Undergraduate Research Conference 2019

Stephen F. Austin State University
Baker Pattillo Student Center Movie Theater and the Twilight Ballroom

April 16, 2019
4-7:30 p.m.
Schedule of Events

BPSC Movie Theater
4:00-4:10 Opening announcements, Dr. Eric Jones

4:10-4:30 Presentation of awards to Top Scholars and Faculty Mentor, Provost Dr. Steven Bullard

Top Scholar Presentations
4:30-4:42 Carly Wright
Fertilizer Type and Rate Influence on *Erysimum* Growth and Development
Faculty Sponsor: Michael Maurer (Agriculture)

4:42-4:54 Kia Fisker
European Labor Market Policies and Unemployment Rates
Faculty Sponsor: Stephen Kosovich (Department of Economics and Finance)

4:54-5:06 Hannah Horton
The Consideration of Students’ Ideas to Improve Online Courses in Higher Education
Faculty Sponsor: Erika Powell (Learning Framework-Tyler Junior College)

5:06-5:18 Michael Dean, Travis Wattigney, Wyatt Gay, and Logan Starks
Interactive Media: Making Music Creation Accessible to the Public
Faculty Sponsor: James Adams (School of Music)

5:18-5:30 Aaron Kelley
The Path to Hegemony: A Model of the Emerging Hegemon
Faculty Sponsor: Julie Harrelson-Stephens (Department of Government)

5:30-5:42 Hailey Jarzynka and Holly Jarzynka
Biotransformation Reactions of Pro-chiral Ketones and Studying Antimicrobial Properties of Biotransformation Products
Faculty Sponsor: Michele R. Harris (Department of Chemistry and Biochemistry)

5:42-5:54 James Hutson, Casey Pederson, and Courtney Elliott
Impact of Heart Rate Intensity on Shooting Accuracy during Games in NCAA Division I Women Basketball Players
Faculty Sponsor: Dustin Joubert (Department of Kinesiology and Health Science)

Twilight Ballroom
5:55-7:30 Poster Presentations of Finalists
Refreshments served

Faculty Mentor of the Year

Michele R. Harris
Department of Chemistry and Biochemistry

The Department of Chemistry and Biochemistry has a long history of undergraduate research and has required all majors to participate in undergraduate research since 2012. Undergraduate research is a transformative learning experience for students and provides chemistry and biochemistry majors skills for the real world that often are not gained in a traditional classroom. Over the years, my students have presented their work at scientific conferences such as the Undergraduate Research Conference at SFA, Undergraduate Research Conference at UTSA, the Texas Academy of Sciences, the American Chemical Society, the American Society of Biochemists and Molecular Biologists, and the National Council on Undergraduate Research Conference. It is always a pleasure to take students to their first scientific conference and see their excitement. The communication of their research at a conference also helps build a student’s professional communication skills as well as their confidence. It helps students realize that they are part of a larger scientific community. In addition to a transformative learning experience and the development of professional skills, students also benefit from the mentoring relationship that occurs via undergraduate research. The URC at SFA is a great way for students to develop the academic and technical credentials that will prepare them for successful life after graduation.
Carly Wright

**Fertilizer Type and Rate Influence on *Erysimum* Growth and Development**

A greenhouse study was conducted to evaluate the response of *Erysimum* to fertilizer type and rate. Two fertilizer sources were used: Peter's 15-5-15 (water soluble fertilizer) and Osmocote 18-6-12 (controlled release fertilizer). Fertilizer rates consisted of 0 (control), 50, 100, 200 and 400 ppm N for the Peter’s 15-5-15 fertilizer and 0 (control), low, medium (recommended rate), high and very high for the Osmocote 18-6-12 fertilizer. *Erysimum 'Sugar Rush Yellow'* (288) plugs were planted 2 per 4 inch pot in potting soil on September 21, 2018. There were 10 treatments in with 8 replicates in a randomized complete block design. On September 28, 2018, the pots were treated with the corresponding fertilizer and measured. Each week the pots were fertilized and measured to calculate average growth for each treatment. This experiment was 8 weeks long and terminated on November 16, 2018. For growing *Erysimum 'Sugar Rush Yellow'* the best fertilizer for growth and flowering would be Peters Excel 15-5-15 at the 200 ppm N applied weekly. If Osmocote is used the low level should be used to be at the critical level. Using the medium, high, and very high would be a waste of fertilizer because the plants did not respond to excess nutrition.

