Marco

NATIONAL IDENTITY-BUILDING AND CULTURAL APPROPRIATION: EXHIBITION OF ARCHAEOLOGICAL AND HISTORIC MATERIALS AT THE MEXICAN NATIONAL MUSEUM OF ANTHROPOLOGY

In the aftermath of the Mexican Revolution in 1920, the Mexican state created a unique national identity to be transmitted to its citizenry through multiple platforms and federal institutions. Initially designed to consolidate the different political forces and ethnic groups that participated in the revolution and to provide legitimacy to the new government, this identity took the form of a project of mass acculturation that would create a new generation of citizens with a shared ethno-national identity and a common history, regardless of actual ethnic background. The narrative that supports this identity was constructed by appropriating a diverse selection of cultural materials located within the Mexican state, obtained and curated through archaeological and historic research, and conveyed in visual form through federally-funded museums and public education textbooks. Although the Mexican state formally abandoned this project in the mid-twentieth century, the identity it created became an implicit component of public institutions, which continue to reproduce it. This study case shows how this process has been replicated without much modification since the past century by the exhibition layout and collections of the National Museum of Anthropology, the largest museum in Mexico, how this specific visual narrative still perpetuates the process of ethnic assimilation originated by the Mexican state, and how community museums in collaboration with archaeological and historical researchers have become a front to counter this process.

Mathur, Nitesh

AN ALGORITHM TO REVERSE THE GENERALIZED FACTORIALS PROCESS

The factorial function, defined on the integers, is the product of consecutive positive integers less than or equal to itself. More formally, it is defined as follows:

\[ n! = \prod_{k=1}^{n} k = n(n-1)(n-2)\ldots(3)(2)(1) \]

The factorial function appears frequently in mathematics, especially in combinatorics and number theory. Previously, we analyzed Dr. Manjul Bhargava’s paper, The Factorial Function and Generalizations, which had the following motivating question: “Is there some other function—some generalized function—that we could change each of the ordinary factorials to, so [certain number-theoretic theorems] would still remain true?” The author then proceeded to provide a methodology
to generate factorials on any subset of the integers. The purpose of our research was to utilize the methods employed in Dr. Bhargava’s paper to find combinatorial patterns within the factorial function. This research process occurred in three phases. The first phase consisted of conducting literary research on related topics, the second phase included building computational tools, and the third phase contained experimentation of new algorithms. During the process, Mathematica code was generated to compute generalized factorials given a subset of the integers based on Dr. Bhargava’s system of p-orderings and psequences. From the results of our research, we propose original algorithms to reverse this process, that is, to generate the original subset of integers that was induced by a given sequence of generalized factorials.

Mayberry, Natalie and Wilson, Laura
THE EFFECTIVENESS OF A ONE TIME TRAINING PROGRAM FOR LAW ENFORCEMENT OFFICERS ON ACQUIRED COMMUNICATION DISORDERS

This pretest/posttest study examined the effectiveness of a one-time training program for law enforcement officers (LEOs) on acquired communication disorders (ACDs). Information regarding optimal program content and format was gathered from content experts on law enforcement and ACDs, focus groups with individuals with ACDs, and video interviews with individuals with ACDs. After the information was gathered, a forty-minute training program was created. The training program was given to twenty-one law enforcement officers. The pretest/posttest data indicated improvements in the following areas as a result of the training: LEOs’ knowledge of ACDs, ability to identify ACDs, knowledge of strategies to use when communicating with individuals with ACDs, and comfort level when communicating with individuals with ACDs. The results of this study indicate that a one-time training program for LEOs is effective in increasing knowledge of ACDs and comfort level with using strategies to communicate with those individuals. This presentation will discuss findings and future steps, including expanding the research on a larger scale with a larger group of LEOs and seeking certification by the Council on Law Enforcement Education and Training (CLEET).

McLin, Sina
WHAT’S LOVE GOT TO DO WITH IT: IDENTITY AND IRONY IN KATE CHOPIN’S THE AWAKENING

This presentation will explore Edna’s awakening in Kate Chopin’s novel The Awakening. Her suicide at the end of the novel has been interpreted as either a failure to complete her escape from societal constraints, or as a final awakening, but Edna’s journey begins and ends in the ocean, meaning the final decision to drown herself is a show of strength and autonomy that defies social expectation. The ocean gives her ability to transcend the societal expectations on her as a woman, mother, and wife. Through the use of irony, Edna’s awakening also informs Kate Chopin’s rejection of the traditional love story, which is centered around the binary of a man and woman. Robert provides Edna with a glimpse at an alternative to her loveless marriage that could result in true happiness, but when he leaves the letter saying goodbye, she realizes she doesn’t have to follow him. Subscribing to the traditional narrative of a love story would mean depending on her relationship with him for happiness, ultimately losing her newly gained independence. She is fully aware of what was written before her, so this authorial choice, much like Edna’s suicide, is designed to defy those preexisting archetypes of societal expectations.

Meneely, Sophia
A CROSS-CULTURAL COMPARISON OF HIV/AIDS THROUGH MEDICAL, GOVERNMENTAL AND SOCIAL LENSES

As the Western world moves further from the HIV pandemic of the 1980’s, less and less attention on funding organizations that test/treat/prevent HIV exists. Using the USA, Russia, South Africa, and China as case studies and observing their responses to HIV, this presentation will focus on what barriers exist in effective treatment. Furthermore this presentation will look into three main areas of response. Firstly, the way medical communities treat and prevent the spread of HIV. Secondly, how governments respond, as well as their plans to reach the 90-90-90 goals set by the UNAIDS programme. Lastly, how HIV infected persons are perceived within these countries, and what stigmas follow them. HIV has moved from only an infectious disease to a chronic illness that a person may live decades having. It becomes imperative that the medical,
governmental and social responses adapt to ensure quality care for infected persons. The goal of this presentation is to show a comprehensive view of different areas that can affect someone living with HIV, and to keep interest alive so that focus and funding can be maintained in an effort to have an HIV free generation.

Mokhtari, Samira and Ali, Akhtar
SEARCH FOR GOOD VIRUSES IN FUNGI

Mycoviruses are viruses that are capable of infecting fungi. The symptoms of mycoviruses can be latent or hypovirulence. Mycoviruses that has hypovirulence will have adverse effect on the growth and virulence of the fungi. Thus mycoviruses could have the potential to be used as a biological control agents to reduce the effects of fungal diseases in plants and avoid the use of fungicides. *Fusarium* is a genus of plant pathogenic fungi that cause various diseases of important agricultural crops. In this research, we are screening *Fusarium* species for mycoviruses. *Fusarium* samples were collected by air sampling at the roof of Oliphant hall, The University of Tulsa, and grown on a potato dextrose agar media. Fungal mycelia was used for double stranded RNA (dsRNA) extraction procedure, the presence of the dsRNA in samples is an indication of the infection of fungi with mycovirus. Reverse transcription polymerase chain reaction (RT-PCR) was performed on infected samples in order to identify the mycovirus, followed by cloning and sequencing. So far, sequencing from one of the samples has been nearly completed and the results demonstrated 73-81% identity with two known mycoviruses available in the GenBank NCBI database.

Molina, David and Levetin, Estelle
AMBROSIA AND POACEAE POLLEN AEROBIOLOGY IN TULSA, OKLAHOMA

Oklahoma has a long pollen season from February through late fall. Grasses (Poaceae) pollinate during late spring and summer, whereas *Ambrosia* (ragweed) pollinates mostly during the fall. Exposure to certain airborne pollen can be harmful to individuals with allergies and asthma, which affect about 25% of the population. To understand pollen exposure, air sampling is performed at many locations around the world. Air samples have been collected with a Burkard sampler from the roof of Oliphant Hall since December 1986. For the current study, samples were analyzed at 400X magnification from summer to fall 2017 and summer 2018. These data were compared to previous years to explore any trends related to climate change. The highest yearly sum for *Ambrosia* was in 1987 with a pollen index of 22,628 and for Poaceae in 1988 with a pollen index of 4,899. Lowest yearly counts were in 2012 for *Ambrosia* with a pollen index of 4,950 and in 1996 for Poaceae with a pollen index of 1,717. Spearman correlations of *Ambrosia* peak and mean concentrations over time showed significant negative relationships, $r = -0.5825$, and $r = -0.5571$, respectively. Thus, indicating a decline in *Ambrosia* pollen levels. Spearman correlations for Poaceae showed a negative relationship between the April temperatures and start date ($r = -0.3997$), suggesting that hotter temperatures lead to earlier start dates. Furthermore, the relationship between start dates over time showed a correlation of $r = -0.3845$, suggesting the start dates for Poaceae pollination have been occurring earlier.

Monses, Sabrina
GENDER, LEADERSHIP STYLE, AND FOLLOWER BEHAVIOR IN AN INTERDEPENDENT TEAM TASK

Throughout the workplace and other contexts in American society, women continue to be barred from attaining the highest levels of leadership (Kubu, 2018). This effect, called the glass ceiling, is theorized to result from multiple constructs, including gender stereotypes and environmental factors. The present research aims to understand the relationships between leadership style, gender, and follower behavior. Using qualitative data analysis, I compare “feminine” leadership styles and “masculine” leadership styles in the context of an interdependent team task. The interdependent task consists of a team of three playing a computer game that simulates the bridge of a space station. The team has a designated leader in an assigned role of Captain. Using qualitative methods, I analyzed communication between the leader and followers by focusing on communal vs. agentic styles, transformational vs. transactional styles, democratic vs. autocratic styles, and protective vs. acquisitive self-presentation. Results and implications will be discussed.
Mortadha, Layla and Borden, Chase

ASSESSING EFFECTS OF PUBLIC ART ON COMMUNITY CAPACITY AND INDIVIDUAL HEALTH IN GREENWOOD

Many cities in the United States face growing issues regarding public health, especially in economically distressed neighborhoods. Often, these neighborhoods face issues with poverty, crime, and community disengagement, all of which are known to coincide with very low collective efficacy, limited access to resources, and worse health overall. There is growing evidence that community-oriented projects such as public art installations can offset such issues and provide measurable improvements to public health outcomes.

Once prosperous and known as “Black Wall Street,” the Greenwood District of North Tulsa continues to bear signs of the destruction wrought by the Tulsa Race Massacre of 1921, having great disparity in income, unemployment, and access to healthcare relative to the rest of Tulsa. A recent commission by internal grants seeks to liven the community by installing a public art work in the B.S. Roberts Park, located in the center of the historical Greenwood District.

The Center for Health, Art, and Measurable Practices (CHAMP) project at TU is designed to utilize this commission as an opportunity to investigate the link between public art and community health. Data will be gathered before and after the art installation and then compared. We will use qualitative methods such as interviews, focus-groups, and surveys alongside quantitative methods such as observed park usage. With the obtained data, we aim to provide insight on the efficacy of using public art for improvement of community health in both North Tulsa and similarly distressed communities across the U.S.

Moses, Daniel; Shirazi, Siamack; and Keller, Michael

SELF HEALING IN POLYMER SEALS VIA LAMINATED VASCULAR NETWORKS

Ball valves are used to turn flow on or off in a pipe. During opening and closing, particles can become entrapped in the contact surface between the rotating ball and valve seats. Relative sliding motion at the interface can lead to accelerated wear and poor seal. In severe instances, the resulting damage leads to valve failure, which necessitates repair or replacement of the valve. Self-healing techniques offer a potential method for autonomously repairing seal leakage caused by abrasive damage. In this work, a microvascular self-healing approach is adopted in which healing chemistry is delivered to damaged regions through laminated channels at the seat surface. Surface scratches caused by abrasive damage activate self-repair by exposing the underlying channels and autonomously filling the damage regions with a healing agent. The healing agent performs a dual purpose of slowing down the damage rate by lubricating the surface as well as replacing lost material through a polymerizing process. Manufacturing techniques of microchannels are developed for Polymethylmethacrylate (PMMA, Acrylic) and Polyoxymethylene (POM, Delrin), and wear resistances are measured. Volume loss and friction analysis are performed, and future challenges and considerations for microvascular based surface healing are discussed.

Mulligan, R.; Hoffmeister, J.; Basso, M.; Whiteside, D.; and Combs, D.

THE EFFECTS OF POLYPHARMACY AND NUMBER OF MEDICAL AND PSYCHIATRIC COMORBIDITIES ON COGNITIVE PERFORMANCE IN MULTIPLE SCLEROSIS

Objective: Multiple sclerosis (MS) is a neurodegenerative disorder, characterized by demyelination of the central nervous system. The myriad of associated physical and cognitive symptoms are often treated with multiple medications. The simultaneous use of numerous medications may result in adverse outcomes. Although polypharmacy coincides with cognitive dysfunction in elderly patients, few studies have examined these effects in people with MS. Thelen et al. (2014) found that degree of polypharmacy correlated with cognitive dysfunction in MS. Nevertheless, this study did not examine presence of comorbidities, which may have more directly accounted for cognitive dysfunction. The present study examined the concurrent impact of polypharmacy and medical and psychiatric comorbidities on neuropsychological function in MS.

Participants and Methods: Participants included 96 people with MS and 48 healthy people. They were primarily female (74.8%), and Caucasian (90.2%). Participants were administered measures of retrospective, prospective, and working memory, verbal fluency and reasoning, and information processing speed. Participants reported their current medication and medical conditions. A semi-structured interview was conducted to assess psychiatric diagnoses.

Results: Multiple regression analyses determined whether polypharmacy or number of comorbidities was most associated
with cognitive performance, while controlling for demographic and MS-specific disease factors. Tolerances were acceptable and ranged from .90 to .99. Polypharmacy explained more unique variance (sr’s ranging from -.19 to -.24) than number of comorbidities (sr’s ranging from .01 to .17) in domains of working memory and information processing speed. Other domains of function were not predicted by either variable.

**Conclusions:** Polypharmacy was associated with decline in working memory and information processing speed. Presence of comorbidity conditions did not account for neurocognitive dysfunction. Such findings may help clinicians more effectively weigh the costs and benefits of multiple medications, especially in populations with multiple comorbidities. Future studies may elaborate on the effects of polypharmacy and other comorbidities on various neuropsychological domains in MS.

**Ndhlovu, Themba**

**INVISIBLE MEN**

This paper argues that the mentality of white Americans depicted in Ralph Ellison’s *Invisible Man* takes root in and is in fact the same mentality of dehumanization that white Europeans used to justify their purchase and shipment of millions of African slaves in the transatlantic slave trade. The ideologies that justified the purchase of millions of African slaves by white Europeans (illustrated in David Davis’s *Inhuman Bondage*) is still evident in *Invisible Man*; furthermore, African Americans continued to be just as integral to the dominant white culture in the time of *Invisible Man* as they were during the transatlantic slave trade. Ellison’s novel recounts the fictive story of its nameless protagonist as he moves through a myriad of subservient positions where he is used by others on account of his race. Subtle details in the modernist novel and the protagonist’s “fake” story reflect an unfortunately real legacy of racial mistreatment in the Americas. I begin with a discussion on dehumanization and what it means, referencing some sociological reasons that people tend to treat each other this way; next, I turn to David Davis’s *Inhuman Bondage* and reveal the extent to which early white Americans dehumanized Africans and their descendants; I then proceed to Ellison’s *Invisible Man* and illustrate the elements of dehumanization undergirding the actions of many of the white characters in the novel; finally, I turn my discussion to the present and discuss the importance of these two books in addressing America’s continual predisposition to dehumanizing others.

**Nelson, Katie**

**ASSESSING LANGUAGE SKILLS OF INTERNATIONALLY-ADOPTED CHILDREN DURING THE SCHOOL-AGE YEARS: A SYSTEMATIC REVIEW**

The purpose of this systematic review is to determine the most effective methods for assessing for language delays in internationally-adopted children during their school-age years. A search of the literature was conducted using five databases. After reviewing, six articles were found that met the inclusion and exclusion criteria and were included in the final review. The six articles included three case series studies and three case-control studies of internationally-adopted children ages 5:0 to 11:8. Since evidence shows that internationally-adopted children are more likely to experience language delays, it is important to assess this population with specific measures that are sensitive to the differences in language skills that are present (Scott, Roberts and Glennen, 2011). Results from this review found tests sensitive to language delays in this population include the Test of Language Development-Primary/Intermediate, Third Edition TOLD:P/I-3, subtests of the Clinical Evaluation of Language Fundamentals (CELF) including Word Structure, Recalling Sentences, and Number Repetition, and Mean Length of Utterance (MLU) and Number of Different Words (NDW) calculated from language samples. More research is needed in order to determine the most efficient assessment battery for language delays in this population. This presentation will cover findings from the study as well as implications for practicing speech-language pathologists.

