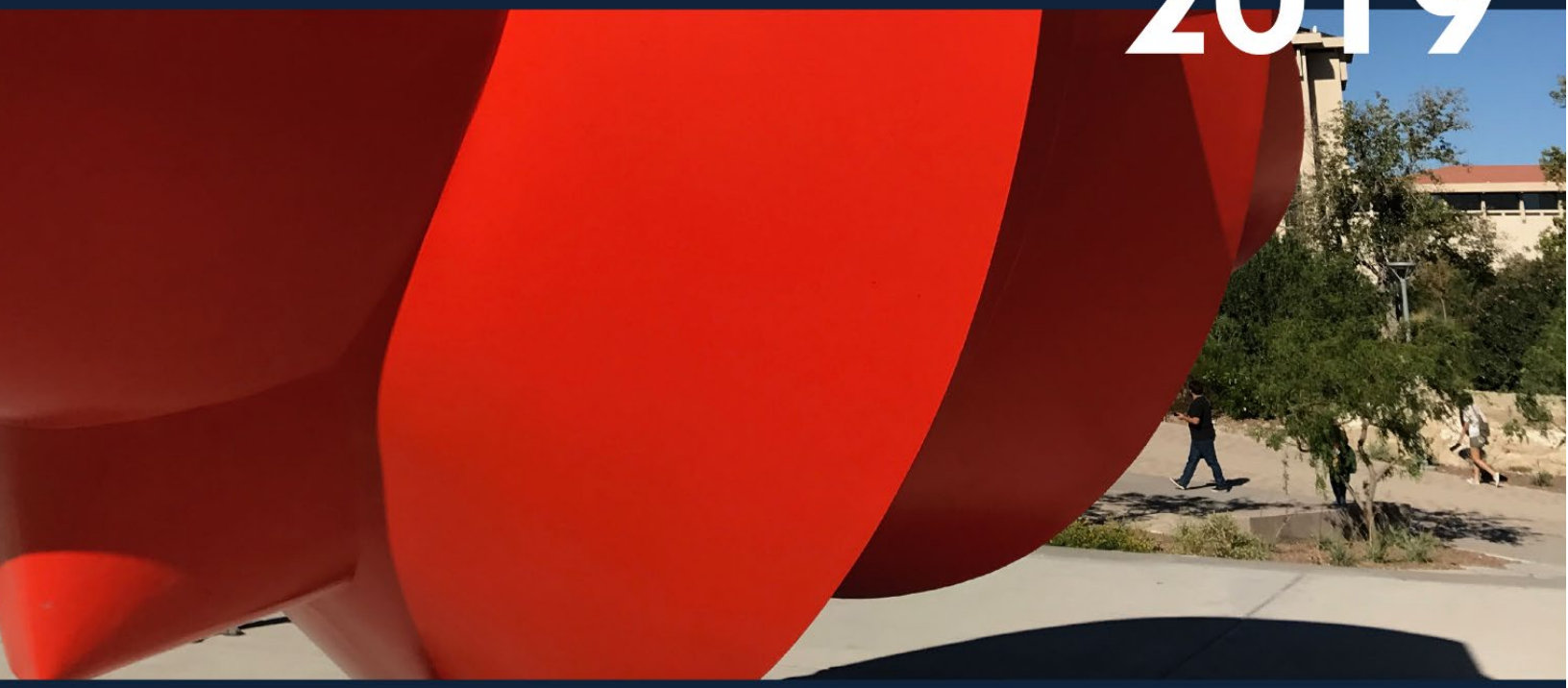
DISCOVER 2019



ABSTRACTS & ARTIST STATEMENTS

UTEP DISCOVER 2019

UTEP

COURI CAMPUS OFFICE OF UNDERGRADUATE RESEARCH INITIATIVES

B O O K O F A B S T R A C T S

2 0 1 9 S p r i n g S y m p o s i u m

UTEP DISCOVER 2019
ABSTRACTS & ARTIST STATEMENTS

SPRING 2019

Laura A. Diaz-Martinez, Editor
Karina Canaba, Associate Editor
Adrian Flores Lira, Assistant Editor

MISSION

Through collaborations with faculty mentors from all disciplines, COURI seeks to enrich the experience of UTEP students by facilitating their training in research, scholarly and creative activities, enhancing their academic success and professional development, and showcasing the results of their work.

COURI
CAMPUS OFFICE OF
UNDERGRADUATE
RESEARCH INITIATIVES

EDITOR'S NOTE

The Campus Office of Undergraduate Research Initiatives (COURI) celebrated undergraduate research, scholarly and creative activities on campus during the spring semester through DISCOVER and the annual Spring Symposium. DISCOVER is our campus-wide celebration of all events happening in April-May that feature undergraduate-led research, scholarly and creative activities. The events in DISCOVER 2019 were:

2019 Spring Symposium. The symposium is unique opportunity for undergraduate researchers, scholars and artists to present and discuss their research with faculty, peers and the community. This year the symposium showcased 162 undergraduate presenters.

2019 Annual Juried UTEP Student Art Exhibition. The Rubin Center annual event showcases works of art and design created by undergraduate students enrolled in the Department of Art during the academic year. All media taught in the department is represented, including painting, drawing, sculpture, ceramics, metals and graphic design.

Art History Symposium. The Art History Symposium is an annual event that showcases the best work in art history completed during that academic year. Each art history faculty member selects and mentors one art history major or minor who presents their research to the art department faculty and the public in April. This spring marked their sixth symposium.

Civil Engineering Senior Design Project. Civil engineering majors present their desings of a new pedestrian experience at the Ysleta-Zaragosa International Bridge.

Entering Students Research and Creative Projects Showcase. At the end of every semester the Entering Student Program hosts the Entering Students Research and Creative Projects Showcase. The students are nominated by their UNIV1301 instructors.

Graphic Design Senior Portfolio Exhibition. Annual exhibition presenting portfolios developed by graphic design majors.

Music Department Honors Recital. Annual recital featuring honors undergraduate and graduate students.

Research2Innovation Presentations. Teams of science and engineering students coached by external consultants will present their projects aimed at translating their research into marketable innovations.

Violin & Viola Studio Recital. Students in Dr. Stephen Nordstrom's studio conduct research on a selected composer and perform in a recital with pieces from this composer.

We thank the organizers of all these events for their willigness to partner with us to make DISCOVER a campus-wide event that showcases the work of undergraduate students in all disciplines.

Laura A. Diaz-Martinez

COURI Associate Director

ACKNOWLEDGEMENTS

Institutional Support

Diana Natalicio, President
Richard Adauto, Executive Vice-President
John Wiebe, Interim Provost and Vice-President for Academic Affairs
Roberto A. Osegueda, Vice-President for Research
Gary Edens, Vice-President for Student Affairs
David Ruiter, Associate Provost for Strategic Initiatives

Faculty Mentors

Special thanks to all faculty members who mentored students presenting at this symposium for their continuous dedication to the mission of undergraduate research, scholarly & creative activities.

Volunteer Judges

Special thanks also to all faculty, staff and graduate students who volunteered to serve as judges during the Symposium. Your enthusiasm about undergraduate research, scholarly & creative activities motivates presenters and creates a campus-wide culture of undergraduate research

Funding Support for Student Research

UTEP Campus Office of Undergraduate Research Initiatives (COURI)
UTEP On-Campus Student Employment Program
UTEP Office of Research and Sponsored Programs (ORSP)
UTEP Border Biomedical Research Center (BBRC)
Air Force Office of Scientific Research (AFOSR)
American Psychology-Law Society
National Aeronautics and Space Administration (NASA)
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National Insitute of Allergy and Infectious Diseases (NIAID)
National Institutes of General Medical Sciences (NIGMS)
National Institute on Drug Abuse (NIDA)
National Institutes on Minority Health & Health Disparities (NIMHD)
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Native Plant Society of New Mexico

Symposium Organization

Herminia Hemmit, UGLC Building Services Coordinator
UGLC Staff and Students
Dr. Peter Golding, CREaTE, Hardware Loan
UTEP Facility Services
Karina Canaba, COURI Assistant Director
Joseph Ramos, COURI Program Manager
Stephanie Figueroa, COURI Student Assistant
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Dr. Laura Diaz-Martinez, COURI Associate Director
Dr. Lourdes Echegoyen, COURI Director

COURI Workshop Facilitators

Dr. Laura Diaz-Martinez, COURI Associate Director
Karina Canaba, COURI Assistant Director
Dr. Lourdes Echegoyen, COURI Director

DISCOVER AGENDA

PICK RESEARCH CO-SPONSORED BY SGA	**April 11th 2 pm - 4pm** Union Cinema Union Bldg.West Room 106
COURI SPRING SYMPOSIUM	**April 13th 9am - 1pm** UGLC
ART HISTORY SYMPOSIUM	**April 26th 5pm - 8pm** Quinn Hall 212
MUSIC DEPARTMENT HONORS RECITAL	**May 3th 1:30pm** Fox Fine Arts Recital Hall
VIOLIN & VIOLA STUDIO RECITAL	**May 5th 2:30 - 4:00 pm** Fox Fine Arts Recital Hall
GRAPHIC DESIGN SENIOR PORTFOLIO EXHIBITION	**May 6th - 17th** Fox Fine Arts Glass Gallery
RESEARCH2INNOVATION PRESENTATIONS	**May 10th 9am - 11am** CCSB Room G.0706A
CIVIL ENGINEERING SENIOR DESIGN PROJECT	**May 10th 9:30 am** Business Room 312/319
ANNUAL JURIED UTEP STUDENT ART EXHIBITION	**May 10th - Aug 9th** Rubin Center
ENTERING STUDENTS RESEARCH & CREATIVE PROJECTS SHOWCASE	**May 11th 1:00 pm - 4:00 pm** Blumberg Auditorium Library Room 111

TABLE OF CONTENTS

2019 SPRING SYMPOSIUM

April 13, 2019

TECHNICAL PROGRAM

8:30 am – 8:50 am	**Check-in for session A**
9:00 am – 10:15 am	**Poster session A**
10:15 am – 10:50 am	**Recruiter Session 1/Check-in for session B**
11:00 am – 12:15 pm	**Poster session B**
12:15 pm – 1:00 pm	**Recruiter Session B**
1:00 pm – 1:30 pm	**Awards Ceremony & Research Stole/Cords presentation**

Recruiters at the symposium

- Pennsylvania State University
- The University of Texas at Austin
- The University of Texas at El Paso
- Texas Tech University Health Sciences Center
- University of Michigan
- University of Notre Dame

POSTER SESSION A

* Undergraduate presenter ^Faculty mentor

1A Representation of female journalists in film
Ana Herrera, Ruth Mc Donald^*

3A Composition for film: Theory and practice
Raul Medellin, Chris Reyman^*

5A UIL: The dangers of standardizing music
Caleb Tullius, Lindsey Macchiarella^*

7A Maze solver algorithms inspired on Micromouse competition
Marcos Garcia, Arturo Rodriguez, Pablo Rangel, Jorge Munoz^*

9A Investigations in the utility of prosody for the detection of actionable information in radio broadcasts
James Jodoin, Anindita Nath, Nigel Ward, Olac Fuentes^*

11A Correcting for environmental factors in microbiome-wide association studies
Michelle Patino Calero, Gabriel Birzu, Kirill Korolev^*

13A Identification of lead compounds of CXCR6 using in silico approaches
Ibrahim Salama, Claire Govea, Suresh Gorle, Suman Sirimulla^*

15A Redesign of the hydraulic system for the M3 prosthetic knee
Guillermo Beckmann, Lucas Galey, Roger Gonzalez^*

17A Analysis of close range hyperspectral images of vegetation communities in a high artic tundra system
Astrid Chacon, Miguel Velez-Reyes, Stephen Escarzaga, Craig Tweedie, Sergio Vargas^*

19A Changes in bar velocity, muscular power, and force during a three-week training mesocycle using supramaximal eccentric bench press training
Itzel De La Torre, Samuel Montalvo, Lance Gruber, Paulina Caraveo, Matthew Gonzalez, Gabriel Mejia-Ibarra, Sandor Dorgo^*

21A A mechanically engineered bioreactor for cardiac tissue engineering applications
Erick Dominguez, Binata Joddar^*

23A Folate decorated polymeric nanoparticles loaded with lutein enhanced uptake in neuroblastoma cells
Julian Franco, Pradeep Bolla, Abhishek Arnipalli, Xiaoming Gong, Venkata Kashyap Yellepeddi, Devaraj Sambalingam, Jwala Renukuntla^*

25A For quantum and reversible computing, intervals are more appropriate than general sets, and fuzzy numbers than general fuzzy sets
Oscar Galindo, Vladik Kreinovich^*

27A Paste extrusion of high density piezoelectric ceramics
Samuel Hall, Luis Delfin, Luis Chavez, Jaime Regis, Anabel Renteria, Yirong Lin^*

29A Water-triggered responsive microneedles for the localized delivery of protein vaccines to epidermal Langerhans cells
Daniel Lara, Carlos Saucedo, Juan Noveron^*

31A Alternatives for reducing nuisance flooding in an urban neighborhood
Isabel Lopez, Ivonne Santiago, Miguel Velez Reyes, Raed Aldouri^*

33A High-throughput silver nano-cluster beacons activator sequence selection
Victor Madrid, Yu-An Kuo, Oliver Zhao, Trung Nguyen, Tim Yeh^*

35A A novel topical gel formulation loaded with ufosomes for topical delivery of clotrimazole
Carlos Meraz, Pradeep Bolla, Jwala Renukuntla, Isaac Deaguero^*

37A Upper limb rehabilitation orthotic
Bianca Montano, Thompson Sarkodie-Gyan^*

39A Isolation and characterization of antibiotic resistant Escherichia coli found on superficial water from Honda River, Costa Rica
Paulette Ramirez, Gabriel Ibarra-Mejia, Luz Chacon^*

40A Differences between males and females in determining exercise intensity
Jozelyn Rascon, Elizabeth Trujillo, Francisco Morales-Acuna, Alvaro Gurovich^*

41A Developing a low-cost prosthetic ankle for developing countries.
Andrew Rios, Lucas Galey, Roger Gonzalez^*

43A Improvement in the creation of n-type silicon solar cells through processing techniques and parameters
Victor Rodriguez, Deidra Hodges^*

45A Formulation of transdermal gel with nicotine conjugate loaded solid lipid nanoparticles
Stephanie Soto, Pradeep Bolla, Jade Vigil, Carlos Meraz, Julian Franco, Jwala Renukuntla^*

47A Development of a vibrotactile biofeedback device for clinical use during lower-limb amputee rehabilitation: A pilot study
Ricardo Vela, Jr., Meagan Kendall^*

49A Effects of microbes and sunlight on dissolved organic carbon quality in desert wetlands
Christy Adame, Christopher Sandoval, Vanessa Lougheed^*

51A Tracking the migration of T-cell acute lymphoblastic leukemia cells in mice: Determining the role of CCR7 in central nervous system invasion
Jailene Amparan, Anahi Sanchez, Charles Bill, Colin Bill, Charlotte Vines^*

53A Effects of mitochondrial dynamics and bioenergetics on mitosis
Seham Azzam, Erica Herrera, Pavel Gonzalez, Laura Diaz-Martinez^*

55A Pigment levels and resistance to ultraviolet radiation
Vanessa Blevines, Elizabeth Walsh^*

57A RON Single Nucleotide Polymorphisms show a potential role in driving acute lymphocytic leukemia (ALL)
Luisa Castillo, Denise Cadena, Elisa Robles, Robert Kirken^*

59A Diet assessment of New Zealand Grey Ducks and the invasive Mallard
Ariana De la Hoya, Philip Lavretsky^*

61A Impact of FTY720-Mitoxy on movement and cognition in Multiple System Atrophy mice
Valeria Diaz, Guadalupe Vidal^*

63A The effects of cohabitation and reproductive activation on microglia in male and female prairie voles
Andrea Enriquez, Adam Perry, Bruce Cushing^*

65A Effects of fatty acid composition in a high fat diet on skeletal muscle mitochondrial content and PLIN3
Isaac Gandara, Shaan Naughton, Lannie O'Keefe, Anna Simcocks, Deanne Hryciw, Michael Mathai, Andrew McAinch, Sudip Bajpeyi^*

67A Effects of a family history of type 2 diabetes on circulating miRNAs 155 and 133

Mario Garcia, Manuel Gomez, Cesar Meza, Andrew McAinch, Sudip Bajpeyi^*

69A Chronic Ethanol Exposure Suppresses Food Consumption in Drosophila

Prescilla Garcia-Trevizo, Paul Sabandal, Kyung-An Han^*

71A Sex differences in high fat diet-induced enhanced sensitivity to dopaminergic drugs SKF 82958 and methamphetamine

Ethan Hardin, Jeremiah Ramos, Katherine Serafine^*

73A The connection of the Red Fire Ant (Solenopsis Invicta) to railways

Jordan Ingalls, Vicky Zhuang^*

74A Olfactory Receptor Family 7 Subfamily C Member 1 expression in T-cell acute lymphoblastic leukemia identifies a potential stem cell sub-population

Dayoung Jeon, Haidar Ahmed, Juan Carlos Silva-Espinoza, Charlotte Vines, Colin Bill^*

75A Isolation of a CCR7 antagonist to prohibit CNS infiltration during T-cell Acute Lymphoblastic Leukemia

Lourdes Jimenez, Charlotte Vines, Mika Gehre^*

77A Observing the mechanisms of nicotine induced disruption of cytoskeleton and neurite formation

Melissa Lerma, Georgina Diaz-Escandon, Sukla Roychowhury ^*

79A The effects of eating a high fat diet on sensitivity of female rats to dopamine D1 receptor agonist SKF 82958-induced eye blinking.

Arantxa Martinez, Katherine Serafine^*

81A Climate change effects on invertebrate diapausing eggs

Joseph McDaniel, Elizabeth Walsh^*

83A Expression of C-C Chemokine Receptor 7 and its role in the chemotaxis of cells to the lymph nodes and spleens in mice

Aaron Molina, Eduardo Holguin, Charlotte Vines^*

85A ERK5 promotes migration of leukemic T cells to CCL19 and Sphingosine-1 Phosphate

Diana Moreno, Maria Uribe, Mika Gehre, Colin Bill, Charlotte Vines^*

87A Expression and purification of human PERIOD-2 (hPER-2) C-terminal domain for structural & functional studies

Luis Nunez, Victoria Miranda, Neha Vijay, Jennie Choi, Neha Chauhan, Karla Moriel, Noah Ruelas, Adan Castaneda, Ruben Cano, Bianca Amezaga, Seham Azam, Supriyo Ray, Chuan Xiao^*

89A The intraneuronal redistribution hypothesis of dopamine and the role of vesicular monoamine transporter (VMAT) in the sensitization model of stimulant drug addiction

Priscilla Parada, Adriana Vasquez, Edward Castañeda^*

91A The effects of temperature on the abundance of native bees and honey bees

Kristen Pulley, Kevin Floyd^*

93A Using zebrafish to understand the function of HCFC1 in cblX syndrome

Joel Reyes, Danica Lopez, Anita Quintana^*

95A A closer look at microbe interactions

Krystal Rocha, Luis Martinez^*

97A Visitation of native and non-native plants from native bees and honey bees

Adrian Ruybe, Kevin Floyd^*

99A Sunlight and mIcrobial effects on dissolved organic carbon in tundra ponds near Barrow, Alaska

Christopher Sandoval, Christy Adame, Vanessa Lougheed^*

101A The effects of eating a high fat diet on methamphetamine-induced conditioned place preference

Paloma Serna, Kayla Galindo, Katherine Serafine^*

103A Use of the ratio between fecal coliforms and enterococci to evaluate the relationship of land usage and the quality of surface water in Coronado, Costa Rica

Evelyn Tovanche, Luz Chacon, Eric Morales, Gabriel Mejia^*

105A Soil microbial diversity patterns at the Jornada Basin LTER, NM

Claudia Villalobos, Andrew Dominguez, Erik Lehnhoff, Nuttapon Pombubpa, Nicole Pietrasiak^*

107A Tandem acyl-carrier protein design and application in polyketide natural product biosynthesis

Gerardo Zavala, Zilong Wang, Saket Bagde, Xi Chen, Chu-Young Kim^*

109A Filtration system of a 3D filter made with polylactic acid (PLA) and coated with 3-aminopropyltrimethoxysilane

Laila alsaihati, Abril Chavez, Andrew Pardo, Juan Noveron^*

111A Identifying water retention of soil in arid regions to determine water sources of vegetation

Amaris Bustamante, Hugo Gutierrez, Hayden Thompson, Anothony Darrouzet-Nardi^*

113A Mapping of the hydrogeochemistry for the Laguna Bustillos basin: using stable water isotopes to identify water pathways in an overexploited watershed-aquifer system of northern Mexico.

Carolina E. Cisneros, Hugo A. Gutierrez-Jurado, Aranda Luna, Orlando Ramirez Valle, Moises Garcia Holguin^*

115A Groundwater Level Declines and Water Quality Deteriorates in Some Areas of the Hueco Bolson Aquifer

Elena Eguiarte, Carolina Lozoya, Zhuping Sheng, Sora Ahn^*

117A Assessing soil conductivity levels at Valley Creek Park

Miranda Govea, Diane Doser^*

119A Mapping the geological features of the Alkali Flats

Corey Howard, Richard Langford^*

121A High ozone episode in the paso del norte region

Miranda Miranda, Rosa Fitzgerald^*

123A Expression of human PERIOD2 protein for interaction studies

Josue Murillo, Neha Chauhan, Jennie Choi, Duer Bolotaulo, Dwayne Bragg, Supriyo Ray, Chuan Xiao^*

125A Dynamic nanoporous carbon materials for the removal of organic pollutants from water

Aileen Nevarez, Luis A Barrera, Juan Noveron^*

126A Bisphenol-A removal from drinking and reclaimed water using alginate encapsulated activated carbon

Jesus Orozco-Reza, Melinda Arrieta, Wen-Yee Lee^*

127A Aqueous chemistry of molybdenum-iron-sulfide system that leads to nanoparticle formation under biological versus abiotic conditions
Alejandro Quezada, Muammar Mansor, Jie Xu^*

129A The impact of protic ionic liquids on the structural stability of lysozyme
Ian Reyes, Jose Leo Bañuelos^*

131A In-vitro analysis of particulate matter using simulated lung and gastrointestinal fluids
Julieta Saucedo, Lixin Jin^*

133A Does survival related information influence memory for social information?
Manal Aboargob, Amber Lupo, Angel Armenta, Michael Zarate^*

135A Conducting a Systematic Review of Prenatal and Pregnancy-related Patient Satisfaction
Paulina Ambert, Alexis Wilson, Ophra Leyser-Whalen^*

136A Grit and social support: Correlates of tobacco, marijuana, and synthetic marijuana
Christopher Anderson, Jacqueline Estrada, Jessica Shenberger-Trujillo, Gabriel Frietze^*

137A Doctor, doctor, give me the news: Patient satisfaction in the infertility diagnostic process
Brianne Bombach, Ophra Leyser-Whalen^*

139A Regional healthcare cost potentially attributable to red meat-induced colorectal cancer incidences
Isabella Caro, Rigoberto Delgado^*

141A Characterization of student and instructor behaviors in CURE and non-CURE contexts in the biological sciences
David Esparza, Amy Wagler, Jeffrey Olimpo^*

143A Student placement at at-risk and alternative schools: The influence of mental health and alternative schooling
Gisselle Garcia, Maria Morales^*

145A Understanding the impact of This Is My Brave on storytellers
Sofia Macias, Kristin Kosyluk, Eva Moya, Nathaniel Chaney^*

147A Opening doors for women in sports
Annel Mena, Guillermina Nunez-Mchiri^*

149A Summary energy outreach effort at The University of Texas at El Paso for K-12 students
Daniela Morales Lopez, Yirong Lin, Lourdes Echegoyen, Norman Love^*

151A Ex-Convict's Gang Engagement and Life Transition
Jennifer Munoz, Yok-Fong Paat^*

153A Correlates of Novel Tobacco Products (NTP), Novel Drugs of Abuse (NDA), and Novel Marijuana Products (NMP) in young Hispanic adults
Raymond Oliva, Jessica Shenberger-Trujillo, Gabriel Frietze^*

155A The interaction effect between self-regulation and protective behavioral strategies for alcohol-related problems
Rebeca F. Pérez-Martinez, Dylan K. Richards, Craig Field^*

157A Prophylactic effects of ketamine in a juvenile model of depression
Joshua Preciado, Sergio Iñiguez^*

159A Factors influencing health insurance uptake among low-income Hispanic communities: Pinpointing the gap
Luis Quintero, Rigoberto Delgado^*

161A The intersections of experiences of violence and immigration-related stress in pregnant women in the borderland region
Isabela Solis, Carina Heckert^*

POSTER SESSION B

* Undergraduate presenter ^Faculty mentor

2B Jazz improvisation pedagogy and its parallels with the Suzuki "Mother Tongue" method
Giovanni Maldonado, Nancy Taylor^*

4B Mujeres Sin Fronteras help create a just world through the stories of El Paso women who fight against injustice
Jessica Ortiz, Elva Reza-Lopez^*

6B Whole exome sequence meta-data collection for detecting genetic variants in prostate cancer
David Armendariz, Jonathon Mohl, Ming-Ying Leung^*

8B Using machine learning to identify and remedy throughput bottlenecks in the emergency department
Oziel Gonzalez Solis, Gina Galey ^*

10B Continued development of the OncoMiner Circos diagram for visualizing exonic variant effects in pediatric acute myeloid leukemia
Angelica Marquez, Jonathon Mohl, Ming-Ying Leung^*

12B Addressing long-range laser propagation through atmospheric turbulence using Large Eddy Simulations (LES)
Arturo Rodriguez, Reynaldo Martinez, Diego Lozano, Luis Rodriguez, V M Krushnarao Kotteda, Jorge Munoz, Vinod Kumar^*

14B Integrating Global Optimization Algorithms into Machine Learning Algorithms
Daniel Villa, Angel Garcia, Martine Ceberio^*

16B Microbial health risk analysis of drinking water in the US/Mexico border colonias
Madison Bencomo, Ivonne Santiago, Kristina Mena, Varinia Felix Parra, Arahim Zuniga Herrera^*

18B Applied Laplace domain stabilization of a shock absorber on a numerical scheme solver
Adrian De la Rocha, Arturo Rodriguez, Jorge Munoz^*

20B Enhanced mechanical and electrical properties of 3D printed photopolymer-CNT nanocomposites through in-situ dispersion
Luis Delfin, Luis Chavez, Jaime Regis, Yirong Lin^*

22B Exploring nucleation agent addition for multi-material fabrication of various metal-metal or metal-ceramic systems using PBF AM
Sergio Estrada, Cesar Terrazas^*

24B Antibacterial effects of photocatalytic activated ZnO nanoparticle hydrogels
Gisel Fregoso, Carol Cleetus, Binata Joddar^*

26B Inspecting clusters of oil utilizing inner-structural analysis through non-destructive CT imaging techniques for carbon sequestration
Sofia Gomez, Arturo Rodriguez, Jorge Munoz^*

28B Validity and reliability of a photoelectric cells device on reactive strength index measures
Ileana Jarquin, Samuel Montalvo, Matthew Gonzalez, Martin Dietze-Hermosa, Sandor Dorgo^*

29B Water-triggered responsive microneedles for the localized delivery of protein vaccines to epidermal Langerhans cells

Daniel Lara, Carlos Saucedo, Juan Noveron^*

30B Molecular imprinted polymers with West Nile antibody templates

Emilio Loera, Julio Rincon, Thomas Boland^*

32B Risk factors for falls in adults older than 60 years in "Los Guido de Desamparados," Costa Rica: Strategies to promote healthy aging

Selene Quetzal Lopez, Norma Celina Lau Sanchez, Pietro Scaglioni, Gabriel Ibarra-Mejia^*

34B Sense & Avoidance Algorithms deployed on Intelligent Ground Vehicles (IGVs)

Hector Marquez, Arturo Rodriguez, Jorge Munoz, Pablo Rangel^*

36B Combustion synthesis of silicon-based nanostructured materials

Rodrigo Mesta, Sergio Cordova, Evgeny Shafirovich^*

38B Peer leaders train students to play an active role in their learning experience in general chemistry

Cassandra Orozco, James Becvar^*

40B Differences between males and females in determining exercise intensity

Jozelyn Rascon, Elizabeth Trujillo, Francisco Morales-Acuna, Alvaro Gurovich^*

42B Device that creates core-shell yarns for biomedical applications

Brittany Rodriguez, Adam Samuta, Omar Abdeladi, Andrea Arreola, Jeoung Lee, Konstantin Kornev, Guzeliya Korneva, Jorge Rodriguez^*

44B Synthesis, characterization and performance evaluation of perovskite structured oxides for smart sensor technology

Aldo Rubio, Mallesham Bandi, Vishal Zade, Chintalapalle Ramana^*

46B Soil Lead Assessment in Central El Paso Neighborhoods Using the p-XRF Analyzing Instrument.

Carlos Vargas, Alexander Obeng, Michelle Del Rio, Christina Sobin, William Hargrove^*

48B Detection of somatic coliphages in superficial waters in the Honda River, Costa Rica

Jessica Velazquez, Eric Morales-Mora, Luz Chacón-Jimenez, Rosario Achí-Araya, Gabriel Ibarra-Mejia^*

50B Olfactory Receptor Family 7 Subfamily C Member 1 as a potential prognostic marker for pediatric T-cell acute lymphoblastic leukemia patients

Haidar Ahmed, Juan Silva Espinoza, Alexia Jauregui, Charles Bill, Alice Hernandez, Robert Kirken, Colin Bill, Charlotte Vines^*

52B Identification of Francisella tularensis lipid extracts activating Natural Killer T (NKT) cells.

Pablo Arenaz III, Charles Spencer^*

53B Effects of mitochondrial dynamics and bioenergetics on mitosis

Seham Azzam, Erica Herrera, Pavel Gonzalez, Laura Diaz-Martinez^*

54B The effects of intermittent dietary supplementation with fish oil on high fat diet-induced enhanced sensitivity to the behavioral effects of dopaminergic drugs

Nina Beltran, Kayla Galindo, Jose Echeverri, Jeremiah Ramos, Caroline Hernandez-Casner, Katherine Serafine^*

56B Increases in muscular activation using overload eccentric training

Paulina Caraveo, Samuel Montalvo, Lance Gruber, Itzel De La Torre, Matthew Gonzalez, Gabriel Mejia-Ibarra, Sandor Dorgo^*

58B Identification of novel phospho-regulatory sites within the common gamma chain (γc) and their role in immune function

Karina Damian, Yoshira M. Ayala-Marin, Georgialina Rodriguez, Robert A. Kirken^*

60B Common gamma chain cytokine inducible Jak3 S449 phosphorylation is mediated by the PI3K pathway

Daniela Diaz, Georgialina Rodriguez, Kristen Ahumada, Robert Kirken^*

62B Urban dipteran diversity in the desert southwest

Nikki T. Donegan, Kevin Floyd^*

64B Diet analysis of New Zealand ducks

Katlyn Feick, Philip Lavretsky, Joshua Brown^*

66B Analysis of SUMO 1 levels upon different stress conditions

Andrea Garcia, Myriah Acuña, Germán Rosas-Acosta^*

68B Sex differences in gene expression of nicotinic acetylcholine receptor (nAChR) subunits in the interpeduncular nucleus of female and male rats experiencing nicotine withdrawal

Montserrat Garcia Arreguin, Victor Correa, Rodolfo Flores, Laura O'Dell^*

70B Ellagic acid as a neuroprotectant against Amyloid beta in Parkinson's and Alzheimer's disease

Alejandra Gomez, Lois Mendez, Gabriela Henriquez, Mahesh Narayan^*

72B Prevalence of biocide resistance genes detected in first year medical students colonized in Staphylococcus aureus

Maria Ibarra, Brenda Baca, Delfina Dominguez, Michael Woods, Debra Bramblett^*

74B Olfactory Receptor Family 7 Subfamily C Member 1 expression in T-cell acute lymphoblastic leukemia identifies a potential stem cell sub-population

Dayoung Jeon, Haidar Ahmed, Juan Carlos Silva-Espinoza, Charlotte Vines, Colin Bill^*

76B Urban pond quality and the effect on microinvertebrate species richness

Randall Legens, Elizabeth Walsh^*

77B Observing the mechanisms of nicotine induced disruption of cytoskeleton and neurite formation

Melissa Lerma, Georgina Diaz-Escandon, Sukla Roychowhury ^*

78B Analyzing ZNF16: a gene with uncharacterized function

Arlene Levario, Chelsea George, Laura Diaz-Martinez^*

80B Organotin compounds as potential metal-based chemotherapeutic agents against Chagas disease

Dominique Mata, Rosa A. Maldonado^*

82B Sex differences in the reinforcing effects of nicotine are larger under more demanding schedules of reinforcement

Tania Miramontes, Rodolfo Flores, Bryan Cruz, Melissa Ibarra, Priscilla Giner, Laura O'Dell^*

84B Effects of tundra shrub encroachment on soil nitrogen mineralization rates

Cynthia Moreno, Daniela Aguirre, Jennie McLaren^*

86B The effect of shrub removal on soil carbon under different vegetation cover types in a New Mexico desert ecosystem

Crystal Noriega, Jennie R McLaren^*

88B An effective vaccine candidate for Chagas disease

Janet Olivas, Susana Portillo, Eva Iniguez, Brenda G. Zepeda, Igor C. Almeida^*

90B Correlation between the chromatin-binding activity and subcellular distribution of Poly (ADP-ribose) Polymerase-1 and its effect on HIV-1 replication.

Alejandra Pina, Sara Garcia, Christopher Farmer, Zachary Martinez, Manuel Llano^*

92B Antibiotic resistance profile among enterobacteria isolated from clinical samples in Costa Rica

Jesus Reyes, Kenia Barrantes, Gabriel Ibarra-Mejia^*

94B Production and purification of pHIS2 Early Secreted Antigenic Target Protein (ESAT-6)

Luis Pablo Reyes De la Riva, Jianjun Sun^*

96B Exercise leads to increase in smaller lipid droplet morphology in peripheral region of muscle fiber

Victoria Rosas, Jasmin Jenkins, Armando Varela, Jeffrey Covington, Sudip Bajpeyi^*

98B Recovery of normal craniofacial phenotype in HMGCS1 mutants via modulation of the WNT signaling pathway

Brianna Sanchez, Anita Quintana^*

100B Characterization of novel anticancer compounds

Austre Schiaffino, Karla Cano, Renato Aguilera^*

102B The roles of estrogen receptor alpha and beta in sexual behavior and social preferences in female prairie voles (Microtus ochragaster)

Dina Torres, Jose Landeros, Adam Perry, Bruce Cushing^*

104B Determining susceptibility to alcoholism using human plasma biomarkers

Sahaly Valadez, Charles Spencer^*

106B Biomarker tagged cells to study pre-clinical brain metastases

Joseph Wingate, Paloma Valenzuela, Karla Parra, Diana Gonzalez Garcia, Joel Martinez, Giulio Francia^*

108B Multicolor metric ELISA platform for visual point-of-care testing based on a paper/polymer hybrid microfluidic microplate

Yousef Abugalyon, Cindy Himmelhaver, XiuJun (James) Li^*

109B Filtration system of a 3D filter made with polylactic acid (PLA) and coated with 3-aminopropyltrimethoxysilane

Laila alsaihati, Abril Chavez, Andrew Pardo, Juan Noveron^* **110B The role of neotropical dry-forests in the water cycle dynamics of the Yucatán Peninsula**

Guadalupe Alvarez Rodriguez, Hugo A. Gutierrez Jurado, Jorge Uuh-Sonda, Luis Mendez-Barroso^*

112B Protein-protein interactions of β-amyloid and α-synuclein

Denisse Castaneda, Erick Guerrero, Emmanuel Zubia, Maria Moya, Mahesh Narayan^*

114B Grain morphology and size changes associated with microbial mats at White Sands Dune Field

Natalie Cowgill, Richard Langford^*

116B Functionalization of fullerenes - towards applications in perovskite solar cells

Ronda Esper, Olivia Fernandez-Delgado, Luis Echegoyen*

118B Standard operating procedure for the analysis of urinary volatile organic compounds: Does storage really matter?