Kia Fisker

**European Labor Market Policies and Unemployment Rates**

This paper studies how government policies impact the unemployment rates in European countries from 2005-2017. The dataset shows that there are substantial differences in unemployment rates within countries measured over time and in the rate across countries, as well as differences in their respective labor market policies. Additionally, an index of economic freedom is also used to test whether there is a relationship between these policies and unemployment rates. Using a pooled OLS approach, the results suggest that there are multiple factors that determine the rate of unemployment in each country. The results also suggest that there is a negative relationship between the labor freedom and unemployment rates, and a positive relationship between European countries’ passive spending and their unemployment rates. Finally, other hypotheses are provided to explain the link between labor market policies and unemployment rates.
The Consideration of Students' Ideas to Improve Online Courses in Higher Education

Over the past two decades, online college courses have become increasingly popular. Many students decide to take online classes so that they can accommodate their schedules, and for other students, online learning is the only way they can attend college.

Previous studies on online learning have predominantly focused on students' perceptions of internet courses and their reasons for selecting these courses, as well as comparisons between online and face-to-face courses. Although researchers such as Walker and Kelly (2007) have asked students survey questions regarding their likes and dislikes with online courses, little research exists on students' practical ideas for ways in which online courses could be improved. Studies show that online students tend to perform well, but O'Neill and Sai (2014) mention that it is well known that online students frequently drop out of their courses. Furthermore, they reason that students who dropped out of their online courses before receiving a final grade may be distorting results of studies comparing the outcomes of traditional and online courses (p. 3).

Through ex post facto research, this study aims to learn why students chose to withdraw from online college courses and what actions they recommend that higher education institutions take to improve these courses.

Qualitative data for this study will be collected through anonymous online surveys and possible interviews. Surveys will include two open-ended questions: one asking respondents what issues they encountered in their online course, and a second asking how they would recommend correcting those issues. Students will be asked to consider only one online course while answering these questions.

College faculty members and instructors can use knowledge on why students drop to improve online course offerings. Quality online courses are a necessity for schools since some students may be unable to take traditional courses. Daymount, Blau, and Campbell (2011) found that 98.2% of online students chose that course format for flexibility (p. 167). Horspool and Lange (2012) found that nearly half of online students (47%) chose online courses to lower commute time (p. 78). Students may not be able to participate in traditional courses if they need a flexible schedule or do not have a college nearby but are unable to move. This research may help institutions lower the high drop rate in online courses. By lowering the amount of dropped college courses, institutions may be able to increase the number of college graduates. This would be beneficial to colleges themselves and to students who would not be able to graduate by taking traditional courses.

Interactive Media: Making Music Creation Accessible to the Public

Interactive media is a massively popular and growing industry that has only realized a fraction of its potential. By nature, media that is interactive is any digital technology that reacts and responds to the user’s actions or inputs. From video games to art installations to educational virtual simulations, interactive media is one of the fastest growing branches of multimedia. This innovation allows us to experience things that we may never have the opportunity to in reality. In our research project, we attempt to create an interactive sound installation that makes the unique experience of music creation accessible to the public.

We strive to accomplish this first by crafting an atmospheric musical soundscape as the baseline canvas for the piece. From there, we program several physical controllers using an arduino circuit board that is configured to affect several parameters in the soundscape. An arduino circuit board is “an open source electronic prototyping platform enabling users to create interactive electronic objects,” as stated by the manufacturers. The first of these controllers allow the user to affect the filters and equalization of the ambient background which allows the user to adjust the tone color of the sonic canvas. Another controller allows the user to add in rhythmic elements to create momentum and direction as the basic lines and structure of the piece. The final controller presents the user with a set of expressive musical gestures that sound at any time they choose to interact with it. The result of releasing creative control of these parameters allows for each unique interaction to be a personal expression of the individual or group of users interacting with the piece.