Neupane, Ganga; Kaphle, Amrit; and Harikumar, Parameswar

COMPARISON OF FE-AND CO-DOPED ZNO NANOPARTICLES SYNTHESIZED BY MICROWAVE METHOD

We have investigated structural, optical and thermal properties of undoped, Fe-and Co-doped ZnO (5%, 10% and 15%) nanoparticles synthesized by a microwave deposition method. Structural properties of Fe-and Co-doped ZnO were studied by X-ray diffraction spectroscopy (XRD) and Transmission electron microscopy (TEM). XRD studies showed the existence of wurtzite ZnO structure in all samples without any secondary phase. TEM studies of both Fe-and Co-doped ZnO revealed formation of nanoparticles with decreasing size with doping concentration. The diameter of particle size decreased from 17 nm to 11 nm for iron doping (0-15%) whereas diameter of particle size decreased from 15 nm to 9 nm for cobalt doping. Optical properties were studied using photoluminescence (PL) and UV-absorption spectra. PL studies show a blue shift in the near band absorption as Fe and Co concentration increases from 0 to 15%. UV-vis absorption measurement shows a systematic increase in bandgap from 3.21 eV to 3.25 eV for iron nanoparticles and 3.22 eV to 3.27 eV for cobalt nanoparticles with doping concentration from 0 to 15% respectively. Thermal properties of both Fe-and Co-doped ZnO nanoparticles were studied using seeback measurements system. Comparison of seeback coefficient and thermal and electrical conductivities of all Fe-and Co-doped ZnO nanoparticles will be discussed.

Ng, Chee; Neeli, Sai; and Ramsurn, Hema

CARBON ENCAPSULATED IRON NANOPARTICLES FOR REMOVAL OF HEAVY METALS FROM AQUEOUS SOLUTIONS

Biochar, a carbon-rich valuable by-product obtained from the hydrothermal carbonization of cellulose, was utilized as a support for synthesis of carbon encapsulated iron nanoparticles (CEINP) to promote green chemistry and engineering. Core-shell structures consisting of dark metal cores ranging from 40 to 80 nm and a light matrix with graphitic structure appeared in the CEINP. The porous graphitic layers encapsulate iron, prevent it from oxidation, while iron retains its magnetic property, and can be easily recovered by an external magnetic field. Heavy metals are toxic to both human and other living forms posing a serious environmental concern nowadays. United States Environmental Protection Agency (US EPA) has enforced regulations to limit the level of inorganic chemicals in drinking water. Present technologies such as precipitation, membrane filtration and ion-exchange are being employed to remove metal pollutants from water. However, many of these processes have several disadvantages such as incomplete removal of metal ions, poor selectivity, requirements for expensive equipment, generation of large amounts of toxic sludge or other waste products that requires disposal. Unlike these methods, adsorption has proven to be economical and efficient for removing heavy metals. Batch experiments were conducted to test the ability of carbon encapsulated iron nanoparticles for removal of heavy metal from aqueous solutions. Higher removal efficiencies (>70%) were obtained at pH 3 for chromium and arsenic while at pH 7 copper was removed completely. Cellulose biochar alone without Fe annealed at 1000 ºC was less efficient (<20% efficiency) in removing chromium and arsenic.

Ozkum, Serren; Narayan, Anupama; and Lin, Mei

MEASUREMENT INVARIANCE IN BURNOUT: A MULTICULTURAL STUDY

Taking its roots from Conservation of Resources Theory (Hobfoll, 1989; Hobfoll, 1998) Shirom (2003) conceptualizes burnout as depletion of one’s resources resulting from distress and an affective reaction to it with three aspects; emotional exhaustion, physical fatigue, and cognitive wariness. Shirom - Melamed Burnout Measure is a self-report measure assessing the construct with thirteen question on a 7-point Likert scale. Even though cross occupational measurement of the scale was claimed to be stable by the authors, across cultures measurement has not been tested. The aim of this study was to investigate whether the measurement of burnout construct was invariant across different cultures. Data was collected from a Malaysian undergraduate student sample (N = 264) and a United States undergraduate student sample (N = 378). Individual confirmatory factor analysis (CFAs) showed that both samples had good fit indices supporting the proposed three factor structure. Then, multi group analysis were conducted to investigate the extent to which measurement of burnout was invariant across two cultures. Results of these analysis and implications will be discussed.
Microfinance programs have historically been utilized to alleviate poverty, reduce hunger, advance women’s rights, and create more sustainable life patterns for vulnerable populations in developing countries. More recently, however, these programs have been integrated with health campaigns to achieve specific health outcomes in communities facing extreme poverty. In this paper, I look at the contributing factors, resulting externalities, and benefits of such programs across different cultures, time periods, and scopes. My aim is to evaluate the effectiveness of these programs at achieving positive health outcomes and to explore the potential application of an integrated microfinance-health program in North Tulsa — a metro area widely considered to be a food desert and whose symptoms may be cured by a microfinance program.

Keywords: microfinance, microcredit, health outcomes

Prebish, Lydia

FLU JULIA

Published between November 1918 and April 1919, a series of newspaper articles from Chicago, Illinois detailed the escapades of Julia Lyons, a young woman who saw an unusual opportunity during the flu pandemic and used the outbreak to her advantage. By impersonating a nurse during the influenza epidemic, “Flu Julia”, a nickname assigned to her by the Chicago Herald and Examiner newspaper, would enter people’s homes under the pretext of providing care but instead would steal their possessions, taking anything from wrist watches, to jewelry, to jars of preserves. “Flu Julia” was arrested for her crimes, escaped and was rearrested by the police multiple times. Numerous women accused Julia of murder, claiming her “care” had killed their spouses or children. She was discovered to have been married, had a child, and later “scandalously” remarried. Her escapades sparked the interest of multiple Chicago newspapers, and with every new article published, “Flu Julia’s” story expanded more and more. “Flu Julia’s” crimes were only able to occur because of the context in which they took place, under the guise of the war effort and the 1918 flu pandemic, which saw a shortage of nurses, allowing Julia to enter the workforce, take advantage of the nursing field, and commit her specific crimes exclusively as a result of the chaos and confusion of the times. By creating a timeline detailing the escapades of “Flu Julia” Lyons from the newspapers and sources that corroborate the story, a better understanding can be gained of the life of “Flu Julia” and of the flu-related issues plaguing Chicago, the nation, and the complicated conversation of what happens when women take advantage of turbulent times to progress their societal standing outside of their expected gender role.

Premkumar, Abhishek and Levetin, Estelle

THE EFFECT OF CLIMATE CHANGE ON QUERCUS AND MORUS POLLEN IN TULSA, OKLAHOMA

Pollen grains are one of the leading causes of allergies and asthma making it essential to study possible trends associated with pollen grains over time. The dispersal of pollen grains is usually higher during the spring, thus causing more discomfort for people. Quercus (oak) pollen is the most commonly found pollen in the spring. Along with Quercus, Morus (mulberry) pollen is also abundant during spring. Air samples were collected with a Burkard sampler on the roof of Oliphant Hall. The air samples were analyzed at a magnification of 400X. Both oak and mulberry pollen grains were counted and utilized for statistical analysis to understand parameters like the start dates, end dates, peak dates, mean concentration, and pollen index. The 2017 data were compared to pollen data from 1987 to 2017. For oak pollen, 2017 was the year with the highest pollen index of 18,707 with the lowest 2,154 in 1992. For mulberry pollen, 2004 was the year with the highest pollen index of 8,769 with the lowest 763 seen in 1992. Based on Spearman correlational statistics, the start date for oak pollen was negatively correlated over time (r = -0.716), showing the earlier start dates for oak pollen. For mulberry pollen, the start date was negatively correlated over time (r = -0.604), also showing an earlier start date. The data suggests that climate change may be advancing the spring tree pollen season in Tulsa. More work needs to be done to determine if the season is also longer.
Pritchard, Shadow; Crawford, Chad; and Sen, Sandip  
ASSESSING NUTRIENT LEVELS IN PLANTS USING ELECTROMAGNETIC SENSORS  

Finding the nutrient levels in plants is costly and takes a significant amount of time. With our research, we are able to use an electromagnetic sensor to read 19 features of Bermuda and Tall Fescue grass, such as plant height or color, to accurately predict nutrient levels. With the data provided by Noble Research Institute, we devised an algorithm using state of the art machine learning techniques to accurately predict the values of biomass, crude protein, detergent fiber, lignin, and dry matter digestibility. The results from our research will save farmers time and money when deciding what if any fertilizer they should add.

Prolago, Piper  
THE ROLE OF QUEENS IN HOMER’S THE ODYSSEY  

Homer’s Odyssey follows Odysseus, a paradigm of Greek manliness, and his son Telemachus. Although the epic centers on the development and exercise of virtues most closely associated with males—wit, cunning, and daring—it also provides insight into female characters and their place in society. I examine three queens of the Odyssey, who are powerful and independent characters in spite of limitations on women. I focus first on Helen, queen of Troy, who proves her cleverness and self-reliance in interactions with guests, including Telemachus, and her husband. Odysseus must appeal to Queen Arete of Phaeacia, perhaps the most powerful queen in the Odyssey, for assistance. Odysseus’ wife, Penelope rules Ithaca in her husband’s absence, demonstrating her strategic abilities that rival Odysseus. I also explore the figure of Clytemnestra, who represents limits constraining women. While Helen, Arete, and Penelope are surprisingly independent rulers, Clytemnestra’s example suggests that their status is merely permitted by their male counterparts. Ultimately, Homer’s depiction of female rulers in the Odyssey shows the complexity women’s role in society; they are not merely subservient to the men in their lives, but neither are they accepted as equals. Using persuasion, rather than directly asserting power, Homer’s queens navigate the inherently patriarchal system and win respect to match the men in the epic. I hope my investigation of the accomplishments of the strong female characters in the Odyssey, especially their use of persuasion, will promote a greater understanding of potential limitations that have faced women from antiquity to contemporary society.

Pulleyking, Spenser  
EXPLORING THE USE OF BIOMIMETIC THUMBS FOR ROBOTIC GRASPING AND MANIPULATION  

Despite recent progress in contact dynamics simulation and an increasing diversity and availability of robotic grippers, complex object manipulation remains a significant hurdle. Virtual experiments simulating robotic control algorithms can be run more quickly and more numerously, with fewer resources, and have thus spurred rapid research. In robotics, simulated robotic grasping tasks results remain inaccurate and thus cannot transfer to the real world, while control policies applied to real world experiment are not yet capable of complex in-hand object manipulation. Towards integrating real-world experimental feedback with simulation and model prediction, a biomimetic robotic thumb is designed, manufactured and assembled to preserve the functionality of human grasping. Cutting-edge robotic and prosthetic hands have not yet attempted to mimic a crucial functional element of the thumb, the Carpometacarpal Joint (CMC). This complex is responsible for the pronation and supination of the thumb and the modulation of the palmar surface during grasping. An experiment is proposed to benchmark the efficacy of various control methodologies around previously published work on a simplified, CMC-mimetic thumb design for the TU Hand. Initial experiments will calibrate the fingertips’ spatial positions about grasped objects, towards accurate in-hand manipulation of a diverse set of test objects. This device will demonstrate the strength of ceramic-magnetic surfaces with variable-stiffness flexure hinges, to emulate the musculoskeletal system responsible for complex human grasps and tool use.
Qualls, Zachary
SELF-DETERMINED POWER: CHANGES IN CHEROKEE CLOTHING FROM THE 18TH-19TH CENTURY

Throughout history fashion has served as a signifier of cultural identity and self-representation. Like many cultural attributes, fashion is fluid and entrenched in utility, power, and prestige. The indigenous peoples of North America have faced extreme social and environmental effects that profoundly influence the subject of clothing and the determinations of representation expressed through fashion. The Cherokee exemplify that self-determined changes in clothing over time became a powerful tool in asserting self-representation. Changes in Cherokee clothing from the 18th – 19th century express relationships to ecological, social, and political environments. This research observes the origins of Cherokee clothing in the American southeast and the post contact material changes that drive Cherokee identity. Additionally, traditional clothing is examined through the material properties of early documented body adornment and body modification. Observations examining the changes of post contact interactions on Cherokee clothing and jewelry demonstrate both the continuity and revival of Cherokee cultural values in the 19th century.

Ramasubramanian, Vaidheeshwar; Liehnard, Daniel; Ramsurn, Hema; and Price, Geoffrey
EFFECT OF ADDITION OF K, Rh AND Fe OVER Mo/HZSM-5 ON METHANE DEHYDROAROMATIZATION UNDER NON-OXIDATIVE CONDITIONS

Methane dehydroaromatization (MDA) was studied over a series of K, Rh and Fe promoted 10 wt% Mo/HZSM-5 catalysts with different promoter loadings of 0.5, 1 and 1.5 wt% at 750 °C in a recirculating batch reactor. All the catalysts were reduced in H2 at 750 °C prior to methane activation. K, Rh and Fe- promoted Mo/HZSM-5 catalysts were prepared by sequential impregnation. N-propylamine-temperature programmed desorption (NPA-TPD) confirmed the significant modification in the acidity of the catalyst upon addition of K. Compared to 10 wt% Mo/HZSM-5, the conversion of CH4 remained nearly unchanged for 1wt% K-promoted catalyst but decreased by ~46% for 1 wt% Rh promoted catalyst and by ~4.3% for Fe-promoted catalyst after 255 min of reaction. The conversion of CH4 further decreased with increase in K and Rh loading, but increased with increase in Fe loading. Compared to Rh and Fe-promoted catalysts, K-promoted catalyst exhibited better selectivity for C6H6 after 255 min of reaction. The TPO results revealed that K-promoted catalyst significantly reduced the catalytic coking. Addition of 1 wt% K to 10 wt% Mo/HZSM-5 exhibited optimum performance, where the conversion of CH4 was ~28%, selectivity of C6H6 was ~50% while the selectivity of carbon was ~47% after 255 min of reaction.

Rathnasekara, Rusiri
COMPARISON OF PLATINIUM (Pt) COUNTER ELECTRODES DEPOSITED BY SPIN COATING METHOD AND ELECTROCHEMICAL METHOD FOR DYE-SENSITIZED SOLAR CELLS (DSSCs)

Dye-sensitized solar cells (DSSCs) are one of the promising photovoltaic technologies due to low production in cost and low human toxicity of chemicals involved in manufacturing. Platinum based DSSCs are not cost effective in designing low cost solar cells due to the high cost of Platinum. In this work, counter electrodes were coated with Platinum using electrochemical method and spin coating method. Morphology and structure of counter electrodes deposited by two methods was studied by scanning electron microscopy (SEM) and X-ray diffraction (XRD), SEM studies revealed the difference in morphologies of counter electrodes prepared by different deposition methods. From current-voltage characteristics, the best performance was exhibited by a counter electrode which was deposited by the electrochemical method. This counter electrode showed a conversion efficiency (η) of 1.44 %, with open circuit voltage of 0.47 V, short circuit current density of 5.87 mAcm² and fill factor of 52.00 %. This performance is superior to the counter electrode made from spin coating method (η=0.29 %). DSSCs electrode characteristics was studies also using cyclic voltammetry which showed that the electrochemical deposited counter electrode’s highest occupied molecular orbital (HOMO) level (~5.22eV) is close to the electrolyte (1/3 /1) HOMO level. Overall, this study shows methods to improve output current as well as efficiency of DSSCs by means of electrochemical method in depositing counter electrodes.
Richardson, Julia; Kovacevic, Merdijana; and Newman, Elana
INVESTIGATING PRIMARY SUBSTANCE OF ABUSE AS A PREDICTOR OF DRUG TREATMENT PROGRAM OUTCOMES

Methamphetamine (MA) is one of the most commonly abused substances in the United States (Rawson, Anglin, & Ling, 2002). There is mixed evidence on the effectiveness of mental health treatments for MA-dependent men and women, with one study (Meredith, Jaffe, Ang-Lee & Saxon, 2005) suggesting that MA use reduces the effectiveness of psychological treatment. Meredith and colleagues believe MA causes cognitive impairment which reduces responsivity to treatment. Further, Maxwell (2013) indicates that women might have unique reasons for MA relapse. No consensus exists on whether MA as a primary substance of abuse significantly influences substance abuse treatment outcomes, such as mental health symptoms and relapse. Thus, the current study investigates primary substance of abuse (MA versus non-MA) as a predictor of broader long-term program outcomes, including mental-health symptoms (e.g., Post-traumatic stress disorder [PTSD] and depression), confidence to refuse drug-use, and drug use post-treatment in a substance abuse treatment prison diversion program for women. Clients with MA as the primary substance of abuse are expected to demonstrate less improvement in depression symptoms, PTSD symptoms, confidence to resist drug use, and higher rates of drug use at two years post treatment than clients with other substances as the primary substance of abuse. The outcomes examined are self-report scales assessed at baseline, six-months in program, program completion, and two years post-treatment. Sixty-four participants identified their primary substance of abuse at each time point, 41 of whom indicated their drug of choice was MA. The data will be analyzed using a repeated measure ANOVA.