Grecia Hinojos, Wen Yee Lee^*

120B Expression and purification of human cryptochrome 2 (hCRY2) for structural and functional studies

Aleksander Lazarski, Brenda Moreno, Ronda Esper, Stefani Petor, Jennie Choi, Supriyo Ray, Chuan Xiao^*

122B The influence of soil texture and irrigation chemistry on pedogenic CaCO3 precipitation and CO2 emissions of soils

Victoria Moreno, Lixin Jin^*

124B Synthesis, characterization, and applications of {[6-(benzyloxy)hexa-2,4-diyn-1-yl] oxy} acetic acid

Carlos Neira, Luis Barrera, Juan Noveron^*

126B Bisphenol-A removal from drinking and reclaimed water using alginate encapsulated activated carbon

Jesus Orozco-Reza, Melinda Arrieta, Wen-Yee Lee^*

128B Soil carbon in New Mexico after shrub removal

Linda Raulston, Jennie McLaren^*

130B Assessing φ-El A91T mutation as an inhibitor in heptameric ring separation

Alejandro Rodriguez, Ricardo Bernal^*

132B Soil quality of Rio Grande sediment at Valley Creek Park

Angela Trejo, Diane Doser^*

134B Why admitting you're wrong can be so right: Workplace wrongness admission and illness related absenteeism

Analisse Acosta, Katherine French, Adam K. Fetterman^*

135B Conducting a Systematic Review of Prenatal and Pregnancy-related Patient Satisfaction

Paulina Ambert, Alexis Wilson, Ophra Leyser-Whalen^*

136B Grit and social support: Correlates of tobacco, marijuana, and synthetic marijuana

Christopher Anderson, Jacqueline Estrada, Jessica Shenberger-Trujillo, Gabriel Frietze^*

138B Examining parental legal socialization and ethnic differences in adolescents' attitudes and beliefs about the law

Mariana Cardenas Dominguez, April Thomas, Adam Fine^*

140B The impact of health informational sources on the perceived risks, effectiveness and safety of the HPV vaccine among hispanic adults

Lauren Chacon, Gabriel Frietze, Jessica Shenberger-Trujillo^*

142B The stratification of marijuana legalization and its effects on people of color

Ana Fuentes, Kate Cartwright^*

144B Is racism effecting my health?

Rubi Gonzales, Miriam Alvarez, Rebeca Fierro-Perez, Michael Zarate^*

146B Race stereotypes and its effects on patient and doctor relationships

Luis-Alberto Magallanes-Duarte, Stephen Crites, Jessica Bray^*

148B Provider perceptions of healthcare access for pregnant immigrant women

James Milam, Carina Heckert^*

150B Attitudes, immunization, and familism

Gil Moreu, Adam Fetterman^*

152B "Walking on a tightrope through hell:" A qualitative inquiry of the lived experience of alcohol withdrawal in recovery

Sarah Najera, Brianna Holcomb, Rubi Gonzalez, Eden Robles, Craig Field^*

154B Intersectionality of ethnicity, gender and homelessness in El Paso, Texas: An exploratory study

Lourdes Perez, Eva Moya, Yok Fong Paat, Layla Townsend, Ryan Floresca^*

156B Qualitative description of the effects of experiencing racial discrimination

Erin Portillo, Miriam Alvarez, Rebeca Fierro-Perez, Michael Zarate^*

158B The use of language style matching as an indicator of rapport in investigative interviews in order to study a potential avenue of improving mental health within the correctional system

Angelica Quinones, Justin Magee, James Wood^*

160B Evaluating The University of Texas at El Paso student perceptions of air quality in the El Paso border region

Caress Riddell, Jeffrey Olimpo^*

162B Sexual health education and student access to health services at The University of Texas at El Paso

Sofia Valenzuela, Guillermina G. Núñez-Mchiri^*

SYMPOSIUM AWARDEES

Category	Type	Presenter	Mentor
Arts & Humanities	**Best Presentation**	Raul Medellin	Chris Reyman
Engineering, Applied & Computational Sciences	**Best Presentation**	Ibrahim Salama	Suman Sirimulla
	Honorable Mention	Angelica Marquez	Ming-Ying Leung
Life Sciences	**Best Presentation**	Georgina Diaz-Escandon	Sukla Roychowhury
	Honorable Mention	Nina Beltran	Katherine Serafine
	Honorable Mention	Seham Azzam	Laura Diaz-Martinez
Physical Sciences	**Best Presentation**	Miranda Govea	Diane Doser
	Honorable Mention	Carlos Neira	Juan Noveron
Social Sciences	**Best Presentation**	Rubi Gonzales	Michael Zarate
	Honorable Mention	Lourdes Perez	Eva Moya

ARTS & HUMANITIES

Jazz improvisation pedagogy and its parallels with the Suzuki 'Mother Tongue' method

Giovanni Maldonado[1,^], Nancy Taylor[1]

[1]*The University of Texas at El Paso.*

There are inherent common characteristics present in the approaches for teaching the distinctly American musical genre known as Jazz and the pedagogic method created by the Japanese pedagogue and violin player Shinichi Suzuki. Such similarities include the focus on the imitation of great musicians, being able to relate to music as a language, and the focus on learning and playing music aurally without written notation. The development of recording technology in the 20th century played a significant role in the creation of both, in that Jazz and Suzuki rely heavily on the repeated listening of recorded music. The ideas present in both pedagogical methods are similar enough that a mutualistic relationship can be established, and a new amalgamated method can be created.

Giovanni Maldonado, Nancy Taylor. "Jazz improvisation pedagogy and its parallels with the Suzuki 'Mother Tongue' method". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=59

Composition for film: Theory and practice

Raul Medellin[1,^], Chris Reyman[1]

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Background: Cinema conveys several different layers of feelings, but emotional climaxes are where the underscores, compositions specifically for the film, and the soundtracks, pieces selected for the film, culminate in a musical marvel. Five pieces from five different media (film and TV) composers were selected due to their ability to blend and enhance these climaxes. *Thesis:* The goal of this project is to analyze five different pieces from different films and composers that have similar effects in their emotional climaxes. The question is, what do these unrelated pieces have in common in terms of musical elements, visual to aural interaction, and the significance of these pieces in these films? *Methods:* After transcribing pieces from the emotional climaxes of films, both original underscores and soundtracks, I will analyze their individual parts, structures, and overall construction. This includes their orchestration, tonality, melodic, and rhythmic factors as the form of study. Using the findings, I will compose original pieces emulating the selections and original pieces using the information learned from these selections. *Results:* Having analyzed each piece in its individual context and in relation to each other, I have found that these pieces have one common feature, malleability. Each of these pieces is ambiguous in harmonic structure and built to be fragmented, enabling them to add a dimension open to interpretation. *Conclusion:* The malleability in form and harmonic ambiguity of these pieces help them to be manipulated, through scene placement, form, mixing, and arranging, delivering an open ended emotional interpretation.

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Raul Medellin, Chris Reyman. "Composition for film: Theory and practice". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=74

Mujeres Sin Fronteras help create a just world through the stories of El Paso women who fight against injustice

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The purpose of this qualitative paper is to embrace and share with colleagues and students the stories of local women who have made differences in the political and educational sphere by advocating for marginalized minorities. Through a Feminist and Critical Pedagogical lens the purpose of this study is to engage public school students in dialogue about their personal thoughts, observations and stories that impedes their learning or progress due to fear of crossing unknown borders. The aim is to develop a Critical Conscious Student. Research questions that will guide this study are: How do women of color utilize their voices to uphold their fundamental rights? How do the stories of these border crossers serve to remind us of past and present oppressions, so that we may transform the future? What social factors contribute to the inequality faced by women of color on the borderlands? Through single case studies of personal testimonios of Latinas/ Chicanas living or working in the U.S.-Mexico borderlands, this study provides examples of the efforts and achievements the women in the study endure on their quest to fight social injustices as well as, how they became Border Crossers or Mujeres sin Fronteras. Their stories provide biographical or autobiographical sketches of determination for the creation of unit plan lessons of borderland literacies to be implemented in local area schools.

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Jessica Ortiz, Elva Reza-Lopez. "Mujeres Sin Fronteras help create a just world through the stories of El Paso women who fight against injustice". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=144

UIL: The dangers of standardizing music

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Music is an art form that is associated with freedom of expression, yet in public education there are many constraints that music educators must follow. In Texas, there are many regulations being put on performances by the University Interscholastic League (UIL), including the use of electronics, time regulations, and other rules that can restrict creativity in young students. The Prescribed Music List (PML) is a collection of music deemed appropriate for students to use at UIL contests that most Texas music students are required to attend. This study was designed to identify the effectiveness of standardized music in schools and its effect on creativity in performance. A break-down of the PML was conducted and the collected data was analyzed to identify outstanding correlations. Research was conducted to identify the relation of standardization of education and its effect on creativity and also to understand the events that led to the current state of the UIL. The comparison of other music agencies will be analyzed to ascertain different methodologies that these institutions use to support creativity, while still ensuring the technical aspects of the music. Findings have provided correlations between the standardization and restriction of music and the creativity that students are allowed to express. A review of UIL restrictions and policies is recommended to ensure that the significance of creativity is at a forefront. Synthesizing UIL policies with those of other successful creativity-based institutions may provide a more successful medium for educational music events.

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Caleb Tullius, Lindsey Macchiarella. "UIL: The dangers of standardizing music". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=13

ENGINEERING, APPLIED AND COMPUTATIONAL SCIENCES

Whole exome sequence meta-data collection for detecting genetic variants in prostate cancer

David Armendariz[1,^], Jonathon Mohl[1], Ming-Ying Leung[1]

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Prostate cancer is the second most common cancer found in men; however, exomic analysis has the potential to augment patient risk stratification and yield targeted therapy efforts. To this end, we have gathered whole exome sequencing (WES) data from The Cancer Genome Atlas (TCGA) project on the Genomic Data Commons (GDC) data portal to be analyzed for genetic variants. Our goal is to use these data to identify variants that are significantly associated with prostate cancer. Specifically, we downloaded data recorded in the TCGA-PRAD project for 500 prostate cancer cases. Relevant metadata collected for each case include Case ID, race, age at diagnosis, and ethnicity, among others, as demographic factors contribute to risk assessment. Additionally, each prostate cancer patient case had several sample files associated with it containing data gathered from patient primary tumor, blood, and solid tissue samples. Metadata collected for these sample files include the Sample ID, File Name, Sample Type, and the associated MuSE variant calling format (VCF) and binary alignment map (BAM) filenames. To automate metadata collection, a python script was written that queries the GDC API. The VCF and BAM filenames were copied into a separate list to call the GDC API for download of the files themselves to be utilized in future downstream analysis using OncoMiner, a WES analysis pipeline developed at UTEP. Ultimately, we hope to single out a small number of variants that can be further investigated in the wet lab to determine their roles (or lack thereof) in the cancer.

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David Armendariz, Jonathon Mohl, Ming-Ying Leung. "Whole exome sequence meta-data collection for detecting genetic variants in prostate cancer". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=145

Redesign of the hydraulic system for the M3 prosthetic knee

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The hydraulic integration with the LIMBS M3 prosthetic knee will be a low-cost alternative to the current market of microprocessor-controlled prosthetic knees. This will allow for a mechanical efficient actuation system for the patient to have support during normal gait. From the previous specifications, the pressure rating had to be decreased to allow for a more stable system and decrease leakage. This caused for a reevaluation of the forces and the attachment of the piston to reduce the output force necessary from the piston. The loading capacity of the piston was established to be 3 kN at a maximum of 6 MPa, with an optimal pressure rating at 5 to 10 MPa. The piston stroke (2 cm), velocity (4.2 cm/s), and the fluid rate (1.3 lpm) are subject to change but should remain close to the previous values for the components to remain a viable option. Additionally, the changes allowed for a decrease in hydraulic leakage due to the lower pressures. An improved design was created using new components from the revised specifications. This consisted of a single-acting cylinder, accumulator, and a proportional flow control valve. The cost of the third design for the hydraulic systems was a total of $545. This meant that the system cost was higher than the first design ($507), and lower than the second design ($674). These changes will allow for the system to work more efficiently and increase the longevity of the knee.

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Guillermo Beckmann, Lucas Galey, Roger Gonzalez. "Redesign of the hydraulic system for the M3 prosthetic knee". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=132

Microbial health risk analysis of drinking water in the US/Mexico border colonias

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[1]The University of Texas at El Paso. [2]University of Texas Health Science Center.

Many low-income communities across the United States, especially along the U.S. Mexico border, lack access to a reliable public water system. These impoverished communities, known as colonias depend on hauling trucks that deliver water into their storage tanks. Water storage practices by colonias residents on both sides of the border poses an enormous risk for disease outbreaks and heavy metal contamination. The water quality in the storage tanks can decrease rapidly due to volatilization of the residual chlorine, the intrusion of rainfall, and air-laden dust. A quantitative microbial risk assessment (QMRA) was used to asses and evaluate the public health impact of potable water in the colonias. The QMRA was conducted to address the human health impact of drinking water contaminated with Escherichia coli, Enterococcus, Cryptosporidium, and Giardia. Yearly infection risks were estimated assuming a 365-day exposure and a consumption estimate of 2-Liters daily. From water samples collected from the storage tanks, the calculated annual risk of infection due to microbial contamination of E-coli ranged from no detection to $4.1x\ 10^{-3}$ percent in El Paso. On the other hand, in Juarez, the annual risk ranged from $2.3x\ 10^{-3}$ to 99 percent. The higher risk in Juarez compared to El Paso can be linked to different storage practices, such as the use of clear uncovered tanks. This places the population, especially children, at risk for waterborne disease outbreaks. Our research shows how QMRA can be can be used to evaluate how microbial contamination affects public health.

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Madison Bencomo, Ivonne Santiago, Kristina Mena, Varinia Felix Parra, Arahim Zuniga Herrera. "Microbial health risk analysis of drinking water in the US/Mexico border colonias". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=41

Applied Laplace domain stabilization of a shock absorber on a numerical scheme solver

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The Laplace domain has been identified as a frequency domain, where simple harmonic oscillatory behavior could be explicitly understood. The stabilization oscillatory behavior could be understood in terms of how many oscillations do the shock absorber takes in order to reach stabilization. Is well understood that shock absorbers in the sense of a damper-spring system take always five τ in order to reach stabilization which is five time periods, on which a time period is the reciprocal of frequency. Frequency on any instance is identified as the time taken to complete x number of oscillations. Which will be always the same for a simple harmonic oscillator at any number of oscillations, which on this example a spring-damper system is acknowledged as a simple harmonic oscillator. In order to verify and validate this statement we have analytically solved a differential equation through Laplace transform and plot its outcome and saw how much time it takes frequency to reach a steady state, while we also performed a validation by developing an algorithm through Simscape Simulink library and compared this behavior to a simple quarter car system in literature. Hence, this Simulink algorithm solves this oscillatory stabilization through a numerical method, is intuitively to call this method a simple harmonic motion numerical scheme solver.

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Adrian De la Rocha, Arturo Rodriguez, Jorge Munoz. "Applied Laplace domain stabilization of a shock absorber on a numerical scheme solver". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=4

Changes in bar velocity, muscular power, and force during a three-week training mesocycle using supramaximal eccentric bench press training

Itzel De La Torre[1,^], Samuel Montalvo[1], Lance Gruber[1], Paulina Caraveo[1], Matthew Gonzalez[1], Gabriel Mejia-Ibarra[1], Sandor Dorgo[1]

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The Bench Press is an essential exercise component of the sport of powerlifting. Supramaximal training is a method in which the individual is overloaded with a greater load than they can handle during dynamic movements. Eccentric Hooks are specialized equipment attached to the bar that allow the individuals to overload the eccentric portion of the Bench Press. PURPOSE: To observe changes in bar velocity, muscular power, and force output during a three-week training intervention using supramaximal eccentric loads in the bench press. METHODS: Ten elite powerlifters (5 males and 5 females; 26.4 ± 3.9 yrs.) participated in a quasi-experimental study design. Subjects participated a in a 5-training session protocol with a 48-72 hour rest in between training sessions. For the first session, subjects performed a Bench Press using the eccentric overload hooks with 105% of their 1 repetition maximum bench press with 90% of the load being on the bar (105/90 of 1RM; first number indicates eccentric load, second number indicates concentric load). Eccentric load was increased by 5% for each training session (110/90, 115/ 90, 120/90, and 125/90, respectively). An Inertial Measuring Unit system (Push Band 2.0) was used to assess changes in bar velocity, muscular power, and force. Data was sampled at 1000 Hz. Proposed Data Analysis: Data is currently being collected. Data will be analyzed in Rstudio using R statistics. The Friedman test, the non-parametric version of ANOVA with repeated measures, will be used.

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Itzel De La Torre, Samuel Montalvo, Lance Gruber, Paulina Caraveo, Matthew Gonzalez, Gabriel Mejia-Ibarra, Sandor Dorgo. "Changes in bar velocity, muscular power, and force during a three-week training mesocycle using supramaximal eccentric bench press training". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=85

Enhanced mechanical and electrical properties of 3D printed photopolymer-CNT nanocomposites through in-situ dispersion

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Polymer matrix nanocomposites have gained increased attention due to the highly desirable properties from their fillers and the manufacturability through the use of polymers. Carbon nanotubes (CNTs) have been studied extensively due to their exceptional thermal, mechanical, and electrical properties. However, they are not often used in bulk because of their tendency to agglomerate. Agglomerations, when present, can create stress concentrations within the composite structure. In situ dispersion of the CNTs in polymer nanocomposites was achieved through the application of an electrical field during the Stereolithography 3D process. The introduction of the dispersed CNTs increased the elastic modulus of the polymer resin by 77%. Additionally, the electric-field-assisted dispersed CNTs nanocomposites displayed an increase of 32% on the average elongation at break over the random CNTs nanocomposites. An increase of over 20% in the ultimate tensile strength in-situ dispersed MWCNT nanocomposites over the pure polymer material was observed. Finally, an increase of 50% electrical conductivity was observed when CNTs were introduced, with a further increase of 26% when the electric field was applied during fabrication. The results presented demonstrate the feasibility of enhancing both electrical and mechanical properties of CNTs reinforced polymer nanocomposites using in situ electrical field-assisted 3D printing.

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Luis Delfin, Luis Chavez, Jaime Regis, Yirong Lin. "Enhanced mechanical and electrical properties of 3D printed photopolymer-CNT nanocomposites through in-situ dispersion". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=148

A mechanically engineered bioreactor for cardiac tissue engineering applications

Erick Dominguez[1,^], Binata Joddar[1]

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Tissue engineering seeks to utilize stem cells, biomaterials, and bioreactors to produce viable tissues with the end goal of replacing their damaged counterpart in the body. Subjecting engineered tissue samples to bioreactors is imperative to creating functional tissues as they condition the cells to behave as they would in vivo by mimicking physiological environments in vitro. The myocardium, or tissue of the heart, is constantly being subjected to perfusion from blood flow, electrical stimulation from electrochemical transients, and mechanical stretching and contraction as the heart beats. In these situations, the cells of the myocardium experience various forces and stresses that may be different than those found in other organs. Current bioreactor technology is categorized by their high construction and maintenance cost, with low customizability and most lack the ability of force measurement. The use of three-dimensional (3D) printing technologies to design and create a low-cost custom mechanical stretching bioreactor system with the capabilities to apply a controlled mechanical load to cells in vitro. In the current study a mechanical stretching bioreactor was designed and printed with Polylactic acid (PLA) to test different stretching parameters on cardiac tissue. Our expected results would prove that our bioreactor system is functional and able to stretch engineered cardiac tissue. In future studies modifications can be made to the design to optimize the stretching parameters or the design structure and improvements on the circuitry using novel technology and recreate the design and having it 3D printed with imbedded electronics or better known as 3D Printed Electronics.

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Erick Dominguez, Binata Joddar. "A mechanically engineered bioreactor for cardiac tissue engineering applications". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=149

Exploring nucleation agent addition for multi-material fabrication of various metal-metal or metal-ceramic systems using PBF AM

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Electron beam melting (EBM), a type of powder bed fusion additive manufacturing, is a process where three-dimensional metallic structures are created through the stacking and selective melting of metal powder layers by the electron beam as indicated by digital data. The process can be performed under high vacuum conditions or in a controlled vacuum through a constant bleed of helium gas. This research explored the use of EBM for the fabrication of pure copper and of copper metal matrix composites by mixing the precursor copper powder with other powder materials including carbon (C) and titanium diboride (TiB_2). At present, results for pure Cu and the Cu-C mixture are available and will be the subject of this presentation. The overarching goals of the study were to develop optimal parameters to 3D print using pure Cu and Cu-C powders, and to characterize the material properties resulting from the addition and EBM processing of these powder mixtures. This study will report on the density measurements of fabricated components as a metric of optimal processing. Pure Cu printing was achieved by using a substrate initial preheating temperature of 420°C, followed by layer deposition using preheating current of12mA and focus offset of 20mA. For pure Cu, these parameters resulted in density values ranging from 8.65 - 8.804 g/cm^3, meaning it was about 98% dense. For the Cu-C mixture, preliminary results indicate extreme porosity and the need for further optimizing processing parameters.

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Sergio Estrada, Cesar Terrazas. "Exploring nucleation agent addition for multi-material fabrication of various metal-metal or metal-ceramic systems using PBF AM". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=114

Folate decorated polymeric nanoparticles loaded with lutein enhanced uptake in neuroblastoma cells

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Perinatal asphyxia caused due to hypoxia complicates and causes neonatal hypoxic-ischemic encephalopathy (HIE). A widely used treatment for HIE is therapeutic hypothermia. Previous reports suggest that lutein supplementation has neuroprotective properties in rats. The aim of the present study is to encapsulate lutein into polymeric nanoparticles (NPs) (PLGA, PLGA-PEG and PLGA-PEG-FOL) and evaluate its uptake in neuroblastoma cells. Lutein loaded PLGA, PLGA-PEG and PLGA-PEG-FOL NPs were prepared using oil in water (O/W) emulsion solvent evaporation method. Particle size, polydispersity index and zeta-potential of NPs were measured using dynamic light scattering (DLS) technique. Differential scanning calorimetry (DSC) was used to confirm encapsulation of lutein into NPs. Scanning electron microscopy (SEM) was used to determine surface morphology of NPs. Cellular uptake studies were conducted in human neuroblastoma cell line. Further characterization of NPs such as encapsulation efficiency (%EE), in-vitro release studies and stability studies were performed. Particle size of lutein loaded PLGA, PLGA-PEG, and PLGA-PEG-FOL NPs were 132.6 ± 1.04 nm, 163.3 ± 2.86 nm, and 188.0 ± 4.06 nm, respectively. %EE of lutein was 48.82 ± 15.50, 63.45 ± 10.13 and 72.87 ± 7.22 for lutein PLGA, PLGA-PEG and PLGA-PEG-FOL NPs, respectively. DSC analysis confirmed encapsulation of lutein into NPs. Release profile had shown that NPs released lutein in a sustained manner with no initial burst release. Cumulative release of lutein was higher in PLGA NPs with 100% release within 24hours. In PLGA-PEG and PLGA-PEG-FOL NPs, cumulative release of lutein was ~69% and ~80% at 48h. In this study, we successfully encapsulated lutein into PLGA-PEG-FOL NPs and significantly enhanced the lutein uptake in neuroblastoma cells. Efficiency of lutein loaded PLGA-PEG-FOL NPs will be confirmed in vivo using HIE rat model.

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Julian Franco, Pradeep Bolla, Abhishek Arnipalli, Xiaoming Gong, Venkata Kashyap Yellepeddi, Devaraj Sambalingam, Jwala Renukuntla. "Folate decorated polymeric nanoparticles loaded with lutein enhanced uptake in neuroblastoma cells". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=125

Antibacterial effects of photocatalytic activated ZnO nanoparticle hydrogels

Gisel Fregoso[1,^], Carol Cleetus[1], Binata Joddar[1]

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Chronic wound development is caused by susceptibility to bacterial infection and biofilm formation that prevents treatment. The proposition of an antibacterial hydrogel that can contain antibiotics exposes the limitation of an antibiotic resistance forming. Alternatively, the evaluation of these antibacterial properties was incorporated through utilizing zinc oxide (ZnO) nanoparticles on an alginate based hydrogel that deterred from an antibiotic inclusion in the hydrogel composition. Through the photocatalytic properties of the ZnO nanoparticles in hydrogels, probe tests measuring free radical formation assessed the extent of activated agents in the hydrogel. To optimize the antibacterial property of the hydrogel, the structural characterization was determined through a swelling and degradation evaluation and rheological analysis. These analysis coincided with the premise of performing effective wound healing through the antibacterial properties the hydrogels offer from the integration of zinc oxide within a biocompatible alginate base.

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Gisel Fregoso, Carol Cleetus, Binata Joddar. "Antibacterial effects of photocatalytic activated ZnO nanoparticle hydrogels". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=159

For quantum and reversible computing, intervals are more appropriate than general sets, and fuzzy numbers than general fuzzy sets

Oscar Galindo[1,^], Vladik Kreinovich[1]

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Need for faster and faster computing necessitates going down to quantum level â€" which means involving quantum computing. One of the important features of quantum computing is that it is reversible. Reversibility is also important as a way to decrease processor heating and thus, enable us to place more computing units in the same volume. In this paper, we argue that from this viewpoint, interval uncertainty is more appropriate than the more general set uncertainty and, similarly, that fuzzy numbers (for which all alpha-cuts are intervals) are more appropriate than more general fuzzy sets. We also explain why intervals (and fuzzy numbers) are indeed ubiquitous in applications.

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Oscar Galindo, Vladik Kreinovich. "For quantum and reversible computing, intervals are more appropriate than general sets, and fuzzy numbers than general fuzzy sets". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=105

Maze solver algorithms inspired on Micromouse competition

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The Micromouse competition consists of a small robot navigating through a maze with the goal of solving the maze by getting to the center of the maze. The small robot should be programmed with different algorithms and see which one solves the algorithm on the best time. This research will focus on the flood fill algorithm and the line follower algorithm. The flood fill algorithm should be able to map and learn that it has to approach previous solutions before going to approach upcoming solutions. The line follower algorithm will follow one side of a wall until it reaches the solution of the maze. The noticeable thing on the line follower algorithm is that it might sometimes reach infinite loops on a maze, mainly because of the design of the maze. The sensors that are designed to help the robot identify its position are ultrasonic sensors attached to all sides of the robot. In order to know its solutions, a robot has a good amount of memory in the microcontroller to be able to identify where it needs to move next in order to solve the maze. In compact with the other information, we will also show what is the architecture of the robot in order to understand why it contains an H-Bridge, Diode, Chassis Structure, and DC Motors. As part of this project, we will also demonstrate a literature review of this well-known micromouse competition.

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Marcos Garcia, Arturo Rodriguez, Pablo Rangel, Jorge Munoz. "Maze solver algorithms inspired on Micromouse competition". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=6

Inspecting clusters of oil utilizing inner-structural analysis through non-destructive CT imaging techniques for carbon sequestration

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It is said that if humans do not change the way they are invigorating pollution, in a few years we will face irreversible consequences due to climate change. A major contribution to global warming is the release of greenhouse gases into Earth's atmosphere. It has been estimated that humans are currently and continually releasing carbon dioxide into the atmosphere. Carbon dioxide levels have reached a record high at 410 parts per million to date. What if researchers discovered an efficient way to capture carbon dioxide instead of releasing it into the air? Increased efforts to store and capture carbon will help to drastically mitigate the damage caused by the carbon dioxide being released into the atmosphere. Using post-combustion processes will enable automobiles and power plants to sequestrate carbon dioxide, and this can be stored in wet sedimentary geological formations for hydrocarbon recovery. Sedimentary oil reservoir samples were scanned using Computerized Tomography (CT). The resulting images were analyzed using the image processing tool ImageJ. The intensity of the pixels in the image is related to the activity of thermal processes and is indicative of how much oil is confined in the damped sedimentary formations. Our statistical analysis establishes the amount of hydrocarbon that can be regenerated as a function of time elapsed.

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Sofia Gomez, Arturo Rodriguez, Jorge Munoz, Vinod Kumar. "Inspecting clusters of oil utilizing inner-structural analysis through non-destructive CT imaging techniques for carbon sequestration". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=8

Using machine learning to identify and remedy throughput bottlenecks in the emergency department

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The average median length of stay (LOS) in US emergency departments (EDs) for 2017-2018 was 257 minutes for admitted patients and 137 minutes for discharged patients. Long wait times can lead to decreased patient satisfaction and increased walkouts and mortality. In this study, the ED throughput process at the Hospitals of Providence â€" East Campus was investigated to identify bottlenecks and provide actionable insights to help decrease wait times. The data included 72,717 discharged and 14,463 admitted patients from February 2017 to August 2018 with a median LOS exceeding targets of 120 and 240 minutes by 24 and 62 minutes, respectively. Machine learning was used to build predictive models for total LOS, as well as identify key predictors and bottlenecks in the ED process. Results for discharged patients revealed hour and month of visit, acuity level, and laboratory tests as the strongest LOS predictors. For admitted patients, radiology tests were the most influential on LOS. The model was accurate at predicting discharged patients' LOS (37% predicted to meet target compared to the actual 38% seen in test data). For admitted patients, the model overestimated the percent meeting the goal (48% predicted versus 31% in the test set). Given these insights, it was recommended that the hospital investigate decreasing radiology times (especially CT with contrast) by purchasing an i-STAT machine, focus on the seasonal and hourly peaks in patient volume, and improve data collection for admitted patients for more accurate modeling in the future.

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Paste extrusion of high density piezoelectric ceramics

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The use of Micro Electro Mechanical System (MEMS) sensors to monitor pressure and temperature conditions in combustion processes is critical to ensure energy generation is the most efficient it can be. MEMS sensors, however, require their own power supply for extended wireless operation. Piezoelectric ceramics are functional materials that can be used to power these sensors by harvesting electrical energy from the thermal and mechanical energy of their operating environment. Conventional manufacturing techniques for ceramics, however, rely on costly casting and press fitting methods and do not allow for complexity of geometry. Additive manufacturing methods such as Paste Extrusion (PE) allow for freedom of design thanks to their layer-by-layer building of parts. Piezoelectric ceramics of Lead Zirconate Titanate (PZT) were successfully fabricated through the use of PE. The selection of appropriate paste compositions and printing parameters such as layer height, printing speeds, and substrate temperature allowed for complex three-dimensional ceramic structures to be built. Density values of up to 7.1 g/cm^3 were obtained corresponding to 93% of the theoretical value. The samples showed relative permittivities as high as 4581, piezoelectric charge coefficients as high as $775*10^{-12}$ C/N, and pyroelectric coefficients of $-5.6*10^{-8}$ C/cm^2*K. The piezoelectric properties of the PE samples rivaled conventionally manufactured ceramics and showed the feasibility of using PE to manufacture functional ceramic bodies for use in energy harvesting.

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Samuel Hall, Luis Delfin, Luis Chavez, Jaime Regis, Anabel Renteria, Yirong Lin. "Paste extrusion of high density piezoelectric ceramics". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=55

Validity and reliability of a photoelectric cells device on reactive strength index measures

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Reactive Strength Index (RSI) is the measurement of reactive capacity that is used to determine an individual's plyometric ability, which is a crucial component in most sports. PURPOSE: To assess the RSI validity and reliability of a photoelectric cell device (Optojump™ system) in comparison to the gold standard measurement of the force platforms. METHODS: 30 college students (17 males and 13 females; mean ± SD: Age = 23.37 ± 1.86 years; Height = 1.62 ± 0.28 m; Weight = 70.85 ± 17.55; BMI = 24.91 ± 4.46; BF (%) 24.11 ± 6.61) participated in this single-session study design. Prior the testing, subjects performed a 5-minute self-paced jog as part of the general warm-up followed by a 5-minute dynamic stretching and jump familiarization phase. Following the warm-up and familiarization phase, subjects performed 5 repetitions of the Depth jump from a 0.3m box with their hands on the hips. Subjects jumped on the force plates and Optojump™ system at the researcher's signal, and proper jump technique with a 90 degree knee flexion during the jump was emphasized. Proposed Data Analysis: Data is currently being analyzed. Data will be analyzed in Rstudio using R statistics. RSI will be computed as contact time divided by flight time. Correlation and agreement between the devices will be assessed using an intra-class correlation test and a Bland Altman plot. Intra-subject testing reliability and instrument stability will be assessed using the 5 jump trials with an intra-class correlation. Finally, all analyzes will be conducted by sex to observe sex RSI differences.

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Ileana Jarquin, Samuel Montalvo, Matthew Gonzalez, Martin Dietze-Hermosa, Sandor Dorgo. "Validity and reliability of a photoelectric cells device on reactive strength index measures". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=83

Water-triggered responsive microneedles for the localized delivery of protein vaccines to epidermal Langerhans cells

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Microneedles can confer advantages over traditional vaccines in terms of comfort, manufacture production, and waste disposal. We have synthesized a zinc metal polymer that forms a gel and is capable of releasing molecules upon in situ reactions with water. Our project focuses in molding this polymer into microneedles so they can serve as water-triggered responsive delivery systems to subcutaneous specialized cells such as Langerhans cells, which are abundant in the last two layers of the epidermis, stratum spinosum and stratum basal. The epidermal thickness ranges from 60μm to 120μm indicating that the microneedle must have similar dimensions. Langerhans cells are dendritic cells indicating functionality as antigen presenting cells that display Major Histocompatibility Complex II (MHC II) proteins on its surface. The insertion of antigen proteins into these cells environment generate adaptive immune responses. In particular, the predicted adaptative immune response is the production of Th2 cells that will interact with MHC II and antigen-reactive B cells leading to the production of antibodies. Other possible immune responses are the activation of T cytotoxic (Tc) cells and Th1 cells. Therefore, the vaccines in microneedles could produce primary and immune memory responses against infectious diseases. In this poster, we will discuss the synthesis, characterization, and evaluation of function of water-responsive microneedles for vaccine applications.