This philosophy is congruent with the artistic trend and compositional technique of indeterminate or aleatoric music which was made famous by incredibly influential composers such as John Cage. Although indeterminacy is not the sole compositional trend of the contemporary music scene, it is the basis of all interactive media as the creator simply cannot make the user press start.
With China’s meteoric rise in global economic and political influence, scholars and policymakers have begun to wonder whether the era of U.S. hegemony (global preponderance of power) is approaching its close. Some go as far as to label China as an “emerging hegemon,” a state experiencing such growth that it is on track to surpass the status quo world superpower: the United States. Although scholars of international relations (IR) have studied and developed the concept of the “hegemon” in depth, few have given a systematic explanation of what characteristics define an “emerging hegemon,” even though it seems intuitive that China would fit that description. The failure to systematize the identifying factors of a hegemon hinders both IR theory and foreign policy. Therefore, the following question arises: what are the defining characteristics of an emerging hegemon? Drawing on economic data and case-study analysis, this paper sets forth a model of the “emerging hegemon” by developing two key components of emerging hegemony: capability growth and hegemonic emulation.

Hailey Jarzynka and Holly Jarzynka

**Biotransformation Reactions of Pro-chiral Ketones and Studying Antimicrobial Properties of Biotransformation Products**

2-Benzofurancarboxaldehyde (BCA) and benzoferan-2-yl methyl ketone (BMK) are benzofuran derivatives that are reduced to 2(Hydroxymethyl)benzoferan (BCAlc) and S-benzoferan-2-yl ethanol (BMA) respectively when exposed to carrot (or other plant) tissue. By using a biocatalyst for the conversion, a biotransformation reaction is occurring. BMK was first studied by testing the best plant type to use for the biotransformation reaction to BMA. The conversion times for each plant type was recorded, with carrots yielding the best result of the conversion from the ketone to alcohol. Since BCA is a new compound that is being studied, the first task that was performed was to identify the reaction time of the biotransformation of the aldehyde to the alcohol.

The transformation to the BMA takes 2 hours and the transformation to the BCAlc takes 1.5 hours as shown in the preliminary study. Both transformations were monitored using TLC. The crude BMA and BCAlc were purified using column chromatography with (85:15) hexane:ethyl acetate for BMA and (75:25) hexane:ethyl acetate for BCAlc, fractions were tested for purity with TLC plates. Preliminary antibacterial and antifungal studies were performed using BMK, BMA, BCA, and BCAlc. These studies were performed using LB agar plates for the BL21 E. coli and YPD agar plate for the Baker’s Yeast. The structure of the BMA and BCAlc product was confirmed using NMR. In the antimicrobial studies for the BMK to BMA, the BMK starting material is less potent than the BMA product for both the BL21 E. coli and for the Bakers’ Yeast. In these preliminary antibacterial studies, the BCA is about three times more potent than the BCAlc for the BL21 E. coli. BCA and BCAlc have about the same potency for the Bakers’ Yeast. Future work will include expanding the study of BCA and BCAlc and moving to other prochiral ketones/benzofuran derivatives.
Impact of Heart Rate Intensity on Shooting Accuracy during Games in NCAA Division I Women Basketball Players

Shooting accuracy in basketball is key to winning games. While there are various factors as to why a team either makes or misses their shots, the intensity of play is likely a contributing factor. A player who has played the majority of the game would likely have a higher, more intense heart rate (HR). Depending on the athlete, this could impact shooting accuracy. Examining the relationship between HR intensity and shooting accuracy has not been looked at in a real game setting before. Therefore, we set out to determine the impact heart rate intensity has on shooting accuracy in a game setting. Purpose: The purpose of this study was to determine the impact of heart rate intensity on shooting accuracy in a game setting in NCAA Division I female basketball players. Methods: We examined the team stats for shooting accuracy from overall attempts, three point attempts, and free throws during five games. During games players wore HR monitors that transmitted to a mobile app that displayed their HR in real time. Every time a shot was attempted, we recorded what kind of shot, where on the floor it came from, whether it was made or missed, and the HR zone that the athlete was at when it took place. The HR zones that were compared were 1) 70-80% HR max, 2) 80-90% HR max, and 3) 90-100% HR max. These data were input into a spreadsheet to calculate the average team shooting percentage across these three HR zones for overall shooting, free throws, and 3-pointers. Results: As indicated in the table, the team shooting percentage was highest for all types of shooting when players were at the lowest HR intensity. Shooting accuracy declined at higher HR intensities.
James I. Perkins College of Education Finalists