Riley, Ian and Gamble, Rose
THE EVALUATION OF SELF-IMPOSED REQUIREMENTS USING STOCHASTIC MULTI-PLAYER GAMES

Smart cyber-physical space systems are difficult to design due to the presence of uncertainty in their actions, their communications, and their environment. Statistical methods can be used to account for the uncertainty by modeling it as a set of stochastic processes. These systems share characteristics with multi-agent systems in which a critical challenge is to manage a large decision space that exponentially increases with the number of actors. Requirements can be imposed on such a system to narrow the decision space. It is important to evaluate the impact that such requirements have on the expected performance of the system to ensure that self-imposed constraints do not degrade goal satisfaction. In this paper, we explore the use of stochastic multi-player games to model how self-imposed requirements impact the expected performance of a smart cyber-physical space system. Our results demonstrate that stochastic multi-player games are an effective method to provide early validation of self-imposed requirements.

Royes, Josh
INTRA-DYADIC EFFECTS OF ORGANIZATIONAL JUSTICE ON TEAM SATISFACTION

Organizations are increasingly turning to teams to conduct complex taskwork. A dyad is a special-case work team. A dyad is the combination of two team members who socially interact, possess common goals, are assembled to perform specific tasks, rely on one another to complete the task work, have differing specializations, and are embedded within larger contextual factors within- and between- which they must maintain boundaries (Kozlowski & Ilgen, 2006). Dyadic research is underutilized in Industrial/Organizational literature. The study of dyads can be used to learn about the team relational processes through Actor-Partner Interdependence Modeling (APIM; Kenny, Kashy, & Cook, 2006). APIM allows for the quantification of the impact dyad members have on one another. The present study uses APIM to analyze the intra-dyadic effects of perceptions of organizational justice on team satisfaction for two types of dyads (i.e., indistinguishable and distinguishable). The results indicate that a person’s own perception of justice is more important for their team satisfaction than their teammate’s perception of justice. In dyads with inequality of information, the member with greater information’s perceptions of justice had greater ties to their team satisfaction than did members without the task-relevant information. This study helps us to better understand how team member interactions can have crossover effects on each other’s outcomes and focuses on the importance of understanding relationships in a team context for team effectiveness.
Sawyer, Mary Beth and Foley, Lara
ATRG-4063 GLOBAL PRACTICES OF HEALTH CARE

The course description offered on the self-service portal for potential students is as follows: An in depth analysis of healthcare systems in the U.S. and abroad. A comparison of a variety of aspects that influence the healthcare system in both the U.S. and other countries. Involves required faculty led international travel for completion of the course. Not listed in this course description is the following: The course began in Tulsa where the students taking the course were required to pick a topic related to public health that they would then spend the semester researching and writing a paper over their findings. The papers were presented in time with special topics being taught by the professors of the course. Each topic presented was taught both as it relates to the U.S. as well as how other countries, specifically Spain handle the same issues. This was a spring semester course, in mid-February a group of exchange students from Universidad Camilo Jose Cela (UCJC) in Spain who were all in health related fields of study came to learn first-hand about healthcare in the U.S. Shortly after the end of the semester the Tulsa students flew to Madrid and spent two weeks learning how healthcare is viewed and handled in Spain. This course was based in classroom, cultural and global education of both American students and their Spanish counterparts.

Schumaker, Emily
HANDY DANDY DATING TOOLKIT: PIPE STEM AND CERAMIC SERIATION AT CHRISTIANSTED NATIONAL HISTORIC SITE

Dating techniques, both relative and absolute, are key members of the archaeological toolkit. They serve to chronologically situate the remnants of past peoples, material or otherwise, in the overarching narrative of a place or region. However, not all methods of dating are created equal, and the utility of a particular method for clarifying the historical and archaeological records can be context-specific. This project is a comparative analysis of two datasets derived from an artifact assemblage recovered as part of the CHRI-92 Tree Stump Removal Project conducted by the National Park Service at Christiansted National Historic Site. More specifically, this project compares the results of the seriation of the pipe stems and ceramics within the CHRI-92 assemblage as a means of determining the utility of the dating method for archaeological sites within the former Danish West Indies.

Seaver, Tori
NARRATIVE IN HUMAN RIGHTS LAW

This project examines the role of narrative in human rights issues, organizations, and law. In order to explore these questions, I interviewed a human rights activist and lawyer in Dublin, Ireland. Using anonymized transcripts from one or more interviews with people working for human rights organizations, I will extrapolate different narrative functions from within their stories. This analysis will help to achieve the goal of better understanding how narrative plays a role in the commitment and self-understanding of an activist in this area. Additionally, by comparing original research with preexisting academic sources and case studies, I will further examine the function of narrative in human rights law. This research allows for a deeper understanding of both narrative within human rights issues and the role of these stories in the context of the surrounding legal profession.

Secrist, Kathryn and Ali, Akhtar
INCIDENCE OF PEPPER MILD MOTTLE VIRUS IN OKLAHOMA DURING THE 2017 AND 2018 GROWING SEASONS

Pepper mild mottle virus (PMMoV) infects Capsicum species worldwide, and can cause the reduction of pepper yield and economic losses to growers. PMMoV was first reported in Oklahoma in 2015, with the first complete genome available in the United States in 2018. The goal of this study was to determine the incidence of PMMoV in commercial fields during the 2017 and 2018 growing seasons, and to understand strain prevalence in Oklahoma. Leaf samples were collected from pepper plants during both years, and processed by dot immunobinding assay to test for PMMoV infection. 2017 PMMoV
incidence was higher later in the growing season, while 2018 showed lower incidence as the growing season progressed. Both asymptomatic and symptomatic tissues in 2018 were equally likely to be infected with PMMoV. Due to the high number of symptomatic plants seen in 2018, these results indicate another unknown virus is causing infection in the field. None of the samples collected during surveys reacted positively against antiserum to Pepper mottle virus (PepMoV) or Tobacco etch virus (TEV). Some plants contained possible new viruses when analyzed by virus like particle extractions, and are currently under molecular characterization.

Sedrez, Thiana and Shirazi, Siamack
CFD SIMULATIONS AND EXPERIMENTS OF SAND EROSION FOR LIQUID-DOMINATED FLOWS IN ELBOWS IN SERIES

In the oil and gas industry, sand can be entrained with the production of gas and liquid and can cause erosion damage and failure of pipelines, especially in elbows that are widely used to change the flow orientation. As a result, erosion failure of pipelines can occur which causes significant costs of workover and significant environmental problems can occur especially in offshore environments. Additionally, liquid-dominated flows can be found in deep water, offshore oil-wells, subsea flowlines during the production of gas and oil. Despite the need, there is a gap in the literature regarding erosion in elbows in series with liquid dominated multiphase flows, both numerically and experimentally. In this work, investigators have performed experiments to understand erosion patterns in elbows in series under liquid-dominated flow conditions in a 50.8 mm diameter experimental facility. Additionally, Computational Fluid Dynamics (CFD) simulations have been performed and compared with experimental pattern results. In this study, a flow loop facility allowing the flow of liquid, gas and solid particles was used with acrylic elbows for erosion pattern visualization. CFD simulations are compared to experimental erosion patterns with both test results for liquid-solid and liquid-gas-solid flows. The qualitative comparison between experiments and CFD simulations showed satisfactory agreement and is providing a basis for improving erosion models for these flow conditions.

Shaw, Magera; Manjarrez, Jacob; and Mailler, Roger
FORWARD AND REVERSE LOCOMOTION IN C. ELEGANS

The nematode C. elegans is a model organism used for studying biological phenomena, such as neural programs and movement generation through muscle contraction. Currently, the C. elegans scientific community has a likely inaccurate and simplistic understanding of C. elegans locomotion. This research aims to discover precisely how forward and reverse locomotion occur in C. elegans, using image analysis techniques on videos of worm strains with fluorescent muscle cells. Part of the research necessitated the creation and development of custom software for video recording C. elegans, video editing, and subsequent video analysis. Using two-channel videos of alternating brightfield and Green Fluorescent Protein images, muscle activation over time could be quantitatively measured. While the C. elegans community has long supposed that C. elegans’ movement occurs as a result of alternating muscle activation between the dorsal and ventral sides of the worm, our observations contradict this hypothesis. Both forward and reverse locomotion demonstrate a strong correlation between the bend angle of the worm and the difference in activation of the dorsal and ventral muscles of a given region. Additionally, there appears to be three regions of distinct muscle behavior of the worm: the head, the midbody, and the tail. Locomotion in C. elegans appears to be a complex process whereby seemingly independent sides of the worm (dorsal and ventral) overlap in a way to produce smooth sinusoidal movement.

Sheaff, Marjorie and Leblanc, Gabriel
IMPROVED ELECTROCHEMICAL PERFORMANCE OF FUSED FILAMENT FABRICATION 3D PRINTED ELECTRODES USING HYDROXIDE TREATMENT METHODS

Fused filament fabrication is a method of 3D printing becoming common in home and laboratory use. We aim to produce useable electrodes from 3D printed material. Strong hydroxide solutions have positive effects on the conductivity of PLA-based conductive 3D printing filaments. The resistance of 3D printed electrodes printed from conductive filaments decreases considerably after hydroxide treatment. This allows for specialized printing of conductive electrodes for use in
Simpson, Geoffrey

**BUSINESS EMAIL COMPROMISE: DATA ANALYSIS FROM THE FBI'S INTERNET CRIME COMPLAINT CENTER**

The United States Federal Bureau of Investigation's Internet Crime Complaint Center (IC3) has provided to us a subset of 2017’s data regarding Business Email Compromise (BEC) fraud. Our analysis shows that BEC fraud is increasing, as analyzed by looking at the data aggregated by both weekly and monthly time frames. Significant amounts stolen also show an increase, as we looked at the trend of the 3rd Quartile of the Lost Amounts over the same aggregates. We find that the victim geographic distribution closely resembles the general population of the United States, and not the geographic distribution of publicly traded companies. Conversely, the recipients of the fraud are concentrated in the United States, Hong Kong, China, and Great Britain. Finally, we find that contrary to our hypothesis, the success rate of the attempts actually increases with the amount of money attempted stolen.

Sinik, Megan; Lapidus, Rachel; and Khalsa, Sahib

**RELATIONSHIP BETWEEN PSYCHOTROPIC MEDICATION USE AND SUFFOCATION FEAR**

Abnormal interoceptive experiences are commonly reported by individuals with mental health disorders, and represent a potential latent variable influencing the expression of psychopathology. We recently demonstrated that individuals with mood, anxiety, and/or eating disorders exhibit heightened suffocation fear in response to breath-holding. However, the potential anxiolytic effects of psychotropic medication use on such fears are unknown. In this follow-up study, we evaluated whether psychotropic medication use was related to lower suffocation fear during breath-holding in the previous sample. 96 patients with diagnoses of either eating, mood, or anxiety disorders, were selected based on standardized diagnostic interviews and elevated scores on screening instruments for anxiety, depression, and eating pathology (OASIS, PHQ9, SCOFF, respectively). Of those, 46 were taking psychotropic medications. Suffocation fears were measured following an inspiratory breath-holding challenge with a two-minute maximum duration. A one-way ANCOVA was conducted to determine the relationship between psychotropic medication status and suffocation fear, while controlling for symptom severity scores on OASIS, PHQ-9, and SCOFF. Medication status was not related to suffocation fear, F(1, 90) = 0.03, p = 0.86, even when controlling for symptom severity (anxiety (OASIS): F(1, 90) = 2.32, p = 0.13, depression (PHQ-9): F(1, 90) = 2.80, p = 0.10, and eating pathology (SCOFF) F(1, 90) = 1.24, p = 0.27). While the limited sample size precluded examination of the effects of specific classes of psychotropic medications, the current findings provide initial support for the notion that psychotropic medication use in general is not substantially associated with reduced suffocation fear.

Sitz, Amber, and McNulty, John

**THE RELATIONSHIP BETWEEN WORD ASSOCIATION TASKS AND PSYCHOTIC INDICATORS**

Early research on psychoticism has been conducted by administering and interpreting participant responses to ambiguous stimuli via projection tests (e.g., Rorschach, Thematic apperception test (TAT) and Word Association Tasks). Specifically, word association tasks prompt the participant with an item word and the response becomes their first association to the prompt word. One way of interpreting the associated responses is to compute the frequency of unique (i.e., uncommon)
responses (Miller & Chapman, 1983). Kent & Rosanoff (1910) found psychotic samples provided more unique responses (35%) than samples of healthy controls (6.8%). The current study investigates empirically supported scoring methods of a word association measure “Free Association Task [FAT].” The FAT was administered in a multi-modal longitudinal study in which many other personality measures were also administered (e.g., MMPI-2-RF). The present study focuses on the association between uncommon word responses and psychoticism indicators. The sample consists of 281 students at a private mid-western university. Methodological approaches include investigating the frequency of responses, measures of central tendency (e.g., average, median), trimmed mean, maximum, minimum as well as common response rates and uncommon response rates. Results indicate a null finding in most approaches (e.g., mean, median, maximum). However, there was a small negative albeit significant (p < .05) correlation of the PSY-5 PSYC scale and the minimum response score (r = -.12). Meaning the associated response that produced the lowest frequency score for that participant (i.e., the most unique response) correlated with higher PSYC scores.

Slavens, Shelyn
EXPRESSION OF THE COFACTOR REGENERATION ENZYME PHOSPHITE DEHYDROGENASE IN THE CHLAMYDOMONAS REINHARDTII NUCLEAR GENOME

Cofactor regeneration systems are necessary to make biocatalytic processes economically feasible on an industrial scale, especially the production of nicotinamide adenine dinucleotide (NADH) and nicotinamide adenine dinucleotide phosphate (NADPH). Enzymatic cofactor regeneration using phosphite dehydrogenase (PTDH) from Pseudomonas stutzeri has been identified as an alternative to enzymes currently used in industrial NADH generation processes. PTDH catalyzes oxidation of phosphite to phosphate with a corresponding reduction of NAD+ to NADH or NADP+ to NADPH. Chlamydomonas reinhardtii is a well-studied, unicellular microalga and serves as a promising opportunity for in situ enzymatic cofactor regeneration system. This study looked at the insertion of a thermostable mutant PTDH gene into the nuclear genome of C. reinhardtii. The PTDH14X gene was first inserted into an Escherichia coli strain DH5α plasmid conferring resistance to the zeocin antibiotic. The linearized plasmid was transformed into the nuclear genome using electroporation. Transformed colonies were chosen based on growth under constant light on TAP/agar plates containing zeocin; PCR analysis was performed to verify gene integration. To determine the activity of the PTDH transformants with NAD+, a NBT colorimetric assay was performed; activity was calculated by measuring the absorbance at 580 nm. All C. reinhardtii transformants containing the PTDH gene had increased PTDH enzyme activity compared to the wild type.

