

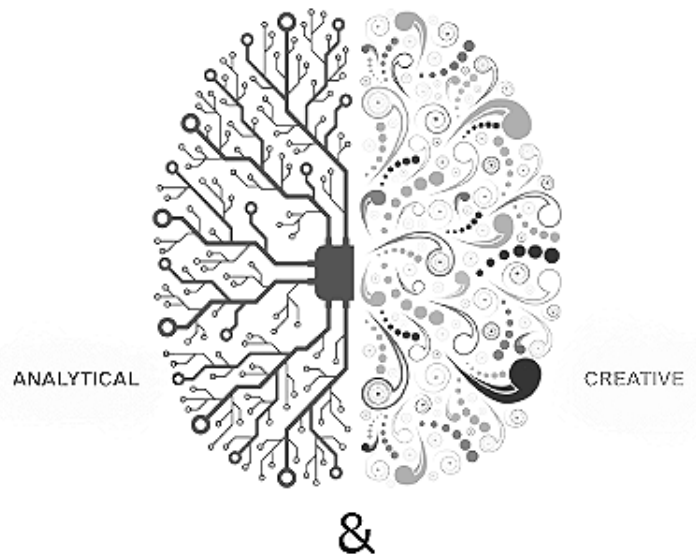
2019-2020

2020-2021

Undergraduate Research
&
Creative Activities
Grants Reception

May 7, 2021

3:30 p.m.



Welcome and Special Guest
Recognition of the Awardees
Recognition of the Committee
Closing

College of Applied Studies

Millicent Setzkorn | *Exercise Science* | 2019-2020

"Pilot Study: Comparison of Vertical Jump Assessments between DARI motion capture, My Jump 2 App, and traditional Vertec."

Dr. Heidi Bell | *Human Performance Studies*

Vertical jump assessments can be used to determine an individual's overall explosive capability. The Vertec jump test is one of the most commonly used tools for measuring vertical reach. With advancing technologies, new methods of assessing vertical jump have presented. The purpose of this study is to determine if the DARI motion capture and the My Jump 2 vertical jump assessments are valid and comparable with the Vertec jump test. All three conditions will be tested within their specified protocol setting. Such findings may further determine whether one test is more robust regardless of being in a controlled setting compared to a field setting.



College of Engineering

Amrutha Dasyam | *Aerospace Engineering* | 2019-2020

"Developing an Experimental Setup for Characterizing the Transport Properties of Porous Structures."

Dr. Bhasham Sharma | *Aerospace Engineering*

Porous structures are widely used in engineering applications across mechanical and aerospace industries. Their open cellular structure makes them lightweight while allowing fluid flow through the structure — ideal for thermal cooling and acoustic applications. Further, they provide better energy absorption characteristics than monolithic structures. Thus, characterizing their flow transport behavior is a crucial step towards developing predictive engineering models. In this project, we will develop a new experimental setup for measuring the transport properties of open-celled porous structures. The primary goal is to accurately measure the tortuosity and flow resistivity of porous structures and compare these with reference values reported across the literature.

William Johnston | *Aerospace Engineering* | 2019-2020
"Using Fused Deposition Modeling to create fibrous Structures"
Dr. Bhisham Sharma | *Aerospace Engineering*

This project will investigate techniques to create fibrous structures, such as bristles, strings, and other hair-like features, using standard additive manufacturing processes. 3D printing has gained popularity in recent years because of its ease in creating rigid objects on a small scale; however, printing flexible objects continues to remain a challenge. This project proposes to develop a novel technique to allow the fabrication of fibrous structures using readily available commercial 3D printers. The technique relies on taking advantage of 'stringing' – typically regarded as an undesirable printing artifact that occurs during the print nozzle's movement away from a printed surface. By altering the set of instructions sent to the printer, a technique will be formed to create fibers resembling human hair with customizable length, thickness, and density. Finally, this project will investigate a way to streamline the programmatic process of adding hair to expand the productivity of Fused Deposition Modeling.

Jacob Keese | *Mechanical Engineering* | 2019-2020
"Enhanced Capillary Flow in Sintered Particles for Efficient Two-Phase Cooling Systems"
Dr. Gisuk Hwang | *Mechanical Engineering*

This project focuses on understanding of enhanced capillary flow in sintered particles (wick structures) which can be used for two-phase cooling systems such as heat pipes or vapor chambers. These are critical components in both the electronics and aerospace industries, allowing thermal energy to be dissipated quickly and effectively before failure of heat-sensitive components, such as computer chips, can occur. Wick structures can be optimized by maximizing the ratio of permeability to effective pore radius, and it is believed that this can be achieved by having a mixture of small and large pore spaces in the wicks. This study will measure permeability and effective pore radius of wicks by a rate-of-rise test within a glass test tube, and will compare the effectiveness of wicks created with a single particle size to those created with particles of two different sizes.