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Alternatives for reducing nuisance flooding in an urban neighborhood

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The proposed project seeks evaluate how different types of land cover and rainwater harvesting practices may affect the risk of nuisance flooding in an urban neighborhood. We will examine the existing risk of nuisance flooding against socioeconomic factors, land cover, and rainwater harvesting practices in the North East region of the City of El Paso, Texas. Different scenarios of rainwater harvesting (e.g, passive, active); level of adoption (e.g. percentage of people that may be able to harvest rain); and feasibility (appropriate structure, sufficient land) will be evaluated to determine which type of neighborhood would benefit the most by implementing rainwater harvesting practices and/or land cover changes. We will quantify the benefit by the reduction in risk of nuisance flooding.

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Isabel Lopez, Ivonne Santiago, Miguel Velez Reyes, Raed Aldouri. "Alternatives for reducing nuisance flooding in an urban neighborhood". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=104

Risk factors for falls in adults older than 60 years in 'Los Guido de Desamparados' Costa Rica: Strategies to promote healthy aging

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[1]The University of Texas at El Paso. [2]Universidad de Costa Rica.

For fall prevention strategies to be effective among older adults, risk factors need to be determined. In this quantitative and qualitative study, we gathered sociodemographic, health, and biomechanical data from 52 healthy subjects residing in 'Los Guido de Desamparados' Costa Rica. The objective was to analyze risk factors and design strategies to prevent falls in adults older than 60 years, and to thereby, promote healthy aging. The participants performed tests for muscle strength, agility, marching, and the modified Clinical Test of Sensory Interaction for Balance (mCTSIB). Strength tests included a 30-second chair-rise test and maximum development of knee extension using a dynamometer. The agility test consisted of an 8-foot timed-up-and-go (TUG) test, whereas the marching test included three normal and three fast-paced trials, measured by an accelerometer. With the use of a Wii Balance Board, the mCTSIB tested the subjects' balance under four different conditions. For qualitative data, we used a focus group to determine risk factors the participants felt caused falls in the elderly, including possible prevention strategies. The average number of squats and TUGs observed were higher in males than females, but females performed at a slower pace indicating that they are more likely to fall with age. Regarding the mCTSIB, as the condition got more difficult, stability decreased forcing the center of pressure to travel a longer distance. It was concluded that older adults fall due to multifactorial causes; however, older females have a higher risk of falling than older men. Additionally, we saw that elders from Latin America have a higher probability of falling than those in the United States due to lack of resources, like public transportation.

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Selene Quetzal Lopez, Norma Celina Lau Sanchez, Pietro Scaglioni, Gabriel Ibarra-Mejia. "Risk factors for falls in adults older than 60 years in 'Los Guido de Desamparados' Costa Rica: Strategies to promote healthy aging". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=53

Continued development of the OncoMiner Circos diagram for visualizing exonic variant effects in pediatric acute myeloid leukemia

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Acute myeloid leukemia (AML) is a cancer where myeloblasts cannot mature into healthy white cells. Precision therapies for pediatric AML are in increasing demand. Whole exome sequencing (WES) data of pediatric AML patients are available in the Therapeutically Applicable Research to Generate Effective Treatment (TARGET) database. From there, we downloaded data of 18 patients between one and 17 years old, where each individual has three WES datasets at three phases: when first diagnosed, in remission following treatment, and after relapse. The objective of the current study is to identify exonic DNA variants from AML patients at these phases. The datasets, ranging from 17 to 31 GB in size in the BAM (binary alignment map) format, are being analyzed using OncoMiner, a web-based bioinformatics pipeline (OncoMiner.utep.edu) for WES data analysis. The first step is to run the OncoMiner Preprocessing program to convert the BAM files to OncoMiner Input files in a CSV (comma-separated values) format. These files are then submitted to the OncoMiner pipeline to assess the variants' deleterious effects by their PROVEAN scores. OncoMiner provides a Python script that can map the PROVEAN (PROtein Variation Effect Analyzer) scores to a Circos diagram to visualize their distribution on the chromosomes. We have recently identified that the script does not accurately reflect the distribution of all the mutations. The python script consists of 24 functions with frequent definition calls within the script. We, therefore, made a communication diagram with instance attributes for every definition in order to detect and correct the identified problems. While this work is still in progress, we expect the corrected Circos diagram of the AML dataset will provide visual insights towards understanding the genetic mechanisms of AML development at the DNA level and help design better strategies for diagnosis and treatment.

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Angelica Marquez, Jonathon Mohl, Ming-Ying Leung. "Continued development of the OncoMiner Circos diagram for visualizing exonic variant effects in pediatric acute myeloid leukemia". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=23

Sense & Avoidance Algorithms deployed on Intelligent Ground Vehicles (IGVs)

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Mechatronics systems are characterized by their computational brain and sensing capabilities. Intelligent Ground Vehicles (IGVs) are mechatronic systems that combine information from distance sensors and algorithms to sense and avoid collisions. Currently the most accurate distance-sensing mechanisms are infrared and ultrasonic sensors. The main goal of this research is to test the use of an ultrasonic sensor in combination with an algorithm to predict IGV possible collision movement in cases where the vehicle is most likely to collide, a possibility could be when the vehicle is traveling at high speed and detects an object at a close distance. We aim to comprehend the relationship between the time and displacement of the vehicle after breaking through Newton's equations of motion and adapt the sensor to react at different speeds for different distances. We will create a Simulink algorithm that functions in coordination with an ultrasonic sensor to sense and avoid collisions, which will eventually lead to a safer driving environment.

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A novel topical gel formulation loaded with ufosomes for topical delivery of clotrimazole

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Global incidence of fungal infections has been on a significant rise since 1980s affecting around a billion people and are primary cause of death in 1 million people, annually. Candidiasis, also referred to as yeast infection is the most common fungal superficial infection caused by Candida species. Topical formulations are intended to treat local fungal infections on the skin by effective penetration of drugs into stratum corneum and killing fungi. However, topical preparations have disadvantages/drawbacks such as poor dermal/ungual bioavailability, poor penetration into the stratum corneum, variable drug levels at the site of infection. The aim of the present investigation is to encapsulate clotrimazole loaded ufosomes into a gel formulation and compare it with currently marketed formulation. Clotrimazole loaded ufosomes were prepared using hand-shaking method of New. Various ratios of clotrimazole: cholesterol: sodium oleate were screened for size, polydispersity index (PDI) and zeta potential (ZP) using dynamic light scattering (DLS) technique. Optimized ufosome formulation ratio was 100 mg clotrimazole, 200 mg cholesterol and 200 mg sodium oleate. DLS results showed that size, PDI and ZP was 296.7 ± 23.58 nm, 0.674 ± 0.159 and -78.0 ± 8.00 mV. Encapsulation efficiency of ufosomes determined by ultracentrifugation method was 75.67 ± 15.17%. Optimized ufosomes will be loaded into Carbopol gels and will be evaluated for skin retention on cadaver skin. Further characterization such as transmission electron microscopy, in vitro release studies, x-ray diffraction, and in vitro anti-fungal activity are underway in our laboratory.

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Carlos Meraz, Pradeep Bolla, Jwala Renukuntla, Isaac Deaguero. "A novel topical gel formulation loaded with ufosomes for topical delivery of clotrimazole". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=130

Combustion synthesis of silicon-based nanostructured materials

Rodrigo Mesta[1,^], Sergio Cordova[1], Evgeny Shafirovich[1]

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Highly efficient thermoelectric materials are sought after for many applications like NASA's usage of radioisotope thermoelectric generators (RTG) or waste heat recovery from a car exhaust. Although there have been increases in performance, current fabrication methods are complex and are difficult to scale up. One major challenge in fabricating these materials is the coupling of its thermal and electrical conductivity. Obtaining maximum efficiency of thermoelectrics requires that the materials have a low glass-like thermal conductivity but a high metal-like electrical conductivity. The present work investigates the feasibility of using combustion synthesis as a reliable method to produce silicon (Si) and silicon-germanium (Si-Ge) in a low energy and inexpensive manner. To ensure full propagation of the material, the powder is mechanically activated which removes any oxide layer, making the powder easier to ignite, while also decreasing the material grain size which decreases its thermal conductivity. Mechanically activated self-propagating high-temperature synthesis (MASHS) allows for high purity products, decoupling conductivities, low energy consumption, and is scalable. This project investigates the optimal conditions for obtaining Si and Si-Ge from silica, germania, and magnesium silicide.

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High ozone episode in the Paso del Norte region

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Topography coupled with constant car traffic flow between cities makes El Paso/Juarez region a suitable location for ozone formation on the ground level. We studied the high ozone episode to discover correlations within the atmosphere to determine Ozone concentration and how it affects it. The emission of VOCs and PM 10 and 2.5 reacts photo chemically with UV radiation to form O3. We used the Comprehensive Air Quality Model (CAMx) and the Weather Research Forecast (WRF) to forecast and model Ozone concentrations, humidity and temperature from May to September 2006, however, the highest episode was observed between June 12th- June 21st, 2006 which is the data observed and analyzed for this High Ozone Episode. Gathering data from the Texas Commission on Environmental Quality we were able to compare the experimental data vs the predicted data and analyze the trends affecting the levels of ozone. During the 10 days of the highest ozone episode, June 15th and June 18th were the points of reference and comparison when analyzing humidity and temperature. From the predicted and experimental data, we concluded first that there was close agreement between the CAMx and the WRF simulations with the TCEQ experimental data. Also, humidity and temperature were inversely proportional on June 18th, the day showing the highest level of ozone; meanwhile June the 15th displayed lower temperatures and higher humidity levels. Concluding that meteorological factors significantly influence the formation of ozone leads not only to the improvement and development of stronger simulation programs for the local airshed but also may enhance us with taking preventative measures that will decrease the effects of ozone on human health in the city of El Paso.

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Correcting for environmental factors in microbiome-wide association studies

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Research into the role that the microbiome plays in human health has helped identify microbes associated with diseases such as obesity and Crohn's disease. However, current microbiome studies do not account for variations in human anatomy, such as pH changes along the gut, which leads to many spurious associations. Furthermore, these variations increase the overall variance in the microbial abundance profiles, making it harder to distinguish between diseased and healthy microbiotas. To correct for these variations, we developed two new methods, "phylum normalization" and "reduced principal component analysis", and applied them to the largest pediatric Crohn's disease dataset containing more that 1,000 diseased and control samples. Each method tackled a different aspect of environmental noise in the data and was used in permutation tests to identify possible disease-causing taxa and for sample diagnosis classification. Phylum normalization, in which relative abundances are obtained by normalizing with respect to phylum taxonomic level counts, reduced the variance between samples-allowing for better classification of disease and control. Reduced principal component analysis, in which a specified number of components causing the greatest data variance are removed, decreased the number of disease-associated taxa, selecting 11 taxa compared to 55 without the method, while preserving classification power. Our methods could have applications in disease diagnosis and in prioritizing follow up studies on potential pathogens. Future work would entail validating result with different datasets and other feature selection methods.

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Michelle Patino Calero, Gabriel Birzu, Kirill Korolev. “Correcting for environmental factors in microbiome-wide association studies”. (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=51

Isolation and characterization of antibiotic resistant Escherichia coli found on superficial water from Honda River, Costa Rica

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Inappropriate use of antibiotics leads to the emergence of drug resistance strains that give rise to bacterial infections that may be difficult to treat. Although tetracycline and penicillin are among the most commonly used antibiotics in aquaculture and farming around the globe, there is scarce information on environmental consequences linked to these uses. The objective of this study was to test antimicrobial susceptibility of the *Escherichia coli* isolates found along the Honda River to explore their natural resistance. Four consecutive weekly water samples taken from four different altitude points of the river were analyzed (Sixteen total samples). Using membrane filtration with Coliblue24®, 41 dilutions from which we isolated 38 bacteria were characterized as *E. coli* and later confirmed by Indole test. The Kirby Bauer method was employed to determine the susceptibility of the isolated bacteria to nine antibiotics. Based on the results, amoxicillin and cephatholin had the highest frequency of resistance (95% and 87%); and 24% of the bacteria showed resistance to 3 or more antibiotics. Multi-resistant bacteria were identified at the highest and lowest altitude sampled points of the river showing resistance to amoxicillin, cephatholin, tetracycline, and chloramphenicol. Additionally, we performed a 16S-gene analysis where only 6 isolates corresponded to *E. coli*. Subsequently, the presence of inti-1 and inti-2 genes was analyzed and found in 66% of the isolates. Future work, concerns molecular analyses of antibiotic-resistant genes present in these bacteria. These results suggest that Honda River might play a role as a reservoir of antibiotic resistant bacteria. In this context, water from Honda River might not be appropriate for human consumption, and awareness should be brought up on the responsible use of antibiotics among the Costa Rican community.

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Paulette Ramirez, Gabriel Ibarra-Mejia, Luz Chacon. "Isolation and characterization of antibiotic resistant Escherichia coli found on superficial water from Honda River, Costa Rica". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=1

Differences between males and females in determining exercise intensity

Jozelyn Rascon[1,^], Elizabeth Trujillo[1], Francisco Morales-Acuna[1], Alvaro Gurovich[1]

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Even though there are physiological differences between males and females, heart rate (HR), rate of perceived exertion (RPE), power output (PO), oxygen consumption (VO2), and blood lactate (BL) levels have been used as measures of exercise intensity indistinctly of the sex. The purpose of this study was to determine if there are differences between sexes in different exercise intensity models. Thirty (15 females) young, healthy individuals (age range 19-33 y) were scheduled for two testing visits 48-72 hours apart. During the first testing visit, a graded exercise test (GXT) was administered on a stationary bicycle. HR, RPE, PO, VO2, and BL were obtained at the end of each exercise step and peak PO and VO2max were recorded at the end of the test. BL during the GXT was used to determine 3 5-min steady-state workloads (low: >2 mmol/l; moderate: 2-4 mmol/l; and high: >4 mmol/l) for the second test. HR, %HRmax (HR/(220-age)), RPE, PO, %POmax, VO2, %VO2max, and BL were also obtained at the end of each steady-state workload. A two-way repeated measures ANOVA was performed to compare all exercise intensity variables obtained during the second test between males and females (α±=0.05).

The results showed that only RPE, %PO, and BL did not differ between sexes on all 3 exercise intensities. HR, %HR, and PO differ between sexes on at least 2 exercise intensities. VO2 and %VO2max differ between sexes on at least 1 exercise intensity. As previously reported, females have higher HR and %HR than males for similar %PO. However, and contradicting previous reports, RPE was similar between males and females for similar %PO. In conclusion, based on the current results, traditional exercise intensity models are different between males and females. BL and %PO appear to be the models that might be used independently of sex.

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Developing a low-cost prosthetic ankle for developing countries

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Many amputees in developing nations do not have access to prosthetic devices. People who have lost a limb in developing countries are marginalized in their societies and unable support themselves or a family. We are developing a low-cost prosthetic ankle to be attached to a SACH foot for lower limb amputees in developing regions to restore mobility and lives. SACH foot prosthetics offer limited movement and virtually no energy storage and return. The goal of this prosthetic ankle development is to increase the movement and energy storage and return capabilities. Extensive background research has been done on prosthetic feet and ankles to determine the best methods to implement in the ankle design. Based on a review of previous works, a set of requirements and specifications have been developed to be implemented in the design process. The best methods for use in the prosthetic ankle design were determined using a decision matrix to weigh design features. It showed that a hinge joint or dynamic ankle would satisfy our requirements best. Initial concept designs were drafted and detailed based on the results of the decision matrix. Early nonfunctioning prototypes of two concept designs were manufactured. One of these designs was chosen to move forward with functional prototyping. Two prototype iterations are planned to be manufactured with increasing functionality. The first prototype will be made at 60% functionality, followed by a second prototype at 80% functionality. We will run tests on these prototypes for overall functionality and how well design specifications are met.

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Andrew Rios, Lucas Galey, Roger Gonzalez. "Developing a low-cost prosthetic ankle for developing countries". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=102

Addressing long-range laser propagation through atmospheric turbulence using Large Eddy Simulations (LES)

Arturo Rodriguez[1,^], Reynaldo Martinez[1], Diego Lozano[1], Luis Rodriguez[1], V M Krushnarao Kotteda[1], Jorge Munoz[1], Vinod Kumar[1]

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Within the Department of Defense (DoD), characterizing the effects of atmospheric turbulence on optical systems will allow improvement in a variety of applications such as space vision via telescopes, remote sensing, matter characterization, long-range satellite communications, active imaging, and better performance on other optical systems. Furthermore, addressing this problem will allow us to characterize how the long-range laser refracts and deviates due to different velocity, temperature and pressure profiles understood through Fluid Dynamics based on analysis results gotten from Large Eddy Simulations (LES), Computational Fluid Dynamics (CFD) model. Using Large Eddy Simulations (LES) - Navier Stokes Numerical Stochastic Analysis Method can provide enough fidelity through a hybrid mesh method depending on mesh spatial frequencies considering the size of the eddies for Large Eddy Simulations (LES) to get good results that are within a small error range and can be trustable. By showing a time series analysis and representing figures of the fluctuations on the contours such as temperature, pressure, and velocity it can be seen how it affects the refractive index and how is affected by turbulent effects of the fluid flow. The results from Large Eddy Simulations (LES) were validated and verified against experimental results and fundamental mathematics equations that represent the model. Finally, by understanding the refractive index structure function, using the contour profiles and temperature structure function the path of the laser can be characterized.

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Device that creates core-shell yarns for biomedical applications

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Composite materials have become of great importance in the biomedical field due to their vast applications. Core-shell yarns, i.e. Nanofibers fabricated with the electrospinning, have been proven useful as a result of their ability to mimic the human Extracellular Matrix (ECM). The objective of this summer project was to design and prototype a mechanism to fabricate composite core-shell yarns. The automated device facilitates the wrapping and coating of the core with electrospun fibers, thus creating a core-shell yarn with multiple biomedical applications. Observations acquired in the first three trials were concerning the electrospun material hardly surrounding the core completely while approaching the center. However, the fibers were spun tight around the core near the ends. This lead to the conception that if the brush diameter increased then the polymer will coat the material around the core more homogeneously. For time constraints, we decided to decrease the distance between the two brushes in the last trial. This showed that increasing the ratio of brush diameter to core length will produce the highest quality of coating surrounding the core. Through many alterations, we created a mechanism that was found to have a tighter and more efficient method of coating when increasing the brush size. Construction of the mechanism now allows for electrospun material to coat any yarn-like material for biomedical applications. The developed device enables the laboratory to continue experimentation with specific biomedical applications. Future work would involve updating the materials of the model and making different sized detachable brushes.

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Brittany Rodriguez, Adam Samuta, Omar Abdeladi, Andrea Arreola, Jeoung Lee, Konstantin Kornev, Guzeliya Korneva, Jorge Rodriguez. "Device that creates core-shell yarns for biomedical applications". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=163

Improvement in the creation of n-type silicon solar cells through processing techniques and parameters

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Solar cell research aims at a gradual increment on the overall energy conversion efficiency, looking into the possibility of an increment on the output current of the device. This research discusses the different methods applied during experimentation allowing for the reach of higher efficiency, explaining the effects each method had on the different samples used. Some of the methods to be discussed are some conventional methods in the creation of n-type silicon solar cells such as light trapping, spin-on doping, annealing, and physical vapor deposition contact creation. Also, some advanced methods will be discussed such as desired wafer thickness, approximated optimal etch time, dopant distribution, gradual temperature increments, and optimal contact creation. In accordance to the methods used, a conversion rate efficiency of 0.99% was obtained, as well as an open circuit voltage (Voc) of 500 mV, a short circuit current (Isc) of 17 mA, a fill factor (FF) of 32.5%, a short circuit current density (Jsc) of 6.39 ma/cm^2, and a shunt resistance of 33 Ω. Each sample is discussed separately in order to provide a wider view on the positive and negative aspects of each method applied.

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Synthesis, characterization and performance evaluation of perovskite structured oxides for smart sensor technology

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Temperature independent gas sensors are needed for optimization of emission control in fossil-fueled based power-plants and other engines operating at extreme temperatures. Unfortunately, traditional metal oxide oxygen sensors tend to fail under extreme operation conditions (600-800°C). In course of finding new materials, Sr and Ba based perovskites has attained great interest to researchers due to their thermal stability in extreme conditions. Recent study on BaFe1-xTaxO3-δ (0≤x≤0.4) perovskite oxides reveals that these materials exhibits a minimal temperature dependency of electrical conductivity in the temperature range 400°C- 900°C towards oxygen sensing. Moreover, it has been reported that among the aforementioned compounds 30 at% of Ta exhibits enhanced oxygen sensing response. Hence, in the present work effect of sintering temperature on sensing response of BaFe0.7Ta0.3O3-δ(BFTO30) bulk ceramics has been studied. For this purpose, BFTO compound was synthesized using conventional solid-state reaction route. To synthesize BFTO compound, high pure precursors (BaCO3, Fe2O3 and Ta2O5) were stoichiometrically weighed and homogeneously mixed in a wetting media. Homogeneously mixed powders were calcined at 1150°C for 8h. X-ray diffraction analysis of calcined powders reveals that synthesized compound was stabilized in perovskite structure without any secondary phases. Phase pure calcined powder was pelletized and sintered at different temperatures [1200°C, 1250°C, 1300°C and 1350°C]. X-ray diffraction patterns of sintered powders reveals that there is a structural transformation with increasing temperature from lower symmetry to higher symmetry. From, morphological features of sintered pellets it is observed that samples sintered at 1200°C, 1250°C and 1300°C exhibit porous morphology, while sample sintered at 1350°C exhibits a dense grain structure. Moreover, we also measured frequency dependence dielectric properties of samples, which reveal a dependency of dielectric constant on density of pellets at ambient temperature. Testing the oxygen sensing behavior of all the sintered pellets is under way; to explore the effect of morphology and sintering temperature on sensing response.

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Identification of lead compounds of CXCR6 using in silico approaches

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The aim of the project was to find the lead compounds that modulate CXC chemokine receptor type 6 (CXCR6). This protein is an entry coreceptor; SIV and HIV viruses exploit its function in order to penetrate a cell. This protein was specifically chosen due to its Tbio development level in the PHAROS database. Tbio proteins are described as not having known drug or small molecule activities. In this project a homology model was predicted using ITASSER. Molecular dynamics was used in order to relax the protein and to pick a number of potentially stable protein conformations. From there, a combination of Pharmacophore modeling, molecular docking, and machine learning techniques were employed to predict lead ligand molecules that had affinity to bind to CXCR6. The molecules that have been identified using computational methods and experimentally validated will be presented.

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Formulation of transdermal gel with nicotine conjugate loaded solid lipid nanoparticles

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As of 2016, 37.8 million adults in the United States currently smoke cigarettes, leading to diseases that have been estimated to kill 0.5 million Americans per year. Smoking cessation often involves the use of nicotine replacement therapy, which can come in multiple forms such as a transdermal patch. However, with current transdermal patches there are limitations which include skin irritation and poor patient compliance. Encapsulation of nicotine into lipid nanoparticles could be an effective strategy to overcome irritation and prolong the release. Therefore, the aim of this study was to develop nicotine loaded solid-lipid nanoparticles (SLNs) for transdermal applications. Particle size, polydispersity index and zeta potential of optimized SLNs were 113.0 ± 0.76 nm, 0.214 ± 0.01 and -54.1 ± 5.01 mV respectively. Percentage encapsulation efficiency determined by using ultrafiltration method was found to be 46.45 ± 1.53%. Transmission electron microscope images revealed that SLNs were roughly spherical in shape. Differential scanning calorimetry and X-ray diffraction studies confirmed the successful encapsulation of the conjugate into SLNs. The amount of nicotine permeated from SLNs after 24 h was 736.61 ± 164.00 μg/cm^2, confirming controlled release. Based on the results of this study it can be concluded that nicotine loaded SLNs can be promising alternative controlled release transdermal drug delivery system for smoking cessation.

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Soil Lead Assessment in Central El Paso Neighborhoods Using the p-XRF Analyzing Instrument.

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Many of El Paso's central neighborhoods have lead-contaminated soils or lead-based paint inside the house. Some houses can be over 100 years old according to the Urban Housing Development, and many have lead-based paint on the inside and on the exterior. High soil lead levels and lead-based paint in houses can be a threat to the health of children that reside in these houses. The presence of lead in central neighborhoods houses' soil can be due to the proximity of metal recycling facilities, busy highways, and the cross-contamination that wind can transport from the past ASARCO Copper refinery smoke stack area. The objective of this experiment is to conduct an environmental survey of soil lead contamination of central El Paso houses that are susceptible for having lead contamination. Lead measurements in soil will be analyzed with a p-XRF (X-Ray Fluorescence) analyzer in houses located in the Segundo Barrio and Chamizal neighborhoods. According to EPA standards, soils that are (>400 ppm) are considered unsafe. Past results of the lead assessment in the Sunset Heights neighborhoods showed lead values ranging from 19-817 ppm with p-XRF. The highest range was from a house from Sunset Heights, ranging from 619-817 ppm. Highest values were found within three mile radius of ASARCO in Sunset Heights. There was a positive correlation between age of house and high soil lead levels. Lead assessment is still in progress, 15-20 more houses are going to be tested for lead in the house surrounding soil using the p-XRF device. Data will be used for current and future studies concerning elevated blood lead levels in children that reside in these surrounding neighborhoods. The Lead assessment data will also be crucial for recommending if a remediation plan will be necessary in the house property.

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Carlos Vargas, Alexander Obeng, Michelle Del Rio, Christina Sobin, William Hargrove. "Soil Lead Assessment in Central El Paso Neighborhoods Using the p-XRF Analyzing Instrument.". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=28

Development of a vibrotactile biofeedback device for clinical use during lower-limb amputee rehabilitation: A pilot study

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Following an amputation, lower-limb amputees are prone to asymmetric weight bearing on their residual limb. This is a consequence of abnormal, increased body weight application onto the intact limb. Prolonged load asymmetries between each limb can lead to balance disorders, gait asymmetry, and Deep Tissue Injury (DTI) if exposure to such imbalances persists. These complications arise due to loss of sensory function and can result in prolonged rehabilitation periods. A prototype of a custom vibrotactile biofeedback system was therefore designed and manufactured to address these issues and to determine: 1. If vibrotactile feedback is appropriate for applications involving lower-limb rehabilitation, 2. If the biofeedback system can act as an effective training tool for targeted weight bearing exercises, and 3. If the device can ameliorate gait asymmetry while ambulating. A pilot test was conducted on a non-amputee subject following a previously designed testing methodology. Preliminary data for this subject suggests that, yes, vibrotactile feedback is appropriate for this and similar applications, the device has potential to improve targeted weight bearing capabilities and using the device can potentially improve gait asymmetry. Participant feedback suggests that this device is effective; nonetheless, further device modifications and testing are needed to validate the results presented herein.

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Ricardo Vela, Jr., Meagan Kendall. "Development of a vibrotactile biofeedback device for clinical use during lower-limb amputee rehabilitation: A pilot study". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=138

Detection of somatic coliphages in superficial waters in the Honda River, Costa Rica

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Somatic coliphages are fecal indicators used to assess water quality. The concentration of somatic coliphages in surface waters were analyzed to evaluate their relationship with human activities. During four consecutive weeks, sixteen samples of surface water were collected from the Honda River in Costa Rica. The land use had some association with the detection of coliphages in surface waters due to abundant forestall and pastoral land. A practical Single Agar Layer (SAL) plaque assay was used to identify the presence of somatic coliphages using Escherichia coli. Samples were collected weekly at four different altitudes; low, medium low, medium-high, and high. A map was developed identifying the four sampled points and corresponding land use classification of agriculture land, grazing area, forest, and urban area using the coordinate system CRTM05 and the ArcGIS 10.3 and QGIS 3.4 software. The highest point of the river had the greatest viral activity with results showing 16,395 FPU. It was observed that fecal matter was present due to predominant use of pasturage, the stream gradient, and contamination of human settlements. Costa Rica does not use the identification of coliphages as an indicator parameter of fecal contamination to assess the quality of drinking water sources. Sampled waters where compared between surface water in Costa Rica with similar international water quality parameters from France, Singapore, and Australia. By comparing the international parameters, results indicated that its quality is not suitable for consumption, irrigation of crops, and domestic use. Evidence suggests that grazing areas and human activity affect water quality.

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Jessica Velazquez, Eric Morales-Mora, Luz Chacón-Jimenez, Rosario Achí-Araya, Gabriel Ibarra-Mejia. "Detection of somatic coliphages in superficial waters in the Honda River, Costa Rica". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=97

Integrating Global Optimization Algorithms into Machine Learning Algorithms

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Recently, Machine Learning (ML) algorithms have become the go-to for developers who need to collect large amounts of data (from complex sources) or solve complex problems with a high degree of accuracy. They are heavily based on optimization routines, which are crucial to the speed and accuracy of the results. For this reason, we believe it important to study how efficient are the current optimization algorithms embedded in the Machine Learning tool. In particular, we postulate that these optimization algorithms can be improved and that improving them should result in better performance overall of ML algorithms. Our goal is to study the effect of improved optimization routines on the overall functionality and accuracy of Machine Learning tools. We furthermore propose to explore the use of global optimization methods. To study the results of a more effective optimization algorithm on traditional Machine Learning approaches, we compare traditional optimization algorithms used in TensorFlow to a proven global optimization method. To this and, we create a function of gradient descent using interval computation. Preliminary results are reported that show the validity of our postulate and inform our future work. This preliminary study shows the promise of embedding more efficient optimization algorithms into ML tools. We need to further expand our study to more applications. Future work includes expanding our work to cases in which uncertainty arises, checking how uncertainty is handled (or not) by current algorithms, and studying how existing global optimization algorithms that handle uncertainty can help.

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LIFE SCIENCES

Effects of microbes and sunlight on dissolved organic carbon quality in desert wetlands

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Dissolved organic carbon (DOC) is an important component in wetland ecosystems, forming an important part of the carbon cycle and a food source for many microorganisms. Importantly in shallow wetland systems, sunlight can degrade DOC into more labile forms, allowing microbes to metabolize the DOC and produce CO_2. Our objective was to see how DOC in local waterbodies is modified by light, and determine if microbes can use this photochemically altered DOC. Water was collected from multiple desert wetlands near El Paso, TX. Samples were filtered for DOC using 0.47 µm filter and microbes using 1.2 µm filter. Four replicate DOC samples were incubated in WhirlPaks with and without a microbial inoculum in light and dark ambient conditions for 7 days. DOC and dissolved inorganic carbon (DIC) concentrations were measured using a SHIMADZU TOC-L. A spectrophotometer (GENESYS 10UV) was used to determine the quality of carbon in samples using calculations for Slope Ratio (SR) for molecular weight, C440 for color, and Specific Ultraviolet Absorbance (SUVA254) for lability. Preliminary results showed significant differences in C440 and SR between some of the light and dark samples, indicating photochemical changes occurred to the DOC. There were conflicting differences between samples in the final concentration of DIC and DOC. Results were inconclusive to weather microbes were better able to use the modified carbon. Additional experiments are being completed to optimize incubation time and temperature. There was also a lot of variability in the data which may indicate more replicates needed for future samples.

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Tracking the migration of T-cell acute lymphoblastic leukemia cells in mice: Determining the role of CCR7 in central nervous system invasion

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T-cell acute lymphoblastic leukemia (T-ALL) is a blood cancer most commonly found in children and adolescents that can invade the central nervous system (CNS). Inside the CNS T-ALL becomes inaccessible to chemotherapies that circulate in the blood, necessitating the direct application of harmful drugs and ionizing radiation to the CNS. CCR7, binds to its ligand C-C motif chemokine ligand 19 (CCL19), which promotes T-ALL invasion of the CNS. Therefore, we hypothesize that if we can block CCR7, we can block T-ALL invasion of the CNS, and potentially prevent recirculation into the CNS if the cells exit to the periphery. To study this we will compare CNS invasion of two pediatric T cell acute lymphoblastic cell lines, CEM that expresses CCR7 and DND41, which does not express endogenous CCR7. We hypothesize that expression of luciferase in the T-ALL cells will allow us to follow the cells during progression of T-ALL in the presence or absence of CCR7 blocking peptides. Using a Luciferase-2 expressing lentivirus we are transducing CEM and DND41, to use in an in vivo mouse model of T-ALL. These cell lines will allow us to track the localization of CEM and DND41 cells by bioluminescent imaging in live animals to determine if CNS infiltration persists in the presence of CCR7 antagonists. Ultimately, these studies will allow us to develop platforms for pharmaceuticals to block CCR7 signaling and prevent T-ALL from invading the CNS.

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Jailene Amparan, Anahi Sanchez, Charles Bill, Colin Bill, Charlotte Vines. "Tracking the migration of T-cell acute lymphoblastic leukemia cells in mice: Determining the role of CCR7 in central nervous system invasion". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=40

Identification of *Francisella tularensis* lipid extracts activating Natural Killer T (NKT) cells.

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Francisella tularensis is a Gram-negative bacterium that causes the fatal disease-tularemia. It causes a cytokine storm. Cytokine storm is a dysregulation of the pro-inflammatory cytokines released during an infection. This response can lead to hypovolemic shock, hemorrhage, edema, acute distress syndrome, and death. Investigating the host immune response showed that Natural Killer T Cells control the production of inflammatory cytokines. Thus, NKT cells can prevent the cytokine storm from developing during infection of F. tularensis. Furthermore, alpha galactosylceramide (alpha-GalCer) activates NKT cells when presented in the context of the CD1d receptor. It is hypothesized that F. tularensis produces a glycosphingolipid responsible for the protective effects. Lipids were extracted from F. tularensis cultures and glycolipids were enriched using solid phase extraction silica column chromatography. Then, lipid extract fractions from the cultures were used as a probe for plate bound CD1d. It was co-cultured with NKT hybridoma cells. Subsequently, ELISA was ran to measure the T cell receptor (TCR) engagement.

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Pablo Arenaz III, Charles Spencer. "Identification of Francisella tularensis lipid extracts activating Natural Killer T (NKT) cells.". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=142

Effects of mitochondrial dynamics and bioenergetics on mitosis

Seham Azzam[1,^], Erica Herrera[0], Pavel Gonzalez[2], Laura Diaz-Martinez[1]

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Mitochondrial dynamics play a significant role in cellular bioenergetics and the cell cycle. Proteins involved in mitochondrial fission and fusion have been shown to play a role in the G1/S and G2/M transition. DRP1, a mitochondrial fission protein, was found to be involved in the response to arrest in mitosis by the anti-cancer drug taxol. Here, we study the role of mitochondria dynamics and function in mitosis. Using siRNAs or chemical compounds to inhibit DRP1, we show a range of mitotic defects, including spindle malformation, decreased spindle size and delayed mitotic exit. These mitotic defects are reversed upon simultaneous inhibition of DRP1 and Opa1, a mitotic fusion protein. Based on these results, we will examine whether DRP1 inhibition affects chromosome segregation using U2OS cells containing a Human Artificial Chromosome (HAC). These results indicate a potential role for mitochondria function in mitosis. To test this, we utilized mitochondrial inhibitors in vitro and in vivo to study the effects on tubulin polymerization and spindle morphology. Surprisingly, a subset of mitochondrial inhibitors disrupted tubulin polymerization in vitro. Future studies will continue to address the molecular mechanisms of these mitochondria/mitosis interaction and its potential effect in cancer progression.