Smith, James
AN ANALYSIS OF TOXIC MASCULINITY IN KATE CHOPIN’S THE AWAKENING

This presentation argues that the humanities are necessary to combat societal inequities by analyzing invasive toxic masculinity in Kate Chopin’s The Awakening. Through careful analysis of the interactions between characters in this novel, emphasis will be placed on the need for men to control women. Men in this novel utilize abusive language and actions to project masculine dominance over female characters. This, ultimately, creates a toxic environment that reflects an internalized toxic masculinity that pervades most characters in the novel. Studying this dynamic in Chopin’s novel and understanding how it affects the novel’s hero, Edna Pontellier, allows us to analyze similar processes in contemporary culture and extend the novel’s call to action to current social discourse. Like Edna, we as readers can learn how to fight suppressive forces and develop an identity outside of a toxic environment. Although The Awakening was written over a century ago, its lesson is still shockingly relevant in the present day.

Sorelle, Josie
APACHE GAAN MASKS: OBJECTS OF CULTURAL PATRIMONY UNDER NAGPRA

NAGPRA was instituted in 1990, and laid out the process by which objects could be repatriated. Claims can be made by groups or individuals including lineal descendants, federally or state recognized tribes, and Native Hawaiian Organizations, and can be made on objects that include human remains, sacred objects, and objects of cultural patrimony. Objects of cultural patrimony are defined as objects that have ongoing historic, traditional, or cultural importance. The Apache have submitted
claims to repatriated Gaan masks as sacred objects and objects of cultural patrimony. The issue in the case with the Denver Art Museum was whether or not all of the Gaan masks in their collection had been ritually treated. Those that were not ritually treated were from a late enough date to have been secular dance troop masks, and may not constitute objects of cultural patrimony or sacred objects. The issue in the case with the Field Museum was whether or not these objects were considered inalienable collective tribal property, and whether or not they were able to be sold by individuals. Despite the claims made on objects of the same type, the issues surrounding each case were different. In the end, both museums published notices of intent to repatriate. Both of these cases show the importance of improved communications between museums and Native American tribes, and also highlight the difficulty in determining cultural patrimony as defined in the NAGPRA legislation.

Spjut, Ellica
DIFFUSION OF TECHNOLOGICAL TRAITS IN SOUTHWEST NATIVE AMERICAN GROUPS

The focus of this research is on the diffusion of technological traits among small-scale societies in the American Southwest, as recorded in ethnohistoric literature. This research tests the hypothesis that the diffusion of technological traits through sharing and borrowing was an important driver of technological change. The diffusion model predicts greater sharing of cultural traits between peoples living close to each other, and therefore a significant correlation between the geographic distance separating groups and the number of shared technological traits. I conducted a Mantel matrix correlation test on the pairwise data of shared technological traits and distances between Native American groups to test this hypothesis. I found a moderately strong, negative linear correlation (r = -0.55). This correlation supports the hypothesis that Native American groups in close proximity shared more technological traits than groups geographically further apart from each other. In contrast to several recent studies, this finding suggests that sharing and borrowing of technology played an important role in technological change among small-scale societies.

Stancil, Justin
DETERMINATION OF THE MECHANICAL PROPERTIES OF CERAMIC PARTICLES AT ELEVATED TEMPERATURES

In Concentrating Solar Power (CSP), mirrors concentrate sunlight onto receivers that collect solar energy and convert it to heat that is used to drive a steam turbine connected to an electrical power generator. Currently, molten salt is used to store the thermal energy and provide the heat transfer that drives turbines. Molten salt is problematic regarding corrosion, and its high temperature of 565°C is nonideal for thermal efficiency. One potential alternative in CSP is the use of falling particles for heat transfer. The particles, either sand or ceramics, have estimated high temperatures exceeding 800°C, allowing improved thermal efficiencies and power generation. However, impact of particles on the system components will cause erosion, and particles’ interaction with one another will cause particle attrition. The University of Tulsa will develop a durability model that characterizes component lifetime and degradation when using falling particles, and the resulting impact on performance. The model will help determine the viability of falling particles’ use in CSP. Experimental investigations of particle and substrate durability, both at high and low temperatures, will be used to create the model. Characterization of the mechanical properties of particles at low and high temperatures is needed to develop this model. Compression testing of individual particles allows certain mechanical properties of the particles to be determined. Data from compression tests on particles will be analyzed to determine material elastic modulus, tensile strength, fracture toughness, and hardness. These properties will be correlated with particle attrition rates determined from impact and abrasion studies.

Suminar, Kurniawan
COLLISION DETECTION IN CLUSTER WELL USING CUBIC SPACE METHOD

During the development of new well in a cluster, a drilling engineer must ensure that the trajectory of the new well is not collide with existing well and the distance between each well is adequate. Using a Cubic Space Method, engineer can ensure that the trajectory of new well is not collide with other well and it has an adequate distance with the neighboring well. If we can define the trajectory of each well is built with a dense point in space (trajectory point) and all the wells are accommodate
in 1 single container that have specific width, length and depth (cluster well area), then by creating a small defined dimension of small cubes in the container, we can verify whether there is a collision in the cluster. The method of Cubic Space will create a small cube and scan the whole area of the cluster. During the scan, if the cube encounters a trajectory point it will raise a flag. In the case during the scan in one cube it encounters another trajectory point it will raise a second flag, hence we know that the well is collide.

Suminar, Kurniawan; Aql, Ahmed; and Akgol, Tolga
APPLICATION OF MACHINE LEARNING IN IMPROVING CUTTING TRANSPORTION DURING DRILLING OPERATION

The most important function of drilling fluid is to transport cuttings from bottom hole to the surface. However, behavior of the drilling fluid is rather complex. Simultaneous changes of drilling fluid rheological properties and formation characteristics, in addition to drill-pipe eccentricity and rotational speed variations add to the complexity of the system. Consequently, drilling engineers rely more on observation and experience to predict the efficiency of cuttings transportation rather than physical models that cannot accurately simulate the entire physical phenomena. In this study, literature set of experimental data has been used to demonstrate the reliability of Artificial Neural Networks in predicting downhole cuttings concentration. Based on 9 dimensionless numbers derived from the governing equations, three layers fully connected backpropagation Artificial Neural Network (ANN) has been created using TensorFlow™ library in Python™. ANN algorithm has been used to train and evaluate the model. ANN allows predicting cuttings concentration in wellbores with a mean absolute error of 4.2%. The regression coefficients stored within “checkpoints” developed with TensorFlow™ allows efficient implementation of the prediction model on new data points. In addition, training tools allow real time configuration of regression coefficients as new field data emerges, adding dynamics to accuracy in predicting such complex parameters.

Thomas, Jacob
VALIDATION OF WEARABLE SENSOR TECHNOLOGY

CONTEXT: Lower extremity injuries are a common occurrence in collegiate athletes. One cause for these injuries can be asymmetries in the athlete’s lower extremities when landing or cutting. These asymmetries often go unnoticed which can lead to injury and re-injury. A new wearable sensor technology, approved by the Food and Drug Administration (FDA), called the dorsaVi™ might help assist in detecting these asymmetries. OBJECTIVE: The objective of this project was to determine the validity of the analytics derived from the dorsaVi™, specifically average ground reaction force. STUDY DESIGN: Cross-sectional. SETTING: Controlled laboratory. PATIENTS OR OTHER PARTICIPANTS: Twenty-two college-aged recreationally active participants were recruited for the study. INTERVENTION: Participants performed a one-minute jogging task at 180 bpm with dorsaVi™ markers attached while striking force plates. MAIN OUTCOME MEASURE(S): The main outcome measure was mean peak vertical ground reaction force (mPVGRF), measured in Newtons (N). The mean difference between devices was assessed using a one-sample t-test. Alpha level was set at 0.05. To assess degree of agreement between two devices, Bland-Altman plots with upper and lower limits of agreement were plotted for each variable to be compared across devices. RESULTS: The mean difference in mPVGRF between the validation device (1678.42±463.18 N) and dorsaVi™ (890.52±533.20 N) did significantly differ from zero (mean difference = 787.89±391.23 N, p<.001, 95% CI = 700.83 to 874.96). Bland-Altman plot depicted a mean difference (i.e. bias) of 787.89 N with the lower and upper level of agreement of 21.08 N and 1554.7 N, respectively. CONCLUSIONS: Based on the results of the study and current clinical practice, the dorsaVi™ does not appear to be an adequate substitute for acquiring mPVGRF.

Toledo, Tyler; Hellman, Natalie; Lannon, Edward; Sturycz, Cassandra; Kuhn, Bethany; Payne, Michael; Palit, Shreela; Guereca, Yvette; Shadlow, Joanna; and Rhudy, Jamie
THE COST OF ANGER INHIBITION ON PAIN

Anger inhibition (anger-in) is associated with increased pain. This relationship may be explained by the negative affectivity hypothesis such that those with high anger-in experience increased negative affectivity and thus increased pain (because
negative affect enhances pain). Alternatively, this relationship may be explained by the cognitive resource hypothesis such that anger-in limits attentional resources normally available for pain modulation. The present study examined these competing hypotheses in healthy, pain-free participants using a well-validated picture viewing paradigm (ECON). ECON is a paradigm in which painful, electrocutaneous stimulations are delivered during and in between pictures of emotional content (mutilation, neutral, and erotica). Pain ratings were assessed in response to electric stimuli. Emotional modulation of pain was assessed by comparing pain during mutilation and erotic pictures to pain during neutral pictures. Additionally, attentional modulation of pain was assessed by comparing pain during neutral pictures (distraction) to pain in the absence of pictures (control). Pain ratings were assessed in response to electric stimuli. Emotional modulation of pain was assessed by comparing pain during mutilation and erotic pictures to pain during neutral pictures. Additionally, attentional modulation of pain was assessed by comparing pain during neutral pictures (distraction) to pain in the absence of pictures (control). Prior to ECON, participants filled out the Anger Expression Inventory to assess their tendency to inhibit anger and two groups were formed (high anger-in, N = 71 and low anger-in, N = 27) from their responses (ie, +/- 1SD from the normative mean of anger-in). Both groups demonstrated similar emotional modulation of pain. By contrast, persons in the low anger-in group displayed attentional modulation of pain, whereas persons in the high anger-in group failed to attentionally modulate pain. These findings suggest that cognitive resource deficits in high anger-in individuals may contribute to increased pain risk.

Tran, Emily
A MECHANICAL BUBBLE MACHINE FOR CHILDREN WITH SPECIAL NEEDS

This presentation describes the design and development of a mechanical bubble machine for children with special needs. Physical activity is a critical part of the development of all children. However, children with special needs often have a more difficult time participating in physical activity due to physical and developmental challenges. Working with the therapists and students at the Little Light House, a special education school in Tulsa, a device to promote such exercise for the children was devised. The purpose of this mechanically powered bubble machine is twofold: (1) to promote physical activity through simple movements, and (2) to stimulate the senses while providing excitement and joy. From consulting the therapists, it was decided that the motion of turning a wheel would be challenging, but beneficial to the student population at the school. A gearbox was designed to use the energy from the wheel motion to power gears, which ultimately rotate fans that blow air through a spinning wheel of bubble wands. The gearbox was designed with clear acrylic to allow the children to observe the gears and visually understand their contribution toward the production of bubbles, which positively enforces the activity. While one child is working to turn the wheel to create the bubbles, other children are encouraged to move around to pop the bubbles, adding another element of exercise while promoting teamwork and friendship. The device is meant to be light and mobile to allow easy transport by therapists across classrooms.

Tresch, Erin
“WHO HERE IS NOT FOR DEMOCRACY?” A STUDY OF AMERICAN PATRIOTIC SUPPRESSION AND SUPPORT DURING THE 1918 FLU PANDEMIC

This poster and the paper that it supports explore the twin conflicts during 1918: the United States’ involvement in World War One and the Spanish Flu pandemic, specifically in San Francisco. The project looks at the propaganda of patriotism that was utilized to heavily promote the war to a previously isolated America and its intersection with the flu pandemic. The propaganda utilized focused on patriotism and suppression of non-American opinions. Through my research, I found that in 1918 and into 1919, this type of language was also used to promote health measures like mask wearing ordinances and anti-crowd ordinances. Patriotic language was used to justify what was considered by citizens of San Francisco as “suppression of civil liberties”: those who did not wear masks were considered slackers, like those who did not go abroad to fight in the War. This continued even after the Armistice in November of 1918, prompting the creation of the Anti-Mask League in the city. Despite the flu pandemic killing more people that both world wars combined, the research is lacking and this research seeks to explore how the war and the flu were connected to each other through propaganda and patriotism.
Trigo, Elio  
**FOAM DRAINAGE EQUATION**

Tracking the liquid fraction in foams plays an important role in determining its nature and stability. Foams are non-equilibrium materials in that their properties vary with time due to shifts in the distribution of the gas and liquid phases. The distribution of liquid in the foam at the outset will determine the profile characteristics of the foam drainage and thereon the liquid fraction varying with time and height. A three dimensional unsteady state model is proposed for computing the distribution of liquid in a foam column in cylindrical coordinates. A detailed derivation of the model provides great insight into the drainage phenomena as well as the assumptions and constraints that appear along its derivation. This model accounts for the propagation of the foam front during foam formation.

Trujillo, Fran  
**CULTURALLY-ADAPTED DIABETES SELF MANAGEMENT EDUCATION FOR HISPANIC PATIENTS WITH TYPE 2 DIABETES**

**Introduction:** Hispanics are disproportionately more vulnerable for adverse diabetes outcomes and suffer from additional risk factors than the general population. There are common misconceptions in Hispanic cultures that make diabetes self-management difficult. For example, fatalismo (fatalism) is a common belief in which death is perceived as inevitable despite all efforts to improve health outcomes. This is a major barrier that leads to Hispanic patients feeling powerless over their diabetes self-management which ultimately leads to poorly controlled diabetes, increased healthcare spending, increased suffering from diabetes complications, and premature death. This study seeks to determine if culturally-adapted diabetes self-management education (DSME) at a local safety net clinic is effective in improving disease management, health knowledge, and self-efficacy among adult Hispanic patients diagnosed type 2 diabetes.

**Methods:** A qualitative study with a single group pretest-posttest design will be used. Study participants will be patients (n=150) from a safety net clinic in Tulsa. Inclusion criteria includes Spanish-speaking Hispanic patients who are 18 years or older, have type 2 diabetes as a diagnosis, and have hemoglobin A1C levels ≥ 8. A one-way within subjects ANOVA statistical analysis will be used to evaluate the outcomes. **Significance:** Culturally-adapting diabetes self-management education for Hispanic patients has the potential to empower proper diabetes self-management, save healthcare dollars, and prevent premature death.

Valencia, Joseph  
**LTRDETECTOR: A MODERN TOOL SUITE TO DETECT LTR-RETROTRANSPOSONS**

Long terminal repeat retrotransposons are the most abundant transposons in plants. They play important roles in alternative splicing, recombination, gene regulation, and genomic evolution. Large-scale sequencing projects for plant genomes are currently underway. Software tools are important for annotating long terminal repeat retrotransposons in these newly available genomes. However, the available tools are not very sensitive to known elements and perform inconsistently on different genomes. Some are hard to install or obsolete. They may struggle to process large plant genomes. None are concurrent or have features to support manual review of new elements. To overcome these limitations, we developed LtrDetector, which uses signal-processing techniques. LtrDetector is easy to install and use. It is not species specific. It utilizes multi-core processors available in personal computers. It is more sensitive than other tools by 14.4%-50.8% while maintaining a low false positive rate on six plant genomes.

Velasco, Alfredo II and Girgis, Hani  
**HEBBPLOT: AN INTELLIGENT TOOL FOR LEARNING AND VISUALIZING CHROMATIN MARK SIGNATURES**

Epigenetics involves the study of histones (proteins that DNA wraps around). Side chains known as marks attached to these histones may determine the function of the DNA wrapped around them. Identifying patterns or signatures consisting of 100 marks can be a challenging task. We developed a tool called HebbPlot, which can learn and visualize a signature from
thousands of genomic locations that have the same function, e.g. active promoters. HebbPlot obtains vectors that represent overlaps between a set of regions and histone marks. These vectors are fed into a Hebbian network, which outputs a grayscale image of the overlaps between the genetic element and the epigenome. Each pixel represents the presence or absence of a mark. We used HebbPlot in six case studies conducted on 57 cell types. HebbPlots of promoters on the positive and the negative strands are mirror images, indicating the directionality of histone marks around active promoters. We confirmed that some marks are only present in high-CpG promoters in contrast to low-CpG promoters. HebbPlots show clear associations between the abundance of histone marks around coding regions and the level of gene expression. We hope HebbPlot will help biologists decipher the histone code.