**Heather Adams**  
Food Insecurity Awareness, Acknowledgment, and Actions on a University Campus  
Faculty Sponsor: Mary Olle (School of Human Sciences)

**Traci Dorsett**  
An Investigation of “Voices from the Field” Regarding Elementary Teachers  
Faculty Sponsor: Deborah Williams and Tingting Xu  
(Department of Elementary Education)

**Courtney D. Elliott, Casey L. Pederson, and James R. Hutson**  
Comparison of Heart Rate Intensity in Practice, Conditioning, and Games in NCAA Division I Women Basketball Players  
Faculty Sponsor: Dustin Joubert (Department of Kinesiology and Health Science)

**Lauren Hutto**  
Dolls, Dinosaurs, and Design  
Faculty Sponsor: Mitzi Perritt (School of Human Sciences)

**Rudi Johnson**  
The Capacity of Eye-Tracking Technology to Determine Non-Diagnosed ADHD in Females  
Faculty Sponsor: Luis Aguerrevere (Department of Human Services)

**Casey L. Pederson, Courtney D. Elliott, and James R. Hutson**  
The Relationship between Objective and Subjective Markers of Training Stress in NCAA Division I Women Basketball Players  
Faculty Sponsor: Dustin Joubert (Department of Kinesiology and Health Science)

**Marilyn Toc**  
Servicios de Salud: Exploring Human Services Utilization among Latin Immigrants  
Faculty Sponsor: Yuleinys Castillo (Department of Human Services)

College of Fine Arts Finalists

**Madeline Castillo**  
5x5: Conceptual and Technical Challenge  
Faculty Sponsor: Lauren Selden (School of Art)

**Austin Cullen**  
The Artist Residency and Lumen Printing Process  
Faculty Sponsor: Wesley Berg (School of Art)

**Jesse Edwards**  
*(Biedermann and) the Firebugs: Composing Contemporary Music for Live Theatre*  
Faculty Sponsor: Rick Jones (School of Theatre)

**Sophia Lee**  
*Nuevo Ritmo: A Multifaceted Electroacoustic Collaboration for Solo Cajon and Electronics*  
Faculty Sponsor: Brad Meyer (School of Music)

**Mia Lindemann**  
Lighting Design and Pre-Visualization Software  
Faculty Sponsor: CC Conn (School of Theatre)

**Aubrey Moore**  
Auditioning at the Southeastern Theatre Conference as an Undergraduate Student  
Faculty Sponsor: B. Slade Billew (School of Theatre)