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Seham Azzam, Erica Herrera, Pavel Gonzalez, Laura Diaz-Martinez. "Effects of mitochondrial dynamics and bioenergetics on mitosis". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=15

The effects of intermittent dietary supplementation with fish oil on high fat diet-induced enhanced sensitivity to the behavioral effects of dopaminergic drugs

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Eating a high fat diet can lead to obesity, type 2 diabetes, and dopamine system dysfunction. For example, rats eating high fat laboratory chow are more sensitive than rats eating standard chow to the behavioral effects of dopaminergic drugs. Specifically, drugs that act on dopamine systems (e.g., quinpirole and cocaine) produce unconditioned behavioral effects (e.g., yawning and locomotion) that are enhanced among rats eating high fat chow. Daily dietary supplementation with fish oil protects this high fat diet-induced effect; however, doctors recommend that patients take fish oil only 2-3 times a week for beneficial health effects. To test the hypothesis that intermittent (e.g., 2/7 days per week) dietary supplementation with fish oil prevents high fat diet-induced effects (e.g., enhanced sensitivity to the behavioral effects of dopaminergic drugs) rats eating standard chow (17% kcal from fat), high fat chow (60% kcal from fat), or standard or high fat chow with 20% (w/w) intermittent (e.g., 2/7 days per week) dietary fish oil supplementation were tested once weekly with quinpirole (0.0032-0.32 mg/kg, i.p.) or cocaine (1-17.8 mg/kg, i.p.) using cumulative dosing procedures. Consistent with previous reports, eating high fat chow enhanced the sensitivity of male rats to quinpirole-induced yawning and female rats to cocaine-induced locomotor sensitization. Intermittent fish oil dietary supplementation prevented effect among rats eating high fat chow. Future experiments will focus on understanding the mechanisms by which fish oil produces these beneficial effects in males, as well as understanding the mechanisms driving the sex differences observed.

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Pigment levels and resistance to ultraviolet radiation

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Studies have found that zooplankton exposed to UVR are negatively impacted through decreased lifespan and fecundity. Bdelloid rotifers are aquatic microinvertebrates that enter a state of anhydrobiosis by stabilizing and compacting cellular structures, reducing metabolic activity to 0.01% of basal activity and forming a xerosome. Pigmented bdelloid rotifers Pleuretra lineata, obtained from rock pools (huecos) located in Hueco Tanks State Park and Historic Site, El Paso Co., TX have shown resistance to UVR due to pigmentation. At the time of collection bdelloids are highly pigmented (HP) and maintain red pigmentation for up to 2 weeks in the laboratory, bdelloids become moderately pigmented (MP) after 2 weeks in the lab, lightly pigmented (LP) after longer than 4 weeks, and rotifers in the lab over 24 weeks are considered clear (CL). Previous studies in our lab have shown that HP rotifers have a higher survival rate than LP when desiccated and exposed to UVR, in this study it will be determined whether Cl rotifers will have lower resistance to UVR as compared to HP, MP and LP rotifers. Clear unpigmented rotifers will be desiccated for 1 or 7 days to form a xerosome, then exposed to low (130 $\mu W/cm^2$), mid (375 $\mu W/cm^2$), or high (500 $\mu W/cm^2$) UVR for 2 hr. Survival will be assessed 48 hr after exposure. This study will provide an understanding on how bdelloids use pigmentation as an adaptation for protection against projected increases in UVR levels with climate change.

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Increases in muscular activation using overload eccentric training

Paulina Caraveo[1,^], Samuel Montalvo[1], Lance Gruber[1], Itzel De La Torre[1], Matthew Gonzalez[1], Gabriel Mejia-Ibarra[1], Sandor Dorgo[1]

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Overload Eccentric Training (OET) is characterized by the use of supramaximal loads during the eccentric portion of a movement. Bench press is an essential component of the sport of powerlifting. Changes in muscular activation during the bench press using OET have not yet been studied with different training loads. PURPOSE: To observe changes in muscular activation during a three-week OET period. METHODS: Ten elite powerlifters (5 males and 5 females; 26.4 ± 3.9 yrs.) participated in a quasi-experimental study design. Subjects participated in a 5-training session protocol with a 48-72 hour rest in between training sessions. For the first session, subjects performed a bench press using eccentric overload hooks with 105% of their 1 repetition maximum bench press with 90% of the load being on the bar (105/90 of 1 RM; first number indicates eccentric load, second number indicates concentric load: Eccentric load was increased by 5% for each training session (110/90, 115/90, 120/90, and 125/90, respectively). Muscular activation of the pectoralis major, anterior deltoid, and triceps brachii was assessed using Electromyography (EMG). The EMG signals were filtered using a band-pass (low pass = 20 Hz, high pass = 450 Hz). Data was smoothed using root mean square at 200. Proposed Data Analysis: Data is currently being collected. Data will be analyzed in Rstudio using R statistics. The Friedman test, the non-parametric version of ANOVA with repeated measures, will be used to asses changes in muscular activation during each of the training sessions.

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Paulina Caraveo, Samuel Montalvo, Lance Gruber, Itzel De La Torre, Matthew Gonzalez, Gabriel Mejia-Ibarra, Sandor Dorgo. "Increases in muscular activation using overload eccentric training". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=116

RON Single Nucleotide Polymorphisms show a potential role in driving acute lymphocytic leukemia (ALL)

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PURPOSE: Acute lymphoblastic leukemia (ALL) is a malignant transformation of lymphoid progenitor cells in the bone marrow, blood, and extramedullary sites. Of significance for our region along the U.S.-Mexico border, ALL incidence rates including relapse are highest in Hispanic Americans compared to Caucasian Americans. To further understand the genetic drivers related to this cancer health disparity, we performed whole exome sequencing (WES) of genomic DNA obtained from 9 local ALL patients, obtained from UTEP's Tissue Biorepository, compared to 7 healthy donors. Using the bioinformatics pipeline, OncoMiner, for sorting through deleterious single nucleotide polymorphisms (SNPs) we identified genetic mutations in cancer patients within the human receptor protein tyrosine kinase (RTK), RON. Notably, aberrant RON activation has been related to tumorigenesis, malignant progression, angiogenesis, and chemoresistance, however, the novel mutations identified in this study have not been previously reported. METHODS: To determine if the newly identified RON mutations have an effect on pro-survival RON signaling pathways, we transfected the cell line HEK293 with wild type RON protein or RON containing SNPs identified by the study and subsequently treated with the tyrosine phosphatase inhibitor, pervanadate. RESULTS: In two of the RON mutants, N440P and L1349P, we observed higher phosphorylation of mutant receptor compared to wild type. This preliminary data suggests a possible pro-survival mechanism for ALL driven by RON signaling. CONCLUSION: Further analysis of these novel mutations within RON related to ALL patients is required to better understand their oncogenic role and assess their potential as cancer biomarkers for relapse or drug-resistance.

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Luisa Castillo, Denise Cadena, Elisa Robles, Robert Kirken. "RON Single Nucleotide Polymorphisms show a potential role in driving acute lymphocytic leukemia (ALL)". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=129

Identification of novel phospho-regulatory sites within the common gamma chain (γc) and their role in immune function

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PURPOSE: Normal immune function ensures the human body is capable of combating diseases, while allowing for self-tolerance. A fine-tuned orchestration of cell activity is required and attained with the help of cytokines that mediate such responses. The cytokine receptor common gamma subunit (γc) is an essential component for the signal transduction of a cytokine family, which includes IL-2, IL-4, IL-7, IL-9, IL-15 and IL-21. The binding of cytokine to its receptor on the cell surface initiates intracellular signaling cascades such as the JAK/STAT, PI3K/AKT and MAPK pathways. While the Î³c is shared by multiple cytokines, different outcomes are produced in response to each. This can be explained by phosphorylation of different residues within the γc resulting in the recruitment of distinctive signaling partners; however, these unique phosphorylation patterns have not been described. METHODS: To test this hypothesis, the human HPB-ALL and the human NK-like cell line, YT, were stimulated with different cytokines and subjected to immunoprecipitation of γc receptor. Subsequent Western blot analysis using phosphotyrosine antibody against γc were performed to assess activation. RESULTS: Our data indicate that Î³c is tyrosine phosphorylated with rapid kinetics in response to IL-2, IL-7, and IL-15 as we observed phosphorylation at 30 seconds. CONCLUSION: Cytokine stimulation induces rapid tyrosine phosphorylation of the receptor. Future analysis by mass spectrometry will be conducted in order to identify unique patterns of phosphorylation associated with γc cytokines. Phosphospecific antibodies will be generated in attempt to characterize and elucidate the role of individual phospho-sites used by γc signaling pathways.

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Karina Damian, Yoshira M. Ayala-Marin, Georgialina Rodriguez, Robert A. Kirken. "Identification of novel phospho-regulatory sites within the common gamma chain (γc) and their role in immune function". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=89

Diet assessment of New Zealand Grey Ducks and the invasive Mallard

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New Zealand Grey Ducks (*Anas superciliosa superciliosa*; grey ducks) are endemic to New Zealand, and has become threatened by the introduction of Mallards (*Anas platyrhynchos*). Determining differences in food items between the two species is necessary for future conservation strategies. Here, we assess the diets of Grey ducks and Mallards by collecting the organic material from dissected crops. Once washed and dried, we calculated the total mass of the entire material, and then separated the material into the categories of seeds, plant material, or animal material. Masses of each category were calculated. We find that Mallards favor plant material over seeds or animal material, while Grey Ducks have an equal preference of plant material and seeds. Finally, hybrid individuals favor seeds over plant material. These preliminary diet analyses show the strength and importance of such information, suggesting that maintenance of habitats with high plant material and seed production is key towards the conservation of Grey Ducks.

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Ariana De la Hoya, Philip Lavretsky. "Diet assessment of New Zealand Grey Ducks and the invasive Mallard". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=46

Common gamma chain cytokine inducible Jak3 S449 phosphorylation is mediated by the PI3K pathway

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PURPOSE: Janus Tyrosine Kinase 3 (JAK3) is a key protein involved in common gamma chain cytokine (γc) receptor mediated intracellular signal transduction. JAK3 kinase activity is known to be regulated by tyrosine phosphorylation; however, the role of serine phosphorylation is not well studied. To remedy this we performed mass spectrometry and identified a new phosphoserine (pS) site within JAK3, S449, located in the Src Homology 2 (SH2) domain. SH2 domains are involved in protein interactions by recognizing phosphorylated tyrosine residues and thus are important in downstream signaling. Based on this knowledge in addition to the fact that this residue is conserved amongst various species as well as amongst JAK family members, we believe that it plays an important role in JAK3 function. METHODS: To test this hypothesis we stimulated the human natural killer like cell line, YT, with IL-2 and IL-15, and performed a kinetic analysis for up to 60 minutes. Cellular Jak3 protein was separated by gel electrophoresis and western blot analysis was performed using phosphospecific antibodies against JAK3 pS449. Kinase inhibitor studies were performed to delineate the serine/threonine kinase regulator of S449. RESULTS: Jak3 S449 phosphorylation mirrored tyrosine phosphorylation in response to cytokine stimulation. Data obtained from a kinase inhibitor study suggests that PI3K, possibly through the serine/threonine kinase AKT, is regulating phosphorylation of S449 downstream of IL-2. CONCLUSION: These results provide the first evidence of serine phosphorylation of Jak3. Future work will aim to further characterize the impact of S449 phosphorylation on Jak3 structure and function.

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Daniela Diaz, Georgialina Rodriguez, Kristen Ahumada, Robert Kirken. "Common gamma chain cytokine inducible Jak3 S449 phosphorylation is mediated by the PI3K pathway". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=95

Impact of FTY720-Mitoxy on movement and cognition in Multiple System Atrophy mice

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In patients with Multiple System Atrophy (MSA) the small protein α-synuclein (αSyn) accumulates in myelinating glial cells forming lesions called glial cytoplasmic inclusions (GCI). GCIs cause demyelination leading to MSA motor and cognitive dysfunction. Transgenic mice (Tg) overexpress αSyn in myelinating glia model MSA with GCI pathology. Tg mice develop movement problems by 8.5 mo, but cognition has never been tested. Using heterozygous mice we generated a colony of wild type (WT) and Tg littermates. We also synthesized FTY720-Mitoxy, an analogue of an FDA-approved drug that crosses the blood brain barrier and is neuroprotective but has more potent effects in cell models. We hypothesize that FTY720-Mitoxy blocks pathology and behavioral deficits in MSA mice. To test this, we gave WT and Tg mice Vehicle or FTY720-Mitoxy then measured motor function by rotarod, and cognition by Barnes Maze and object recognition tasks. All WT and Tg mice had similar motor and cognitive function at 8 mo. From 8.5 mo, WT and Tg mice began receiving Vehicle orally or FTY720-Mitoxy by Alzet osmotic pumps, which deliver drug for 42 days. At 10 mo, movement remained normal in WT mice and in Tg mice given FTY720-Mitoxy, but Vehicle treated Tg mice developed motor deficits. Cognition was similar in all mice at 10 mo. To further assess FTY720-Mitoxy vs Vehicle cognitive effects, we implanted a second pump at 10 mo. Preliminary data suggest that FTY720-Mitoxy helped sustain both movement and cognition in aging Tg mice, supporting the further clinical development of FTY720-Mitoxy for MSA.

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Valeria Diaz, Guadalupe Vidal. "Impact of FTY720-Mitoxy on movement and cognition in Multiple System Atrophy mice". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=87

Urban dipteran diversity in the desert southwest

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Honey bees and native bees have been the primary focus of pollinator studies. Pollination by dipterans is not well understood, although some species are noted as frequent floral visitors. Dipterans may become more important in agriculture to supplement decreasing pollination if honey bees and native bees decline. Understanding the diversity and abundance of dipterans will help enhance our understanding of potential pollination services. We collected samples via pan trapping and sweep netting at three locations with varying floral diversity on the University of Texas at El Paso (UTEP) campus, an urban desert location. The dipterans were identified to family, and their feeding habits as larvae and adults were assessed using existing literature. A total of 134 dipterans were collected in March and April 2018. We have identified 67 to family thus far, representing feeding strategies including opportunists (n=18), pollinators (n=18), predators (n=28), and scavengers (n=3). We collected 242 bees during this same time period, indicating that pollinating flies are still a small component of the pollinator community. Future work includes continued dipteran identification for the length of the study, March 2018 to March 2019, and more detailed feeding strategy identification. This will help us document the dipteran diversity and abundance in the urban southwest and can allow for improved insect conservation actions that protect all pollinators.

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Nikki T. Donegan, Kevin Floyd. "Urban dipteran diversity in the desert southwest". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=44

The effects of cohabitation and reproductive activation on microglia in male and female prairie voles

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Prairie voles are socially monogamous rodents that form long-term pair bonds. Exposure to a novel member of the opposite sex stimulates reproductive activation, which is associated with rising concentrations of gonadal hormones. Changing hormone levels act as a trigger initiating a variety of neural mechanisms that stimulate sociosexual behavior and culminates in mating within 24-48 hours after pairing. The neuroimmune system, composed primarily of microglia and mast cells, is a critical regulator of many functions in the central nervous system. Microglia and mast cells are also exquisitely sensitive to gonadal hormones, suggesting that they may be key mediators bridging neuroendocrine activation and changes in sociosexual behavior. Previous research has shown that mast cell numbers increase in several brain regions in female prairie voles following exposure to male urine (a chemosensory stimulus that induces estrus). However, the potential role of microglia in reproductive activation and pair bond formation has never been directly examined. The objective of the current study is to analyze changes in microglia density and morphology in male and female prairie voles after being paired with a member of the opposite sex. We hypothesized that pair bonding and reproductive activation would be associated with increased numbers of microglia in brain regions implicated in sociosexual behavior, including the medial amygdala, anteroventral periventricular nucleus of the hypothalamus and medial habenula.

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Andrea Enriquez, Adam Perry, Bruce Cushing. “The effects of cohabitation and reproductive activation on microglia in male and female prairie voles”. (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=56

Diet analysis of New Zealand ducks

Katlyn Feick[1,^], Philip Lavretsky[1], Joshua Brown[1]

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Understanding the dietary preferences of species is essential for more effective conservation. Here, we conduct a diet analysis of ~30 New Zealand Grey Ducks, Mallards, and their hybrids through locations in New Zealand. Given previous research on Grey Duck preferences, we expect them to favor the seeds of aquatic vegetation, while Mallards will likely favor seeds from larger grass and grain plants due to their captive-bred ancestry. We collected and washed all organic material from dissected gizzards, and took total mass once dried, as well as counted and categorized into seeds, plant material, or animal material. First, Grey Ducks preferred seeds (N = 50%) and plant material equally (N = 50%), while Mallards favored plant material (N = 71%) significantly more than seeds (N = 27%) or animal material (N = 2%). Furthermore, unlike the parental species, we found that hybrids strongly favor seeds (N = 76%) over other plant material (N = 24%). These results suggest that there are significant differences in the diet preferences of Grey Ducks and Mallards. Given that Mallards are threatening to displace endemic Grey Ducks, these results suggest that management could focus on maintaining habitat that supports aquatic vegetation with high seed production for Grey Ducks. These are the initial findings of the most extensive diet analysis of Grey Ducks and Mallards in New Zealand to date and will undoubtedly be essential for the conservation of Grey Ducks in the future.

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Katlyn Feick, Philip Lavretsky, Joshua Brown. "Diet analysis of New Zealand ducks". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=63

Effects of fatty acid composition in a high fat diet on skeletal muscle mitochondrial content and PLIN3

Isaac Gandara[1,^], Shaan Naughton[2], Lannie O'Keefe[2], Anna Simcocks[2], Deanne Hryciw[2], Michael Mathai[2], Andrew McAinch[2], Sudip Bajpeyi[1]

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High fat diets (HFD) impair skeletal muscle mitochondria and lipid oxidation. We have demonstrated that Perilipin 3 (PLIN3) protein is associated with greater lipid oxidation and is upregulated with exercise. It is not clear how dietary fatty acid composition impacts mitochondrial content and PLIN3. PURPOSE: To determine the effects of HFD differing in fatty acid composition on skeletal muscle mitochondrial content and PLIN3. METHODS: Male Sprague Dawley rats were fed a Western-style (21% fat; 41% energy) HFD for 9-weeks and then divided into three HFD groups, for an additional 6 weeks: a) mixed fat Western diet (WD) (21% fat; 9.76% saturated), b) HFD rich in monounsaturated fatty acids (MUFA) (21% fat; 16.01% mono), or c) HFD rich in polyunsaturated fatty acids (PUFA) (21% fat; 16% poly). A control group consumed a low fat Chow diet (CD) (4.8% fat). After 15 weeks, mitochondrial content (OXPHOS) and PLIN3 proteins in soleus muscle were measured using Western immunoblotting. RESULTS: There were no significant differences in OXPHOS proteins among diet groups (One-way ANOVA $p>0.05$ for each complex). Complex I (Chow: 1.33±0.83; WD: 1.23±0.52; MUFA: 0.81±0.26; PUFA: 0.66±0.16), Complex II (Chow: 1.02±0.45; WD: 0.51±0.21; MUFA: 0.33±0.18; PUFA: 0.56±0.23), Complex III (Chow: 11.63±8.216; WD: 6.52±3.16; MUFA: 5.05±1.90; PUFA: 3.44±1.23), Complex IV (Chow: 3.95±1.98; WD: 2.60±0.86; MUFA: 2.20±0.69; PUFA: 1.65±0.55), and Complex V (Chow: 13.00± 9.87; WD: 6.52±3.45; MUFA: 4.12±1.57; PUFA: 3.26±1.22) were not different among diet groups. PLIN3 quantification is in progress. CONCLUSIONS: Skeletal muscle mitochondrial content is unaffected by HFD or fatty acid composition.

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Isaac Gandara, Shaan Naughton, Lannie O'Keefe, Anna Simcocks, Deanne Hryciw, Michael Mathai, Andrew McAinch, Sudip Bajpeyi. "Effects of fatty acid composition in a high fat diet on skeletal muscle mitochondrial content and PLIN3". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=151

Analysis of SUMO 1 levels upon different stress conditions

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SUMOylation is a post-translational modification consisting of covalent conjugation of ubiquitin-like proteins called SUMO (Small Ubiquitin-like Modifier)-1, SUMO-2 and SUMO-3 to target proteins and regulate a wide array of cellular processes. It has been proved that SUMO increases when cells experience any kind of stress; such as arsenic poisoning, hibernation, heat shock, any kind of ischemic events, and plays important roles for numerous viruses during infection. This study was designed to gain in-depth knowledge in how SUMO-1 is regulated in the cell upon stress conditions, such as heat shock and influenza infection. These findings would open the path to the development of artificial ways to increase SUMOylation in pursuit of specific therapeutic effects, such as protection against ischemic damage and viral infection. Western blot analysis were conducted to know if there was an increase in SUMOylation under these types of stress. A SUMOylation increase was observed under influenza viral infection and heat-shock stress. Therefore, these observations indicate that these stress treatments interact extensively with the cellular SUMOylation system during these types of stress conditions. These findings suggest that SUMOylation plays an important role during influenza virus infection and heat-shock to prevent apoptosis.

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Andrea Garcia, Myriah Acuña, Germán Rosas-Acosta. "Analysis of SUMO 1 levels upon different stress conditions". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=115

Effects of a family history of type 2 diabetes on circulating miRNAs 155 and 133

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Background: Type 2 diabetes (T2D) is characterized by impaired glucose uptake and insulin resistance. A family history of T2D (FH+) and physical inactivity increase the risk for development of T2D, whereas regular exercise is highly effective in preventing the pathogenesis of T2D. The emergence of microRNAs (miRNAs) in circulation has acquired interest in identifying stable biomarkers for the early detection of T2D risks and exercise induced benefits on skeletal muscle metabolism. Circulating miRNA-133 has been shown to increase in response to inflammation following exercise. miRNA-155 has been shown to be associated with increased insulin sensitivity. Purpose: To determine the effects of a FH+ on circulating miRNA-133 and miRNA-155 and to determine whether 8 weeks of exercise induced improvements in insulin sensitivity and cardiorespiratory fitness are associated with changes in circulating miRNA-133 and miRNA-155. Methods: 19 participants underwent 8 weeks of combined exercise training (35-min aerobic exercise followed by 6 full-body resistance exercises) 3x/week. Insulin sensitivity was assessed via the gold-standard hyperinsulinemic euglycemic clamp. Circulating miRNA expression was assessed by isolation of total RNA from serum, reverse transcription of miRNA, pre-amplification and quantification by qRT-PCR using the comparative method. Results: There were no significant differences between FH+ and individuals without a family history of T2D in expression levels of miRNA-133a (0.89±3.97 vs. 1.76±3.85; p=0.88), miRNA-133b (-1.73±4.4 vs. -3.52±5.44; p=0.80) and miRNA-155 (2.01±5.06 vs. 3.31±9.47; p=0.89). Conclusion: In conclusion, sedentary, normoglycemic, healthy Mexican American males with FH+ do not display an altered expression of circulating miRNA-133 and miRNA-155.

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Mario Garcia, Manuel Gomez, Cesar Meza, Andrew McAinch, Sudip Bajpeyi. "Effects of a family history of type 2 diabetes on circulating miRNAs 155 and 133". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=147

Sex differences in gene expression of nicotinic acetylcholine receptor (nAChR) subunits in the interpeduncular nucleus of female and male rats experiencing nicotine withdrawal

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Withdrawal from chronic nicotine elicits negative affective states that are modulated, in large part, via nAChRs in the medial habenula-interpeduncular nucleus (MHb-IPN) pathway of the brain. Previous research using knock-out mice has demonstrated that alpha4beta2 and alpha5 nAChRs in MHb-IPN pathway are necessary for the expression of negative affective states produced by nicotine withdrawal. Despite the current knowledge of the role of nAChRs in nicotine withdrawal, there is little information regarding sex differences in the expression of these receptors during withdrawal in the IPN. To address this issue, the present study compared gene expression of alpha4, beta2, and alpha5 receptor subunits in the IPN of female and male rats during nicotine withdrawal. Female and male rats were implanted with a pump that delivered nicotine for 14 days. The following day, the rats received an injection of saline or the nAChR antagonist, mecamylamine, to precipitate withdrawal. Twenty minutes later, rats were tested for anxiety-like behavior using the elevated plus maze (EPM) test. After testing, the IPN was dissected and alpha4beta2, and alpha5 mRNA expression was assessed using RT-qPCR methods. The results from the EPM revealed that female rats displayed an increase in anxiety-like behavior during withdrawal that was larger than males. The molecular results revealed that female rats displayed an increase in the expression of alpha5 mRNA, an effect that was absent in male rats experiencing withdrawal. In contrast, male rats displayed an increase in the expression of alpha4 and beta2 mRNA, and this effect was absent in female rats. These data suggest that sex differences in anxiety-like behavior produced by nicotine withdrawal is related to a differential expression of alpha4beta2 and/or alpha5 nAChRs in the IPN, and future studies are needed to explore the role of various nAChRs in the MHb-IPN pathway in modulating sex differences in the expression of the nicotine withdrawal syndrome.

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Montserrat Garcia Arreguin, Victor Correa, Rodolfo Flores, Laura O'Dell. "Sex differences in gene expression of nicotinic acetylcholine receptor (nAChR) subunits in the interpeduncular nucleus of female and male rats experiencing nicotine withdrawal". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=150

Chronic Ethanol Exposure Suppresses Food Consumption in Drosophila

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Alcohol is one of the most consumed drugs globally. Alcohol use and abuse can lead to increased disinhibition, elevated aggression, altered decision-making, anhedonia and ultimately, addiction. However, the underlying mechanisms by which alcohol causes immediate and long-lasting behavioral changes are not fully understood. In this study, we sought to uncover whether repeated ethanol (EtOH) exposure alters food consumption and reward preference using the Drosophila melanogaster (also known as fruit fly) model. The wild-type Canton-S (CS) male and female flies were chronically exposed to EtOH for 6 consecutive days and then tested for food consumption and reward preference. We utilized a Capillary Feeder (CAFE) assay for three consecutive days to measure the amount of consumed food and preference to EtOH-containing food either a day after (short term) or a week after (long term) the last EtOH exposure. We found that food intake was decreased in chronically EtOH-exposed male and female flies when measured immediately or a week later. This suggests that chronic EtOH exposure has a perdurable feeding suppressant effect. In contrast, EtOH preference remained unaffected in all conditions tested. These findings provide an initial framework to uncover the mechanism by which alcohol alters feeding behavior.

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Prescilla Garcia-Trevizo, Paul Sabandal, Kyung-An Han. "Chronic Ethanol Exposure Suppresses Food Consumption in Drosophila". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=165

Ellagic acid as a neuroprotectant against Amyloid beta in Parkinsons and Alzheimers disease

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Amyloid Beta (Aβ) is a known biomarker for Alzheimers Disease (AD). This disease is characterized by the formation of Aβ fibrils in the brain which cause neuronal damage. In addition, Aβ has been identified to act in a prion-like manner, recruiting other proteins to misfold and aggregate. In an effort to translate the clinical presentation of mixed neuropathies (i.e. Lewy body dementia), we will be using the amyloid beta peptide and introducing it to a non-native environment (dopaminergic neurons) and study the cellular mechanisms that ensue. Our lab is adept at using rotenone (a pesticide) as a model for Parkinsons Disease (PD); we will thus use this previously established model to draw parallels between these two mechanisms. Furthermore, the pathogenesis of Aβ (specifically 1-42) has been observed to be mitigated with the action of antioxidant compounds. The polyphenol ellagic acid (EA) was tested for its neuroprotectant ability to reduce Aβ (1-42) aggregation in vitro. The SH-SY5Y cell line transfected with α-synuclein (a biomarker for PD) was pre-treated with EA and insulted with Aβ. The biochemical changes were assayed via immunocytochemistry and Western Blot for protein detection to look for reduced PD-like pathogenesis.

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Alejandra Gomez, Lois Mendez, Gabriela Henriquez, Mahesh Narayan. "Ellagic acid as a neuroprotectant against Amyloid beta in Parkinsons and Alzheimers disease". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=13

Sex differences in high fat diet-induced enhanced sensitivity to dopaminergic drugs SKF 82958 and methamphetamine

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Eating a diet high in fat can lead to obesity and insulin resistance, but it can also enhance sensitivity of rats to the behavioral effects of drugs acting on dopamine systems (e.g., methamphetamine). For example, male rats eating high fat chow are more sensitive to the locomotor stimulating effects of methamphetamine. The locomotor-stimulating effects of methamphetamine are due, in part, to increased action of dopamine at dopamine D1 receptors; however, it is not known if diet enhances sensitivity of rats to the behavioral effects of dopamine D1 receptor agonists (e.g., SKF 82958). To test the hypothesis that eating a high fat diet enhances sensitivity rats to locomotion induced by dopaminergic drugs, male and female Sprague-Dawley rats ate either standard (17% kcal from fat) or high fat chow (60% kcal from fat) and were tested once per week with SKF 82958 (0.01-3.2 mg/kg) or methamphetamine (0.1-3.2 mg/kg) using a cumulative dosing procedure for 6 weeks. All rats eating high fat chow were more sensitive to the locomotor-stimulating effects methamphetamine than those eating standard chow. Females, but not males, eating high fat chow were also more sensitive to the locomotor stimulating effects of SKF 82958 than those eating standard chow. Taken together with previous research, these results suggest that among females, eating high fat chow might impact sensitivity to methamphetamine via dopamine D1 receptor specific changes, while among males, high fat diet-induced enhanced sensitivity to methamphetamine might be due to changes specific to dopamine D2 receptors.

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Ethan Hardin, Jeremiah Ramos, Katherine Serafine. "Sex differences in high fat diet-induced enhanced sensitivity to dopaminergic drugs SKF 82958 and methamphetamine". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=133

Prevalence of biocide resistance genes detected in first year medical students colonized in Staphylococcus aureus

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One of the major public health challenges that the world faces is antimicrobial resistance. Staphylococcus aureus is a versatile pathogen that can cause a wide variety of infections and can develop resistance to many antimicrobial compounds including antibiotics and biocides. These infections cause an enormous economic burden on healthcare resources, since patients infected with these organisms have to stay longer in hospitals. S. aureus often colonizes the anterior nares of humans. If healthcare workers carry resistance S. aureus organisms in their nares, they can act as vectors and may transmit the organism to patients who may be vulnerable to infections. This is a longitudinal study that aims to investigate the prevalence of S. aureus carrying biocide resistant genes (qacA, qacB, smr, norA, norb, norC, mepA) in medical students beginning in their first year of medical school and every year thereafter as they advance through their clinical rotations. We hypothesized that the rate of colonization in medical students will increase as they are more exposed to a clinical environment. Nasal swabs samples were collected from medical students and plated onto Mannitol Salts Agar and incubated for 24 hours at 35 C. Colonies fermenting mannitol were further confirmed by S. aureus latex agglutination and a coagulase test. DNA extraction was performed by using DNeasy Tissue Kit (Qiagen) following manufacturer's directions. Presence of biocide genes was analyzed by PCR according to the protocols of Noguchi and coworkers (1999). To verify the specificity of the reaction we included a negative, positive, and internal controls in each run. Up to now we have not found S. aureus carrying the qacA/B and smr genes in first year medical students. Future work includes the identification of the other biocide genes in the same cohort.

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Maria Ibarra, Brenda Baca, Delfina Dominguez, Michael Woods, Debra Bramblett. "Prevalence of biocide resistance genes detected in first year medical students colonized in Staphylococcus aureus". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=39

The connection of the Red Fire Ant (*Solenopsis invicta*) to railways

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Introduction: Solenopsis Invicta(Red Fire Ant) is from Central South America. The species likely entered Texas through Houston. The Red Fire ant is an invasive species to Texas that is harmful to the native species, threatens agriculture, natural environment, and public health, reduce biodiversity, and serves as a pathogen vector. Understanding what affects its distribution can help manage its spread. Sources suggests that railroads might have been important to the spread of S. Invicta. Question: Are railroads a factor affecting the distribution of Solenopsis Invicta? Hypothesis: Records of Solenopsis Invicta are going to associated with the railroads. Methodology: Georeference historical records from Dr. William P. Mackay with Google Earth.U. S. Department records of Solenopsis Invicta from the SCAN network (Symbiotic Collections of Arthropods Network).Data was imported into QGIS (Quantum Global Information System) and mapped onto a base map of Texas. Imported railroad maps and data which was obtained from the Texas Department of Transportation Website. There was a buffer of ants within 3000 meters of a railroad. Results: Results support the hypothesis that Solenopsis Invicta is associated with railroads. Results suggest that ants may use railroads to spread through Texas. Discussion: Records may be affected by other factors, such as wind patterns, precipitation, and competition. Conclusion: It seems that there is a connection to railroads and the spread of the red fire ant.

Funding Acknowledgement: The University of Texas at El Paso

Jordan Ingalls, Vicky Zhuang. "The connection of the Red Fire Ant (*Solenopsis invicta*) to railways". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=86

Olfactory Receptor Family 7 Subfamily C Member 1 expression in T-cell acute lymphoblastic leukemia identifies a potential stem cell sub-population

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According to Morita et al, Olfactory Receptor Family 7 Subfamily C Member 1 (OR7C1) is directly associated in ectopic expression in cancer stemness cells (CSC) of colorectal cancer patients. OR7C1 is one of the G-protein coupled receptors that initiates neuronal signals that are responsible for the perception of smell. We wanted to see if the ectopic expression of OR7C1 is also evident in our cell lines, which are T-acute lymphoblastic leukemia that mainly affect children. We will be using different methods in order to prove the expression of the receptor using western blot, flow cytometer, RT-PCR, and cell sorters. Upon proving the expression, it could then be studied further to determine how to specifically target OR7C1.

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Dayoung Jeon, Haidar Ahmed, Juan Carlos Silva-Espinoza, Charlotte Vines, Colin Bill. "Olfactory Receptor Family 7 Subfamily C Member 1 expression in T-cell acute lymphoblastic leukemia identifies a potential stem cell sub-population". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=162

Isolation of a CCR7 antagonist to prohibit CNS infiltration during T-cell Acute Lymphoblastic Leukemia

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T-cell Acute Lymphoblastic Leukemia (T-ALL) is a disease that affects mostly children. A complication of T-ALL is the infiltration of the central nervous system (CNS) by leukemic T-cells, which leads to the use of aggressive treatments like intrathecal chemotherapy to combat the disease. In many children the long-term side effects from the treatments lead to morbid side effects such as brain damage, secondary tumors and endocrine disorders. C-C- chemokine receptor 7 (CCR7), is a seven transmembrane receptor, that plays an essential role in promoting CNS invasion by T-ALL cells to occur through the interaction with the CCR7 ligand C-C chemokine Ligand 19 (CCL19). Therefore, the goal of this study is to isolate a CCR7 antagonist, CCL198-83, from a recombinantly expressed N-terminal fusion of CCL198-83 to yeast SUMO in BL21 DE3 cells. We are using the SUMO fusion protein to increase solubility. Expression will be monitored using Western blots. Once purified, we will determine the efficacy of CCL198-83 in blocking chemotaxis of human T-ALL cell lines towards CCL19.