Wang, Mengxiu; Chen, Jingyi; and Zhao, Zhencong
FAST SWEEPING METHOD FOR CALCULATING FIRST-ARRIVAL TRAVELTIME IN AN ATTENUATING TITLED TRANVERSELY ISOTROPIC MEDIUM

First-arrival traveltime plays an important role in many areas of seismic exploration including static correction, tomography, pre-stack migration. Eikonal equations have been proven as an effective way to calculate the first-arrival traveltime in different kind of media such as acoustic media, elastic isotropic and anisotropic media. However, for an attenuating medium, the eikonal equation becomes complex since the complex-valued traveltime is introduced to describe attenuation. The real part of the complex-valued traveltime describes the phase of waves, which is associated with wave propagation. The imaginary part corresponds to the decay of the amplitude, which is associated with the attenuation. For addressing this problem, a perturbation method has been introduced to obtain the governing equations for the zeroth- and first-order coefficients, namely the real part and imaginary part of complex-valued eikonal equation. Due to the terms of zeroth-order equation involving product of derivatives of traveltime raised to the power two, the traditional discretization method cannot be applied to this equation for calculating the traveltime. What is more, the source-singularity problem imposes an adverse impact on the accuracy of traveltime computation. We solve those two problems by using factorization and implementing a fast sweeping method to calculate the approximate solution of the complex-valued eikonal equation by updating the right-hand-side function iteratively. Numerical tests show that this method can be applied to complex models such as the titled a transversely isotropic (TTI) with weak attenuating Marmousi model.

Wang, Guan
A COMBINED GRAZING AND FIRE MANAGEMENT MAY REVERSE WOODY SHRUB ENCROACHMENT IN DESERT GRASSLANDS

Grazing and fire have been widely adopted as management interventions to counteract woody shrub proliferation in many arid and semi-arid grassland systems. The actual intensity of grazing and fire, along with the timing of the interventions, however, are difficult to determine in practice. In this study, we developed a cellular automata model to evaluate landscape dynamics in response to scenarios of grazing, fire, time of intervention, and initial coverage of grasses and shrubs. For a grassland to shrubland transition system located in the northern Chihuahuan Desert, New Mexico, USA, the modeling results show that, with current grazing intensity and fire suppression, the landscape may shift to a shrubland-dominated landscape in 100-150 years. This study highlighted that the introduction of fire not only directly removes shrubs but also reallocates the soil water and resources among different microsites, which may accelerate grass recovery and prevent shrub regrowth, thereby synergistically inhibits the plants’ replacement and neutralizes the shrub invasion process. Reduced grazing slows down the grass decline rate, thereby prolonging the time needed for a landscape to shift to shrubland. An appropriately combined grazing and fire management could help maintain over 50% of grass cover and reduce the shrub cover to less than 2%, keeping the landscape highly reversible. Even using 1% grazing intensity and periodic fire once a year, the management tools should be implemented in 60 years, otherwise they may lose effectiveness and the vegetation transition tend to be irreversible to grass dominance.
Weindel, Alexandra; Puhl, Maria; Ralph-Nearman, Christina; and Khalsa, Sahib
SEPARATING MEAL RELATED ANXIETY FROM GENERAL ANXIETY USING STATISTICAL MAPPING OF HEARTBEAT SENSATIONS

Individuals with anorexia nervosa (AN) frequently display comorbid anxiety disorders and characteristically heightened anxiety in situations related to food consumption. They have also been shown to have altered interoceptive awareness, in the form of abnormal interpretation and localization of internal bodily sensations. In a prior study, we found that individuals with AN experienced heartbeat sensations to a greater extent throughout the body in the context of meal anticipation. What remains unclear is the role of anxiety as a general contributor to this process. To address this question, we recruited individuals with a history of AN, generalized anxiety disorder (GAD), and healthy comparisons (HC) to participate in a neuroimaging experiment during which cardiac sensations were stimulated using isoproterenol, a beta-adrenergic agonist comparable to adrenaline. Participants were informed they would consume a 1000-calorie meal immediately after the brain imaging session. Directly following the scan, and prior to consuming the meal, participants outlined on a two-dimensional avatar the regions of their body where they had felt their heartbeat. To assess differences in perceived heartbeat sensations between the groups, a statistical resampling method called permutation testing will be used to generate statistical body maps indicating areas of reported sensation that significantly differ between groups. We hypothesize that, while the general influence heightened anxiety will lead individuals with AN and GAD to exhibit a greater spatial extent of heartbeat sensation than the HCs, those with AN will display a larger spatial extent of heartbeat sensation than GAD, due to the specific influence of meal anticipation.

Wennemyr, Fynn
THE DAWNING OF MODERN LOVE IN ERNEST HEMMINGWAY’S THE SUN ALSO RISES

This presentation explores the moral virtues formed through the relationship between Jake and Brett in Ernest Hemmingway’s The Sun Also Rises. With themes of love and gender, discovering what love means to oneself and discovering ways to overcome gender stereotypes in the 1920's are two leading virtues fought for by the characters in The Sun Also Rises. What makes an impact on a reader is not only the virtues that a character has, but how that character comes to realize those virtues within themself. Jake and Brett develop different life paths that lead away from each other, yet end together with a relationship stronger than they could have envisioned at the beginning. Jake’s friend Robert Cohn depicts someone who becomes agitated by insults directed at himself that he would not be insulted by when directed at his wife, and is the person Jake strives to not be. Through a journey of self-discovery, Jake and Brett learn to care for each other as much as themselves, fighting against the expectations that men should be given the privilege between a man and a woman who love each other.

Wentling, Anna
FACTORS INFLUENCING TEAM SHARED MENTAL MODELS

Team-based work and projects are becoming more frequent in the work place, thus creating a call for research and understanding surrounding team learning. Team learning can be defined as a near permanent change to the collective level of knowledge and skill due to the team members shared experience (Ellis, Hollenbeck, Ilgen, Porter, West & Moon, 2003). Specific team learning behaviors help teams develop a shared mental model, or a team’s collective understanding of knowledge related to a task or objective (Mohammed & Dumville, 2001). Shared mental models and team learning increase team performance and effectiveness (Bossche, Gijselaers, Segers, Woltjer, & Kirschner, 2010); so, it important to determine which circumstances are conducive to development of effective team mental models. Many theoretical models have been proposed to understand team learning from different perspectives. For instance, one model for developing a shared mental model focuses on construction, co-construction, and constructive process, which entails a team making model together and adjusting the model via collaborative thinking and conflict resolution (Bossche et.al., 2010). This model includes factors regarding knowledge, individual experience and psychological safety. Another study describes team learning as developing in distinct stages; fragmented, pooled, synergistic, and continuous (Kasl, Marsick, & Dechant, 1997). This model also includes psychological safety and response to mistakes, but it considers workload circumstances and team commitment as
well. Thus, the purpose of this presentation is to identify key factors influencing the development of shared team mental models in an interdependent task.

Wijayasekara, Dulanjani and Akhtar, Ali
COMPLETE GENOME OF A WILD ISOLATE OF MAIZE DWARF MOSAIC VIRUS REVEALS DISTANT RELATIONSHIP TO EUROPEAN MDMV ISOLATES

Maize dwarf mosaic virus (MDMV) is a Potyvirus which belongs to the family Potyviridae. MDMV is known as one of the most important viral diseases in corn and sorghum. Wild MDMV isolates in Johnson grass (JG) poses a threat to corn industry due to its ability to mutate which could lead to a resistant breaking strain. MDMV was first reported in 1960s but until now a complete genome of MDMV from JG has not reported. Infected JG samples were collected from a field in Tulsa county of Oklahoma and was labeled as MDMV-Bibxy1 isolate. MDMV symptoms on JG leaves exhibit yellow streaking and mottling pattern. Total RNA was extracted from virus infected JG leaves and specific RT-PCR was carried out using nine overlapping primer pairs. All PCR products were purified, cloned and sequenced. The complete genome of MDMV-Bixby1 isolate contained 9563 bp including 5 and 3 terminal non-translated regions and resembles the typical genome organization of a Potyvirus. The polyprotein consists of 3053 aa which cleaves in to ten mature protein products including P1PO. Multiple sequence alignment indicated that there are 39 nucleotide insertion which produces 13 extra amino acids in the N terminal region of the CP. Phylogenetic analysis revealed that MDMV is distantly related to other MDMV isolates from Europe, Hungary and two US MDMV isolates from Ohio. Recombination analysis showed that MDMV-Bibxy1 isolate is a potential minor parent for recombinant Italian MDMV isolate.

Williams, Angie
IMPROVING AUTISM SPECTRUM DISORDER (ASD) ACCESSIBILITY WITHIN MUSEUMS

Museums are a space that the public can visit to experience art, history, and culture. Everyone has the right to visit and to cherish the objects that the museums hold. Although the museum’s goal is to serve everyone, museum environments can often be restrictive to individuals with Autism Spectrum Disorder (ASD). In order to develop universally accessible museum experiences for a neurologically diverse world, it is imperative to learn what works and doesn’t work for ASD individuals first hand. For this project I conducted a qualitative research study with parents and educators of children on the Autism spectrum. Research questions revolved around how their unique children learn, what keeps them engaged and excited, and discovering any specific examples of good or bad experiences that their children have had in educational, entertainment, or museum settings. I used this qualitative analysis to inform recommendations for a more universal inclusive design of museum galleries and programs. This presentation discusses the background, methodology, findings and analysis, and recommendations for museums.

Williams, Henry
DIRECT CONTACT MEMBRANE DISTILLATION SYSTEM

Potable water is a necessity for all humans, but it is not available in all parts of the world. Currently, many people live without direct access to clean water as a result of geographic location and/or economic situation. Reverse osmosis is the leading method of desalination, but it is limited by the osmotic pressure and is not ideal for high salinity wastewater. This project proposes an alternative solution. The overall goal is to design a solar-powered water distillation system that effectively desalinates water in a cost-effective, energy-saving manner. The objective is to build a direct contact membrane distillation (DCMD) system that purifies salinized water by transporting vapor particles through porous hydrophobic membranes. This will be accomplished with a temperature difference between the feed and permeate, which will create a pressure difference across the membrane and therefore transfer the water vapor across the membrane. Once the water vapor has crossed the membrane, it is condensed in the cold permeate. This summer’s TURC project focused on designing and building the DCMD apparatus for the overall system. The DCMD apparatus was constructed with UV resistant acrylic, complete with feed and permeate inlet and outlet connections, an inner cavity to allow space for the membranes and feed
spacers, cut-outs for rubber O-rings, and bolt holes so the apparatus can stay intact with high pressure water flowing through. The project is on-going and will require future design improvements and testing.

**Williams, Abigail and Habig, Stewart**

**SUBMERGING SOCIETY’S STANDARDS**

This presentation examines the significance of the caged birds and the ocean in Kate Chopin’s novel The Awakening. The birds represent the boundaries placed on female identity in the late 1800’s, while the ocean represents a limitless space that allows the novel’s protagonist, Edna Pontellier, to develop an identity free from social limitations. Edna is contrasted with her friend Adele Ratignolle and together they symbolize two different types of feminist ideals. Adele is content with living in a sphere created for her by society while Edna does everything in her power to escape the sphere and fly. This novel focuses on Edna Pontellier’s self-awakening and her process of discovering her sexual desires, emotional needs, and independence, which lead to her separation from her family and children. Edna interprets suicide as her way of taking control over her body and her life.

**Wilson, Jazzmin**

“IT’S ALIVE!”: UNBURYING THE MEMORY OF THE 1918 INFLUENZA PANDEMIC IN EARLY AMERICAN HORROR

A new stranger is in town, familiar but somehow deadlier than it should be. Suddenly in the middle of the night, terror seizes a small town! It is a typical classic horror movie set up. Or is it instead the cultural memory of the influenza pandemic bleeding into entertainment? Why not both? In this paper, I analyze how the collective memory of influenza pandemic of 1918 imprinted itself onto early twentieth century American horror film and fiction. Vampirism, zombies, man-made monsters and mad scientists dominated this era of horror. The roots of the terror they instill are the fear of the scientific unknown, the fear of the foreign, and the fear of being trapped between death and life. I argue that rather than reflect on the pandemic directly, Americans turned to horror to explore how the influenza pandemic had strengthened a distrust of modern medicine and science, increased wariness of non-Anglo European immigrants and mutated ideas of anti-blackness and disease to a more global scale. The films I scrutinize are *Dr. Jekyll and Mr. Hyde* (1920), *Frankenstein* (1931), *Nosferatu* (1922), and *White Zombie* (1932) as well as HP Lovecraft’s popular story, “Herbert West: Reanimator” to unbury how Americans processed, repressed, and transformed those traumatizing months.

**Zandy, Rachel; Wilson, Laura; Clancy, Mary; Hart, Jacob; and Hale, John**

**SPATIAL ACCESS TO RESOURCES POST-ONSET OF APHASIA IN TULSA COUNTY**

Aphasia is an acquired language disorder resulting from brain injury that affects speech comprehension and production as well as reading and writing abilities. 1After the onset of aphasia, it is common for individuals to receive speech therapy services, which aim to improve communication abilities. In addition, many people with aphasia benefit from services such as day centers and support groups, which help individuals improve their communication skills, participate in desired activities, and regain confidence. However, the supply of services for people post-onset of aphasia is not always adequate to meet the demand. In Tulsa County, geographic health disparities exist related to location of residence; for example, there is a 10.7-year life expectancy gap between residents in two zip codes in Tulsa County. 3The purpose of this interdisciplinary study is to determine if geographic health disparities exist in terms of access to resources for people with aphasia living in Tulsa County. Demand for services was calculated using data from St. John Health System, and the supply of resources is being calculated through surveys of local providers. We will use a two-step floating catchment area method using GIS mapping technology to quantify disparity based on geography. 4Data collection and preliminary analyses will be completed at the time of presentation. Findings from this research could identify under-resourced areas of the city and could justify increased services to support those with limited access to care following the onset of aphasia.
Hydrocarbon mixtures containing water is of great importance in many industrial areas, especially in oil and gas field. Existing cubic equation of states (e.g., PR78 EoS) are failed to capture the effect of hydrogen bonding and yields significant errors in phase equilibrium predictions for these mixtures. However, association theories such as SAFT proven to accurately predict this behavior but computationally demanding. So it is vital to develop simple and accurate models to predict phase changes involving water. In this study, the association term coupled with cubic equation of state (CPA EoS) was used to develop a computational model and accurately predicted phase behavior of various hydrocarbon mixtures containing water.

Seismic wavefield simulation with the presence of rough surface topography provides important information for characterizing seismic wavefield simulation. Numerous researches have been carried out in the time domain. Compared with the time-domain seismic wavefield simulation, the frequency-domain seismic wavefield simulation has the advantages of easy implementation of multiple sources and straightforward extension to add attenuation factors. And model parameters are more easily inverted in frequency domain. In the frequency domain, most researches about seismic wavefield simulation with an irregular free surface have been tackled with finite-element and finite-volume methods. The finite-difference method has the advantages of low computational cost and more stability. In this paper, we propose to carry out finite-difference seismic wavefield simulation with rough topography by using the boundary-conforming method. To accurately model seismic wavefield and absorb artificial reflections from the truncated computational domain, the complex frequency-shifted perfectly matched layer (CFS-PML) absorbing boundary condition is used here. In this paper, we first transform the second-order wave equations from the Cartesian coordinate to the curvilinear coordinate through mapping. Then, the CFS-PML boundary condition is implemented to seismic wave equations in the curvilinear coordinate. The first-order free surface boundary conditions are also converted from the Cartesian coordinate to the curvilinear coordinate. Numerical studies testify the validity of algorithm and the CFS-PML boundary condition is efficient in absorbing unwanted reflections from the boundaries in the frequency domain.
PREVALENCE AND EFFECTS OF UNDERREPORTING ON THE MMPI-2 AMONG PARENTS INVOLVED WITH DHS

Background: The Minnesota Multiphasic Personality Inventory-2 (MMPI-2) is a psychological measure of personality, emotional distress, and other symptoms of mental illness. It is frequently used to evaluate individuals in clinical and forensic contexts. Among parents whose custodial rights have been suspended because of abuse or neglect, states often obligate parents to complete the MMPI-2 before reuniting them with children. Some research has shown that parents typically under-report psychological problems on the MMPI-2 (cf. Carr et al., 2005). However, little research has reported on the observed probability of under-reporting in this forensic context. Additionally, research is needed to determine to what extent under-reporting may influence reports of psychopathology on the MMPI-2.