**Jordan Weaver**  
Caddo Inspired Coil Pots  
Faculty Sponsor: Maggie Leysath (School of Art)
<table>
<thead>
<tr>
<th>Arthur Temple College of Forestry and Agriculture Finalists</th>
<th>College of Liberal and Applied Arts Finalists</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Garret Ashabranner and Ian Brock</strong></td>
<td><strong>Emily Crider</strong></td>
</tr>
<tr>
<td>A Comparative Analysis of a Built-up Composting Poultry</td>
<td>“Happiest Delineation:” Literature, Reading</td>
</tr>
<tr>
<td>Litter System Compared to a Conventional Poultry Litter</td>
<td>Habits, and Characterization in Austen’s</td>
</tr>
<tr>
<td>System and Their Effects on the Performance of Broiler</td>
<td><em>Northanger Abbey</em></td>
</tr>
<tr>
<td>Chickens</td>
<td>Faculty Sponsor: Elizabeth Tasker Davis</td>
</tr>
<tr>
<td>Faculty Sponsor: Joey Bray (Department of Agriculture)</td>
<td>(Department of English and Creative Writing)</td>
</tr>
<tr>
<td>**Crystal Alexander, Connor S. Adams, Kathryn R. Kidd,</td>
<td><strong>Bryan Jew</strong></td>
</tr>
<tr>
<td>and Christopher Schalk**</td>
<td>Rap Music Videos and Media (Mis)Representa-</td>
</tr>
<tr>
<td>Silvicultural Systems in Southern Bottomland Hardwoods:</td>
<td>tional Politics</td>
</tr>
<tr>
<td>A Review of Avifauna Community Response to Forestry</td>
<td>Faculty Sponsor: Sudeshna Roy (Department of</td>
</tr>
<tr>
<td>Management Practices</td>
<td>Languages, Cultures, and Communication)</td>
</tr>
<tr>
<td>Faculty Sponsor: Kathryn R. Kidd (Forestry and Spatial</td>
<td><strong>Taryn Lenert</strong></td>
</tr>
<tr>
<td>Science)</td>
<td>“Pretty is as Pretty Does:” Child Beauty</td>
</tr>
<tr>
<td></td>
<td>Pageants in Deep East Texas</td>
</tr>
<tr>
<td>**Jack DiFrank, Ashley Broadhurst, Deanna Alpert,</td>
<td>Faculty Sponsor: Dianne Dentice (Department</td>
</tr>
<tr>
<td>Leenell Colon, and Tyler Kysiak**</td>
<td>of Anthropology, Geography, and Sociology)</td>
</tr>
<tr>
<td>Examining the Impacts of Lead Regulations on the Levels</td>
<td><strong>Ashley McMilon</strong></td>
</tr>
<tr>
<td>Found in Soil Along Local Highways in Nacogdoches</td>
<td>Verbatim and Gist Extraction among University</td>
</tr>
<tr>
<td>Faculty Sponsor: Sheryll B. Jerez (Division of Environmental</td>
<td>Colleges</td>
</tr>
<tr>
<td>Science)</td>
<td>Faculty Sponsor: Steven Estrada (Department</td>
</tr>
<tr>
<td></td>
<td>of Psychology)</td>
</tr>
<tr>
<td>**Emily Ivester, Hollyn Grizzaffi, Nicklaus Langlois, and</td>
<td><strong>Dylan Possoit</strong></td>
</tr>
<tr>
<td>Augusto Conde De Frankenberg**</td>
<td>Poetic Realism in <em>Drive</em> and *Port of</td>
</tr>
<tr>
<td>Using Macroinvertebrates to Test the Water Quality of Lake</td>
<td>Shadows*</td>
</tr>
<tr>
<td>Nacogdoches</td>
<td>Faculty Sponsor: Joyce Johnston (Division of</td>
</tr>
<tr>
<td>Faculty Sponsor: Sheryll B. Jerez (Division of Environmental</td>
<td>Multidisciplinary Studies)</td>
</tr>
<tr>
<td>Science)</td>
<td><strong>Reyna Sanchez</strong></td>
</tr>
<tr>
<td></td>
<td>Homelessness among Youth</td>
</tr>
<tr>
<td><strong>Emily Ruth Lozano</strong></td>
<td>Faculty Sponsor: Kristin C. Bailey-Wallace</td>
</tr>
<tr>
<td>LAnana Creek Historical Trial: Blazing a Path Through the</td>
<td>(School of Social Work)</td>
</tr>
<tr>
<td>Oldest Town in Texas</td>
<td><strong>Sarah Shade</strong></td>
</tr>
<tr>
<td>Faculty Sponsors: David Kulhavy, I-Kuai Hung, and Dan</td>
<td>Series of Identities: Bob Dylan in the 1980s</td>
</tr>
<tr>
<td>Unger (Forestry and Spatial Science)</td>
<td>Faculty Sponsor: Court Carney (Department of</td>
</tr>
<tr>
<td></td>
<td>History)</td>
</tr>
<tr>
<td><strong>Nina M. McCallum and Nicky A. Vermeersch</strong></td>
<td></td>
</tr>
<tr>
<td>Concentrations of Copper, Zinc, and <em>Escherichia coli</em></td>
<td></td>
</tr>
<tr>
<td>Bacteria in East Texas Ponds as Affected by Source of</td>
<td></td>
</tr>
<tr>
<td>Stormwater Runoff</td>
<td></td>
</tr>
<tr>
<td>Faculty Sponsor: Kenneth Farrish (Division of Environmental</td>
<td></td>
</tr>
<tr>
<td>Science)</td>
<td></td>
</tr>
<tr>
<td><strong>Reid Viegut and Schaeffer Shockley</strong></td>
<td></td>
</tr>
<tr>
<td>Using Unmanned Aircraft Systems (UAS) to Quantify Mistle-</td>
<td></td>
</tr>
<tr>
<td>to in Urban Environments</td>
<td></td>
</tr>
<tr>
<td>Faculty Sponsor: David Kulhavy (Forestry and Spatial</td>
<td></td>
</tr>
<tr>
<td>Science)</td>
<td></td>
</tr>
</tbody>
</table>
Sarah Browning
Extraction and Quantification of Hydrolyzable Tannins in Acorns from Different Species of Oak Trees (*Quercus* sp.)
Faculty Sponsor: Russell Franks (Department of Chemistry and Biochemistry)