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Lourdes Jimenez, Charlotte Vines, Mika Gehre. "Isolation of a CCR7 antagonist to prohibit CNS infiltration during T-cell Acute Lymphoblastic Leukemia". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=146

Urban pond quality and the effect on microinvertebrate species richness

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El Paso is in the Chihuahuan desert, an arid desert, and has limited water sources. These sources can affect the quality of water found in the local bodies of water. The sources that feed these bodies of water are the Rio Grande River, treated wastewater, and runoff. Runoff can either be urban or agricultural but can be significant during El Paso's monsoon season which generally is the June through September timeframe. Excessive nutrification can lead to eutrophication of the local ponds and lakes. This can affect primary production which can affect species richness of microinvertebrates. Microinvertebrates are microscopic life forms found in water and are good indicators of water quality. This research is aimed at studying the nutrient levels of local ponds and lakes in different seasons. The ponds and lakes (6) are fed from different sources and are located throughout the El Paso area. We also investigated species richness of microinvertebrates located in these ponds and lakes and compared them seasonally. This study started in the summer of 2018 and has continued through the spring of 2019. The results of the research show the nutrient levels and conductivity of the ponds have decreased from summer to fall, as expected. They also showed a decrease in microinvertebrate species richness in the ponds (the summer ranged from 3-27, the winter ranged from 8-10, and spring from 3-10). Interestingly it was also found that as the pond temperatures decreased, so did the species richness.

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Randall Legens, Elizabeth Walsh. "Urban pond quality and the effect on microinvertebrate species richness". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=94

Observing the mechanisms of nicotine induced disruption of cytoskeleton and neurite formation

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Tobacco use remains a major public health concern. It is known that nicotine, the main addictive agent in tobacco, interferes with neural communication. However, the process by which nicotine alters neuronal pathways is not well understood. Previous results from our laboratory indicate that nicotine exposure in rat brain inhibits neurite formation and alters microtubule (a major component of neuronal cytoskeleton) organization in nucleus acumens, a brain region known to be associated with drug addiction. The goal of the present study is to understand the mechanism of nicotine-mediated microtubules (MTs) assembly/organization in neurons and neurite formation. PC12 cells were used to conduct this study because it responds to nerve growth factor (NGF) exhibiting neuronal phenotypes. PC12 cells were treated with 100ng/ml NGF for two days to induce neuronal differentiation followed by treatment (24h) with 5uM or 10uM Nicotine. Samples were subsequently processed for confocal microscopy using antibodies specific for tubulin to analyze the effect of nicotine on MT alterations and neuronal disruption. Likewise, samples were subjected to whole cell lysis followed by immunoblotting using anti-tubulin, anti-tau (a MT associated proteins known to play critical role in MT organization), G-Beta (a signaling protein known to regulate MTs). Preliminary results indicate the inhibition of neurite formation, alteration MT organization and tubulin expression in response to nicotine. Experiments are underway to determine the involvement of tau proteins and G-Beta in nicotine-mediated cytoskeletal alteration and neurite formation. This could provide a mechanism of nicotine abuse and addiction, and the involvement of cytoskeleton in this process.

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Melissa Lerma, Georgina Diaz-Escandon, Sukla Roychowhury. "Observing the mechanisms of nicotine induced disruption of cytoskeleton and neurite formation". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=106

Analyzing ZNF16: a gene with uncharacterized function

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Proteins of uncharacterized function make up a significant portion of the human genome. Elucidating the roles of these proteins is fundamental to fully understand cellular and molecular processes. ZNF16 is a protein containing multiple zinc finger motifs that has been linked to erythroid and megakaryocytic differentiation. However, its molecular function remains unknown. Here, we explore ZNF16 function at the cellular and molecular level by analyzing its localization and characterizing the phenotypes of cells containing different levels of ZNF16. To determine its localization, we created three different cell lines expressing tagged versions of ZNF16. Using immunofluorescence and microscopy methods, we showed that exogenous ZNF16 is imported into the nucleus, however, the specific subnuclear localization is depended on the tag. We will also analyze potential functions for ZNF16 in cell proliferation, DNA damage, cell cycle regulation, apoptosis, and transcription. This study will serve as an initial characterization of ZNF16 function and a starting point for the analysis of other genes with unknown function.

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Arlene Levario, Chelsea George, Laura Diaz-Martinez. "Analyzing ZNF16: a gene with uncharacterized function". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=21

The effects of eating a high fat diet on sensitivity of female rats to dopamine D1 receptor agonist SKF 82958-induced eye blinking

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Eating a high fat diet can lead to several negative health consequences such as obesity, type 2 diabetes, and dopamine system dysfunction. Eating high fat chow enhances sensitivity of rats to the behavioral effects of drugs that act on dopamine systems. For example, rats eating high fat chow are more sensitive than rats eating standard chow to the unconditioned behavioral effects (i.e., yawning and penile erections) induced by the dopamine D2/D3 receptor agonist quinpirole. Drugs that act on dopamine D1 receptors also produce unconditioned behavioral effects in rats (i.e., eye blinking and locomotion); however, it is not known if eating high fat chow also enhances sensitivity of rats to these effects. In order to test the hypothesis that eating high fat chow will enhance the sensitivity of rats to the behavioral effects of dopamine D1 receptor agonist SKF 82958, rats were tested weekly using cumulative doses (0.01. 0.032, 0.1, 0.32, 1.0, 3.2 mg/kg) and eye blinking was measured in male and female rats eating either standard chow (17% kcal from fat) or high fat chow (60% kcal from fat). SKF 82958 significantly induced eye-blinking in male and female rats. In females, eating high fat chow for three weeks modestly, though not significantly, increased SKF 82958-induced eye-blinking as compared to standard chow fed controls. Based on these results, ongoing experiments are examining the impact of a history of eating high fat chow (e.g., pre-feeding for several weeks prior to SKF 82958 testing) on sensitivity of rats to dopamine D1 agonist-elicited eye-blinking. Further, additional experiments are examining other unconditioned behavioral effects of SKF 82958 (i.e., locomotion and sensitization) in rats eating different diets. These results add to the growing literature demonstrating sex differences regarding psychostimulants, as well as the relationship between diet and drug sensitivity.

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Organotin compounds as potential metal-based chemotherapeutic agents against Chagas disease

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An estimated 18-20 million people in Mexico, Central America, and South America are infected with Chagas disease (ChD) caused by the protozoan parasite *Trypanosoma cruzi* (T. cruzi). ChD is a zoonotic disease transmitted to humans and animals by the insect vector Triatomine, also known as 'kissing bug'. In recent years, this neglected infectious disease has become a global health concern. Currently, benznidazole and nifurtimox are the only clinically available drugs against T. cruzi, which have high toxicity, strain resistance, and limited efficacy. Thus, the development of effective new chemotherapies against ChD is imperative. Organotin compounds have been shown to be broad and potent biocides against eukaryotic infections ranging from fungicides to acaricides. Moreover, it has been established that a novel tetravalent organotin compound bis-(methylthiopropyl)tin dichloride acts as a benign organotin compound in respect to interactions with human natural killer cells. Therefore, the aim of this study is to assess novel organotin compounds as anti-Trypanosoma cruzi agents in an in vitro model of ChD. The anti-parasitic activity and cytotoxicity of bis-(methylthiopropyl)tin dichloride and a library of organotins (4 derivatives) was screened against T. cruzi and mammalian cells. These preliminary results provide evidence that bis-(methylthiopropyl)tin dichloride showed high anti-parasitic activity (EC50 = 1.816 μM) with low mammalian cell toxicity (IC50 = > 50 μM). Thus, these findings can be further extended to investigate the tetravalent organotin compound bis-[methylthiopropyl]tin dichloride therapeutic effects in the infective and intracellular stages of T. cruzi.

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Dominique Mata, Rosa A. Maldonado. "Organotin compounds as potential metal-based chemotherapeutic agents against Chagas disease". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=100

Climate change effects on invertebrate diapausing eggs

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A major environmental concern going forward into the 21st century is that of climate change. Invertebrates that reside in habitats with momentary periods of environmental suitability may be particularly at risk to increases in temperature. Many, including fairy shrimp, are able to survive unfavorable conditions by producing diapausing eggs. Diapausing eggs from two fairy shrimp (Branchinecta sp. = summer; Streptocephalus sp. = winter) were used to determine the possible effects of a projected 4°C rise on hatching success. To obtain optimal egg hatching temperatures, fairy shrimp species diapausing eggs (n=20, 3 replicates) were incubated at temperature treatments of 22, 27, 32, 37 °C for summer, and 7, 12, 17, 22 °C for winter species. The seasonal high where the summer species eggs were obtained is 37.5 °C with a low of 4 °C, while a high of 26.8 °C and low of -2 °C for habitats of winter species. The 27 °C treatment yielded the highest hatching rate (% Mean ± SD: 0.85 ± 0.1) while 37 °C had the lowest (0.28 ± 0.25) for the summer species. Treatment 22 °C had highest hatching rate for the winter species (0.17 ± 0.10) and 7 °C the lowest (0.017 ± 0.029). Overall, this study aims to find possible effects of a rise in temperature on diapausing eggs, as well as which species is more susceptible to the possible effects from a rise in temperature.

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Joseph McDaniel, Elizabeth Walsh. “Climate change effects on invertebrate diapausing eggs”. (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=71

Sex differences in the reinforcing effects of nicotine are larger under more demanding schedules of reinforcement

Tania Miramontes[1,^], Rodolfo Flores[1], Bryan Cruz[1], Melissa Ibarra[1], Priscilla Giner[1], Laura O'Dell[1]

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Introduction: A recent meta-analysis from our laboratory summarized the existing literature on sex differences in nicotine intravenous self-administration (IVSA). The results of this work revealed that IVSA procedural variables, such as the schedule of reinforcement, might influence the magnitude of sex differences in nicotine IVSA. To empirically test this hypothesis, the present study examined sex differences in nicotine IVSA under increasing fixed reinforcement (FR) and progressive ratio (PR) schedules of reinforcement. *Methods*: To acquire nicotine IVSA, adult female and male rats received extended access (23 hours) to a low (0.015 mg/kg) dose of nicotine for 6 consecutive days under a FR-1 schedule of reinforcement. The rats were then given access to nicotine (0.03 mg/kg) for 5 additional days under an FR-1, FR-3, FR-5, then PR schedule of reinforcement. The rats received 3 days of abstinence between each change in their schedule of reinforcement. *Results*: Female rats displayed greater levels of nicotine IVSA as compared to males under FR-1 and FR-3 procedures. However, there were no sex differences in nicotine IVSA under FR-5 procedures. Also, females reached higher breakpoints under the PR procedures. *Conclusion*: These results suggest that in general females display greater nicotine intake under higher reinforcement demands, and our results support our meta-analysis results suggesting that the schedule of reinforcement influences sex differences in nicotine IVSA.

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Tania Miramontes, Rodolfo Flores, Bryan Cruz, Melissa Ibarra, Priscilla Giner, Laura O'Dell. "Sex differences in the reinforcing effects of nicotine are larger under more demanding schedules of reinforcement". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=127

Expression of C-C Chemokine Receptor 7 and its role in the chemotaxis of cells to the lymph nodes and spleens in mice

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C-C Chemokine Receptor 7 (CCR7) is a G-protein-coupled receptor (GPCR) that regulates the trafficking of different immune cell populations to and within secondary lymphoid organs (SLO). This GPCR induces migration of cells towards C-C Chemokine Ligand 19 (CCL19) and 21 (CCL21) in a process termed chemotaxis. The signals induced by CCR7 bound to its ligand promote chemotaxis of specific populations of immune cells to the SLO; including the lymph nodes and spleen. This function is important since CCR7 is upregulated in certain cancers, such as breast cancer and T cell acute lymphoblastic leukemia (T-ALL), where it can direct chemotactic migration of cells to the lymph nodes and bone (a primary lymphoid tissue) or brain, respectively. The purpose of this study is to analyze the primary, and secondary lymphoid tissues, along with visceral organs and the brain for cells that migrate in response to signaling through CCR7. We are currently working to visualize the gross architecture of the spleen and lymph node tissue isolated from CCR7+/+ and mice homozygously deleted for the CCR7 locus (CCR7-/-). We hypothesize that absence of CCR7 will have no effect on the lymphoid follicles or size of the red pulp within the spleen, but will reduce the size of white pulp within the spleen and reduce the presence or degree in appearance of T and B lymphocytes, as well as dendritic cells in our mouse nodel.

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Aaron Molina, Eduardo Holguin, Charlotte Vines. "Expression of C-C Chemokine Receptor 7 and its role in the chemotaxis of cells to the lymph nodes and spleens in mice". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=166

Effects of tundra shrub encroachment on soil nitrogen mineralization rates

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Global warming is expected to have disproportionate effects on alpine and arctic tundra ecosystems, compared with other ecosystems worldwide. One observed consequence of global warming in the tundra has been a shift in vegetation, with increases in deciduous shrub abundance observed in many circumpolar locations. This change in vegetation can affect ecosystem properties through presence of a physical canopy; for example, shrub canopies shade the soil beneath them resulting in lower temperatures. Increasing shrub abundance also increases their contribution to the plant litter, which may directly influence ecosystem properties. Effects of shrubs on the nitrogen (N) cycle, including N-mineralization (the rate at which inorganic N becomes available in the soil), are particularly important given the N-limitation by tundra vegetation. We examined the effect of a deciduous shrub, Betula glandulosa, and its litter, on summer N mineralization rates in the alpine tundra of northern Canada. We measured N-mineralization in a 2 x 3 factorial experiment with shrub removal (+/- shrubs) and litter gradients quantity (0, 1x and 2x natural abundance) as the treatments. Although results are still pending, we hypothesize that less microbial activity will occur in plots with shrubs, because their shaded soil leads to lower soil temperatures. We further hypothesize that plots with increased plant litter will have higher N-mineralization rates because of the increased input of organic N.

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Cynthia Moreno, Daniela Aguirre, Jennie McLaren. "Effects of tundra shrub encroachment on soil nitrogen mineralization rates". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=160

ERK5 promotes migration of leukemic T cells to CCL19 and Sphingosine-1 Phosphate

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Extracellular signal-regulated kinase 5 (ERK5) is a mitogen activated protein kinase which regulates signaling for cell growth, proliferation, differentiation, and survival. We have shown that ERK5 is upregulated following CCL19 binding to its receptor C-C chemokine receptor 7 (CCR7). Subsequently, the expression of endothelial differentiation gene 1 (EDG-1 or S1P1) is upregulated, promoting T lymphocyte chemotaxis to sphingosine-1-phosphate (S1P). Our focus is to understand the mechanisms of ERK5 regulation of signaling in the CCR7/CCL19 pathway in more detail. Based on preliminary studies, we hypothesize that T-cells in which ERK5 expression has been reduced using CRISPR-Cas9 technology (ERK5CRISPR) exhibit decreased migration to S1P, and CCR7 endogenous ligands CCL19 and CCL21. To test this, ERKCRISPR HuT78 and CEM leukemic T lymphocyte cell lines were generated using pLentiCRISPRV2. Single-cell clones were stimulated with 40nM CCL19 for up to 72h to induce upregulation of ERK5 and tested by Western Blots. In parallel, total RNA was extracted from ERKCRISPR HuT78 and ERKCRISPR CEM clones, and RT-PCR was used to quantify ERK5 and actin mRNA levels. We found that ERK5 levels were reduced to at least half of the control levels in 1 of 25 different CEM clones, and 0 of 48 HuT78 clones. Overall, 1 ERKCRISPR clone was identified and assays were used to assess chemotaxis of the clone to CCL19, CCL21 and S1P. WT CEM and HuT78 cells were used as controls. We expect to see greater than 50% decrease in migration in ERKCRISPR HuT78 and ERKCRISPR CEM clones when compared to the controls.

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Diana Moreno, Maria Uribe, Mika Gehre, Colin Bill, Charlotte Vines. "ERK5 promotes migration of leukemic T cells to CCL19 and Sphingosine-1 Phosphate". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=155

The effect of shrub removal on soil carbon under different vegetation cover types in a New Mexico desert ecosystem

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The Restore New Mexico program was established by the Bureau of Land Management in an attempt to restore grasslands in the Chihuahuan desert of the Southwestern United States. A number of large areas of the Chihuahuan desert grasslands were converted to shrub lands after excessive cattle grazing resulted in shrub encroachment and the resulting disappearance of grasses. New Mexico grasslands are essentially historical ecosystems and the shrub lands that we see today are what we can consider to be novel ecosystems. When we permit historical conditions to degrade and to diverge, we put much of life and soil health at risk because soil is deprived of nutrients and minerals and may also erode away. The type of vegetation cover can change soil properties including increases soil resources including N and C. Our objective was to determine the effects of shrub removal treatments on soil carbon underneath different vegetation classes. We sampled 14 sites treated by the Restore New Mexico program in 2017 with each site containing a control plot (untreated) and a treated plot (treated with herbicide to reduce shrub cover). At each plot we sampled soil from under different vegetation cover types including live shrubs, dead shrubs, forb/grasses and bare ground. We analyzed this soil for total carbon and organic carbon content. Soil analysis is currently underway. We predict that there will be more carbon in soil from underneath the forbs and grasses followed by soil from under live shrubs. We further predict that these vegetation class effects will be consistent between treated and untreated plots. These results will help us to fully understand shrub encroachment on an ecosystem and rehabilitation of a degraded land.

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Crystal Noriega, Jennie R McLaren. "The effect of shrub removal on soil carbon under different vegetation cover types in a New Mexico desert ecosystem". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=60

Expression and purification of human PERIOD-2 (hPER-2) C-terminal domain for structural & functional studies

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The circadian rhythm is an important biological clock that synchronizes behavioral and physiological processes to the daily cycles of the organism's environment. Several core proteins are essential to the circadian regulation at the molecular level including Period (PER) and Cryptochrome (CRY). In humans, there are three PER paralogs: PER 1, 2, and 3. In this study, we focus on the structural and functional analysis of the C-terminal domain of human PER2 (hPER2c) that plays key roles in interacting with CRY protein. We have expressed our hPER2c in bacteria and then purified the recombinant protein using affinity chromatography. Highly purified hPER2c has been characterized using circular dichroism (CD) and dynamic light scattering (DLS). Our results indicate that hPER2c is very stable in solution. To solve hPER2c atomic structure, production and purification of the recombinant protein has been scaled up for crystallization trials.

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Luis Nunez, Victoria Miranda, Neha Vijay, Jennie Choi, Neha Chauhan, Karla Moriel, Noah Ruelas, Adan Castaneda, Ruben Cano, Bianca Amezaga, Seham Azam, Supriyo Ray, Chuan Xiao. "Expression and purification of human PERIOD-2 (hPER-2) C-terminal domain for structural & functional studies". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=22

An effective vaccine candidate for Chagas disease

Janet Olivas[1,^], Susana Portillo[1], Eva Iniguez[1], Brenda G. Zepeda[1], Igor C. Almeida[1]

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Chagas disease (ChD) is caused by the protozoan parasite *Trypanosoma cruzi*, in which transmission occurs via insect-vector (kissing bug), blood transfusion, organ transplant, congenital contagion, and tainted foods and juices. Currently, ChD is endemic to Latin America, where an estimated 6-8 million people are currently infected. Nonetheless, an efficient preventive or therapeutic vaccine against ChD has yet to be developed. To this end, T. cruzi contains many immunogenic targets that could be exploited as tools to develop such vaccines. For instance, T. cruzi has a cell surface covered by glycoconjugates in which one of the dominant glycotopes is Galα(1,3)Galβ(1,4)GlcNα (αGal3LN), expressed on glycosylphosphatidylinositol-anchored mucins (tGPI-mucins) of the infective trypomastigote stage of T. cruzi. Thus, we have used the same epitope, chemically synthesized and linked to the carrier protein human serum albumin (HSA), as a vaccine candidate for ChD. Here, mice were given a prime and three boost immunizations and challenged thereafter to test the αGal3LN-HSA efficacy. To assess this, we then analyzed parasite burden in different organs through quantitative polymerase chain reaction (qPCR). We have found that αGal3LN-HSA-immunized mice have a highly significant (>90%) reduction of parasites in various tissues as compared to placebo-vaccinated controls. These results demonstrate that our vaccine candidate is highly effective in decreasing parasite burden levels and thus potentially preventing ChD pathology.

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Janet Olivas, Susana Portillo, Eva Iniguez, Brenda G. Zepeda, Igor C. Almeida. "An effective vaccine candidate for Chagas disease". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=135

The intraneuronal redistribution hypothesis of dopamine and the role of vesicular monoamine transporter (VMAT) in the sensitization model of stimulant drug addiction

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Drug addiction is a costly and debilitating problem in society. In our lab, we study brain changes that may lead to addiction. Specifically, when stimulants such as amphetamine (AMPH) are repeatedly taken over time, there is an enhanced increase in the psychomotor and reinforcement responses compared to the first exposure that is related to enhanced amounts of dopamine release. These enhancements in behavior and neurochemical responses depict sensitization. To strategize successful experiments, a foundation of basic concepts must be mastered. First, the basal ganglia system modulates the cortex. Second, dopamine pathways in the basal ganglia play a major role in motor, reward and cognitive responses to drugs of addiction. Additionally, the life cycle of dopamine, known as turnover, involves the synthesis, storage, utilization, reuptake, and degradation, which exist in a dynamic equilibrium. The details of these concepts will be presented. Finally, our current work revolves around the Redistribution Hypothesis, which states that the protein VMAT, involved in storing dopamine into vesicles is labile, meaning that VMAT is able to reverse its function to store dopamine into storage vesicles back out into the intracellular cytoplasm. It is predicted that the lability of VMAT to reverse its function meets demands for where dopamine is needed, and this may characterize sensitization. In the present study, we block VMAT with tetrabenazine (TBZ) prior to treating rats with AMPH. Our specific aim is to demonstrate that blocking VMAT prevents the expression of sensitization. The rationale for the complete experimental design will be presented.

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Priscilla Parada, Adriana Vasquez, Edward CastaÃ±eda. "The intraneuronal redistribution hypothesis of dopamine and the role of vesicular monoamine transporter (VMAT) in the sensitization model of stimulant drug addiction". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=112

Correlation between the chromatin-binding activity and subcellular distribution of Poly (ADP-ribose) Polymerase-1 and its effect on HIV-1 replication

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Poly (ADP-ribose) Polymerase-1 (PARP-1) is a nuclear enzyme implicated in multiple biological processes including DNA repair and regulation of transcription. We have found that PARP-1 impairs HIV-1 replication in human CD4+ T cells. HIV-1 replicates faster and reaches higher titers in cells lacking PARP-1 and re-expression of full-length PARP-1 in these cells impairs HIV-1 replication. A similar inhibitory effect was observed with PARP-1 mutants expressing only the N-terminal region or lacking the nuclear localization signal. However, a PARP-1 mutant expressing only the C-terminal domain was inactive. To better characterize the mechanism of action of PARP-1, we determined the subcellular localization and the chromatin-binding activity of these PARP-1 mutants to correlate these properties with anti-viral activity. Chromatin binding and salt extraction assays were used to evaluate the PARP-1 chromatin-binding activity in PARP-1 KO human CD4+ T cells engineered to stably express PARP-1 full-length, the N- or C-terminal domains, or a mutant lacking the nuclear localization signal. These methods are based on the ability of high salt concentration to extract from chromatin bound proteins. Subcellular distribution was determined by immunofluorescence analysis of transiently expressed PARP-1 mutants in PARP-1 KO HEK293T cells. Our results indicate that, in addition to being localized to the nucleus, PARP-1 is bound to chromatin through the N-terminal region of the protein that contains the DNA-binding domain. Furthermore, we demonstrated that chromatin-binding was required for the anti-HIV-1 activity of PARP-1. We are currently evaluating the contribution of each of the three zinc-finger motifs composing the PARP-1 DNA-binding domain to the chromatin binding activity of this protein.

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Alejandra Pina, Sara Garcia, Christopher Farmer, Zachary Martinez, Manuel Llano. "Correlation between the chromatin-binding activity and subcellular distribution of Poly (ADP-ribose) Polymerase-1 and its effect on HIV-1 replication". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=30

The effects of temperature on the abundance of native bees and honey bees

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Insect species respond to weather conditions differentially. The Southwestern United States is expected to see temperature increases of 3.1-5.3 ºC by the end of the century. As temperatures continue to increase due to climate change, activity and thus pollination services provided by honey bees are predicted to decline, while some native bees will continue to pollinate. This study is aimed at identifying changes in bee abundance in the Chihuahuan Desert in response to varying temperatures. We hypothesized that honey bee abundance will decrease as temperatures increase while the abundance of native bees will remain constant. Data were collected through visual encounter surveys across three locations at the University of Texas at El Paso. They were conducted every other week, once in the morning and once in the afternoon, from March 2018 through January 2019. Temperature, along with humidity and wind speed, were recorded at the beginning and end of each survey. We recorded both the floral visitor and the plant species visited during the transects, with a total of 2,487 bee observations. A positive relationship between the abundance of native bees and temperature was found. Honey bees were equally abundant across our recorded temperatures, while native bees tended to be more abundant at the hottest temperatures. As the climate continues to warm in the Southwest, pollination services might shift from honey bees to native bees. These results demonstrate the agricultural and ecological importance of native bee conservation efforts in this area.

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Kristen Pulley, Kevin Floyd. "The effects of temperature on the abundance of native bees and honey bees". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=43

Antibiotic resistance profile among enterobacteria isolated from clinical samples in Costa Rica

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The indiscriminate use of antibiotics has generated an increase in the number of resistant microorganisms. The production of extended-spectrum beta-lactamases (ESBLs) is one of the most common resistance mechanisms among bacteria. Bacteria that has shown to be multi-resistant to different groups of antibiotics has specific associated mechanisms, such as a genotypic and phenotypic profile distinct from bacteria that have shown sensitivity to antibiotics. This study had two specific aims. Perform an Antimicrobial Susceptibility Profile (ASP) in 12 enterobacteria strains of hospital origin to determine their resistance phenotype and detect the presence of the resistance genes (ampCCIT, sul1, sul2, intI1, intI2, blaOXA, blaTEM, and orf 513) to determine the resistance genotype. ASP was assessed by Disk diffusion method CLSI M100 2015. Extraction and purification of DNA from the bacteria of interest was performed. PCR technique was assessed for the analysis of the following resistance genes: ampCCIT, sul1, sul2, intI1, intI2, blaOXA, blaTEM, and orf 513. Strains showed high resistance rates to Ampicillin (33.3%), Cefotaxime (83.33%), Ceftazidime (50%), Co-trimoxazole (25%), Nalidixic Acid (33.3%), Ciprofloxacin (33.3%), and Cefoxitin (33.3%). Only two strains; E. coli (973-2) and Morganella morganii (701-1) presented the gene orf513 inferring presence of complex integrons. Six strains presented a description of Î²-Lactam type ampC group CIT. Gene blaOXA was present only in Escherichia coli 471-1. This study revealed alarming data on relevant genotypes conferring ESBLs and carbapenems resistance for bacteria. A relationship was found in phenotypic and genotypic characteristics of antimicrobial resistance bacteria from hospital setting.

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Jesus Reyes, Kenia Barrantes, Gabriel Ibarra-Mejia. "Antibiotic resistance profile among enterobacteria isolated from clinical samples in Costa Rica". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=54

Using zebrafish to understand the function of HCFC1 in cblX syndrome

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cblX is a multiple congenital anomaly syndrome caused by mutations in the HCFC1 gene and is characterized by microcephaly, intellectual disability, movement disorders, craniofacial abnormalities, intractable epilepsy, and defects in cobalamin metabolism. HCFC1 (Host Cell Factor C1) encodes a transcriptional co-regulator that facilitates the expression of over 5,000 unique downstream target genes including the MMACHC (Methylmalonic Aciduria with Homocystinuria) gene. Mutation of murine Hcfc1 is lethal and therefore, additional systems with which to understand HCFC1 function are warranted. Zebrafish have two HCFC1 orthologs, hcfc1a and hcfc1b. Previous studies have demonstrated that knockdown of hcfc1b, but not hcfc1a results in facial dysmorphia suggesting that each paralog may have a unique function during development. To determine the function of hcfc1a, we created a germline mutation in this gene using CRISPR/Cas9 genome editing. Our results indicate that contrary to hcfc1b, mutations in hcfc1a do not affect mmachc expression. These results suggest that the second paralog, hcfc1b, is the primary modulator of mmachc expression and in addition, raises the possibility that hcfc1a has a unique function which may useful to understand the MMACHC independent phenotypes associated with cblX syndrome.

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Joel Reyes, Danica Lopez, Anita Quintana. "Using zebrafish to understand the function of HCFC1 in cblX syndrome". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=80

Production and purification of pHIS2 Early Secreted Antigenic Target Protein (ESAT-6)

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The 6kDa Early Secreted Antigenic Target (ESAT-6) is a secreted protein involved in the virulence of Mycobacterium tuberculosis (Mtb), the causative agent for tuberculosis. So far, ESAT-6 is thought to form pores in the membrane of phagosomes, allowing Mtb to escape the phagosome. To further unravel the mechanisms of ESAT6, a BRIL tagged protein inside a pHIS2 vector will be produced and purified for additional experimenting on the mechanisms of the protein under two different pH conditions.

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Luis Pablo Reyes De la Riva, Jianjun Sun. "Production and purification of pHIS2 Early Secreted Antigenic Target Protein (ESAT-6)". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=154

A closer look at microbe interactions

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Pigeons are ubiquitous on various parts of the world. Pigeon droppings are in great abundance but what exactly is in pigeon excreta and why is it important? One known microbe found in pigeon excreta is called Cryptococcus neoformans which is an encapsulated yeast-like fungus. C. neoformans causes cryptococcosis in individuals with immunosuppression such as AIDS and organ-transplant and it is acquired by inhalation of the basidiospores. Infection leads to meningoencephalitis resulting in approximately 250,000 deaths worldwide mainly in sub-Saharan Africa. In nature C. neoformans forms symbiotic relationships with other microbes called polymicrobial biofilms. One of these interactions occurs along with a bacterium called Acinetobacter baumannii. These biofilms are essential to the survival of these microbes making them more resistant to harsh environments. Understanding these interactions between C. neoformans and other microbes is of utmost importance to explain the molecular mechanisms responsible for changes in virulence factors and the evolution of pathogenicity. The main objective of this study is to understand the evolution of virulence of the fungus Cryptococcus neoformans and its interactions in the human host. Examination of Cryptococcus neoformans will be performed at the molecular level using Polymerase Chain Reaction (PCR) to elucidate the metagenome in pigeon excreta. The fungus in its natural niche will be investigated using Next Gen sequencing and culture techniques. This research will help the biomedical industry move forward to create improved medicine to treat this specific infection and have a better knowledge of biofilms for a better medical approach.

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Krystal Rocha, Luis Martinez. "A closer look at microbe interactions". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=48

Exercise leads to increase in smaller lipid droplet morphology in peripheral region of muscle fiber

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In a previous study, we have shown that high fat overfeeding results in decreased smaller lipid droplet density in the peripheral region of skeletal muscle fiber. This decrease was associated with high fat overfeeding induced weight gain and insulin resistance. However, it is not clear whether an acute bout of exercise (elevated fat oxidation state) affects lipid droplet size. PURPOSE: To determine the effects of a single bout of endurance exercise on skeletal muscle lipid content and lipid droplet size. METHODS: Ten healthy male volunteers (Mean ± SEM; age: 23.11 ± 0.98; BMI: 23.27 ± 0.50 kg/m^2) participated in a single bout of endurance exercise on a cycle ergometer at 65% maximal aerobic capacity (VO2max) for 1.5 - 2 hours (650 kcal). Muscle biopsies were obtained from the vastus lateralis immediately before and after exercise. Intramuscular lipid was accessed via immunohistochemistry technique and images were captured using confocal microscopy. Image analysis and lipid quantification was done using ImageJ software. RESULTS: One bout of long duration exercise led to an elevated fat oxidation state measured by RQ (0.94 ± 0.01 to 0.89 ± 0.008, p=0.003). This long duration acute exercise did not change intramuscular lipid content (30.73 ± 2.69 to 30.23 ± 3.16 AU, p=0.72). However, there was a significant increase in smaller peripherally located lipid droplet density after one bout of exercise (0.58 ± 0.01 to 0.63 ± 0.02 AU, p=0.01). CONCLUSION: Exercise induced elevated lipid oxidation state is characterized by a shift in smaller lipid droplet morphology without a change in total lipid content. Future studies should investigate if smaller lipid droplet size is associated with better lipid oxidation capacity in human skeletal muscle.

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Victoria Rosas, Jasmin Jenkins, Armando Varela, Jeffrey Covington, Sudip Bajpeyi. "Exercise leads to increase in smaller lipid droplet morphology in peripheral region of muscle fiber". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=65

Visitation of native and non-native plants from native bees and honey bees

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Native bees and honey bees are important pollinators for global food production, but are facing global declines due to loss of habitat, pathogens, and climate change. Urban pollinator gardens have been suggested as a method to support bee populations, but it is unclear if such gardens require mostly native plants to be successful. We studied whether native bees and honey bees preferentially visit native plants. We hypothesized that native bees would visit more native plants, while honey bees would visit native and non-native plants in equal proportions. We surveyed three gardens at the University of Texas at El Paso: the roof of the Biology Building, the Physical Science courtyard, and the Centennial Gardens. Surveys were conducted every other week in the morning and afternoon, March-December 2018. We scanned each plot and recorded the floral visitor and plant species being visited. We recorded 2384 visitations of native and honey bees to 86 native plants and 39 non-native plants. Honey bees were observed 842 times on native plants and 429 on non-native plants, and native bees had 786 observations on native plants and 327 on non-native plants. Both types of bees are using native and non-native plants in approximately the proportions available, indicating a potential lack of preference. However, we need to scale observations by relative floral abundance, as a few plants are particularly abundant in the study locations. Understanding how native bees and honey bees interact with native and non-native plants in urban gardens could significantly aid in conservation efforts.

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Adrian Ruybe, Kevin Floyd. "Visitation of native and non-native plants from native bees and honey bees". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=84

Recovery of normal craniofacial phenotype in HMGCS1 mutants via modulation of the WNT signaling pathway

Brianna Sanchez[1,^], Anita Quintana[1]

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There are 8 different human syndromes caused by mutations in the cholesterol synthesis pathway leading to multiple congenital abnormalities (MCAs) which cause a significant and long-term impact on the lives of affected individuals, the families of those affected, society, and our health-care systems. Recent findings suggest the cholesterol synthesis pathway (CSP) is an important mediator of craniofacial development. Moreover, our lab has shown that mutations in hmgcs1, which encodes the first enzyme in the CSP, cause craniofacial defects. However, the molecular mechanisms associated with these phenotypes are yet to be elucidated. We hypothesized that cholesterol and the CSP regulate facial development via modulation of WNT signaling. To test this hypothesis, we treated hmgcs1 mutant and wildtype zebrafish larvae with a WNT antagonist in an attempt to rescue the craniofacial phenotypes. These studies have the potential to discern the interplay between cholesterol and WNT signaling during normal facial development.