Methods: Participants were 101 individuals who had parental rights suspended by the State of Oklahoma consequent to abuse or neglect. All of the participants completed the MMPI-2. Scales L, K, and S were evaluated to measure under-reporting. All clinical scales were also evaluated as measures of reported psychopathology.

Results: The prevalence of under-reporting was 23.8% for L, 18.8% for K, and 10.9% for S. The L scale had significant negative correlations with Hs, Pd, Pa, Pt, Sc, and Ma, which ranged from -.23 to -.58. The K scale had significant negative correlations with Hs, D, Pd, Pa, Pt, Sc, and Ma, which ranged from -.31 and.-70. The S scale had significant negative correlations with Hs, D, Pd, Pa, Pt, Sc, and Ma, which ranged from -.34 and -71.

Conclusion: Under-reporting for parents undergoing psychological evaluations consequent parental right suspension was found to be prevalent for both positive self-presentation and defensiveness. Furthermore, under-reporting was related to lower reports of psychopathology on most of the MMPI-2 clinical scales. This indicates that effective assessment of under-reporting in this forensic context is essential for psychodiagnostics.

HIGHLY LUMINESCENT LEAD DEPLETED CS4PBBR6 CRYSTALS FOR WHITE LIGHT EMISSION

In this work, we have summarized the room temperature synthesis of blue emitting CsPbBr3 and lead depleted green emitting Cs4PbBr6 crystals at an ambient atmosphere, and investigate the potential application of these crystals in white light emitting diodes. We observed that the cubic CsPbBr3 nanoplatelets obtained at a low amount of Cs-oleate precursor completely transformed into the more stable and less toxic rhombohedral Cs4PbBr6 when the amount of precursor was subsequently increased. This work also offered an explanation for luminescent nature of lead depleted Cs4PbBr6 through optical and surface characterization. Furthermore, the desirable tunability of correlated color temperature from 2480 - 9134 K (warm - cool white light) maintaining the color rendering index (CRI) up to 96 can be obtained by combining these crystals with yellow and red emissive perovskites. To the best of our knowledge, this is the highest value of CRI yet reported for these type of materials. Hence, these experimental results suggest that these materials provide great advantages to be used for illumination purposes.

MORE THAN EMOTION: HOW MUSIC AFFECTS THE AUTONOMIC NERVOUS SYSTEM

Introduction: Music is an integral aspect of modern life. Individuals not only listen to music on their own time, but in restaurants, workout facilities, elevators, and countless other commonly trafficked areas. While a substantial number of studies have been conducted over the way music affects human emotion, much less studied is the way music affects the autonomic nervous system. While it is clear that music affects the human body, it is not evident what factors are causing reactions within the human body, or if there is a physiological reaction to music.

Statement of Methods: To measure music’s effect on the autonomic nervous system, we measured heart rate, sweat gland activity, and muscle contraction of the frontalis. Participants were asked to sit facing away from the screen and an initial recording of data was taken. Five selections of music were played and data was recorded during these selections.
Expected Results: We expect that participants will experience higher levels of sympathetic activity during more arousing pieces and lower levels of sympathetic activity during soothing or calming pieces. We are currently working to analyze the data we have collected from individuals and determine if there are any differences between how individuals with musical training respond to music versus individuals without musical training respond.

Conclusions: Upon completion of our study, we hope to find evidence that music is stimulating or suppressing sympathetic activity. While a large body of research supports music’s psychological benefits in therapies, little research is done to support music’s role in more physiological applications, despite its current use in therapies such as pain management and anxiety reduction.

Bossert, G.; Hale, D.; and Pace, J.
THE ASSOCIATION OF THREE VERTICAL JUMP PROTOCOLS TO AGILITY PERFORMANCE IN YOUTH FEMALE VOLLEYBALL PLAYERS

Introduction: Unique performance related attributes for the sport of volleyball include speed, maximal vertical jump, frequent change of direction, and repeated over-head movements. Volleyball players must generate high levels of force at high rates of speed with change of direction when performing an approach jump, diving, landing, blocking, and/or spiking. Vertical jumping ability, specific to volleyball, can be assessed through various types of vertical jumping protocols such as the block vertical jump (BVJ), the countermovement vertical jump (CMJ), and the two-step approach vertical jump (AVJ). Sport specific agility testing for volleyball can be assessed with a 9-cone test to determine the athletes’ ability to generate quick and accurate movement with change of direction and/or acceleration and deceleration. The purpose of this study was to determine if a significant association exists between three different vertical jump protocols and agility performance in youth female volleyball players.

Methods: Fourteen female youth volleyball players were recruited for this study (ages: 14±1.7) who were enrolled in a summer conditioning program. The average height and weight of the volleyball players were 67.35 inches and 152 pounds. Three vertical jump protocols (BVJ, CMJ, AVJ) were administered during the first week of the summer conditioning period. The best of three trials was retained for each of the three vertical jump protocols with a three minute rest between trials and a ten minute rest between protocols. Athletes then completed a 9-cone test of agility to determine change of direction ability. The best of two trials for the 9-cone test was retained with a three minute rest between trials. Data was recorded and loaded into SPSS for statistical analyses.

Results: Prior to data comparisons, a Kolmogorov-Smirnov test of normality was performed for each of the four variables and determined to be from a normal distribution (BVJ: p = .096, CMJ: p = .200, AVJ: p = .187, 9-cone: p = .127). A series of three Pearson tests of bivariate correlation were performed on vertical jump type with agility performance. All three vertical jump protocols were determined to have significant correlation with agility performance, BVJ: r = -.714, p = .006; CMJ: r = -.511, p = .029; AVJ: r = -.698, .006.

Conclusion: Results of the current study indicate that there is a significant indirect relationship between three vertical jump protocols and agility performance in youth female volleyball players. Therefore, the influence of lower body peak anaerobic power through vertical movement can be an indicator in change of direction ability.

Bucani, Rigel; DiCesare, John; John-Paul, Alao; and Sheaff, Robert
IDENTIFICATION OF NOVEL INDOLEAMINE-2,3-DIOXYGENASE AS POTENTIAL IMMUNOTHERAPY ADDITIVES

Indolamine-2,3-dioxygenase (IDO) is an enzyme involved in the kynurenine pathway that produces kynurenine from tryptophan. Specific cancer cell lines manipulate overexpression of IDO in order to become immunoresistant. Coupling it to current immunotherapies could make them more efficacious and give them more specific targets. The napthoquinone abduct 12,13-Dihydro-N-methyl-6,11,13-trioxo-5H-benzo[4,5]cyclohepta[1,2-b]naphthalen-5,12-imine (TU100) was previously synthesized and has promise as a chemotherapeutic agent. TU100 was also identified as an inhibitor of luciferase, which is a member of the oxygenase class of enzymes. Based on this observation we hypothesized that TU100 might inhibit other important enzymes in this class, such as IDO. To test this idea, IDO expression was induced in tissue culture cells using growth factors. A cell extract was then prepared and IDO activity measured in the presence and absence of TU100 using an absorbance-based assay. These initial results were inconclusive, however, so purified and active IDO was
purchased from a commercial supplier. The ability of TU100 (and structural derivatives) to inhibit IDO enzyme activity was then examined directly.

**Burleson, Jennifer**

**STABILITY OF A VORTEX EQUILIBRIUM CONFIGURATION**

Vortex statics is an area of mathematical physics that is ripe with potential discoveries and relevant due to its applications to fluid dynamics and other physical phenomena. The term vortex statics refers to a distribution of vorticity in a fluid that is motionless in some reference frame. There has been a considerable amount of studies devoted to developing numerical and analytical descriptions of the behavior of specific configurations. This study focuses on numerically interpreting an equilibrium configuration consisting of a positive vortex sheet and two negative point vortices symmetric about the real axis. Mathematica was used to determine the parameters of the configuration for which the total circulation was zero. The system was then modeled with a discrete number of points. The effects of small perturbations to the system over time were investigated using Euler’s method. The studied perturbations involved displacing the single point vortices and bending the vortex sheet. The resulting configurations were displayed graphically and characterized in terms of the level of deformity that resulted from the alterations to the system. The results of this work could lead to a preliminary understanding of the stability of this particular configuration.

**deVries, K.; Akeman, E.; Touthang; J.; and Aupperle, R.**

**ANALYSIS OF DEPRESSION, ANXIETY, AND DRUG USE IN SEXUAL MINORITIES AND HETEROSEXUALS**

**Introduction:** Previous research indicates that sexual minorities are more likely to be diagnosed with mental illnesses and experience greater levels of depression and anxiety. This study examined whether these relationships held true in a large transdiagnostic mental-health sample screened at Laureate Institute for Brain Research.

**Methods:** A total of 822 participants completed a screening assessment that included demographic and sexuality questions and the Patient Health Questionnaire (PHQ-9), Overall Anxiety Severity and Impairment Index (OASIS), and Drug Abuse Screening Test (DAST). Individuals identifying as homosexual or bisexual were compared to a matched (by age and education) comparison heterosexual sample on depression, anxiety, and substance use scores using independent samples t-tests.

**Results:** There were 83 sexual minorities and a matched sample of 83 heterosexuals. There were no significant differences in anxiety \( t(82)= 0.51, p=0.61 \) and substance use scores \( t(82)=0.45 , p=0.65 \) between groups, but there was a trend difference in depression scores \( t(82)=1.87 , p=0.06 \). If sexual minorities were compared to the full sample of heterosexuals (N=739) without matching, the differences in depression were more robust \( p< .01 \).

**Conclusion:** In our current sample, sexual orientation did not incur as much risk for greater mental health problems as expected based on previous literature. Findings suggest that matching groups on demographic variables may reduce observed symptomatic differences related to sexual orientation. Future analyses will investigate potential protective or risk factors for sexual minorities; including social support, previous treatments, and trauma history.

**Ganguly, Ritvik; Slavens, Shelyn; and Johannes, Ty**

**CRISPR-Cas9 INDUCED KNOCKOUT IN ALGAL MODEL CHLAMYDOMONAS REINHARDTII**

**Introduction:** The CRISPR/Cas9 gene editing system is a highly selective and specific method for introducing transgenes in a multitude of organisms. However, utilization on CRISPR/Cas9 on algae strains has led to numerous challenges in the past ranging from cytotoxicity to off-target effects. We attempted to replicate a breakthrough protocol that delivered Cas9 ribonucleoproteins (RNPs) and used a one-step targeted mutagenesis that was DNA-free on the model algal strain Chlamydomonas Reinhardtii.

**Methods:** Instead of developing plasmid vector encoding Cas9 and guide RNAs, the Cas9 and small guide RNA (sgRNA) were introduced to the algal strains during transformation via electroporation. The specific genes targeted by the sgRNA were ChlM and CpFTSY, which inhibited chlorophyll accumulation. The colonies were then placed in a low-light environment and grown for a 2-week duration for pigment analysis.
Results: After trials of transformation via electroporation, gene integration was statistically insignificant. The transformed algal colonies were qualitatively less pigmented, and the transformation efficiency was significantly below 1%. When PCR verification was used, the transformed colonies did not indicate any of the genes to be successfully knocked out.

Statement of Conclusions: In conclusion, the potential off-target effects and unwanted mutagenesis demonstrate that the CRISPR/Cas9 genomic editing system was not effective on the model algae strain *Chlamydomonas Reinhardtii*. The breakthrough protocol did not seem to provide a reasonable transformation efficiency or evidence of mutagenesis. Alternate methods of algae transformation may be required in order to successfully and reliably manipulate gene(s) into the algal genome in the future.

Harville, Payten
SUMMER OF REFLECTION

This summer I worked in Dr. Purser’s Lab researching the kinetics of the hydrolysis of L-arginine ethyl ester. This was my second summer researching in his lab. This has been a wonderful experience and I will continue researching during the academic year. Research has further established my interest in chemistry and my plan to continue to go to graduate school. I enjoyed engaging in research and it allowed me to develop my laboratory technique and critical thinking skills. My ability to research as a rising sophomore allowed me to develop relationships with not only my research advisor, but with other professors and students within the chemistry department. My involvement in TURC and research gave me insight into different research projects. This has allowed me to have a greater understanding of how research papers are written and how to use other people’s research to gain a greater understanding of my own research. The ability to work on my own research project and learn about other’s research has allowed me to be able to understand other research presentations and develop my own questions regarding their research. This summer, I engaged in an outreach project with the Department of Chemistry. This community outreach project involved a partnership with a youth camp in Tulsa. During the outreach, we conducted different chemistry demonstrations for a variety of children and taught them about science during the demos. This outreach project was very rewarding as I was able to interact with a diverse group of children and get them excited about science. As I worked with the children, it showed me the importance of developing an interest in STEM fields at a young age and it further cemented my future goal of helping young girls develop a passion for STEM fields.

Jenkins, Gillian; Crowley, Matthew; and Davis, Joanne
AN EXPLORATION OF THE POSSIBLE MODERATION OF ACADEMIC STRESS BETWEEN BINGE DRINKING AND SEXUAL ASSAULT

The focus of this study was to examine academic stress as a possible moderator between binge drinking and sexual assault. Further, we looked at the influences of the factors of school year and membership in a Greek organization could have on binge drinking behavior and sexual assault. Finally, this study examined if the relationship was bi-directional, with academic stress still conceptualized as a moderator. Participants came from a Midwestern university, and were aged 18 years or older. Participants took a campus climate survey, and the study looked at items concerning demographics, behavior with drugs and alcohol, experiences with unwanted sexual contact, and sexual assault. There were 550 participants who took this survey, which accounts for 12.5% of the population on campus. Out of those participants, 100 were included in the study based on their experiences with sexual assault. Data analysis was conducted by running ANOVA to examine significance in binge drinking behaviors concerning different school years or Greek life membership. Then, a regression was run to explore the relationship between sexual assault and binge drinking, academic stress, and Greek affiliation. Contrary to the hypothesis, academic stress was not found to be a statistically significant moderating variable between binge drinking and sexual assault. Furthermore, Greek affiliation did not significantly contribute to the regression model. One possible explanation for the findings is that being a member of Greek life can be a protective factor under certain situations. Also, there may be a different relationship between academic stress, binge drinking, and sexual assault.
DETERMINING THE EFFECTS OF REACTION MEDIA ON ELECTRONICALLY MISMATCHED DIELS-ALDER REACTIONS

The Diels-Alder (DA) reaction is among the most used organic reactions in synthetic organic chemistry. It enables the formation of cyclohexenes by reacting a diene with a dienophile. They are some of the most popular transformations for organic chemists to generate molecular complexity efficiently. The majority of DA reactions have an electron rich reactant and an electron deficient reactant. In our research group we looked at electronically mismatched reactants, meaning that they both are electronically similar. We used anthole (1) and dimethly butadiene (2) as our electron rich diene and dienophile. We used a solvent system of varying molarities of lithium perchlorate (3) and a constant amount of nitromethane (4). The reaction was ran for 12 hours at room temperature, then we checked the conversion of starting material to our desired product (5). We discovered that the addition of water in our solvent system increased our percent conversion. Moving forward, we plan to test a variety of different electronically mismatched reactants and see their percent conversion.

SURVIVOR AND PERPETRATOR AFFILIATION AS A PREDICTOR OF REPORTING AND INSTITUTIONAL BETRAYAL

The role of student affiliation is of debatable influence on likelihood to report a sexual assault. Survivors who know their perpetrator or have affiliation may be less likely to report (Felson & Paré, 2005). Likewise, students may fear retaliation or feel unsupported by the organization they are affiliated with due to their perpetrator’s affiliation with the same organization (e.g., X; Sable et al., 2006). However, social support from affiliated groups as a key factor in increasing likelihood to report is something literature often neglects to examine. There is evidence that social support can lead to decreasing feelings of institutional betrayal, which is often found to decrease reporting and exacerbate negative trauma-associated symptoms (Parnitzke, Smith, & Freyd, 2013). The present study seeks to examine affiliations of both survivors and their perpetrators as a predictor of likelihood to report, as well as how these affiliations affect survivors’ endorsement of institutional betrayal. Data was collected as part of a larger survey examining the experiences, perceptions, and attitudes with/towards sexual violence at a small Midwestern university. It is hypothesized that when a survivor and perpetrator are affiliated with the same or similar organizations, a survivor will be less likely to report and will report greater feelings of institutional betrayal. Additionally, we hypothesize that if a survivor is affiliated with an organization that their perpetrator is not affiliated with, social support from this group will increase likelihood to report and decrease feelings of institutional betrayal. Examining predictors of reporting sexual assault may help universities to better understand how on-campus organizations can provide support for and protect survivors in order to increase reporting of assaults and decrease feelings of institutional betrayal.