Dan Thangi | *Mechanical Engineering* | 2019-2020

“Modified Activated Carbon Materials for Supercapacitor with Ultrahigh Areal Capacitance at High Current Density”

Dr. Wei Wei | *Mechanical Engineering*

The widespread application of super-capacitors, which store electrical charge on high-surface-area conducting materials, is limited by their small accessible area and low areal mass loading of active materials due to their microporous structures. It is important to tune the surface and pore structures of carbon materials for their application in super-capacitor. Herein, this research will employ a novel microwave-based approach to increase the capacity of a supercapacitor.

Evan Waddell | *Mechanical Engineering* | 2019-2020

“Ultrasound-Heated Polymer Skin for Efficient Deicing Systems”

Dr. Gisuk Hwang | *Mechanical Engineering*

This research seeks a new efficient deicing approach using ultrasound-heated thin polymer coating for different composite, metallic, and glass surfaces for the aviation, automobile, and renewable energy applications. A key is to demonstrate the ice/polymer interfacial heating ability using ultrasound while aiming at detaching ice layers from ice interfacial melting. The ultrasound heating ability will be measured using an infrared camera for various polymer/surface types, and ultrasonic power/frequencies. Also, the hydrophobic nature of the polymer can further assist the deicing by minimizing surface energy, i.e., delayed ice formation on the surface. The ultimate goal of this research would be used in the application of de-icing various structures including aircraft wings and wind turbines. If successful, the data produced from this research would provide beneficial information toward a cost efficient, lightweight, and environmentally-friendly deicing system.

College of Health Professions

David Lui | *Nursing* | 2020-2021

"Defining the Palladin:F-actin Complex Interface using Crosslinking-Mass Spectroscopy"

Dr. Moriah Beck | *Chemistry*

Palladin was discovered at the turn of the century, and it plays a significant role in actin growth, also known as polymerization, which is a key mechanism in cancer metastasis. On the palladin protein, the Ig3 domain has been identified as the portion which binds to actin. Furthermore, there are lysine amino acids that are responsible for binding to actin. Amino acids are the building blocks of proteins. However, on actin, it is not yet known which amino acids participate in its interactions with palladin, and that is what we are hoping to find out through techniques such as crosslinking mass spectroscopy (XL-MS) and site-directed mutagenesis.

Laura Santos-Rodriguez | *Communication Sciences and Disorders* | 2020-2021

"A comparison of skilled strategies used with bilingual adolescents between school-based and non-school-based speech-language pathologists (SLPs)."

Dr. Karissa Marble-Flint | *Communication Sciences and Disorders*

When a child with speech or language difficulties is bilingual, providing skilled services can be difficult because SLPs may not feel confident in their abilities to best serve the child. The objective of this research is to explore whether differences in clinical services exist between school-based speech-language pathologists (SLPs) and non-school-based SLPs who provide skilled speech-language services for bilingual adolescents (speaking English and Spanish). It is important to help SLPs be better at serving bilingual adolescents, especially in a school setting. This is research that can help SLPs find the language accuracy of bilingual adolescents and their speech therapy according to the setting. It benefits adolescents by letting clinicians know what feels more comfortable to them, school-based speech therapy or clinical-based. Not only that, but it will also help SLPs receive more information about adolescents since there is minimal research on that population.

Fairmount College of Liberal Arts and Sciences

Hanna Chastain | *Biological Sciences* | 2020-2021

"PARROT: an Orofacial Myofunctional Imaging and Pressure Device"

Dr. Heidi Bell | *Human Performance Studies*

Orofacial Myofunctional Disorders (OMDs) are characterized by abnormal movement patterns of the mouth. Complications from OMDs include problems with talking, swallowing, and breathing. The tongue is a commonly assessed structure within the mouth to monitor complications from OMDs. The tongue's placement within the oral cavity, however, limits the accessibility to observe and record objective lingual behaviors such as spatial positioning, placement (passive, active), movement, and performance simultaneously. PARROT is a wireless orofacial myofunctional imaging and pressure device to objectively measure tongue behaviors such as spatial positioning, placement, and movement without impeding natural movement. Further development and refinement of PARROT as a wearable mouthpiece with integrated sensors continues, in addition to exploring PARROT's viability for telemedicine capabilities alongside clinical guidance. Results obtained from this study will assist in the advancement of PARROT and current clinical practices addressing functional complications such as dysphagia and sleep apnea.