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Brianna Sanchez, Anita Quintana. "Recovery of normal craniofacial phenotype in HMGCS1 mutants via modulation of the WNT signaling pathway". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=122

Sunlight and microbial effects on dissolved organic carbon in tundra ponds near Barrow, Alaska

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Due to the rising temperatures in the Arctic, we are seeing permafrost melt at a rate never seen before. Due to these increasing rates of thaw, carbon contained within the permafrost, sometimes older than 10,000 years, may be released into our modern atmosphere, including aquatic environments. We examined how light and microbes affect carbon transformation in ponds, rivers and nearshore lagoons near Barrow, Alaska. Filtered samples were incubated in Whirl-Paks® with and without a native or exotic microbial inoculum, in light and dark conditions. Samples were incubated for a period of 5 days in a cold room kept at 14°C, equipped with a metal halide bulb (approx. 17,000 lux). Dark samples were wrapped in tin foil. Changes in dissolved oxygen (DO), dissolved organic carbon (DOC) and spectral properties of the organic matter (C440, SUVA254, spectral ratio) were monitored. Preliminary results from a reference pond (IBP-C) and a thermokarst pond (TK3), which has experienced a greater rate of thaw and slumping than the reference site, indicate that light increased the lability of DOC relative to the dark control, and native innocula were better able to transform photodegraded DOC relative to non-native innocula. Additional sites will be added to the analyses to see if these trends hold across multiple habitats and dates.

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Christopher Sandoval, Christy Adame, Vanessa Lougheed. "Sunlight and mIcrobial effects on dissolved organic carbon in tundra ponds near Barrow, Alaska". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=69

Characterization of novel anticancer compounds

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In the USA, it is estimated that 1.7 million new cases would be diagnosed with cancer in 2019 from which about 606,880 Americans are expected to die. Currently, one of the therapies used to combat this disease is through drug treatments. Although drug treatment is effective in most cases, drug resistance is a frequent problem. For this reason, identifying novel anticancer compounds is of vital importance. In order to characterize new potential anticancer compounds, researchers perform drug screening as a way to test drug libraries on different cancer cell lines. In this study, the cytotoxicity of 21 novel anti-cancer compounds was evaluated on several human cancer and one non-cancerous cell lines by the Differential Nuclear Staining assay. Two of the 21 compounds indicated potent cytotoxicity against the colon cancer cells having the higher selective cytotoxicity when compared with non-cancerous fibroblast cells. In order to determine the cell death pathway induced by the two compounds, Annexin V-FITC assay was performed via flow cytometry. The data obtained revealed that apoptosis is the cell death mechanism induced when cells are treated with these compounds.

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Austre Schiaffino, Karla Cano, Renato Aguilera. "Characterization of novel anticancer compounds". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=66

The effects of eating a high fat diet on methamphetamine-induced conditioned place preference

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Eating a high fat diet can cause several negative health consequences, including dysfunction to dopamine systems. For example, eating a high fat laboratory chow enhances sensitivity of rats to methamphetamine-induced locomotion. However, it is not known if sensitivity to the rewarding effects of methamphetamine are similarly enhanced in rats eating high fat chow. To test the hypothesis that eating high fat chow enhances sensitivity of rats to the rewarding effects of methamphetamine, female Sprague-Dawley rats were fed standard laboratory chow (17% kcal from fat) or high fat chow (60% kcal from fat) for 4 weeks prior to conditioned place preference (CPP) training, using a biased design. Rats were trained on alternating days rats with saline or methamphetamine (0.32 or 1.0 mg/kg, i.p.) and were restricted to one of two sides (wire mesh vs rod flooring) of a CPP apparatus. After 8 alternating training days, rats had free access to the entire apparatus, and time spent in the drug-paired side versus the saline-paired side was examined. On average, methamphetamine induced a significant CPP in the rats, regardless of diet or dose of methamphetamine; however, there were no differences in magnitude of CPP between rats eating high fat chow and rats eating standard chow. Previous literature suggests that females might be more sensitive to the rewarding effects of methamphetamine, necessitating the use of smaller doses. As such, future studies will examine a wider range of doses of methamphetamine and will include male subjects to study potential sex differences.

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Paloma Serna, Kayla Galindo, Katherine Serafine. "The effects of eating a high fat diet on methamphetamine-induced conditioned place preference". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=136

The roles of estrogen receptor alpha and beta in sexual behavior and social preferences in female prairie voles (*Microtus ochragaster*)

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ERα and ERβ are the primary estrogen receptors (ER) in the central nervous system that regulate sociosexual behavior in numerous species. ERα is essential for mating and maternal behavior in mice and rats, whereas ERβ exerts a moderating effect on sociosexual behavior. Female prairie voles (Microtus ochrogaster) require exposure to a novel male for estrus induction, which is associated with increasing 17β-estradiol (E2) concentrations and sexual receptivity within 48-72 hours of male exposure. Exogenous E2 induces sexual receptivity and partner preference formation in female voles, but it is unclear if E2 is directly affecting social behavior independent of mating and which ER are involved. We hypothesized that ERβ activation contributes to pair bonding, whereas ERα activation mediates sexual receptivity. To test this hypothesis, adult females were treated for three days with either: vehicle (hydroxypropyl-β-cyclodextrin), selective ERα agonist (PPT), selective ERβ agonist (DPN), or the non-selective ER agonist (E2). 24 hours later, females were paired with a sexually-experienced male for a 6-hour cohabitation followed by a 3-hour social preference test. Brains were collected immediately after the preference test following transcardiac perfusion to visualize the neuropeptide oxytocin (OT) in the paraventricular nucleus of the hypothalamus (PVN). OT is known to facilitate partner preference formation in female voles and is regulated by E2 in many species. Following 6-hour cohabitations, VEH- and DPN-treated females displayed a preference for the familiar partner despite failure to mate. E2-treated females displayed robust sexual receptivity but failed to form a partner preference. PPT-treated females failed to display either sexual receptivity or partner preference. DPN was the only treatment to increase OT-immunoreactivity in the PVN. Collectively, these data suggest that ERα inhibits the formation of selective attachments in female prairie voles, and activation of both receptors is necessary for mating to occur. Because of the increased expression of the prosocial OT neuropeptide in DPN-treated females, we are currently examining whether ERβ activation facilitates preference formation after a 3-hour cohabitation where VEH-treated females failed to form a partner preference.

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Dina Torres, Jose Landeros, Adam Perry, Bruce Cushing. "The roles of estrogen receptor alpha and beta in sexual behavior and social preferences in female prairie voles (*Microtus ochragaster*)". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=124

Use of the ratio between fecal coliforms and enterococci to evaluate the relationship of land usage and the quality of surface water in Coronado, Costa Rica

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Water is the means of life for many organisms, including pathogenic organisms that may affect human health. Previous research corroborates a positive correlation between human urbanization near superficial water and risk of human contaminated water. Evaluating land usage through microbial indicators and finding the origin of contamination near a water basin is imperative to maintaining the quality of drinkable water. This research study aims to find a relationship between the spatial patterns of human activity and the salubrity of water destined to become potable in Canton de Coronado, Costa Rica. Water samples were collected from the Honda River to find the ratio of fecal coliforms and enterococci during the month of July 2018. Four points at the river were chosen, which where explored and mapped to find possible illegal human wastewater disposals: Point 1 (lowest), Point 2 (low mid), Point 3 (high mid), Point 4 (highest). Using the Multiple Tube Fermentation technique by serial dilutions and aseptic technique established by APHA, the water samples were analyzed to create a descriptive analysis and a map locating illegal human and animal discharges into the river. Results demonstrated human and animal contamination in highly urbanized areas; illegal discharges were found at the highest altitudes (Point 3 and 4), while Points 2 and 3 showed a lower level of contamination. Future implications should create awareness of the risks of inadequate land usage on water conditions and its effect on the quality of life.

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Evelyn Tovanche, Luz Chacon, Eric Morales, Gabriel Mejia. "Use of the ratio between fecal coliforms and enterococci to evaluate the relationship of land usage and the quality of surface water in Coronado, Costa Rica". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=24

Determining susceptibility to alcoholism using human plasma biomarkers

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Millions of individuals worldwide fall victims to alcoholism because they get involved in simple social drinking that progresses into much more. Although alcoholism affects millions, we are still unclear why certain individuals have predisposition for falling into alcohol abuse while others do not. Therefore, it would be very desirable if we were to be able to develop an identification of a panel of biomarkers that could differentiate an individual's susceptibility to becoming an alcoholic. For this study we used blinded and de-identified patient blood samples from recovering alcoholics generously provided by Dr. Bryon Adolf from UT Southwestern University to correlate susceptibility to alcoholism to changes in the allostatic load of certain biomarkers. Using Milliplex experiments we tested several biomarkers in the hopes of narrowing down the search to determine better biomarker selection. With these results we hope that this study will allow scientists to identify specific biomarkers that could determine an individual's susceptibility to becoming an alcoholic.

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Sahaly Valadez, Charles Spencer. "Determining susceptibility to alcoholism using human plasma biomarkers". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=108

Soil microbial diversity patterns at the Jornada Basin LTER, NM

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The Chihuahuan Desert is home to communities of microscopically small but beneficial microorganisms that impact dryland biodiversity and functions. However, we know very little about the factors that influence soil microbial communities in the desert biome. The objective of this study was to determine effects from season, precipitation treatments, and soil depths onto microbial communities in the Chihuahuan desert. We hypothesized that changes in rainfall, season, and soil depth will result in different patterns of soil microbial community composition in soil samples collected from the Jornada Long-Term Experimental Range. Samples were taken from experimental plots that have been manipulated in the amount of rainfall they receive. A sterile core was used to remove the surface soil (0-1 cm) and the associated subsurface soil (1-6 cm). We applied several DNA based techniques to address our hypotheses. In specifically, we utilized TRFLP fingerprinting to investigate community patterns of bacteria, general fungi, and arbuscular mycorrhizal fungi. We also used MiSeq sequencing to obtain more in depth data on diversity and abundance dynamics of the bacteria community. Preliminary results showed a significant difference between DNA concentrations extracted from surface soils versus subsurface soils. The p-value calculated by a t-test was 0.017. Our poster will present first results from TRFLP fingerprinting and MiSeq sequence data. Our findings how season, climate, and soil depth may affect microbial communities can greatly enrich our understanding of possible effects of global climate change to important microorganisms that dwell in desert soils covering among one third of the planet's surface.

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Claudia Villalobos, Andrew Dominguez, Erik Lehnhoff, Nuttapon Pombubpa, Nicole Pietrasiak. "Soil microbial diversity patterns at the Jornada Basin LTER, NM". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=3

Biomarker tagged cells to study pre-clinical brain metastases

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Breast cancer affects 12.5% of women in the United States each year and is classified into different subtypes, with HER2-positive breast cancer (HER2+) as an example. HER2+ is caused by the overexpression of the human epidermal growth factor receptor 2 (HER2) protein. HER2+ life expectancies are approximately 22% when diagnosed at stage IV. 40-50% of diagnosed patients with HER2+ develop brain metastasis (the spread of cancer to the brain) - a condition that is currently incurable with survival rates of 1 to 23.5 months after diagnosis. A reproducible pre-clinical model to study brain metastases due to HER2+ breast cancer is important because the incidence of brain metastases is rising due to increased patient survival through more advanced targeted therapies (e.g., immunotherapy and targeted therapy). To study brain metastases caused by HER2+, we generated a variant of the BT474 HER2+ human breast cancer cell line called BTGF-1 and injected BTGF-1 cells into the brain of severe combined immune deficient (SCID) mice via stereotactic surgery. BTGF-1 cells were tagged with luciferase, an enzyme with inherent bioluminescence, to monitor tumor progression with non-invasive in vivo imaging system (IVIS). Mice were monitored twice weekly IVIS with treatments (e.g., Control vs. Gemcitabine) starting after randomization of mice. A limitation with this model is the availability of cell lines with high levels of HER2 overexpression and the time required to develop breast cancer brain metastases (BCBM). Therefore, it is vital to continue developing additional models for the study of HER2+ metastatic breast cancer, such as the one proposed here.

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Joseph Wingate, Paloma Valenzuela, Karla Parra, Diana Gonzalez Garcia, Joel Martinez, Giulio Francia. "Biomarker tagged cells to study pre-clinical brain metastases". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=42

Tandem acyl-carrier protein design and application in polyketide natural product biosynthesis

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Polyketides are secondary metabolites produced by plants, insects, fungi and bacteria that function as effective antibacterial agents. However, they are limited by their low synthesis yields, leading to limited applications in large scale manufacturing and commercialization. Additionally, silent genes exist in several of these species which encode for novel and unexplored metabolites including polyketides, however, these metabolites are expressed at exceedingly low rates, if at all. One method by which the yield of these metabolites can be increased is by engineering the enzymes responsible for their production. One such enzyme is 6-deoxyerythronolide B synthase (DEBS), a multi-domain polyketide synthase that is composed of repeating modules containing, among other domains, one acyl-carrier protein (ACP). These domains serve as a tethering point on which polyketide elongation occurs, and is a domain shared with fatty acid synthases (FASs). Inspired by deep-sea bacteria that possess FASs with two or more ACPs, which we hypothesize leads to greater efficiency in polyunsaturated fatty acid production by providing multiple chain-elongation sites, we propose to engineer this tandem-ACP system into DEBS, specifically the final module 6, to increase the overall turnover rate. We aim to evaluate this modification by determining the crystal structure of both the native and engineered module 6, and thus better understand how the tandem-ACP functions. We believe that this tandem-ACP system can be applied to a variety of polyketide synthases to increase their turnover rate and thus access new and unexplored polyketides for their antibacterial properties.

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Gerardo Zavala, Zilong Wang, Saket Bagde, Xi Chen, Chu-Young Kim. "Tandem acyl-carrier protein design and application in polyketide natural product biosynthesis". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=37

PHYSICAL SCIENCES

Multicolor metric ELISA platform for visual point-of-care testing based on a paper/polymer hybrid microfluidic microplate

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Enzyme-linked immunosorbent assay (ELISA) is widely used for the detection of many chemical substances, proteins, and microorganisms. However, during the detection step, people would be confronted with the inconvenience of utilizing some expensive instruments such as spectrophotometer which is time-consuming. In this project, we propose an ELISA on a microfluidic microplate which allows for portable colorimetric detection instead of the traditional detection method of an ELISA. We used hydrogen peroxide, 3,3',5,5'-Tetramethylbenzidine (TMB), horseradish peroxidase (HRP), gold nanorods (AuNR) and hydrochloric acid (HCl) to produce a standard for the multicolor metric ELISA for the designed microfluidic platform. The TMB and AuNR were used to prepare the color standards based on the oxidation of the TMB. The AuNR and the oxidation of TMB would be controlled by the HRP concentration because HRP is a catalyst for the reaction. This allowed us to produce a wide visible range of colors from 400 nm to 750 nm on a microfluidic chip without the assistant of any other instrument. Compared to the traditional methods of conducting an ELISA, our system provides a new versatile, user-friendly, affordable and portable immune-detection method that has a high potential to expand on-site detections of viruses, proteins, and biomarkers at home, industries, and many other labs.

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Yousef Abugalyon, Cindy Himmelhaver, XiuJun (James) Li. "Multicolor metric ELISA platform for visual point-of-care testing based on a paper/polymer hybrid microfluidic microplate". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=164

Filtration system of a 3D filter made with polylactic acid (PLA) and coated with 3-aminopropyltrimethoxysilane

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Agua Dulce and Anapra are economically disadvantage in the Texas-Mexico Border Region of El Paso-Juarez. Communities such as these would benefit greatly from a water filter that is can adsorb heavy metal contaminates and is cost efficient. Water systems in underserved communities have become outdated as new needs arose. The lack of attention to water needs will put communities at risk. Water filtration systems using 3D printable filters provide essential water treatment solutions. After testing Six water samples collected from households in t Juarez city and outskirt of El Paso were analyzed for the presence of metals by inductively coupled plasma- mass spectrometry (ICP-MS) and compared to EPA standard regulations, Results showed lead, mercury and uranium contamination. High intake levels of lead and mercury causes central nervous system (CNS) problems, uranium causes kidney damage and can lead to cancer. Therefore, our idea is to design a filtration system of a 3D filter made with polylactic acid (PLA) and coated with 3-aminopropyltrimethoxysilane. The coating will create a negative surface area that will trap metals and cations such as Ca2+, Na+, Mg2+ and Pb2+. The manufacture of a 3D-printable device can be engineered to specific measurements needed for its assembly. Our prototype is intended to work with free flow; which means no change in water rate and pressure will be required in order to work properly.

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Laila Alsaihati, Abril Chavez, Andrew Pardo, Juan Noveron. "Filtration system of a 3D filter made with polylactic acid (PLA) and coated with 3-aminopropyltrimethoxysilane". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=99

The role of neotropical dry-forests in the water cycle dynamics of the Yucatan Peninsula

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Previous work allowed us to understand the movement and storage of water in the Yucatan Peninsula through the analysis of groundwater, precipitation and evapotranspiration estimations from remote sensing data. Those estimates provided a first glance of the importance of vegetation on the water cycling of the complex Yucatan hydrologic system. We now investigate the role of vegetation on the Yucatan water resources by analyzing how much of the estimations provided are solely equivalent for surface water that is found in soil moisture and plants. Since most of the peninsula is covered by tropical forests, a significant amount of the water is contained in the vegetation. Estimating the water content in the vegetation helps us understand better the dynamics of the Neotropical dry forests or Seasonally dry tropical forests (SDTFs) that cover most of the peninsula. SDTFs are one of the main and most threatened ecosystems in Mexico and Latin America. Understanding how these ecosystems modify their water and energy exchanges with the atmosphere throughout the year is critical for their conservation. This research will help us analyze and understand the dynamics of water and carbon exchanges of this forest with the atmosphere. Concurrently, while estimating soil moisture and vegetation water content, we can also estimate closer values of groundwater storage. Our approach could later be applied to other regions in South America where the same type of ecosystems exist and are threatened.

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Guadalupe Alvarez Rodriguez, Hugo A. Gutierrez Jurado, Jorge Uuh-Sonda, Luis Mendez-Barroso. "The role of neotropical dry-forests in the water cycle dynamics of the YucatÃin Peninsula". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=62

Identifying water retention of soil in arid regions to determine water sources of vegetation

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Arid region vegetation such as Honey Mesquite (Prosopis Glandulosa) and Creosote Bush (Larrea tridentata), can maintain activity year round. That implies that these plants have access to water, even after long periods of no rainfall. With limited attainable water sources available, the vegetation is prompted to obtain water from a distinct place. Finding the origin of water for these year round plants, is the main focus of a study that is currently being conducted in the Jornada Experimental Range, in which, stable isotopes of oxygen (δO18) and hydrogen (δH2) present in the soil and woody stems of the Honey Mesquite and Creosote shrub are being compared to one another in order to see similarities that may indicate differing water sources of the vegetation. To aid in revealing the plants' water source, we conduct an experiment to determine the soil water retention curve showing the relationship between soil water potential and soil moisture content. By comparing water retention curves created by a Hy-Prop at various depths on the soils where vegetation is being sampled, we can get an indication of the moisture conditions and most probable soil layer sources of water for the plants. The results of this project combined with data obtained from the study that compares stable water isotopes of soil and woody stems of the vegetation can help shed light on the relationship plants have with their water sources.

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Amaris Bustamante, Hugo Gutierrez, Hayden Thompson, Anothony Darrouzet-Nardi. "Identifying water retention of soil in arid regions to determine water sources of vegetation". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=19

Protein-protein interactions of β-amyloid and α-synuclein

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Aggregation of β-amyloid is related to Alzheimers disease. Using a fluorescence spectrophotometer with a magnetic stirrer and ThT fluorescence, the fibrillization of lysozyme and its interactions with β-amyloid and α-synuclein was monitored. The mechanism of fibrilization formation is unknown as there have been many pathways identified for the aggregation. We hypothesize that lysozyme fibrillization formation is a model for the fibrillization formation of β-amyloid and α-synuclein. This will allow for a correlation between Alzheimers disease and Parkinsons disease.

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Denisse Castaneda, Erick Guerrero, Emmanuel Zubia, Maria Moya, Mahesh Narayan. "Protein-protein interactions of β-amyloid and α-synuclein". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=111

Mapping of the hydrogeochemistry for the Laguna Bustillos basin: using stable water isotopes to identify water pathways in an overexploited watershed-aquifer system of northern Mexico

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The Laguna Bustillos basin has one of the most overexploited aquifers in Northern Mexico. Its semi-arid climate conditions and extensive use of groundwater for irrigation in agriculture activities, generates water stress in the communities relying on groundwater and pushes the aquifer system towards a depletion state. Understanding the processes that control this hydrologic system is essential to determine the dynamics between groundwater and surface water that will inform better water management practices. In this study, stable water isotope data of Oxygen (O) and Hydrogen (H) were gathered from 88 surface water sites and 50 groundwater sites over the period from March 2018 to October 2018 with aims to reveal water recharge sources for the Laguna Bustillos basin. Samples collected from different reservoirs including groundwater wells, springs, lake, streams and rainfall were analyzed to determine their isotopic ratios using a laser spectrometer. The ratios of light and heavy isotopes can serve as tracers of the water cycle in the basin and can reveal recharge and discharge patterns. Isotopic data obtained from precipitation samples was used to construct a Local Meteoric Water Line (LMWL) for the region by applying a linear regression on which all the other waters' isotopes are plotted to assess their most likely origin. The difference between wells located at the East of the basin and the wells located in the Northwest of the basin indicate a variation in the recharge rate throughout the basin and therefore differing surface-groundwater interactions across the basin.

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Carolina E. Cisneros, Hugo A. Gutierrez-Jurado, Aranda Luna, Orlando Ramirez Valle, Moises Garcia Holguin. "Mapping of the hydrogeochemistry for the Laguna Bustillos basin: using stable water isotopes to identify water pathways in an overexploited watershed-aquifer system of northern Mexico". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=81

Grain morphology and size changes associated with microbial mats at White Sands Dune Field

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Microbial endolithic communities have been found amongst the gypsum sand at White Sands Dune Field, New Mexico, USA. This experiment aims to observe whether there is a difference in grain sizes where the microbial mats have been visually identified. In this experiment, the grain sizes of gypsum sand from four sites in the White Sands Dune Field were collected and examined by laboratory analyses. It was hypothesized that the samples taken near the microbial mats would be finer grained due to the possible harvesting of gypsum by microorganisms as an energy or water source. A Mastersizer 2000 laser-diffraction particle sizer machine was used in this experiment to measure the sizes of gypsum particles sampled from the White Sands Dune Field. Data was recorded on the Mastersizer 2000 program on a Windows computer. The data demonstrate that the surface and other biological layers contained populations of finer grained particles than the layers with no visual microbial mats. This could be an indicator that some microorganisms are able to use the calcium, sulfur, or water molecules that make up gypsum as a bioavailable source for water, nutrients, energy processes. This is important for future work conducted by NASA and other research groups seeking to find presence of life on Mars in relation to the gypsum detected on Mars.

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Natalie Cowgill, Richard Langford. "Grain morphology and size changes associated with microbial mats at White Sands Dune Field". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=29

Groundwater Level Declines and Water Quality Deteriorates in Some Areas of the Hueco Bolson Aquifer

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Groundwater plays a vital role as the main source of drinking water and agricultural irrigation in Far West Texas. Historical over-pumping and climate change has caused groundwater level decline and deterioration of water quality due to brackish water intrusion, which has impacted water supplies. In order to understand current status of groundwater conditions and future trends in terms of water quantity and water quality, this study was undertaken to define water quality, water levels and to trace ground-water-flow paths, by using hydrochemical and hydrogeological data. The study area focuses on Hueco Bolson aquifer in El Paso and Hudspeth County, Texas. Data was compiled from the Texas Water Development Board groundwater database. Well data, water level and water quality data were compiled, coded, and integrated into multiple spreadsheets. ArcGIS map was utilized to generate a contour maps for groundwater levels around the Hueco Bolson aquifer. A Piper diagram was used to characterize the major cations and anions and identify water types. The results show excessive pumpage that has led to a great decline in water levels over the past century and water quality has been substantially changed at some wells over time leading to higher salt content in the well water. Management strategies have been taken to address those challenges, such as reduction of pumping, desalination of brackish groundwater, and managed aquifer recharge. This study is an important step for a better understating of future trends of water levels and water quality, and water flow path within this aquifer.

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Elena Eguiarte, Carolina Lozoya, Zhuping Sheng, Sora Ahn. "Groundwater Level Declines and Water Quality Deteriorates in Some Areas of the Hueco Bolson Aquifer". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=18

Assessing soil conductivity levels at Valley Creek Park

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The purpose of this experiment is to take monthly conductivity readings that can be related to soil moisture and salinity changes, and how this may impact the growth of native trees in Valley Creek Park. There are several factors that affect conductivity readings, such as the growth of tamarisk trees, ponding of surface water after rain storms, and the fluctuation of the river that flows along the eastern edge of the park. Tamarisk trees are an invasive species that deposit an excess amount of salt when their leaves drop during the winter, killing less salt tolerant plants. During the summer, the flow of the river is high to provide irrigation and during the fall the water flow is shut off. Typically, this is when conductivity readings decrease. In this experiment, I measured soil conductivity on a monthly basis at a cottonwood and tornillo tree. This was done by placing two measuring tapes, oriented 20 meters in the north-south and in the east-west direction, and measured conductivity at 1-meter spacings using an EM-31 ground conductivity meter. During October, the area received a higher amount of rainfall which resulted in more moisture in the soil. Small tamarisks observed growing near the cottonwood and tornillo trees do not yet appear large enough to be affecting the soil salinity. These observations are part of a long-term study to help determine how moisture and salinity variations affect the growth of the current native trees and identify the region's most suitable for planting new native vegetation.

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Miranda Govea, Diane Doser. "Assessing soil conductivity levels at Valley Creek Park". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=82

Standard operating procedure for the analysis of urinary volatile organic compounds: Does storage really matter?

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Recent studies have targeted the use of Volatile Organic Compounds (VOCs) as potential biomarkers for non-invasive diagnostic tools for different diseases. Most biological processes and products constantly release VOCs that can be found in different body fluids for example stool, blood, saliva, and urine. Collected evidence shows that urinary VOCs profile detection is a potential non-invasive diagnostic effective technique. The handling of the urine sample used for VOCs detection lacks an established standard operating procedure for proper preservation and storage. In this study, urine samples were monitored with the use of GC/MS in the interest of suggesting a standard operating procedure for assessment of VOCs profiles in the urine non-invasive diagnostic tool. To analyze if pre-analytical storage conditions have an impact on the quality and stability, urine samples collected were monitored under storage conditions such as heating at 45°C for 1 hour and refrigeration at time periods of 3, 5, 7 days. Data collected were statistically analyzed and compared to the original VOCs profile. Appreciable changes in the VOCs profiles pertaining to the qualitative and semi-quantitative detection were discussed. The results of this study will allow us to determine an appropriate procedure for urine sample storage pre-analysis, that will preserve as much VOCs profile from the pre-storage original sample. This study highlights the importance of maintaining a standard operating procedure for urine sample storage conditions to obtain analytical reliability and reproducibility.

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Grecia Hinojos, Wen Yee Lee. "Standard operating procedure for the analysis of urinary volatile organic compounds: Does storage really matter?" (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=140

Mapping the geological features of the Alkali Flats

Corey Howard[1,^], Richard Langford[1]

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The Alkali Flats lie west of the White Sands dune field, this flat area of exposed evaporates has been called playa lakes and an erosional feature. The area is now known to be a mosaic of lake beds, in which sediments are being deposited, and a 'deflation plain', from which the wind is eroding sediment. The slopes in the area are extremely flat. Elevation ranges from 1186 m at the lowest point in Lake Lucero to 1200 m above sea level at its highest point. This site receives salts from groundwater inflow sources and runoff from adjoining mountains. These salts are concentrated on the surface by the process of evaporation and act as a supply source for downwind gypsum dune formations.

Currently, it is believed that the Alkali Flats are just an old set of simple eroding lake beds adjacent to filling playa lakes filled up with sediment having little to no significant influence on the area's underlying hydrology. However, the area has never been mapped in detail and there is evidence of a much more complex story, with fresh-water ponds near the dune field, and a complex of modern and older playa lakes that are both depositing gypsum and eroding.

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Corey Howard, Richard Langford. "Mapping the geological features of the Alkali Flats". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=17

Expression and purification of human cryptochrome 2 (hCRY2) for structural and functional studies

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The circadian rhythm is an intrinsic biological clock that correlates an organism's behavioral and physiological processes with the earth daily cycles. The human circadian rhythm regulates many key cellular functions such as the cell cycle, DNA damage responses, and metabolism. At cellular level, circadian rhythm is maintained by a transcriptional-translational feedback loop (TTFL). Human cryptochrome 2 (hCRY2) is one of the essential proteins in the TTFL where it participates in the negative feedback part of the loop. Using bacterial expression systems, hCRY2 was produced and then purified using affinity and size exclusion chromatographies. Interactions between purified recombinant hCRY2 and its cellular counterparts will be studied using pulldown assay, dynamic light scattering, circular dichroism, and transmission electron-microscopy. The results from these studies will deepen our understanding of the mechanism of the TTFL, which will provide insights to facilitate development of treatments for diseases related to circadian rhythms.

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Aleksander Lazarski, Brenda Moreno, Ronda Esper, Stefani Petor, Jennie Choi, Supriyo Ray, Chuan Xiao. "Expression and purification of human cryptochrome 2 (hCRY2) for structural and functional studies". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=45

The influence of soil texture and irrigation chemistry on pedogenic CaCO3 precipitation and CO2 emissions of soils

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Recent studies of soils in agricultural fields in Tornillo, Texas have observed rapid salt accumulation as a result of flood irrigation, a common agricultural practice in drylands in the Southwestern United States. While the sources of evaporate salts including pedogenic carbonates have been identified and long-term accumulation rates quantified, little is known about the behavior of these salt buildups between soil horizons of differing soil texture during each irrigation event. The purpose of this study is to investigate the buildup of salts in typical irrigation events through column and field experiments. For the column experiments, two 20 cm-diameter, 80-cm tall PVC capsules were packed with sand-clay-sand layers (40 cm sand layer at bottom, 20 cm bentonite clay layer above, 20 cm sand layer at top) to simulate contrasting soil texture to what is observed in the field site. The columns were irrigated and monitored over a period of approximately 90 days to investigate the effects of time and salinity of irrigation water on pedogenic carbonate precipitation and CO_2 emission. After the irrigation events have passed, sediments from the column will be examined to: a) observe co-changes in soil moisture content, electrical conductivity, temperature, dissolved O_2 and dissolved CO_2 through in-situ sensors b) to conduct chemical and isotopic analyses of pedogenic carbonate in layers of differing soil textures and relate to irrigation water characteristics.

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Victoria Moreno, Lixin Jin. "The influence of soil texture and irrigation chemistry on pedogenic CaCO3 precipitation and CO2 emissions of soils". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=61

Expression of human PERIOD2 protein for interaction studies

Josue Murillo[1,^], Neha Chauhan[1], Jennie Choi[1], Duer Bolotaulo[1], Dwayne Bragg[1], Supriyo Ray[1], Chuan Xiao[1]

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Circadian rhythm is an intrinsic biological clock in most organisms that synchronize their activities to the day and night cycles of the earth. Chronic disruption of the circadian rhythm has been associated with mental illnesses, metabolic disorders, and high risks of cancer. At the molecular level, this circadian rhythm is composed of four core proteins: Brain Muscle ARNT Like-1 (BMAL1), Circadian Locomotor Output Cycles Kaput (CLOCK), Cryptochrome (CRY), and Period (PER). BMAL1 and CLOCK form a complex that promotes the expression of PER and CRY. After accumulation with a time delay, PER and CRY form a complex and inhibit their own expression by disrupting the BMAL/CLOCK complex, thus, finishing the negative feedback loop to establish the rhythm. However, some of the detailed interactions among these four core proteins remain unknown such as those between PERs and CRYs. Three paralogs of PERs (PER1, PER2 and PER3) exist in mammals. The full-length genes for human PER2 (hPER2) were cloned and transformed into an E. coli cell line. Expression of the hPER2 was optimized and the recombinant protein was purified using affinity chromatography. The purified hPER2 will be characterized and its interaction with other circadian proteins will be studied using classic biochemistry assays. Results from the project will deepen our understanding of the mechanism of the circadian rhythm.

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Synthesis, characterization, and applications of {[6-(benzyloxy)hexa-2,4-diyn-1-yl] oxy} acetic acid

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Polydiacetylene (PDA) photopolymers like {[6-(benzyloxy)hexa-2,4-diyn-1-yl] oxy} acetic acid (1*) have garnered growing attention due to their potential role in a wide array of emerging applications. PDAs with a polar group on one end and non polar group on the other show promise as nanoparticle templates in which a vesicle forms around a later removed sacrificial metal nanoparticle with polar groups coating the inner surface of the vesicle. The resulting uniform porosities can be used to create nanoparticles of specific size and shape. Our group reports on a synthetic route, characterization, and applications of 1* in a Cu(II) nanoparticle complex. Cu(II) capped nanoparticles were produced by reduction of Cu(II) and 1* complex with sodium bororhydride followed by UV photopolymerization. The porosities are produced by the removal of the Cu nanoparticle with acid. The resulting nanopores functionalized with carboxylate groups can be used to grow Pd and Au nanoparticles. The porous polymer has applications in pollutant adsorption, nanoparticle development, drug delivery, and as an emerging nanoporous conductive polymer.

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Dynamic nanoporous carbon materials for the removal of organic pollutants from water

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Water-soluble organic compounds of industrial origin represent a serious environmental concern because they are difficult to remove during water treatment. For example, the organic contaminants such , as methylene blue (MB) and 2-naphthol and bisphenol-A (BPA) can be highly harmful and even deadly at high concentrations, therefore an efficient and inexpensive method for their removal from water is essential. In this poster, we will present the use of glucose as a carbon source for the synthesis of highly porous graphenic carbon to serve as effective adsorbent material for organic pollutants in water. To form dynamic nanoporous, we employed zinc (II) oxide nanoparticles (ZnO NPs) as templates for the carbonization of glucose under Argon at 1000oC, at which point Zn(II) gets reduced to Zn metal and evaporates, generating nanoporous carbon matrix. The porous material has high surface area measured with B.E.T. analysis to be 1228 m2/g with small average porosities of 14.7 nm. Average adsorption capacities of our material were ~500 mg/g for MB, ~400 mg/g for BPA, and ~700 mg/g for 2-naphthol, while activated charcoal shows adsorption capacities of ~300 mg/g for MB, ~400 mg/g for BPA, and ~300 mg/g for 2-naphthol. We observed fast adsorption kinetics for our material, with near-complete adsorption of contaminants by our material within 5 minutes. In comparison, activated charcoal requires 30 minutes and 1 hour the complete adsorption of MB and BPA, respectably. As a result, we will report that our material has higher absorption capacities and higher kinetic capacities than commercially available activated charcoal.

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Aileen Nevarez, Luis A Barrera, Juan Noveron. "Dynamic nanoporous carbon materials for the removal of organic pollutants from water". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=91

Bisphenol-A removal from drinking and reclaimed water using alginate encapsulated activated carbon

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Bisphenol-A (BPA) is an endocrine disrupting chemical (EDC) which can mimic, block, or bind to hormone receptors. BPA is an additive in the manufacturing of various plastic products and can leach out into the environment. Currently, there is no regulation that requires the removal of BPA from food and water supplies; and water treatment processes are not designed to remove BPA and other EDCs. BPA can remain in the environment even after being processed through waste and wastewater treatment plants. Even though the health impacts of low levels of BPA on human health and ecosystem remains controversial, it is of great interest to find ways in which BPA can be removed. Various studies have found that activated carbon readily absorbs many EDCs, such as BPA. This project investigated the potential of alginate encapsulated activated carbon (ACA) beads as BPA adsorbents. The efficiency of BPA removal by ACA beads from drinking and reclaimed water was studied using Stir Bar Sorptive Extraction (SBSE) bars coupled with thermal desorption, followed by gas chromatography/mass spectrometry (GC-MS). The preliminary BPA removal under the laboratory condition will be reported. This outcome will provide the information on the potential of using the ecofriendly ACA in drinking water and wastewater treatment.