DEVELOPMENT AND CHARACTERIZATION OF PROMOTED CATALYSTS USED IN MDA

Methane dehydroaromatization (MDA) is a popular method for direct conversion of methane to various aromatics using a bifunctional catalyst (Mo/HZSM-5). To improve its conversion and to reduce coking, several techniques were studied in literature, including the addition of promoters to the source catalyst. In this study, three different promoters, namely K, Rh, and Fe, were added to Mo/HZSM-5. Three sets were prepared for each promoter, with a loading of 0.5 wt%, 1.0 wt%, and 1.5 wt%, over the 10 wt% Mo-loaded HZSM-5 catalyst. Mo/HZSM-5 was prepared by incipient wetness impregnation...
method. K, Rh, and Fe-promoted Mo/HZSM-5 catalysts were prepared by sequential impregnation method. These fresh catalysts, as well as the spent catalysts (after the MDA process), were then characterized with Brunauer-Emmett-Teller (BET) surface area analysis, inductively coupled plasma-optical emission spectrometry (ICP-OES), X-ray diffraction (XRD), scanning electron microscopic analysis (SEM), temperature programmed oxidation (TPO), n-Propylamine-temperature programmed desorption (NPA-TBD), and CO-chemisorption. The characterization of all of the promoted metal catalysts were compared to that of the unpromoted Mo/HZSM-5. Finally, the surface properties, acidity, and the metal support interaction in terms of metal reduction as a function of temperature for the fresh catalysts and the carbon content of the spent catalysts were successfully studied.

Long, Alex
THE ASSOCIATION OF HIP ABDUCTOR MUSCLE STRENGTH TO HIP AND KNEE KINEMATICS POST-PERIPHERAL FATIGUE

CONTEXT: Researchers have postulated that decreased muscular strength at the hip may lead to poor lower extremity alignment during weight-bearing athletic maneuvers and increase an athlete’s injury susceptibility. OBJECTIVE: The objective of this project will be to determine the relationship of hip abductor strength to hip and knee kinematics during a single-leg landing task (SLL) post-peripheral fatigue in females. STUDY DESIGN: Cross-sectional. SETTING: Controlled laboratory. PATIENTS OR OTHER PARTICIPANTS: Nine recreationally active female participants (age, 20±1 years; height, 168.90±15.6 centimeters weight, 69.78±21.2 kilograms.) were recruited for the study. INTERVENTION: The participant then performed 3 repetitions of a SLL task on the dominant leg. Each repetition was separated by a 30-second rest period. A 3-D motion tracking system was used to track/record the participant’s pattern of movement during the SLL. Following the SLL task, the participant performed an isometric (static) strength assessment at the hip abductors of the dominant leg using a muscle strength-testing device. For the isometric strength assessment the participant performed two, 3-second contractions separated by a 60-second rest period. After a 2-minute rest period, the participants performed two, 30-second contractions. Each 30-second contraction was separated by a 2-minute rest period. After the isometric strength assessment, the participant performed a peripheral fatigue protocol on their dominant leg, which involved the participant jumping vertically 60 consecutive times as fast as possible on their dominant leg. Immediately following the fatigue protocol the participant again performed 3 repetitions of the SLL task. MAIN OUTCOME MEASURE(S): The kinematic outcome measures were post fatigue hip abduction and knee abduction angles at initial ground contact and maximum vertical ground reaction force. The main outcome measures for strength were hip abduction peak torque per kilogram of body mass and hip abduction fatigue index values. Multiple bivariate correlations were performed to determine the association between muscular strength and kinematics. Alpha level was set at 0.05. RESULTS: Hip abduction fatigue index was significantly correlated to post fatigue hip abduction angles at initial contact (r=0.808, p=0.028). No other significant correlations between muscular strength and kinematics were observed. CONCLUSIONS: The results suggest a relationship between hip muscle fatigue and hip abduction angle at initial contact post fatigue protocol.

Maag, John; Daily, Jeremy; and Sandoval, Alan
AUTHENTICATING IN SAE J1939 WITH WATERMARKING

Watermarking is the act of superimposing information within data. In cryptography, watermarking is used to authenticate information by adding message authentication codes that only the sender and receiver, with a shared symmetric key, can validate. An implementation of watermarking SAE J1939 CAN messages using hardware accelerated security modules is presented. CAN environments in heavy vehicles largely follow the SAE J1939 standard. The standard CAN 2.0 data frame has a maximum size of eight bytes. In typical authentication on other networking schemes, there is more available bandwidth and frame space for cryptographically secure authentication. In addition, Heavy vehicles’ increasing incorporation of technology has increased the overall frequency of CAN messages on the bus. With little available bandwidth for security and authentication, a solution that utilizes little additional bandwidth is required. Watermarking is an approach to authenticate nodes on a network given current CAN technology deployed in heavy vehicles currently in service with little additional bandwidth requirements. Presented is an implementation of watermarking CAN frames using the SAE J1939 standard and ensuring authenticated delivery. The implementation utilizes NXP’s s32k family of processors to provide hardware accelerated cryptographic message authentication codes (CMACs) as a means of authentication. The CMAC is
generated using sent CAN data and watermarked within a suspect parameter number (SPN) defined by the J1939 standard but underutilized by manufactures’ implementations. To date, similar implementations have been demonstrated with algorithms in software and networking occurring in CAN systems not utilizing the J1939 standard.

Meador, Cassandra; Davis, Joanne; Scholl, Jim; and Cranston, Chris
THE EFFECTS OF SELF-BLAME AND MALADAPTIVE COPING MECHANISMS ON POSTTRAUMATIC GROWTH IN SEXUAL ASSAULT SURVIVORS

As sexual assault is a leading cause of posttraumatic stress disorder (PTSD) especially for women, conversations focusing on better and faster recovery for survivors are just as important as conversations regarding prevention. As the healing and recovery process for survivors sometimes take years of suffering, the degree of posttraumatic growth (PTG) in sexual assault survivors is a less studied but intriguing phenomenon. Since survivors especially experience a severe betrayal of trust and security, it was assumed that these factors would lead to assault survivors experiencing lower degrees of PTG. Therefore, any stronger degrees of PTG despite those factors warrants investigation. There are a couple of known factors that affect and decrease PTG and recovery in survivors. For instance, maladaptive coping methods (such as mental disengagement and avoidant coping) have been shown to decrease growth, predict the presence and severity of PTSD, and to some extent predict revictimization. Self-blame and attribution for assaults have also been shown as a negative correlate to PTG. In this study I hypothesize that self-blame in survivors of assault and the use of maladaptive coping mechanisms will negatively correlate with the degree of PTG in sexual assault survivors. I also hypothesize that maladaptive coping mechanisms will mediate the relationship between self-blame and poorer recovery and decreased degrees of PTG. This study of restrictors of PTG will allow clinicians and researchers to explore and create new avenues of treatment for survivors and to help survivors reach faster recovery and resilience.

Parameswaran, Abhinav
CYBER TRUCK LEARNING EXPERIENNCE (CYTEX)

Objectives: Our objectives are to develop interest in the Heavy Vehicle Cybersecurity Industry, develop fundamental qualities in engineering, learn relevant Computer Science and Cybersecurity practices, and become familiarized with the trucking industry. We will also provide the resources for students to have meaningful impacts on the Heavy Vehicle Cybersecurity Industry for the coming future. We will create a pipeline of cyber capable engineers with experience in the Heavy Vehicle Industry.

Curriculum: Coding with Arduino: A beginner's guide to general coding and develop good coding knowledge. Transmitting and receiving data over the CAN bus.
Coding with python: Learn the basics of coding with python along with more advanced topics to implement with CAN through parsing CAN traffic.
Coding with python: Learn the basics of coding with python along with more advanced topics to implement with CAN through parsing CAN traffic.

Industry Visits: Trips include the Cyberauto Challenge, the CyberTruck Challenge, and visits to heavy vehicle industry offices and workplaces such as Omnitracs and Peterbilt.

Cyberauto Challenge: SAE provides the Cyberauto Challenge to students who want to learn the fundamental basics of vehicle networks and develop the skills to work on vehicles systems with a group. The Cyberauto Challenge brings professionals from many facets to construct a solid learning platform for student participants. Participants range from high school students to those seeking a masters. The challenge is aimed to introduce vehicle cybersecurity industry so that participants can leave it with the knowledge necessary to explore more.

Challenge Assignments: Apart from the main Cytex curriculum, students have the opportunity to attempt different Challenge assignments given by Dr.Daily. Challenge assignments serve to give students engaging problems to further familiarize with more CAN related projects
Citizenship/ St. Elizabeth’s Charitable Automotive Repair: A charity dedicated to providing free automotive repair for single mothers. This is a great opportunity to understand basic car maintenance and get more comfortable working in the garage.

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Petty, Makayla; Wirth, Denise; and LeBlanc, Gabriel
ELECTROCHEMICAL DEPOSITION OF POLYANILINE ONTO ITO COATED PET

Polyaniline is a flexible conducting polymer that exists in various oxidations states. Each oxidation stat has a unique set of properties, which allows for a wide variety of applications. Some of the applications of polyaniline includes us as conducting fiber, electromagnetic screens, and smart windows. Through manipulating the electrochemical parameters during the synthesis, various version of polyaniline with differing properties can be produced. Thus the effects of synthesis parameters on the properties of polyaniline can be observed, which allows for better understanding of polyaniline and its chemical properties.

Pickering, Annemarie; Paquet, Caitlin; Davis, Joanne; Micol, Rachel; and Cogan, Chelsea
FACTORS IMPACTING SEXUAL ASSAULT REPORTING TO THE POLICE

The aim of the current study was to investigate potential factors that impact whether or not a sexual assault survivor will report the assault to the police. Specifically, the two factors looked at were, duration of time between the assault and physical exam, and showering/bathing after the sexual assault. It is recommended that after a sexual assault, a medical examination should be conducted within 72 hours. Also, to preserve DNA evidence, the survivor should not shower until after the medical exam. (Eogan, McHugh, & Holohan, 2013). Furthermore, research states that only about 20% of those who have been sexually assaulted report to the police (Heffling, 2014). Data for this study was obtained from a sample of sexual assault survivors that completed medical examinations. 90 survivors requested to not report to the police and a sample of 884 survivors did report to the police. A logistical regression was utilized to determine if time reliably predicted whether or not a survivor would make a report to the police, and chi square analysis was run to determine if there was a significant relationship between showering/bathing and reporting. The results concluded that there was no significance that duration of time between the reported assault time and the time of the physical exam will impact a survivor’s likelihood to report. Results also found that survivors of sexual assault are less likely to report to the police if they shower between the assault and receiving a medical examination.

Rajagopal, Nitya
COUPLING REACTION OF ETHYL DIAZOACETATE WITH A TERTIARY THIOAMIDE

Peripentonine is a pyrrolidine alkaloid that has been shown to be biologically active when isolated from the naturally occurring Peripentadenia Merarsii. Therefore, this compound has implications in the medicinal industry, but has not been synthesized in a laboratory. Our research involved optimizing a copper-catalyzed coupling reaction of this tertiary thioamide (I) with ethyl diazoacetate (2) to yield an enaminone intermediate (3). The optimized reactions conditions will be used in a similar coupling reaction to yield a key intermediate in the total synthesis of Peripentonine. Copper catalysts are more economical than Rh(II) or Ru(II) catalysts in these sorts of coupling reactions. Five copper(I) catalysts were screened and CuBr was found to be the most effective catalyst.

Reavis, Madison; Beffa, Alessio; Harville, Payten; and Purser, Gordon
PROPOSED MECHANISM AND RATE LAW FOR THE NON-ENZYMATIC HYDROLYSIS OF L-ARGININE ETHYL ESTER

\[
\text{S} \quad \text{N} \quad \text{CO}_2\text{Et} \quad \xrightarrow{\text{CuBr (5 mol%)}} \quad \text{EtO}_2\text{C} \quad \text{N} \quad \text{64%}
\]

L-Arginine (LA) is commonly used as a workout supplement to increase athletic stamina and ability. The low oral bioavailability of LA has led to the synthesis of new molecules such as l-arginine ethyl ester (LAEE). LAEE is argued to
have a higher bioavailability than LA because of an increase in hydrophobic properties. The kinetic mechanism of the non-enzymatic hydrolysis of LAEE, with a specific emphasis on the physiological pH conditions found in the body (2.5, 8.1, and 7.4), is the subject of this study. Apparent rate constants were measured by performing rate experiments under pseudo-first order reaction conditions using a phosphate buffer. From this data, a proposed rate law for the non-enzymatic hydrolysis of LAEE is proposed over the pH range of 0.5-12.9.

Reddy, Paul; Gutierrez, Roman; Paulus, Martin; and Breslin, Florence

RELATIONSHIP BETWEEN ADOLESCENTS WEEKEND SCREEN TIME AND INTELLIGENCE

Background: Approximately 99% of US adolescents use the internet, 85% engage in electronic gaming (Rikkers et al., 2016), and 97% have at least one electronic item in their bedroom. Screen time has been implicated in negative outcomes such as obesity (Wen, 2014), sleep disturbance (Cespedes, 2014) and may also be related to intelligence.

Methods: Data from the National Institute of Mental Health Data Archives - ABCD Study (https://dx.doi.org/10.15154/1412097) was used to compare screen use and intelligence in 9-10 year old (n=3950). Variables were: self-reported total screen hours for an average weekend day and age-corrected fluid and crystallized intelligence scores from the NIH Toolbox Cognitive Function Battery.

Results: Generalized Additive Mixed Models (GAMM4, R) was run through the Data Exploration and Analysis Portal. The analysis controlled for fixed effect covariates: race/ethnicity, sex, education, parental income, marital status and random effects for family and ABCD site. A small, but significant (p<0.01) negative correlation was found between the amount of screen time and fluid (R²=0.08, ΔR²=0.35%) and crystallized (R²=0.08, ΔR²=0.5%). Several of the controlled parameters had a significant positive effect on the results including: child age, race/ethnicity, sex, and parent education, marital status and income.

Conclusion: Our data was able to conclude that when considering multiple variables, screen time has an impact on intelligence scores. Future research could utilize this data and further it by examining the relationship when considering the content of screen time.

Saleh, Ayah and Sheaff, Robert

HOW TUMORS SURVIVE SUFFOCATION: THE ROLE OF P27KIP1 IN ADAPTING TO HYPOXIA

All cancer cells proliferate inappropriately. P27 is a tumor-suppressor that suppresses cell proliferation by blocking progression through the cell cycle. Cancer cells rarely present with a mutated or deleted p27 gene, but the p27 protein is commonly disrupted in aggressive cancers, suggesting that p27 might play some novel role in cancer. Previous work in our lab shows that cells lacking the p27 protein exhibit altered cell metabolism: they switch from metabolizing glucose to the amino acid glutamine when glucose levels drop. This suggests that cancers with deregulated p27 can modulate their metabolism based on available nutrients. However, amino acid metabolism requires oxygen while glucose metabolism doesn’t, and hypoxia is a common issue in tumors. In an oxygen-poor environment, can cells lacking p27 adapt by switching back to glycolysis? To answer this, we will allow cells lacking p27 to switch to glutamine, then cut off oxygen at different points in the cells’ metabolism to see if cells are capable of switching back to glucose in an oxygen-poor environment. The main methods of oxygen depletion were gradual depletion in a sealed container or quick depletion using glucose oxidase (enzyme). Effects on ATP production and viability were evaluated and metabolic inhibitors were employed to identify metabolic pathways being used. Because tumors face hypoxia, we can begin to understand how tumors characterized by p27 deregulation might adapt to their environment. If we can prove that these tumors can adapt to hypoxia, we can try to discover why and discover ways to target them specifically.