Lauren Eichman | *Psychology* | 2019-2020

"The Link between Abstract Thinking and Violence in a Criminal Offender Sample"

Dr. C. Brenden Clark | *Psychology*

Abstract thinking is one's ability to consider, manipulate, and understand ideas that do not physically exist. The ability to think abstractly helps people comprehend and take into consideration another person's perspective. This study attempts to evaluate if a lack of abstract thinking is related to aggression, and if a deficit in abstract thinking can increase aggressive tendencies. This study examined aggression, depression, and anxiety levels by employing the Brief Aggression Questionnaire and the Depression Anxiety Stress Scale-21; it also examined one's ability to think abstractly utilizing an abbreviated version of Raven's Progressive Matrices. The study found evidence that former criminal offenders with deficits in abstract thinking were more likely to have aggressive tendencies.

Patoul Halimeh | *Biological Sciences* | 2019-2020

“Defining the binding between C-terminal alpha3 chain of type VI collagen and anthrax toxin receptors”

Dr. James Bann | *Chemistry*

Type VI collagen is upregulated in breast cancer and neuroendocrine cancers, and abrogates the effects of cisplatin treatment in animal cancer models. Two cell surface receptors have been identified that bind to type VI collagen and include capillary morphogenesis protein 2 (CMG2) and tumor endothelial marker 8 (TEM8). Both receptors are also receptors for anthrax toxin, although only TEM8 is upregulated in cancer and can be found in tumor stroma. We hypothesize that the noncollagenous C1-C5 domains of type VI collagen specifically mimic the action of anthrax toxin, and we plan to test this hypothesis by producing the C1-C5 domains of type VI collagen in yeast, and measuring binding interactions to CMG2 and TEM8 using GST pulldown assays. Both CMG2 and TEM8 can be purified as GST-fusion proteins, and we have shown this assay to be effective in defining pH-dependent interactions with anthrax toxin.

Robbyn McKellop | *Anthropology* | 2020-2021

"Quiviran Ceramic Vessel Analysis"

Dr. Donald Blakeslee | *Anthropology*

The intent of my research is to determine the change of cooking-vessel shapes through time from Quivira and related sites. This will allow us to identify sequences which will benefit our endeavors in dating the assemblage from Etzanao. The project will focus on complete and restored vessels from multiple sites in Kansas and Oklahoma. This is necessary because it has been difficult to determine the sequence of features because of how Etzanao was used when it was occupied. Research at Etzanao on behalf of the State Historical Society has provided us with an estimated occupation of the site ranging from 1450-1700. For this project travel across Kansas and Oklahoma will be necessary.

Ciara Mould | *Psychology* | 2019-2020

"The Relationship Between Moral Foundations and Opinions on Social Hierarchy"

Dr. C. Brenden Clark | *Psychology*

Moral foundations play a role in people's political affiliations and beliefs. Certain moral foundations (i.e., harm/care and fairness/cheating) are indicative of higher Progressivism, while other moral foundations (i.e., ingroup/loyalty, authority/respect, and purity/sanctity) are more indicative of lower Progressivism. This study examined the relationship between moral foundations and social constructs like Right-Wing Authoritarianism, Social Dominance Orientation, and fear of immigrants. The researchers hypothesized that higher scores on Progressive moral foundations like harm/care and fairness/reciprocity are linked to lower scores on Right-Wing Authoritarianism (RWA), Social Dominance Orientation (SDO), and negative opinions on immigrants. The study found evidence that higher rates of Progressivism predict lower scores on RWA, SDO, and fear of immigrants. The findings further the research on political affiliation and allow us to better understand the link between moral, social, and political domains.

Alyssa Scott | *Creative Writing* | 2019-2020

"Missed Connections - How A Craigslist Add Can Become A Short Story"

Dr. Darren Defrain | *English*

In this world, people communicate online far more than in person, and because of this it is very easy for people to not only hide who they are but to create completely different personas. The purpose of this artifact is to make someone believe that I could be talking about them, and how our world views typical online "dating." The man, Propergentleman, is a typical male incel within the online world. My form of realism is made to make the reader believe that this ad is real. This type of fake satire, is common. Many ads are faked every day. Maybe not in missed connections on Craigslist, but through email, Facebook, phone calls, and many more. People are always faking who they are to get something. It's up to each reader/speaker to determine if what is written or said is fake or not. Can you tell the difference?

Kathrynn Smith | *Creative Writing; English Language and Literature* | 2019-2020

“Folks with Jokes: Responding to Nothing”

Dr. Darren Defrain | *English*

In this project, my aim was to portray my personal outlook on the consumption of music and its surrounding culture and industry in today’s society. As such, this is a creative work and the ideas expressed which are my unique opinion shaped by readings and study in class along with general observations from the world around me. It is merely a work of creative expression rooted in the study of literary theory and similar texts. As a generalization, I believe that currently, people disregard music’s meaning—to show this, I created a fraudulent artifact, or a piece of literature appearing to be something, a record, for example, but itself is not that thing. My project serves to put into question the listener’s relationship to the lyrics in a song and how often, they may value the biographical information of who wrote the song over what the song says .

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Dr. Enrique Navarro
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