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Aqueous chemistry of molybdenum-iron-sulfide system that leads to nanoparticle formation under biological versus abiotic conditions

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Molybdenum (Mo) sulfide nanominerals are yet to be studied in a thorough manner in geological and environmental contexts, and the formation pathways remain unclear. Sedimentary Mo accumulation is a robust proxy for sulfidic conditions in both modern and ancient aquatic systems and is found in abundance in ore deposits of iron and other metals. Thus, understanding the aqueous chemistry of Mo-sulfide systems that leads to the formation of Mo-sulfide nanoparticles has important implications for a range of natural processes other than inspiring new designs in nanotechnology. A replicate of Mo-sulfide systems using an abiotic setting consisted of titrating a sodium sulfide (Na_2S) stock solution into sodium molybdate dihydrate (Na_2MoO_4 $2H_2O$) in a Metal Toxicity Medium solution at a controlled rate using a syringe pump. The final concentrations in solution consisted of 500 µM of molybdenum and another of 83.3 µM of iron and 416.5 µM. A biotic setting was also implemented which consisted of growing the sulfate-reducer Desulfovibrio vulgaris in concentrations of 500 µM of molybdenum, 250 µM of molybdenum and 250 µM of iron, and 417 µM of molybdenum and 83 µM iron. Both settings were analyzed using UV-Vis spectroscopy while the biotic mineral formation was analyzed using transmission electron microscopy.

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Alejandro Quezada, Muammar Mansor, Jie Xu. "Aqueous chemistry of molybdenum-iron-sulfide system that leads to nanoparticle formation under biological versus abiotic conditions". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=143

Soil carbon in New Mexico after shrub removal

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The Chihuahuan Desert of New Mexico was once composed primarily of grasslands. Years of overgrazing resulted in shrub encroachment, turning the area into a Creosote dominated shrubland. This shift from grasslands to shrublands has been seen in arid-lands worldwide and can have negative impacts on ecosystems. Grazing may lead to shifts in animal populations, plant communities, and soil disturbances. In 2017, the New Mexico Bureau of Land Management began their Restore New Mexico initiative, a partnership between individual land owners and land management agencies. The goal of the initiative is to restore New Mexico to a grassland state through the removal of shrubs using herbicides. My objective was to analyze the impacts of this large-scale shrub removal on the ecosystem's soil quality. I examined soil collected from 14 sites which were treated with herbicide in the 1980s - each of these sites contained a treated plot (shrub removal) and a shrub dominated control. Soil was collected from each plot under the dominant vegetation types. All samples were sieved using a 2mm sieve, dried at 50C, and ground before being analyzed for total soil carbon with a LECO carbon analyzer (samples are currently being processed). We hypothesize that soils taken from underneath forbs/grasses will have higher soil carbon, and those from bare soil will have low soil carbon. We also hypothesize an increase in average soil carbon, because shrub removal results in a shift in vegetation coverage from shrub dominated to a mixture of dead shrubs and forbs/grasses.

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Linda Raulston, Jennie McLaren. "Soil carbon in New Mexico after shrub removal". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=78

The impact of protic ionic liquids on the structural stability of lysozyme

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Protic Ionic Liquids (PILs) possess unique properties that make them attractive solvent media in a variety of applications including protein stabilization. The repeated transition between a native folded and an unfolded state are essential to a protein's function. During this process, a protein transitions through several metastable intermediate states whose structure and associated energy make them susceptible to misfolding and subsequent reduced bioactivity. PIL-based mixtures composed of ethyl ammonium nitrate (EAN) and water increase a protein's resistance to misfolding and improve folding reversibility compared to aqueous solutions. The large quantity of ions that make up an ionic liquid, combined with the PILs ability to participate in hydrogen bonding, could simultaneously screen protein-protein interactions while offering stability to the protein's structure. Previous temperature-dependent studies of proteins in PIL-based media elucidated unique folding intermediates that are not accessible in aqueous media. This project investigates the impact of changes in the solvent composition and temperature on protein structure. Temperature-dependent small-angle x-ray scattering (SAXS) measurements of hen egg white lysozyme (HWL) in a mixture of BMIMBF4 (1-Butyl-3-methylimidazolium tetrafluoroborate), EAN and water were performed. SAXS data were collected from 20 to 75 °C, at 5 °C increments, and scattering data was collected for 20 min. at each temperature. SAXS is a nanoscale characterization technique that can quantify the extent and type of aggregation that occurs. The measurements also monitored the protein's overall morphology and allowed the identification of aggregation onset temperatures, which depend on the type of ionic liquid / water mixture employed.

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Assessing φ-El A91T mutation as an inhibitor in heptameric ring separation

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The potential aggregation or misfolding of proteins occurs within a highly crowded cellular environment. Chaperonins are special molecules that help refold misfolded polypeptides to create a native and fully functional protein. The continuous aggregation of proteins within an organism can potentially form amyloid fibrils, which are toxic to cells and can lead to neurodegenerative diseases like Parkinson or Alzheimers Disease. Wild Type φ-EL is a bacteriophage encoded chaperonin and is only one of two known viruses that encode their own chaperonin. The structure of the φ-EL chaperonin is characterized by two heptameric rings that separate after ATP hydrolysis. φ-EL A91T is a mutation derived from the WT gene sequence to prevent the separation of the two rings. We hypothesize that the chaperonin formed with the φ-EL A91T mutation will inhibit the ring separation and with a high resolution cryo-EM structure, we can determine the atomic details for the ring separation. To date, we have successfully cloned, expressed and purified the φ-EL mutant. We are now awaiting high resolution cryo-EM data collection so that we can determine the cryo-EM reconstruction.

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Alejandro Rodriguez, Ricardo Bernal. "Assessing φ-EL A91T mutation as an inhibitor in heptameric ring separation". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=113

In-vitro analysis of particulate matter using simulated lung and gastrointestinal fluids

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Suspended sediment in dust storms is known to be a great traffic hazard in highways by the accidents it causes, but it can also threat human health by intake of particulate matter (PM) via the respiratory system. The main objective of this research is to review the existing literature and design the most adequate protocol to assess in vitro metal availability in the respiratory system by wind-suspended sediment. This is part of a project to evaluate the health impact by one of the sources of the most intense dust storms in the Chihuahuan Desert: the Lordsburg Playa in Hidalgo County, New Mexico, the only dust-emitting playa crossed by an interstate highway in Texas or New Mexico and also crossed by the Union Pacific Railroad 30m north of the interstate. The transportation-derived metals, and those from mining districts that surround the playa are potential sources of hazardous PM. Method of Wiseman (2014) was chosen considering the selection criteria: 1) transportation and mining related, 2) EPA parameters, 3) grade of representation, 4) compatible for analysis with ICP-MS. One leaching solution was chosen, simulated epithelial lung fluid (SELF) (Boisa et al. 2015) to represent the central part of the lungs and two solutions, Gamble's and artificial lung fluid (ALF) (Colombo et al. 2008), for the peripherals. We are currently in the process of carrying out the chemical procedure on Lordsburg samples and will report preliminary data.

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Julieta Saucedo, Lixin Jin. "In-vitro analysis of particulate matter using simulated lung and gastrointestinal fluids". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=20

Soil quality of Rio Grande sediment at Valley Creek Park

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The Rio Grande is an important supplier of water for the El Paso region. In the winter the dry river channel is a popular site for motorcycle, ATV, and horseback riding. Previous studies of the Rio Grande have focused on the salinity and the sources of elements found in its water. This study focuses on how elemental concentrations in the river sediment fluctuate over time to assess the effect of human interaction on the quality of river sediment. Samples were collected from three different sites at Valley Creek Park, El Paso: by the levee and in the river channel (closest to standing water and in its driest part) during March, October, and December 2018, and January and February 2019. The sediment was dried, combined with deionized water, and mixed in a lab shaker and centrifuged. The fluid was then filtered and the concentration of Boron, Nickel, Copper, Arsenic, Cadmium, Lead, and Uranium within the samples were analyzed using an Inductively Coupled Plasma Mass Spectrometer (ICP-MS). These elements were chosen because of their effect on human health and their connection to human activity. Results show higher concentrations of Boron, Copper, and Arsenic overall and higher concentrations of elements in the levee sediments as compared to the river sediments. Further testing of sediments around the levee showed the highest concentrations occur near a ditch that served as a drain during farming activities, suggesting the high concentrations might be due to previous agricultural practices.

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Angela Trejo, Diane Doser. "Soil quality of Rio Grande sediment at Valley Creek Park". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=49

SOCIAL SCIENCES

Does survival related information influence memory for social information?

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Social memory is derived from information we learn about individuals and groups. These memories facilitate the formation of impressions, especially with out-group members. New information is organized with existing memory structures in a process called memory consolidation. Memory consolidation occurs during sleep. In general, negative information is more readily recalled in comparison to neutral information. The present study aims to determine if an evolutionary mechanism drives prejudice formation by having participants learn survival (i.e. threatening) and non-survival (i.e. non-threatening by extreme) information about in and out-group members. It is hypothesized that in-group participants will have better implicit memory for learned survival related negative information about out-group members than for in-group members. We also propose that content matters, thus participants will show differences in responses and consolidation effects for negative information when it is survival related compared to survival unrelated information.

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Manal Aboargob, Amber Lupo, Angel Armenta, Michael Zarate. "Does survival related information influence memory for social information?" (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=25

Why admitting you are wrong can be so right: Workplace wrongness admission and illness related absenteeism

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While there is a large body of research examining job satisfaction and its implications, there is a lack of research regarding the possible involvement wrongness admission may have on these outcomes. We hypothesized that perceiving a supervisor's willingness to admit wrongness would lead to increased workplace positive affect which in turn would decrease negative outcomes while also increasing positive outcomes in relation to participants' jobs. We administered a series of surveys to measure participants' (N = 116) views of their supervisor's willingness to admit wrongness while also asking about job related variables (i.e. job stress, job satisfaction, workplace positive affect, and illness related absenteeism). Results of the Pearson correlations indicated a significant positive association between employee perception of supervisor wrongness admission with workplace positive affect and job satisfaction. In addition, we examined if workplace positive affect would mediate the relationship between employees' perception of supervisor's wrongness admission and our outcome variables. There was a significant mediation solely with job satisfaction, but not with the other variables. Ultimately, these discoveries add to the current literature concerning employee perceptions and well-being.

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Analisse Acosta, Katherine French, Adam K. Fetterman. "Why admitting you are wrong can be so right: Workplace wrongness admission and illness related absenteeism". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=101

Conducting a Systematic Review of Prenatal and Pregnancy-related Patient Satisfaction

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Objective: Systematic reviews are an important resource in health care. They are used by clinicians in order to stay informed and up-to-date in their fields, and they are often used as a starting point for developing clinical practice guidelines. The objective of this study is to conduct a proper systematic review on the theme of patient-provider communication and patient satisfaction in the prenatal context by addressing the research question: What factors influence patient-provider satisfaction during prenatal care? *Methods*: Following PRISMA guidelines, a search of several online databases was done with a combination of 10 key terms for research articles published in English between the years 1993-2018 on the topic of U.S. women's perceptions of provider communication skills, and patient satisfaction in the prenatal context. *Results*: Out of the many articles produced by searching 36 databases with 10 key terms, a total of 38 articles were deemed relevant and have been read. Data were entered into an Excel spreadsheet. An analysis of synthesizing the findings is ongoing. We have seen that there is little focus on the research of women's perceptions of their provider's communication skills. The articles found focused on themes of race/ethnicity of patients and providers, type of providers, gender of providers, type of prenatal care, state of pregnancy when patients initiated prenatal care, discrimination as well as other covariates of patient-satisfaction. *Conclusion*: Conducting a systematic review of this theme could help shed some new light on the subject and hopefully improve the areas of miscommunication in prenatal care.

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Paulina Ambert, Alexis Wilson, Ophra Leyser-Whalen. "Conducting a Systematic Review of Prenatal and Pregnancy-related Patient Satisfaction". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=88

Grit and social support: Correlates of tobacco, marijuana, and synthetic marijuana

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The use of tobacco is attributed to approximately 800,000 deaths per year. While use of inhaled-smoke tobacco products (excluding hookah) is on the decline, the use of other nicotine delivery products is on the rise. Marijuana use will likely increase as state legislatures become increasingly amenable to legalizing marijuana use. Hefty taxes levied on the newly-legalized marijuana and its derivatives may cause an increase in the popularity of less-expensive synthetic marijuana products (e.g. Spice and K2). The health effects of these products may be equally or more detrimental as those of natural marijuana. Availability and price may not be the only factors that dispose someone to the use of Novel Tobacco Products, Novel Drugs of Abuse (e.g. Spice and K2), and Marijuana. The current study investigated factors associated with their use. Specifically, this study focused on how grit (strength in character, perseverance) and social support (having/lacking social support from family or friends) may influence product use. Four hundred young adults were recruited from UTEP to participate in the online study that was conducted through QuestionPro. Eligibility requirements were that the participant was over the age of 18 and spoke English. Participants were compensated with a $10 electronic gift card for completing the 10-15 minute survey. Results of the current study are pending. Findings from this research may identify factors that influence young adults' propensities to use these products. Future research will focus on the difference in the propensity to use inhaled-smoke v. ingested-delivery nicotine and tetrahydrocannabinol (THC).

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Doctor, doctor, give me the news: Patient satisfaction in the infertility diagnostic process

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The literature on patient satisfaction varies widely, but little is understood about the interactions of patients and doctors during the diagnosis process â€" more specifically, how doctors treat their patients when there is a possibility that they are infertile. Providing insight into patient views of the diagnostic and treatment process is helpful for future fertility patients who will be experiencing life-changing challenges, and for health professionals who strive to ensure better patient satisfaction. Interview data from 20 women and 8 men who underwent fertility treatment between 2002 and 2008 are utilized in this research. Medical professionals in this research are categorized to further analyze the difference in treatment between generalists (e.g. Obstetricians/ Gynecologists) and specialists (e.g. Reproductive Endocrinologists) regarding patient satisfaction. Our data reveal that both generalists and specialists dismissed respondent's personal knowledge and individual differences concerning their own bodies. Differences emerged in how generalists tended to view the female body as more â€œnormalâ€□ and thus easily able to become pregnant. Thus, generalists did not pursue diagnostic testing as quickly as specialists. As women became frustrated, they sought further diagnostics from specialists. Thus, for these patients, satisfaction was evaluated in terms of the care and services that were provided to them by generalists and specialists. This raises questions such as whether providing patients with more personalized care, engaging in active listening, and providing sufficient knowledge on fertility treatments helps improve overall satisfaction regardless of the outcome (i.e. pregnancy).

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Brianne Bombach, Ophra Leyser-Whalen. "Doctor, doctor, give me the news: Patient satisfaction in the infertility diagnostic process". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=75

Examining parental legal socialization and ethnic differences in adolescents' attitudes and beliefs about the law

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Adolescence is the period of development when individuals begin forming ideas about the law. Research suggests that adolescents' legal attitudes about laws are shaped, primarily, through parental socialization. Legal socialization by parents may be especially salient for Hispanic cultures, for whom familism tends to be greater, than among non-Hispanic individuals. The present study examined ethnic differences (Hispanic vs non-Hispanic) in adolescents' attitudes about the law and parental legal socialization among a sample of 216 adolescents-parent dyads from the states of California and Texas. To assess adolescents' and parents' attitudes about the law, participants self-reported their feelings of obligation to obey the law and the degree to which they believed it is acceptable to break legal rules. Linear regression analyses evaluated the association between youth and parent legal attitudes and examined whether the association varied by ethnicity. Results from these analyses indicate that although legal attitudes themselves do not differ between Hispanic and Non-Hispanic youth and parents, the process of legal socialization may vary between these groups. Specifically, we find a positive association between parents' and youth's legal attitudes among Hispanic adolescents only. These findings elucidate the differential processes of legal socialization among Hispanic youth and may help to clarify disparities in adolescents' engagement in illegal behavior. These results underscore the importance of parental socialization for Hispanic adolescents, as the transmission of legal attitudes appears to be stronger for this ethnic group. In light of this finding, legal education efforts among predominantly Hispanic/Latinx populations should include a parent-education component.

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Mariana Cardenas Dominguez, April Thomas, Adam Fine. "Examining parental legal socialization and ethnic differences in adolescents' attitudes and beliefs about the law". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=93

The impact of health informational sources on the perceived risks, effectiveness and safety of the HPV vaccine among hispanic adults

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Increased knowledge of the human papillomavirus (HPV) and the HPV vaccine is needed among adults, Hispanics in particular, due to misconceptions about their susceptibility to contracting the disease. The purpose of this study is to investigate the impact of health information sources on the perceived risk associated with the HPV vaccine, as well as the perceived effectiveness and perceived safety of the HPV vaccine among Hispanic adults. Participants (N = 160) were randomly assigned to one of three experimental health information source conditions such that participants received HPV vaccine information framed as provided by: 1) friends/family through social media, 2) local healthcare provider (e.g., pharmacist or family doctor), 3) government and health care system. Participants in the control condition received neutral information unrelated to vaccines (e.g., information about the use of health fairs in the workplace). It is hypothesized that health information sources will differentially impact participant perceptions of the vaccine's safety, risk, effectiveness, and intentions to vaccinate. Specifically, we hypothesize that health information recommending the HPV vaccine from friends/family will lead to the most positive attitudes and perceptions of the HPV vaccine. Furthermore, we hypothesized individual factors of participant vaccination history and distrust in the government will moderate the impact of health information source on participants' attitudes perceptions, and behavioral intentions.

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Lauren Chacon, Gabriel Frietze, Jessica Shenberger-Trujillo. "The impact of health informational sources on the perceived risks, effectiveness and safety of the HPV vaccine among hispanic adults". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=33

Characterization of student and instructor behaviors in CURE and non-CURE contexts in the biological sciences

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While imperative in enhancing the community's understanding of the benefits of Course-based undergraduate research experiences (CUREs), research on this context has historically focused on student outcomes. In contrast, few, if any, studies have characterized the behaviors and interactions occurring within CURE and non-CURE settings and the impact of those behaviors on student outcomes. To address these concerns, a quasi-experimental design was employed to evaluate student and instructor behaviors in four CURE and four non-CURE sections. Videodata were collected in each section, with collection distributed evenly throughout the term to generate a representative account of interactions occurring within the laboratory. All videodata were analyzed using an adapted version of the Laboratory Observation Protocol for Undergraduate STEM (LOPUS). In addition, pre-/post-semester affective survey data were obtained from CURE (n = 47) and non-CURE (n = 60) students in the above-referenced sections. Partial correlation networks (PCNs) built using the coded videodata revealed distinct latent variables present in CURE and non-CURE courses that are associated with student outcomes. The PCNs then informed generalized linear mixed modeling approaches, which indicated that CURE participants exhibited more positive shifts in motivation and science identity formation over the course of the semester than their non-CURE peers. Behaviors indicative of high student engagement in the course were found to result in more positive shifts in motivation within CURE contexts. Collectively, these findings provide novel insights into the contextual features inherent of CURE and non-CURE learning environments and the influence of these factors on non-cognitive student outcomes in the domain.

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David Esparza, Amy Wagler, Jeffrey Olimpo. "Characterization of student and instructor behaviors in CURE and non-CURE contexts in the biological sciences". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=67

The stratification of marijuana legalization and its effects on people of color

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The extant literature has shown that conservative policies on the criminalization of marijuana have historically been used as a tool to target and stigmatize people of color. The criminalization of marijuana has contributed to the disproportionate mass incarceration rate of people of color in the prison industrial complex. To counteract failed drug war policies, eight states thus far have legalized and/or have decriminalization the drug. However, few studies explore whether existing policy platforms, liberal or conservative, result in the marginalization of people of color. Therefore, this study examines the role of ideology in marijuana policy on arrests and detentions of possession by race and ethnicity. Our argument is twofold: 1) liberal policies enforcing the decriminalization of marijuana greatly decrease the number of arrests and detentions due to possession over time, and 2) the effect of existing policies, regardless of its ideological foundation, differ by race and ethnicity. To test this relationship, we make use of the American Community Survey and the 2016 FBI Uniform Crime Report to employ a content analysis of New Mexico, Colorado, and Oregon marijuana policies. The findings suggest that policies regarding taxation, employment and housing will keep minorities from benefiting economically from the legalization boom. Furthermore, Blacks and Latinos are most affected by the implementation of these policies even when the policy is liberal. Thus, due to the predominantly White makeup of both Colorado and Oregon, we recommend New Mexico adapt a new legalization model that will be more beneficial for its unique demographics.

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Ana Fuentes, Kate Cartwright. "The stratification of marijuana legalization and its effects on people of color". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=117

Student placement at at-risk and alternative schools: The influence of mental health and alternative schooling

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Research Objective: The objective of this study is to examine the role of mental health in student placement at risk schools. Data and Methods. I will utilize data from the National Health Interview Survey (2013) with 12,860 respondents collected in the U.S. between January and December of 2013 to address this research objective. Descriptive statistics, chi-square, and binary logistic regression are the statistical methods that I will utilize. Preliminary Findings. Preliminary findings indicate that 62.1 percent of students at at-risk and alternative schools have learning disabilities. Moreover, most of the students sent to alternative schools are described as being generally well-behaved. Indeed, 87 percent of students were described as well-behaved and as doing what is requested of them based on caretaker observations. Also, nearly 50% of students who attend alternative schools exhibit depressive symptoms. Conclusion. Preliminary results show that mental illnesses, developmental disabilities, and 'bad' behavior, are the primary motivators for being send to at risk schools. Additionally, Latina/os, in contrast to non-Latina/os, are more likely to be placed in at-risk schools regardless of mental health or developmental disabilities and disruptive behavior. This is a concern given that previous literature suggests that even when intended to benefit the students restrictive placements, in contrast to mainstream classrooms, exacerbates maladjustment for youth.

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Gisselle Garcia, Maria Morales. "Student placement at at-risk and alternative schools: The influence of mental health and alternative schooling". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=121

Is racism effecting my health?

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Background: Attitudes toward one's ethnic group can have particular implications for health functioning among groups that are misrepresented or discriminated against by societal institutions. This experiment sought to examine the relationship between racism and psycho-physiological indicators of stress. We also investigated how stress responses are linked to impaired self-control which leads to poor health choices. We hypothesized that changes in stress would be a function of experimental condition and strength of ethnic identity. Among participants in the racism condition, high ethnic identification would be associated with lower stress ratings and lower loss of self-control. In addition, it was anticipated that participants in the racism condition would make unhealthy food choices. *Methods*: A total of 142 Latinx and African American students participated in this study. Students were randomly assigned to two conditions (racism, no racism), and five baseline measures were collected: demographic information, ethnic identity, anxiety, heart rate, and cortisol. After interacting with a racist confederate, participants completed the following post-test measures: self-control, heart rate, cortisol, anxiety, and a food-choice task. *Results*: Results revealed significant increases in heart rate and self-reported levels of anxiety after experiencing racism. There was no effect of condition on cortisol and self-control. Contrary to predictions, participants in racism condition were more likely to make a healthy food choice. *Conclusion*: This study enhanced our understanding of how racial discrimination and its direct and indirect impact on an individual's ability to regulate their behavior and in turn, their health.

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Understanding the impact of This Is My Brave on storytellers

Sofia Macias[1,^], Kristin Kosyluk[2], Eva Moya[1], Nathaniel Chaney[1]

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Self-stigma occurs when an individual with a mental illness internalizes society's misconceptions (stereotypes) regarding mental illness (Corrigan & Kosyluk, 2013). Self-stigma can lead one to feelings of hopelessness, loss of self-esteem, and decrease in social relationships. (Advancing Policy to Eliminate Discrimination Program [APEDP], 2015). This Is My Brave is a mental illness stigma reduction program grounded in the principles of contact-based stigma reduction & storytelling. The aim of this study is to explore the impact of sharing one's stories of mental illness & recovery on the presenters of This Is My Brave (TIMB) all of whom self-identify as having a mental illness. Qualitative methods -key informant interviews- were adopted for the purpose of this study. Questions asked include: What influenced you in sharing your story when participating in This Is My Brave? In what areas of your life has participating helped you? What have you learned from yourself after participating? What were your thoughts before & after your participation? What changes have you perceived from others after participating? Findings provide a better understanding of impact in storytelling on individuals who participate firsthand experience in TIMB. Participants had the opportunity to state positive feelings of storytelling through the position of both a teller and listener. Additionally, qualitative data analysis to code themes and conduct inter-coder reliability was calculated. In conclusion, this study provides support for TIMB as a mechanism for promoting storytelling towards individuals with mental illness and normalizing personal mental health experiences.

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Sofia Macias, Kristin Kosyluk, Eva Moya, Nathaniel Chaney. "Understanding the impact of This Is My Brave on storytellers". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=32

Race stereotypes and its effects on patient and doctor relationships

Luis-Alberto Magallanes-Duarte[1,^], Stephen Crites[1], Jessica Bray[1]

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Spontaneous trait inferencing (STI) is an automatic process of forming memories. The current study examined the effects of race on STIs. Specifically, we were interested in exploring if a doctor's race affected patients' perceptions of them. Previous literature shows that if patients perceived medical practitioners as warm, they adhered to treatment and shared more information with practitioners. If a doctors race affects the patient's perception of them, it could, in turn, affect adherence to treatment. We hypothesize that similar to previous research Hispanic doctors will be seen as warmer than white doctors. In order to test our hypothesis, we conducted three analysis: we tested for the presence of STIs, the effects of stereotypes on STIs, and the effect of race on STIs. We tested STIs, stereotypes, and race by using a modified version of the recognition probe task. Our results showed that participants did not infer any traits based on the doctors' behaviors. They also did not associate any stereotypes to the doctors, and race did not affect STI's. However, previous studies have found evidence for STIs by using the recognition probe task. In addition, previous research has shown that STIs are activated from observing trait implying behaviors, and from associating stereotype-consistent behavior. Our contradictory results may be due to either participant preceding familiarity with doctors or the modifications made to the recognition probe task.

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Luis-Alberto Magallanes-Duarte, Stephen Crites, Jessica Bray. "Race stereotypes and its effects on patient and doctor relationships". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=70

Opening doors for women in sports

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In 1972, Congress passed Title IX of the Education Amendments that forbids any institution or organization receiving federal funding from discriminating on the basis of sex. Title IX biggest impact was in intercollegiate sports making possible for female athletes to have equal opportunities. This research study presents the stories of female El Paso athletes that have pioneered the road for current athletes. This study also portrays how Title IX has impacted the University of Texas at El Paso campus and intercollegiate sports. This research was conducted with an intensive literature review and well-structured interviews. According to the literature review, Title IX impacted the university by not only addressing inequalities in sports but by also addressing sexual misconduct in campus which includes sexual assault, stalking, and sexual violence. In addition, the interviews portrayed strong stories of these female athletes that paved the road for future athletes. In conclusion, history has shown the enormous impact that Title IX has had in the community and intercollegiate sports.

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Annel Mena, Guillermina Nunez-Mchiri. "Opening doors for women in sports". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=134

Provider perceptions of healthcare access for pregnant immigrant women

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Immigrant populations in the US are subjected to exclusionary policies that often prevent them from accessing insurance coverage and healthcare services. New immigration policies have been associated with mental health issues among the immigrant population, such as depression, anxiety, and post-traumatic stress disorder (Martinez, 2016). Thus, it is important to understand the emotional experience of pregnant immigrant women in the border region. This paper explores one aspect of this broader issue by exploring how healthcare and social service providers view healthcare for pregnant immigrant women, and their observations of the difficulties immigrant women go through in trying to access healthcare. To understand this issue, we interviewed eight social service and healthcare providers to explore their knowledge regarding the health of immigrant women in the border region and the challenges to providing this population with support. Interviews were analyzed and broken down into salient themes. The themes include providers' perceptions of women's challenges and barriers to accessing care, provider challenges to providing care, and provider recommendations for policy. These themes are important because they will inform us on how aware the providers are to immigrant women's difficulties. Additionally, the data on providers challenges to providing care and provider recommendations for policy may produce a solution to those struggles in the future.

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James Milam, Carina Heckert. "Provider perceptions of healthcare access for pregnant immigrant women". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=52

Summary energy outreach effort at UTEP for K12 students

Daniela Morales Lopez[1,^], Yirong Lin[1], Lourdes Echegoyen[1], Norman Love[1]

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The Consortium for Integrating Energy Systems in Engineering and Science Education (CIESESE) program at UTEP has the mission of embracing and preparing future generations in the field of engineering and science. The consortium was established to prepare and educate the future energy workforce by implementing educational modules that consist of presentations and interactive videos and by integrating project-based learning exercises in the classroom to help students from K-12 better understand energy-related concepts. Past modules consisted of pre-made LEGO and other lab-based activities that required hands-on assembly. The activities were implemented during the summer of 2017, in which 187 students participated in 1-day workshops. These modules were too expensive for local El Paso teachers to transfer into their classroom. Because of school limitations, alternative experiments for broader teacher adoption were developed. New educational modules are low-cost effective, transferable to classroom curriculum, and promote the usage of recycled materials. These new activities focus on emphasizing concepts associated with recycling and reusing everyday items for the generation of renewable energy. In-class projects covered topics of distribution of energy and work output produced by windmills, watermills, wind turbines, and solar cars and use of materials such as plastic bottle caps, Styrofoam cups, popsicle sticks, and DC motors. Since the summer of 2018 to this day, a total number of 347 students have worked with the new modules. These modules are publicly available on the UTEP CIESESE website http://engineering.utep.edu/ciesese.

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Daniela Morales Lopez, Yirong Lin, Lourdes Echegoyen, Norman Love. "Summary energy outreach effort at UTEP for K12 students". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=118

Attitudes, immunization, and familism

Gil Moreu[1,^], Adam Fetterman[1]

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Although the efficacy and safety of immunizations have been validated in numerous studies, immunizations still face controversy and resistance. In particular, the Measles, Mumps, and Rubella (MMR) and Human Papilloma Virus (HPV) vaccines have proven to be especially controversial. However, little research has been done to see which factors predict the likelihood of parents vaccinating their children. In order to assess which factor is most predictive of parental intentions to vaccinate for MMR and HPV, we used the Theory of Planned Behavior (TPB), which states that there are three factors that contribute to whether or not a person will intend to perform a behavior. We want to see which aspect of TPB is most predictive of intention to immunize and to see if this is affected by cultural factors such as familism. We predict that associations between both attitudes and subjective norms and immunization intentions will be moderated by familism such that subjective norms will be most predictive of immunization intentions for participants that score high on measures of familism, whereas attitudes will be more predictive of intentions for participants who score low on measures of familism. Results are still pending.

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Gil Moreu, Adam Fetterman. "Attitudes, immunization, and familism". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=27

Ex-Convict's Gang Engagement and Life Transition

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Ex-convicts social environment in the correctional facilities increases their propensity to join a prison gang. Victimization and peer pressure to join a gang are situations which convicts encounter while entering to the correctional facility (Katz, Webb, Fox, and Saffer, 2010). Prison gang member's engagement into criminal activities provides a sense of belonging to the individual by having the support and protection of their peers. The purpose of this study is to explore ex-convicts' experience with gang engagement (before, during and after incarceration) and the challenges they were facing upon release from prison. Data were collected from personal interviews with ex-convicts recruited from a local support group that helps facilitate ex-convicts' re-integration to society. Each interview took approximately 50 minutes to an hour. To compensate for their time, participants were given an incentive (i.e., a coffee mug) as an appreciation for their participation. Preliminary research findings show that peer pressure plays a critical role in ex-convict participants' decision to join prison gangs as they faced dreadful experiences while incarcerated. Moreover, their experiences with gang's engagement and criminal background inhibited their transition to the community and limited their access to job opportunities and social services. Family support was the major driving force that motivated these participants to pursue personal goals.

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Jennifer Munoz, Yok-Fong Paat. "Ex-Convict's Gang Engagement and Life Transition". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=11

‘Walking on a tightrope through hell’: A qualitative inquiry of the lived experience of alcohol withdrawal in recovery

Sarah Najera[1,^], Brianna Holcomb[1], Rubi Gonzalez[1], Eden Robles[1], Craig Field[1]

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Existing research on alcohol use does not investigate the lived experience of withdrawal. More knowledge has been generated regarding its physical symptoms, and studies that do inquire about the experience of recovery briefly discuss withdrawal and contain shallow discussions of the topic. More knowledge and updated interventions exist for withdrawal from nicotine than from that from alcohol, even though the latter is often severe and life-threatening as opposed to the former. The present study was meant investigate an otherwise misunderstood and often stigmatized phenomenon, and to uncover meanings behind psychological, social, cultural and perhaps spiritual aspects of the experience of withdrawal during recovery from an alcohol use disorder. Using a phenomenological theoretical framework, qualitative methods such as semi-structured interviews were implemented to gather open ended responses from participants. Both men (n=4) and women (n=2) who identify as Hispanic and who were being treated for an alcohol use disorder in an inpatient facility were interviewed. Careful coding and recoding of transcribed interviews amongst the research team is the primary form of analysis and is currently underway. Member checking will also be implemented to ensure that results are congruent with the intended messages of study participants. A total of 29 codes have been identified, and the research team is currently in the process of organizing and identifying major themes from these codes. The significance of this study lies in its potential to further research in recovery and interventions regarding alcohol use disorders. Understanding the meaning of the experience of alcohol withdrawal can help scientists determine whether there is potential for capitalizing on the experience within clinical settings and interventions, and can help lay people and professionals alike carefully consider traditional approaches to alcohol withdrawal management as opposed to other common substance use disorders.

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Sarah Najera, Brianna Holcomb, Rubi Gonzalez, Eden Robles, Craig Field. “’Walking on a tightrope through hell’: A qualitative inquiry of the lived experience of alcohol withdrawal in recovery”. (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=34

Correlates of Novel Tobacco Products (NTP), Novel Drugs of Abuse (NDA), and Novel Marijuana Products (NMP) in young Hispanic adults

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Approximately 13 out of 100 adults ages 18-24 identified as cigarette smokers in 2016. Many laws and regulations have been imposed with aims of reducing tobacco use, however, the Tobacco industry has adapted to these regulations by introducing Novel Tobacco Products (NTP) such as dissolvables and e-cigarettes. Another national trend in the U.S. involves the legalization of marijuana which has contributed to the development of Novel Marijuana Products (NMP) including edibles and topicals. The latter products will likely lead to increases in marijuana use. Although there are many states in which marijuana is legal for either medicinal or recreational purposes, Novel Drugs of Abuse (NDA) have been developed in order to mimic the psychoactive effects of marijuana (e.g., K2 and Spice) and are appealing to those who do not have access to marijuana or seek a cheaper alternative to marijuana. The current study investigated factors that are associated with using NTPs, NMPs, and NDA. Four-hundred young adults were recruited from UTEP to participate in the online study that was conducted through QuestionPro. Eligibility requirements were that the participant was over the age of 18 and spoke English. Participants were compensated with a $10 electronic gift card for completing the 10-15 minute survey. Results are pending. Findings have implications for health professionals who seek to understand factors that contribute to the use of tobacco, marijuana, and synthetic marijuana. Future studies will investigate how the packaging and presentation of these products influence intentions to use each product.