Srinivasan, Srivats; McDermott, Tim; Puhl, Maria; and Aupperle, Robin

PREDICTING NEURAL RESPONSES TO FMRI EMOTIONAL FACES TASK USING MULTIVARIATE PATTERN ANALYSIS: APPLICATION TO MAJOR DEPRESSIVE DISORDER.

Background: Traditional neuroimaging approaches using univariate analyses indicate that major depressive disorder is often associated with dysfunction in emotional processing networks. Multi-variate pattern analyses (MVPA) are novel
statistical methods that examine multivariate correlations of patterns across the brain. MVPA shows greater generalizability for individuals than univariate analyses and has been useful in identifying regions in the brain that differentially predict various emotional states. In this study, a neural pattern was developed with MVPA for emotional face processing and examined to determine if it was reliable across both healthy controls and individuals with major depressive disorder (MDD). **Methods:** In study 1, a LASSO multivariate analysis was first applied to a sample of healthy participants (n=39) to create the MVPA predictive pattern that best identified whether participants were viewing either emotional faces or shapes during fMRI. This pattern was tested on two independent samples: study 2, which included 40 healthy controls (HC), and study 3, which included 43 individuals diagnosed with MDD. **Results:** Results with the training set (study 1) identified a pattern with 95.28% sensitivity and 93.33% specificity for predicting emotional faces. Results from Studies 1 and 2 are pending. **Conclusion:** Initial findings suggest MVPA is robust for identifying networks most predictive of emotional face processing. Comparing pattern predictability for healthy and depressed participants will give more insight into the utility of MVPA within clinical populations. Future studies exploring different study groups and analyses using MVPA are needed to establish generalizability and utility for addressing clinically-relevant questions.

Stafford, T. and Hale, D.
HEART RATE VARIABILITY AND SLEEP DURATION IN COLLEGIATE FOOTBALL PLAYERS

**Introduction:** Effective conditioning uses training loads combined with adequate recovery to optimize athlete performance. With the prevalence of wearable devices, more athletes are focusing on monitoring physiological changes of training adaptation and recovery with variables such as heart rate variability (HRV) and sleep duration (SD). Athletes who lack proper recovery are at greater risk for injury, have decreases in performance, and can experience negative cognitive changes. Biometric variables such as HRV and SD can provide insight into athletes’ homeostatic and autonomic function, both important aspects of recovery. The purpose of this study was to assess the association between HRV and SD in members of a Division I collegiate football team during a 6-week summer conditioning program. **Methods:** Twenty-three male student-athletes from a Division I Football team were purposively selected in coordination with the sports performance staff to wear a WHOOP recovery tracking device at all times during a 6-week summer conditioning program. The WHOOP recovery tracking device measures HRV (RMSSD) and SD (hrs/day), among other variables of work and recovery. Athletes completed their scheduled strength and conditioning program, which included weekly sessions of resistance training x 3, speed and agility training x 4, and football specific drills for metabolic conditioning x 2. The WHOOP recovery tracking device is designed to be worn throughout the day, including during workouts and sleep. Following the 6-week summer conditioning program, data was sorted and uploaded into SPSS for statistical analysis. **Results:** Adequate data normality of HRV (p = .510) and SD (p = .341) was determined prior to statistical analysis via a Shapiro-Wilk test. A Pearson bivariate test of correlation was performed. A significant correlation was observed between HRV (RMSSD) and SD (hrs/day), r = .95, p = .033. Means and standard deviations for HRV and SD were 88.2±3.63 and 4.92±.15 respectively. **Conclusion:** A significant direct association between HRV and SD existed in Division I football players during a 6-week summer conditioning program. Adequate sleep duration is important to improve recovery as measured by autonomic function.

Thapa, Saroj; Adhikari, Gopi; Zhu, Hongyang; and Zhu, Peifen
ALL-INORGANIC MIXED HALIDE PEROVSKITES FOR WHITE LIGHT EMISSION

All-inorganic lead halide perovskites because of its remarkable optical properties offer an advantage to be used in the fabrication of various optoelectronic devices. Herein, fully-inorganic perovskite crystals with tunable properties were synthesized at an ambient atmosphere employing a solution processed precipitation technique by adjusting the bromide-iodide composition. The peak emission wavelength and the band gap of mixed CsPb(Br1-xIbx)3 [0≤x<1] nanocrystals were readily tuned over the entire visible spectrum ranging from 464-667 nm with a narrow emission line width (23-47 nm). The application of these nanocrystals in white light-emitting diodes (LEDs) leads to tunable correlated color temperature (CCT) with a high color rendering index (CRI≈92). Thus, the synthesis of perovskite nanocrystals with the characteristics of tunable emission, tunable band gap with narrow line-width emission, and adjustable CCT with a high CRI makes them more promising candidates in the field of lighting devices.
Tresch, Erin
“WHO HERE IS NOT FOR DEMOCRACY?” A STUDY OF AMERICAN PATRIOTIC SUPPRESSION AND SUPPORT DURING THE 1918 FLU PANDEMIC

This poster and the paper that it supports explore the twin conflicts during 1918: the United States’ involvement in World War One and the Spanish Flu pandemic, specifically in San Francisco. The project looks at the propaganda of patriotism that was utilized to heavily promote the war to a previously isolated America and its intersection with the flu pandemic. The propaganda utilized focused on patriotism and suppression of non-American opinions. Through my research, I found that in 1918 and into 1919, this type of language was also used to promote health measures like mask wearing ordinances and anti-crowd ordinances. Patriotic language was used to justify what was considered by citizens of San Francisco as “suppression of civil liberties”: those who did not wear masks were considered slackers, like those who did not go abroad to fight in the War. This continued even after the Armistice in November of 1918, prompting the creation of the Anti-Mask League in the city. Despite the flu pandemic killing more people that both world wars combined, the research is lacking and this research seeks to explore how the war and the flu were connected to each other through propaganda and patriotism.

Tripplehorn, Tyler; Ruhl, Christine; and Roche, Steven
COMPARING SEISMICITY-INFERRRED FAULT STRUCTURES TO LOCAL BASEMENT FAULT STRUCTURES IN OKLAHOMA

The vast majority of seismicity that north central Oklahoma has experienced since 2009 has occurred in the upper portion of the basement. Basement fault structure, however, remains poorly understood on a regional basis. Recent relocation studies have found that earthquake clusters very rarely correlate with faults mapped in the overlying stratigraphic sequence; this implies a distinct difference in structural style between the sedimentary cover and the basement, and that the most significant seismic hazard currently exists on unknown faults. Given the importance of basement structure to seismic hazard in the region, correlating fault structures inferred from spatiotemporal clustering of seismicity to structures derived from other geophysical techniques (e.g., potential field and subsurface imaging) may prove to be a useful tool for corroborating fault structures. These structures could then be incorporated into seismic hazard maps with more confidence, particularly in areas where seismicity has yet to migrate to. Here, we test this hypothesis by systematically comparing high-precision earthquake relocations to a variety of other basement fault data on a local basis in Oklahoma.

Van, Duy and Daily, Jeremy
HEAVY VEHICLE CHIP LEVEL FORENSICS

Heavy vehicle historical data such as sudden deceleration reports show the vehicle speed, engine RPM, engine load, brake and clutch status from a hard-braking event is critical information for law enforcement to reconstruct crashes. This data is stored in the Engine Control Module (ECM) inside the truck and can be downloaded via the diagnostic port. However, in some cases, the physical connections of the ECM are broken so that data cannot be retrieved through standard procedures. A method of physically removing the microchips from the crashed ECM and soldering them back to a new blank ECM has been implemented in some places, but it is time consuming and difficult due to how small and delicate these microchips are. The proposed method is to execute a virtual chip swap, also known as cloning. The process of digitally transferring data between two ECMs is secure and efficient. There are two devices that can operate the cloning process: Alien Tech K-TAG and PEmicro Cyclone. Both devices require the JTAG ports for communication. K-TAG is more “user-friendly” with detailed instructions, but its service requires an annual subscription. Unlike PEmicros, which is open source, allowing anyone to access it. Moreover, only in this process, the raw binary data of the ECM can be obtained and analyzed. The location in memory of the sudden deceleration report within the binary data is found by locating and converting the raw bits to engine data through the J1939 standard.
Warner, R. and Hale, D.
CHANGES IN VO2 RESPONSES AND SUBSTRATE UTILIZATION BETWEEN THREE HYDRATION LOAD CONFIGURATIONS

The purpose of this study was to assess oxygen uptake in ml/kg/min (VO2), heart rate in beats per minute (HR), and respiratory exchange ratio with respiratory quotient (RER) differences between three treadmill conditions. Ten college students completed three trials of a self-paced 5K on a treadmill (incline 1%). Participants (ages: 20.1±1.7) completed three trials on a treadmill. The tests consisted of a self-paced 5K, one without a hydration system, one with a backpack hydration system, and another with a handheld hydration system. Expired gases of participants were measured to determine mean relative VO2, HR, and mean RER. ANOVA tests were utilized to compare differences of the three variables. Results from the ANOVA tests indicated an overall difference in VO2 (F: 4.2, p = .002) and RER (F: 5.5, p = .03) with no significant HR difference detected between trials. Comparisons for VO2 determined the main difference was between the handheld trial (34.3±3.7) and the unloaded trial (32.1±2.4). Similar findings were detected of RER with a significant difference detected between the handheld trial (.95±.14) and the unloaded trial (.87±.21). Results of this study indicate that the VO2 and substrate utilization increased the most during the handheld trial versus the other two trials. It seems that a handheld hydration system may place more strain on a runner than an unloaded or backpack-based system. There was no significant HR difference between trials; handheld hydration elicited the highest mean HR (168±4.5).

Zandy, Rachel; Hildebrand, Rachel; and Wilson, Laura
SERIAL ASSESSMENT OF CONCUSSION-LIKE SYMPTOMS IN NON-CONCUSSED COLLEGIATE ATHLETES AND NON-ATHLETE CONTROLS

Background Repetitive head impacts (RHI) are subconcussive impacts experienced during the course of typical play in collision and contact sports that do not result in a clinical diagnosis of concussion. In a study of twenty non-concussed collegiate football athletes, more RHIs were related to an increase in concussion-like symptoms reported. The purpose of this study is to determine if non-concussed student-athletes who engage in contact sports with more RHI exposure have a greater concussion-like symptom burden (e.g., a greater number and/or severity of symptoms such as headache, fatigue, difficulty remembering) than those who do not engage in contact sports. Methods We will use a repeated-measure, multi-group design of 160 subjects to identify the relationship between exposure to RHI and self-reported concussion-like symptoms. We will track the number, severity, and variance of self-reported concussion-like symptoms across two weeks. Data will be managed using REDCap Cloud and data analysis will be conducted using R. Results We anticipate that athletes in collision or contact sports will experience a greater number, severity, and variation of symptoms than those in non-contact sports or those who are not athletes due to their exposure to repetitive head impacts. Data collection will be completed and results will be reported at time of presentation. Conclusion Findings will inform healthcare providers about the effect of head impacts on student-athlete health outcomes. This research will also add to the body of knowledge regarding symptoms as a result of exposure to repetitive head impacts in non-concussed individuals.
Hlavacek, Carson; Bunnag-Stoner, Amber; and Purser, Gordon
THE CHEMICAL OXIDATION OF BRILLIANT GREEN DYE IN AQUEOUS SYSTEMS USING HYPOCHLORITE SOLUTIONS AT VARYING PH VALUES

Brilliant Green (BG) is a triarylmethane dyes commonly used in manufacturing processes. Following manufacturing, BG can often runoff into streams and lakes endangering the welfare of animals due to its toxic and phototoxic effects on aquatic ecosystems. BG’s absorbance changes at acidic and alkaline pH values. It was found that a hypochlorite solution could fully discolor the BG solutions. This study looks at effects of pH value on BG’s reaction when using hypochlorite as an oxidant.

Ng, Chee; Neeli, Sai; and Ramsurn, Hema
CARBON ENCAPSULATED IRON NANOPARTICLES FOR REMOVAL OF HEAVY METALS FROM AQUEOUS SOLUTIONS

Biochar, a carbon-rich valuable by-product obtained from the hydrothermal carbonization of cellulose, was utilized as a support for synthesis of carbon encapsulated iron nanoparticles (CEINP) to promote green chemistry and engineering. Core-shell structures consisting of dark metal cores ranging from 40 to 80 nm and a light matrix with graphitic structure appeared in the CEINP. The porous graphitic layers encapsulate iron, prevent it from oxidation, while iron retains its magnetic property, and can be easily recovered by an external magnetic field. Heavy metals are toxic to both human and other living forms posing a serious environmental concern nowadays. United States Environmental Protection Agency (US EPA) has enforced regulations to limit the level of inorganic chemicals in drinking water. Present technologies such as precipitation, membrane filtration and ion-exchange are being employed to remove metal pollutants from water. However, many of these processes have several disadvantages such as incomplete removal of metal ions, poor selectivity, requirements for expensive equipment, generation of large amounts of toxic sludge or other waste products that requires disposal. Unlike these methods, adsorption has proven to be economical and efficient for removing heavy metals. Batch experiments were conducted to test the ability of carbon encapsulated iron nanoparticles for removal of heavy metal from aqueous solutions. Higher removal efficiencies (>70%) were obtained at pH 3 for chromium and arsenic while at pH 7 copper was removed completely. Cellulose biochar alone with Fe annealed at 1000 °C was less efficient (<20% efficiency) in removing chromium and arsenic.

Scott, Joshua
IMPROVING QUALITY OF CARE BY INCREASING THE UTILIZATION OF SODIUM GLUCOSE CO-TRANSPORTER 2 INHIBITORS IN PATIENTS WITH DIABETES AND CONCURRENT CARDIOVASCULAR DISEASE

Diabetes and cardiovascular disease are among the most burdensome chronic diseases in the United States. Over 100 million Americans have been diagnosed with diabetes or prediabetes. Heart disease is the cause of over 600,000 deaths each year in the United States, roughly 1 in every 4 deaths. Fifteen to 35% of patients admitted to hospitals for acute coronary syndrome have diabetes and up to 15% have previously unrecognized diabetes. New antihyperglycemic agents, sodium glucose co-transport 2 (SGLT2) inhibitors, offer cardiovascular protection and need to be considered by cardiovascular clinicians when developing a treatment plan. Medication utilization data shows that this class of medication is rarely prescribed at the hospital of interest where this quality improvement project will be implemented. Evidence-based research and expert consensus guidelines put forward by the American College of Cardiology were used to develop education materials that will be used to increase awareness of SGLT2 inhibitors’ effectiveness in reducing poor cardiovascular outcomes. Implementation of education will be conducted by presentations and one-on-one communication to nurse practitioners, physician assistants, and physicians that have admission and discharge privileges in a 62-inpatient bed physician-owned cardiovascular specialty hospital. Pre-implementation and post-implementation medication utilization data will be collected and the percentage increase in SGLT2 inhibitor prescribing/utilization will be used to measure the effectiveness of this quality improvement project.
Whitaker, Laura  
PAIRED SEDATION VACATION AND SPONTANEOUS BREATHING TRIAL EDUCATION AND THE EFFECT ON AVERAGE VENTILATOR DAYS IN THE ADULT MEDICAL INTENSIVE CARE UNIT

Mechanical ventilation is a life support modality present in many patients admitted to the adult intensive care unit. Although frequently life-saving, this intervention can cause numerous physiological and clinical complications. The purpose of this project is to reduce the average number of days that patient’s spend on mechanical ventilation and average length of ICU stay. The method is to provide education to bedside nurses on the latest guidelines and evidence-based practice associated with sedation vacation and weaning. This education encouraged earlier daily awakening, and improved documentation on the attempts to liberate patients from mechanical ventilation. This quality improvement project was developed using Lewin’s Change Theory. This consists of the three steps of unfreeze, change and refreeze. The unfreeze phase consisted of discussion on current methods and how bedside staff could improve outcomes. The change phase is education provided in classes, and as short in-services in the unit. Refreezing phase reinforces the knowledge learned with unit flyers, monitoring the changes in ventilator days, and sharing the data collected with staff. The data will be collected from aggregate information that is gathered for each intensive care unit. The average number of ventilator days and ICU days will be compared from the months preceding education, and then the months following education.