Patrick J. Ellis
Spectroscopic and Electrochemical Studies of Benz[a]anthracene and Dibenz[a,h]anthracene
Faculty Sponsor: Kefa K. Onchoke (Department of Chemistry and Biochemistry)

Joshua Harris
Surfaces of Revolution in Virtual Reality
Faculty Sponsor: Jeremy Becnel (Department of Mathematics and Statistics)

Luke Rens
Molecular Geometry Calculation
Faculty Sponsor: Christopher Ivancic (Department of Computer Science)

Roberto Silva Villatoro
Designing a Simple Catalytic System for C-H Bond Oxidation
Faculty Sponsor: J. Brannon Gary (Department of Chemistry and Biochemistry)

Hannah Trauger and Madilynn Dewell
Synthesis & Characterization of Biodiesel Fuels Made from Hickory Kernel Oil
Faculty Sponsor: Russell Franks (Department of Chemistry and Biochemistry)

Bayler Barnes, Trace Washburn, and Jackson T. Ortiz
Longitudinal Study of Lanana Creek
Faculty Sponsor: Alyx S. Frantzen (Department of Chemistry and Biochemistry)

Best Freshman Paper

Lacy Cook
Comparing Determination between Men and Women in Mathematics
Faculty Sponsor: Chris Chappa (Mathematics)

Justin Crowe
Misperceptions of Chemicals & Their Names
Faculty Sponsor: Rodney Whetzel (Chemistry)

Alyssa Henderson
Exploration into Associations of ADHD Medication to Academic and Behavioral Performance in Comparison to the Adverse Side Effects
Faculty Sponsor: Larry Pilgrim (Biology)

Chiagozie Nwasuruba
Historical Content Analysis of Gender Portrayal of Superheroes in Marvel Comics
Faculty Sponsor: Clint Selman (Psychology)

Jose Perez
Representation of Minorities in College Advertisements Compared to Actual College Populations
Faculty Sponsor: Ryan Button (Sociology)

Kassandra Soledad
Exploratory Research into the Effects of Authoritative Parenting and Children’s Emotional and Academic Behavior
Faculty Sponsor: Ryan Button (Sociology)
Council on Undergraduate Research

The Council on Undergraduate Research (CUR), founded in 1978, is a national organization of individual and institutional members representing over 950 colleges and universities. The mission of CUR is to support and promote high-quality undergraduate student-faculty collaborative research and scholarship.

CUR believes that faculty members enhance their teaching and contribution to society by remaining active in research and by involving students in these activities. CUR's leadership works with agencies and foundations to enhance research opportunities for faculty and students and it:

- Supports faculty development through expert-designed institutes and offers the option of customizable campus-wide or departmental institutes.
- Publishes books and articles related to creating, managing, and evaluating undergraduate research programs, and mentoring undergraduate researchers.
- Assists administrators and faculty members in improving and assessing the research environment at their institutions.
- Hosts annual undergraduate research conferences; one of which is on Capitol Hill and another which brings together over 3,000 students from across the nation.
- Provides information on the importance of undergraduate research to state legislatures, private foundations, government agencies, and the U.S. Congress.

CUR's divisional structure includes arts and humanities, biology, chemistry, engineering, geosciences, health sciences, mathematics and computer science, physics and astronomy, psychology, social sciences, an at-large division that serves administrators and other disciplines, and a division for directors of undergraduate research programs.

Finalist Poster Competition

This is your chance to pick your favorite student poster. The winner of the Best Student Poster will be announced on SFA Today and mySFA and hold this title for the coming year!

How to exercise your vote:
1) Go to the Twilight Ballroom and view the 48 posters available.
2) Decide which student poster you enjoy most.
3) Put the SFA logo affixed below in the envelope located next to the poster.

After the conference, the logos will be counted and the winner announced.

Thank you for your participation!