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Raymond Oliva, Jessica Shenberger-Trujillo, Gabriel Frietze. "Correlates of Novel Tobacco Products (NTP), Novel Drugs of Abuse (NDA), and Novel Marijuana Products (NMP) in young Hispanic adults". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=36

Intersectionality of ethnicity, gender and homelessness in El Paso, Texas: An exploratory study

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Current research demonstrates the importance of addressing gender and ethnicity to understand the needs of the homeless population. Despite the intricate relationship found between these themes, there is insufficient research on the intersection of gender, ethnicity, and homelessness in El Paso, Texas. Understanding the intersection of gender, ethnicity, and homelessness is ever more important in our border city as there are salient factors (e.g. Hispanic Homeless Paradox, binational nature of a border city) that affect and contribute to this relationship. This study will document the emotional and health experiences of Hispanic and Non-Hispanic women experiencing homelessness, and identify barriers and facilitators in accessing health services. Implications of this study will be used to inform social, program, and policy change to improve service delivery of women affected by homelessness. Recruitment of participants will be done through the help of partner agencies. In-depth interviews will be conducted through a sample of 30 adult women (i.e. 15 Hispanic and 15 Non-Hispanic women) experiencing homelessness and residing in a shelter. Beck Depression Inventory II, General Self-Efficacy, and Adverse Childhood Experiences scales will be used to help assess depression, quality of life, and childhood abuse experiences, respectively. Qualitative and quantitative data produced will be analyzed through descriptive statistics, content and thematic analysis. Findings will be used to inform health and human service providers and decision makers about the needs and perspectives of Hispanic and Non-Hispanic women experiencing homelessness.

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Lourdes Perez, Eva Moya, Yok Fong Paat, Layla Townsend, Ryan Floresca. "Intersectionality of ethnicity, gender and homelessness in El Paso, Texas: An exploratory study". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=14

The interaction effect between self-regulation and protective behavioral strategies for alcohol-related problems

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Purpose: The present study conducted at a predominantly Hispanic serving institution examined a potential interaction effect between self-regulation (SSRQ) and protective behavioral strategies (PBS) for alcohol-related consequences (RAPI) among student drinkers. *Methods*: A random sample of seven hundred sixty undergraduate students from the University of Texas at El Paso completed an online survey regarding the impact psychological and cultural factors have on health behaviors. Approximately half of the students completed the entire survey (n=371; 48.8% participation rate). Only data from students who reported having consumed alcohol at least once in the past month (n=192; 58.9% female; Mage = 23.4, SD = 6.61; Hispanic 89.6%) were used for this study. The online survey included assessments of SSRQ, PBS, and RAPI. *Results*: Based on previous literature we predict to have a statistically significant interaction between SSRQ and PBS on RAPI even after controlling for socio-demographic variables that are affiliated with alcohol use and related problems. We expect SSRQ and PBS to be significant predictors of RAPI. The SSRQ and RAPI will be negatively correlated. Moreover, an increase in PBS will strengthen the negative relationship between SSRQ and RAPI. Conclusion: Although these relationships have been tested, the current study adds to the *literature* by providing a unique sample of predominantly Hispanic student drinkers. Additionally, the current study tests the three subscales (Limiting/Stopping Drinking, Manner of Drinking, and Serious Harm Reduction) that make up PBS which have a higher reliability than the PBS measure.

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Qualitative description of the effects of experiencing racial discrimination

Erin Portillo[1,^], Miriam Alvarez[1], Rebeca Fierro-Perez[1], Michael Zarate[1]

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Experiencing racism has shown to have strong consequences on mental and physical stress. Despite ongoing efforts to increase diversity in academic settings, attitudes towards minorities continue impacting their academic success. This qualitative research aims to examine student responses to experiencing racism in an academic setting. Ninety-three Latinx and African American students participated in this study. Participants were randomly assigned to a racism or no racism condition and instructed to interact with an online mentor who behaved according to experimental assignment. After interacting with the mentor, participants were asked to provide feedback on the impression their mentor made. Written responses that occurred in response to the racial discrimination will be analyzed. All responses will be coded and indexed to facilitate theme extraction. Understanding how experiencing racial discrimination impacts minorities' emotion and thought processes will triangulate quantitative findings, which show that heart rate and anxiety responses are activated after experiencing racism. Furthermore, this mixed-method approach will validate the quantitative findings and provide stronger evidence that experiencing racial discrimination produces a psychophysiological response.

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Prophylactic effects of ketamine in a juvenile model of depression

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Approximately 10% of children and adolescents are diagnosed with major depressive disorder (MDD). Unfortunately, close to 50% of depressed youth are unresponsive to traditional pharmaceutical treatments, such as fluoxetine (Prozac), which reflects the need to identify alternative compounds for the management of juvenile MDD. In adult populations, ketamine, an N-methyl-D-aspartate receptor antagonist, has recently shown the capacity for rapid-acting antidepressant efficacy in both preclinical and clinical studies. Thus, to examine ketamine's potential as a rapid and effective antidepressant therapeutic agent for juvenile MDD, ketamine was administered to adolescent male C57BL/6 mice while undergoing social defeat stress for 10 consecutive days (postnatal days [PD] 35-44) - a stress regimen that results in depression-like behaviors in mice under normal conditions. Specifically, separate groups of stressed (defeated) and non-stressed (control) mice were administered with ketamine (20 mg/kg) either immediately after each daily episode of defeat (chronic; 10 exposures), or after the last day of stress (acute; single exposure). Twenty-four hours later (PD45), all mice were tested for depression-like behavior, as inferred from the social interaction/avoidance test. As expected, defeated adolescent mice administered with saline (chronic or acute) exhibited a depressive-like response (i.e., increased social avoidance). Conversely, exposure to ketamine (chronic or acute) prevented the development of the stress-induced avoidance phenotype. Together, these findings indicate that ketamine may be a potential novel agent for the treatment of juvenile MDD.

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Joshua Preciado, Sergio Iñiguez. "Prophylactic effects of ketamine in a juvenile model of depression". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=76

The use of language style matching as an indicator of rapport in investigative interviews in order to study a potential avenue of improving mental health within the correctional system

Angelica Quinones[1,^], Justin Magee[1], James Wood[1]

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Research suggests that rapport plays an influential role in the success and quality of investigative interviews. It is, however, difficult to study the effect of rapport between detainees and other members of the correctional system including therapists and psychiatrists. To study how rapport may be maintained and developed in these interactions, the dialogue of 45 simulated investigative interviews was analyzed using LIWC software. The interviewee's reported experience of rapport as measured by the RS3i, as well as rapport building measured by observational scales, was utilized in order to conduct correlation analysis with the linguistic variable of Language Style Matching (LSM). This study could provide further evidence for the validity of previously developed tools such as the RS3i and various observer scales. If LSM is suggested to be a valid indicator of rapport, it may be a valuable tool for research and training purposes. In addition, these linguistic variables would facilitate the study of rapport in potentially confidential or sensitive interactions.

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Angelica Quinones, Justin Magee, James Wood. "The use of language style matching as an indicator of rapport in investigative interviews in order to study a potential avenue of improving mental health within the correctional system". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=157

Factors influencing health insurance uptake among low-income Hispanic communities: Pinpointing the gap

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Research shows that Hispanics regularly opt out of health coverage, generally lagging behind other ethnic groups. This seen even among Hispanic families eligible to receive free (or low-cost) insurance coverage. Hispanics constitute the fastest growing minority in the country and it is important to understand factors restricting these groups from having access to healthcare. We hypothesized that income is a major factor restricting health insurance uptake. We also hypothesize that operational issues such as reduced enrollment periods for subsidized health coverage and enrollment process complexities influence uptake. This study aims to: identify main factors which restrict low-income Hispanics from obtaining health insurance; identify ways of minimizing the negative impact of factors which hinder access to healthcare; and propose general policies which might improve health insurance uptake in Hispanics. Randomly selected families residing in El Paso counter were given a survey to gauge a variety of different variables, to include: where they got their coverage from, the last time they were covered by insurance, the level of awareness about coverage plans, the length of time worked in U.S, left before retirement, their occupation, and relationship with care provider/representative/ broker.

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Luis Quintero, Rigoberto Delgado. "Factors influencing health insurance uptake among low-income Hispanic communities: Pinpointing the gap". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=167

Evaluating UTEP student perceptions of air quality in the El Paso border region

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The El Paso border region faces complex air quality challenges, has high rates of asthma and other respiratory-related diseases, and is considered a moderate nonattainment area for particulate matter (PM_{10}). Previous studies conducted in the San Joaquin Valley of California, which also has poor air quality and high rates of asthma, have determined that sensitive groups (e.g., those individuals with pre-existing health conditions) tend to perceive the air quality in their community to be unhealthy. In order to achieve similar cooperative efforts in reducing individual exposure and contribution to air pollution in the border region, it is essential to gain an understanding of how the public perceives air quality in their community, especially those in sensitive groups. Our current study will descriptively examine students' (N = 200) perceptions of air quality in the region and its perceived health impacts. Furthermore, we will use regression analyses to explore the relationship between those perceptions and students' sense of community belonging, sense of agency in improving air quality in the region, and demographic characteristics. Once similarities and differences in student perceptions are better understood, this information can be utilized to create a more appropriate communication framework that ensures that students understand the health impacts of air pollution and how to effectively mitigate their exposure and contributions to negative air quality.

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The intersections of experiences of violence and immigration-related stress in pregnant women in the borderland region

Isabela Solis[1,^], Carina Heckert[1]

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This paper explores how experiences of violence shape pregnancy and maternal health outcomes among immigrant women in the border region of El Paso, TX. Semi-structured interviews were conducted with 35 pre-natal and post-natal women on their experiences of stress and health in relation to their pregnancy. Women's emotional experiences of pregnancy can offer insight into the production of health disparities on the border, as a number of key maternal and infant health outcomes are stress sensitive. This paper will focus on a subset of 5 women from the full study who experienced intimate partner violence during their pregnancy, specifically looking at how intersecting sources of stress related to women's experiences of violence and their immigration-related concerns shaped their physical and emotional well-being. Interview data was analyzed for common themes from these 5 interviews. Common themes included adverse outcomes women perceived as being stress-related, lack of resources, and a status of being legal limbo compounding stress. Adverse outcomes included infants being born at low birth weight, pre-term birth, and near infant mortality. Lack of resources included low access to health care and a lack of resources for getting out of an abusive relationship which subjected women to more violence. Lastly, being in legal limbo for women with a precarious immigration status perpetuates stress, further putting women at risk for stress-sensitive adverse outcomes. Exploring these themes will help us understand how experiences of violence shape emotional and physical well-being of pregnant immigrant women in the borderland.

Funding Acknowledgement: Latino Center for Leadership Development at Southern Methodist University

Isabela Solis, Carina Heckert. "The intersections of experiences of violence and immigration-related stress in pregnant women in the borderland region". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=68

Sexual health education and student access to health services at UTEP

Sofia Valenzuela[1,^], Guillermina G. Nuñez-Mchiri[1]

[1]*The University of Texas at El Paso.*

The definition of sexual health is complex and varies amongst scholars. Nonetheless, most definitions agree that having a physical, emotional, mental, and social wellbeing in relation to sexuality are crucial aspects of sexual health (WHO, 2016). According to the World's Health Organization, sexual health also entails having a positive and respectful approach to sex and sexuality (2016). Healthy sexual relations should be pleasurable experiences, free of coercion, discrimination, and violence; as well as respecting, protecting and fulfilling the sexual rights of all persons (WHO, 2016). How sexual health is viewed, practiced, and how we approach resources that promote sexually healthy practices can be influenced by education, cultural and religious ideologies as well as the way individuals express their sexuality towards the world (Deardorff, Tschann, Flores, & Ozer. 2010; Marticka-Tyndale, Shipak & Chinichian; Chandra-Mouli, 2015; Gonzales, Przedworski & Henning-Smith. 2016; Williama-Barnard, Mendoza & Shippee-Rice. 2001). This research focuses on the sexual health behaviors of college students at the University of Texas at El Paso. This mixed method study aims to shed light on the sexual health practices that students engage, in school and outside resources that they reach out, their opinion over the school health resources, and what aspects they consider to be sexually healthy. This will be studied by using intersectional theoretical framework to understand the aspects that influence student's sexual health behaviors such as education and medical services.

Funding Acknowledgement: Women and Gender Studies; Campus Office for Undergraduate Research Initiatives

Sofia Valenzuela, Guillermina G. Nuñez-Mchiri. "Sexual health education and student access to health services at UTEP". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=153

2019 DEPARTMENT OF MUSIC VIOLA/VIOLIN STUDIO RECITAL

Twentieth Century Modernism:

The music of Bartók and Shostakovich

Studio Project and Recital

Spring 2019

Sunday May 5, 2019

2:30pm

UTEP Fox Fine Arts Recital Hall

Violin and Viola Studio of Dr. Stephen Nordstrom

The University of Texas at El Paso

PROGRAM

Béla Bartók - Selections from *44 Duos for Two Violins*

#1 *Teasing Song*, #8 *Slovakian Song*, #6 *Hungarian Song*, #9 *Play Song*
Carlos Esparza, violin
#5 *Slovakian Song,* #12 *Hay Song*, #20 *A Rhythm Song*, #26 *Teasing Song*
Ramon Valenzuela, violin
#2 *Maypole Dance*, #43 *Pizzicato*, #36 *Bagpipes*, #15 *Soldier's Song*, #14 *Pillow Dance*
Abigail Arredando, violin
#23 *Bride's Farewell*, #25 *Hungarian Song*, #33 *Harvest Song*,
#4 *Midsummer Night Song*, #27 *Limping Dance*
Jose Tarango, violin
#17 *Hungarian March,* #38 *Rumanian Whirling Dance,* #28 *Sorrow,* #35 *Ruthenian Kolomeika*
Emilio Montoya, violin
#37 *Prelude & Canon,* #10 *Ruthenian Song,* #22 *Mosquito Dance,*
#13 *Wedding Song,* #32 *Dance from Máramaros*
Bethany Portillo, violin
~ Accompanied by Dr. Stephen Nordstrom, violin ~

Béla Bartók - *Sonatina for Violin and Piano*, Sz. 55
Preston Griffith, violin, with Dr. Nayeli Dousa, piano

INTERMISSION

Dmitri Shostakovich - *Five Pieces for Two Violins*
I. Prelude, II. Gavotte, III. Elegy, IV. Waltz, V. Polka
Shannon Clark and Suzanne Graham, violins, with Dr. Nayeli Dousa, piano

Dmitri Shostakovich - Waltz No. 2 from *Suite for Variety Orchestra*
Arranged for String Quartet by Diego Marani

Dmitri Shostakovich - *Two Pieces for String Quartet*
I. Elegy, II. Polka

Dmitri Shostakovich - Three Pieces from *The Gadfly*
I. Contredanse, II. Romance, III. Galop
Alejandra Ortiz, solo violin

Nordstrom Studio String Orchestra
Violin I - Preston Griffith, Alejandra Ortiz, Emilio Montoya, Shannon Clark
Violin II - Bethany Portillo, Ramon Valenzuela, Abigail Arredando, Suzanne Graham
Viola - Jose Tarango, Alejandra Sandoval, Dr. Stephen Nordstrom, Cello - Carlos Esparza

PERFORMER STATEMENTS

Dmitri Shostakovich – Five pieces for two violins

Shannon Clarke[1,^] Suzanne Graham[1,^]

[1]*The University of Texas at El Paso.*

This set of five short pieces for two violins and piano was arranged by Lev Atovmyan, a close friend of Shostakovich. The first of these pieces, "Prelude", is from the score to the film The Gadfly. This extremely romantic piece captures a mood of darkness and encompasses what feels at times overly somber. There are very few slurred notes, which gives the character of the music a rhythmic pulsation. The melody and harmony remain very equal between the two string voices. Rhythmically it stays in simple meter throughout, however, the tempo quickens in the middle section and the style becomes upbeat and briefly happier, before returning to the opening tempo and character. The second and third pieces, "Gavotte" and "Elegy", come from the Third Ballet Suite. From the outset, the "Gavotte" is very evidently in contrast to the opening piece, with a much faster tempo and more joyous character. These first two movements contrast immensely, which really shows the skill of Shostakovich as a composer. There are many slurred eighth notes along with staccato markings, making the music of the second piece sound bouncy, swift, and light. The third piece, "Elegy", remains in the same key as the second but takes on a whole new mood. The contrast occurs mainly with the added slurs in this movement, which note to note make the music seamless. The harmony between the two violins adds a rich texture. In the middle section, Poco piu mosso, there is a key change and a quickening pace, where the violins hand off sixteenth-note runs that capture a moment of diversion from the romanticism of the piece. The fourth piece, "Waltz", comes from Shostakovich's sketches to the film The Tale of the Priest and of His Workman Balda. It has the classic elements of a waltz dance, with the piano playing bright harmonies and the traditional "one, two-three" pattern beneath the violins' sweet and driving eighth-note melodies. The slight differences in bowing between the violins keep the performers engaged while the constant trading off of the melody, one violin floating above the other, leaves the listener waiting to hear who will take the melody next. The final piece, "Polka", is in a much quicker tempo and with the generally happy music, a fun way to end this collection of pieces. The accents, short slurs, and multi-note chords make the "Polka" exciting from start to finish. In their entirety these five pieces take the listener through a broad spectrum of musicality, mood, color, and harmony. Each short movement captures in itself a brief personal story. The remarkable ability to change characters and style so quickly is what makes Shostakovich such an amazing and influential artist.

Funding Acknowledgement: N/A

Shannon Clarke, Suzanne Graham. "Dmitri Shostakovich – Five pieces for two violins". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M1

Béla Bártok – 44 duos for two violins

Carlos Esparza[1,^]

[1]*The University of Texas at El Paso.*

Within the series *44 Duos for Two Violins* by Béla Bartók there are a number of recommended sets that are suitable for performance. The first of these suggested arrangements is of the 1st, 6th, 8th and 9th duets, which I will be performing with my teacher on our studio recital. Duet No. 1, *Teasing Song*, starts off with the first violin playing the melody and the second violin playing the harmony. Bartók was able to achieve the idea that this was indeed a teasing song through the use of soft dynamics, having the first violin play in the upper register, and using a simple folk melody reminiscent of a nursery rhyme. In the middle section it suddenly feels as if the music gets faster and more violent, but in reality, it is the same melody written down the octave and with louder dynamics. The music then returns to the original idea briefly at the end. The next in my set is Duet No. 8, *Slovakian Song*. This piece gives the idea that Bartók wanted the music to sound dark, as if people were going through a hard time. He did this by incorporating many dissonant notes between the two violins and asking for softer dynamic levels throughout the piece. Only once does it change from that dynamic structure, when the second violin has the melody, putting emphasis on that part and bringing out the numerous accidentals. The two parts both have an equally important melodic role within the piece, usually taking turns one right after the other as in call and response writing. Duet No. 6 is a *Hungarian Song*. Bartók gave the first violin the melody throughout most of the piece, with the second violin playing harmony and an occasional chromatic note. The piece starts off rather intensely and with liveliness, almost as if it is a dance. The first violin plays accented *marcato* quarter notes throughout the whole piece. The two violin parts are again written with call and response, starting with the first violin and then ending with the second violin. Towards the end of the piece, the original melodic idea is presented at a softer dynamic. I interpret this as the folk people singing this evocative song are starting to settle down. The piece ends with the second violin climbing its way upward with the interval of an ascending fifth.The final duet in this set is No. 9, *Play Song*. The music feels very lively, almost as if two children are running around playing. The melody begins frequently with an accented pick up that leads into the next measure. The first violin has the melody throughout the entire piece, while the second violin supports by playing the harmony. Bartók constructs the melody with four bar phrases that repeat throughout the piece. The dynamics of the piece don't change much at all, they are mostly loud in volume. Bartók concludes the final section of melody with descending quarter notes to give off the impression that the children are finished playing.

Funding Acknowledgement: N/A

Carlos Esparza. "Béla Bártok – 44 duos for two violins". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M2

Béla Bártok – 44 duos for two violins

Emilio Montoya[1,^]

[1]*The University of Texas at El Paso.*

In the early 1930s, as Bartók's career began to blossom, his publishers requested that he work on several arrangements of his music to boost publication sales. After he received a commission from a prominent violin teacher, a series of miniature pedagogical pieces was realized. The *44 Duos for Two Violins* introduced simple folk music from a great range of Eastern European cultures, including Romanian, Ruthenian, and Serbian, as well as Slovakian and Hungarian. I will be performing a set of four of these short pieces: 17, 38, 28, and 35. Duet No. 17 is titled *Hungarian March*. It is rhythmically very active, as would be expected of a march. The first violin part plays the melody in the opening and the second violin plays the melody in the second section, which is also faster. The melody returns to the first violin part near the end of this short piece. Duet No. 38, *Rumanian Whirling Dance* has that peasant like feel of rhythmic unsteadiness and rapid changing notes in quick succession. Written in duple meter in D major, this very fast dance has both violins playing double stops with open strings. The overwhelming clash of overtones that occurs with the open string double stops makes the music sound as if it were performed by four violins rather than two. The "whirling" aspect of the dance, fast paced sets of two sixteenth notes followed by an eighth note, gives the music a lively character and the imagery of a gathering with people attempting to dance yet stumbling around clumsily, possibly from having one too many beverages. On the completely other side of the spectrum is Duet No. 28, *Sorrow*. As the title implies, this grieving piece is very slow, dragging along as if showcasing the pain of losing a loved one, all while maintaining the simple peasant like feel that Bartók was fond of. The piece is in 3/4 time, with syncopated rhythms, heavy texture, and much dissonance between the two violins. It is full of long phrases traded off between the violin parts with prominent eighth notes on the first beats of measures and continuing with half notes and long held quarter notes. My set of pieces finishes with Duet No. 35, *Ruthenian Kolomeika*. Despite the rhythmic activity and folk atmosphere of this dance, it is curiously one of only two of the 44 Duos that are based on original themes and not folk tunes. The fast paced music is interrupted briefly near the end by a more lyrical slow section before finishing with a fast and rhythmic cadence.

Funding Acknowledgement: N/A

Emilio Montoya. "Béla Bártok – 44 duos for two violins". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M3

Dmitri Shostakovich – Romance from The Gadfly

Alejandra Ortiz[1,^]

[1]*The University of Texas at El Paso.*

In addition to being a classical composer, Shostakovich was also well known for his film music. One of the movies he scored was *The Gadfly,* a Soviet movie based on the novel by Ethel Lilian Voynich. The story is about Italian patriots struggling for the independence of their homeland, which is being threatened by Austrian invaders. It is essentially a story of the transformation of the character Arthur Burton from a young, innocent man full of enthusiasm to a revolutionary. One very popular movement from the film score of *The Gadfly* is the Romance, which in the full score is title "Youth". This movement was very popular in the era of the film and has now found a place in the solo repertoire for violin. The Romance is very different in comparison to Shostakovich's usual modernist style, written in a romantic and youthful manner. I believe Shostakovich was trying to capture the simplicity of Arthur Burton's earlier life and portray a feeling of nostalgia. It is interesting to imagine how different Shostakovich's compositions would have been if he did not have to conform to the strict rules of the Soviet government. One can only wonder what his compositions would have sounded like if he had the freedom to express himself completely through music. I am glad that he had some opportunity to step away from the strict artistic rules of Soviet Russia and have the ability to portray different emotions, most especially in the case of this short piece, nostalgia.

Funding Acknowledgement: N/A

Alejandra Ortiz. "Dmitri Shostakovich – Romance from The Gadfly". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M4

Béla Bártok – 44 duos for two violins

Bethany Portillo[1,^]

[1]*The University of Texas at El Paso.*

Early in the twentieth century, the prominent German violin instructor Erich Doflein asked Bartók if he would write a set of pedagogical pieces for violin. In response to this commission, Bartók wrote the set of short pieces *44 Duos for Two Violins.* Many of these feature prominently in the Doflein method, which is still widely used today. The first in my set of five selections is No. 37, *Prelude and Canon.* The first violin starts with the melodic line which is then passed off to the second violin. The violins continually alternate and repeat the same melodic material as the tempo decreases throughout the prelude. When the key changes in the middle of the piece, the same melodic line is repeated, however in a much faster tempo compared to the previous section. It then continues to increase in tempo until the end of the piece. At the *Allegro molto*, both violins are conversing in a duel-like manner by passing back and forth a syncopated melodic line, not quite a canon but very similar. Duet No. 10, *Ruthenian Song,* has the first violin playing the melodic line throughout, which is harmonically and rhythmically supported by the second violin. Violin I has a syncopated melodic line that includes multiple G sharps, which give the piece an A harmonic minor tonality. Duet No. 22, *Mosquito Dance,* is a fast piece for two violins, and is to be performed with mutes, which dampen the sound of the instrument. Both violin I and II play the same melodic line, however the melodic lines are the interval of a fifth apart and written one measure apart with many interlocking ties and eighth notes. Hence, the audience will continuously hear the sound of consecutive slurred eight notes, which represent the buzzing of two mosquitos. Duet No. 13 *Wedding Song,* is a slow and bright piece and contrasts with the surrounding selections in terms of tempo. The second violin begins playing the melodic line this time, while the first violin supports the melodic line with a harmonic countermelody in double stops. The violins soon switch roles, however, as the first violin takes over the melody and the second violin provides harmonic support with both moving and sustained notes. The final work in my collection of five pieces is Duet No. 32, *Dance from Máramaros*, a once territory of Hungary which is now part of Romania. It is a piece that is rhythmically driven by the second violin part, which plays syncopations and off beats throughout. The harmonic dissonance between both violins enhances the energetic mood of the piece.

Funding Acknowledgement: N/A

Bethany Portillo. "Béla Bártok – 44 duos for two violins". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M5

Dmitri Shostakovich – Twentieth Century Modernism

Alejandra Sandoval[1,^]

[1]*The University of Texas at El Paso.*

The first piece that we will perform as a group is the "Waltz No. 2" from *Suite for Variety Orchestra* and serves as a good example of the polystylism of Shostakovich. This sentimental movement is originally part of the film score to *The First Echelon* and here is arranged for string quartet by Diego Marani. After the grand success of the premiere of Shostakovich's opera *Lady Macbeth of the Mtsenk District*, Stalin appeared in one of the subsequent performances, describing the work as vulgar and primitive. One memorable moment in this opera comes from scene three, Katerina's aria, which has been transcribed into the version we will hear today, "Elegy," the first of the *Two Pieces for String Quartet*. Shostakovich's first ballet, *The Golden Age*, was no exception to political influences. The ballet, composed in 1930, is a mocking take on the political and cultural changes that occurred in the Soviet Union and Europe in the 1920s. Shostakovich would later use the Music Hall scene from the ballet and transform it in a single night into the second of our *Two Pieces for String Quartet*, a comical "Polka". In 1955, almost two years after Stalin's death, Shostakovich composed what is now one of his most famous works, *The Gadfly*, a Soviet film. In this composition, Shostakovich's relief from oppression is almost tangible through his music. The film is nostalgic and deals with events during the Italian *Risorgimento* of the 1840s. We will be performing a collection of three pieces from *The Gadfly*, the "Contredanse," "Romance," and "Galop". The first two works are tender in character and sound as if from another era, while the third work is an upbeat dance full of activity and energy.

Funding Acknowledgement: N/A

Alejandra Sandoval. "Dmitri Shostakovich – Twentieth Century Modernism". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M6

Béla Bártok – 44 duos for two violins

Jose Tarango[1,^]

[1]*The University of Texas at El Paso.*

Béla Bartók was one of the most well-known modernist composers of the twentieth century and very much inspired by others great composers who came before him. Although he began writing compositions in a style close to his contemporaries, he did much during his life to change composition, mostly through his travels discovering and collecting folk tunes to include in his music. From his *44 Duos for Two Violins*, I will be performing the following set: 23, 25, 33, 4, 27. The first piece, No. 23 *Bride's Farewell*, is interesting because of the use of minor second intervals, which contribute to a sense of sadness throughout the short work. This style is sustained until it resolves in the end because the melody and harmony are never really together until the last few measures. Duet No. 25, *Hungarian Song*, is a lyrical piece in a medium speed, with many slurs and back and forth between the violin parts. Probably the strangest and most amazing piece in my set is No. 33, *Harvest Song*, where Bartók puts the two violins in different key signatures at the same time. The first violin starts playing in A minor and the second violin in F# minor. In the middle of the piece, the first violin changes to Bb minor and the second violin A minor, changing roles. This music sounds more dark and quiet without saying too much at the beginning. When the dynamic changes to *forte* in the middle it sounds louder and almost angry. The end returns to the softer character of the beginning. Duet No. 4, *Midsummer Night Song*, is the most common of my set of pieces and the easiest to play compared to the others. It is in a *moderato* tempo with uncomplicated rhythm in 4/4 time, mostly quarter notes, eighth notes, and half notes. There is more of a blend of melody and harmony in this than in the other duos with imitation and call and answer between the two violins. The final piece I will play is No. 27, *Limping Dance*. It is fast in tempo, features a lot of back and forth between the violins, and has many irregular accents that give it an uneasy or "limping" feel.

Funding Acknowledgement: N/A

Jose Tarango. "Béla Bártok – 44 duos for two violins". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M7

Béla Bártok – 44 duos for two violins

Ramon Valenzuela[1,^]

[1]*The University of Texas at El Paso.*

For our spring studio recital, my professor and I will be performing a selection of four pieces from *44 Duos for Two Violins*, composed by Béla Bartók in 1931. Each of the duets and dances in this series are based on Eastern European folk tunes and arranged roughly in ascending order of difficulty. The first duet in my selection of pieces is *Slovakian Song*. The tempo of this opening piece is fairly slow, written as *Molto moderato*. It is quite short, under a minute in length, and written with very simple melody and rhythm. The second piece we will perform is *Hay Song*. The tempo *Lento religioso*, which means slow and in a religious manner, contrasts nicely with the first piece. It begins in 3/8 triple meter and alternates with a simple duple meter section in 2/4. Out of my selection of four pieces, this duet sounds more than the others as if it lacks harmony, mainly through the independence of each violin part. This independence lasts almost until the very end of the piece, where the violins finish by holding the same note. The third piece we will perform is number twenty from the first volume of duets, *A Rhythm Song*. This short work is joyful, dance-like, and full of syncopated beats, where the two violins play off each other at the level of an eighth note. It starts in duple meter at a moderately paced tempo, *Allegretto*. Near the end, the tempo becomes noticeably slower and the piece ends with the same syncopated melody but in a much more tranquil character. The last piece we will perform is *Teasing Song*. It is *scherzando* in character, and written in a playful manner, as the title implies. This short piece creates the teasing nature of the violin parts through off beat entrances and carefully placed accents. It ends abruptly, when you least expect it.

Funding Acknowledgement: N/A

Ramon Valenzuela. "Béla Bártok – 44 duos for two violins". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M8

2019 DEPARTMENT OF MUSIC HONORS RECITAL

The University of Texas at El Paso

Department of Music

Presents:

Honors Recital

May 3, 2019

1:30 pm

UTEP Fox Fine Arts Recital Hall

The Music Department Honors Recital is a part of the 2019 COURI Spring Symposium, which features UTEP undergraduate research and creative activities. Student performer statements and abstracts can be found in the *COURI Discover* book of abstracts.

PROGRAM

Concert piece for Viola and Piano — George Enesco (1881–1955)

Orlando Barajas Soria, viola
Dr. Ezequiel Meza, piano

Lotus Flower — Carlos Barba (b. 1991)

Carlos Barba, piano

"**Heiß mich nicht reden, heiß much schweigen"** — Robert Schumann (1810-1856)
from *Lieder der Mignon*

Samantha N. Dávalos, soprano
Patricia Ann Provencio, piano

Trombone Concerto — Ida Gotkovsky (b. 1933)

I. *Lyrique*

Christopher Terrazas, trombone
Patricia Ann Provencio, piano

The Presser Foundation Scholar Award — Dr. Steve Wilson
Christopher Terrazas, trombone

Suite del Recuerdo — Jose Merlin (b. 1952)

I. Evocacion
II. Zamba
III. Joropo

Adam Hernandez, guitar

L'Abbandonata — Saverio Mercandante (1795–1870)

Rebeca Gonzalez-Maldonado, soprano
Elvira Spector, piano

Ode to Mario — Cesar Huizar (b. 1998)

Dante Pena, flute
Corey Tamez, clarinet
Michelle Shaheen, horn
Arturo Olivo, trumpet
Javier Hernandez, trombone
Jesus Perez, marimba
Preston Griffith, violin
Emmanuel Delmar, violin
Aime DeAnda, violin
Bethany Portillo, violin
Belem Urbina, viola
Tom Woo, viola
Chris Beroes-Haigis, cello
Miguel Martinez, cello
Cesar Huizar, contrabass

Outstanding Music Student Awards — Dr. Nordstrom, Dr. Wilson

Carlos Barba, Outstanding Graduate Student in Music
Michelle Shaheen, Outstanding Graduate Student in Music
Ashley Venegas, Outstanding Graduate Student in Music
Alejandro Pastrana, Outstanding Graduate Student in Music
Paul Reid, Outstanding Senior in Music Education, Instrumental
Caleb Tullius, Outstanding Senior in Music Education, Instrumental
Xavier Diaz, Outstanding Senior in Music Education, Instrumental
Tiffany Davis, Outstanding Senior in Music Education, Vocal
Orlando Barajas, Outstanding Senior in Music Performance, Strings

Honors Recital Performer Awards — Dr. Nordstrom, Dr. Wilson

~ Reception to follow ~

PERFORMER STATEMENTS

Concertpiece by George Enescu

Orlando Barajas[1,^]

[1]*The University of Texas at El Paso.*

Romanian composer, violinist, conductor, and teacher. He was the leading figure in Romanian musical life in the first half of the 20th century, and one of the best-known violinists of his generation. He started to play the violin at the age of four, and began composing as soon as he learnt musical notation aged five. From 1888-1899, he studied composition both in Vienna, and at the Paris Conservatory. He spent the rest of his life residing in both Romania and Paris, dividing his time between performing and composing. *Concertpiece* was the result of a commission by Fauré for the internal competition of the Paris Conservatory in 1906.Enescu dedicated this piece to the first Viola Professor of this institution, Théophile Laforge. Since it was a competition piece, this work was designed to test the performer's capabilities in every respect, such as highlighting the stark contrasts between the different sections of this piece. Some passages are lyrical and Romantic, while others are playful, and later aggressive; the mood changes swiftly throughout the piece. There are also virtuosic, rapid passages that return with permutated rhythms and require good left-hand dexterity. A performance of this work also requires a good memory, since Enescu often repeats phrases with very slight variation.

Funding Acknowledgement: N/A

Orlando Barajas. "*Concertpiece* by George Enescu". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M9

Heiß mich nicht reden, heiß mich schweigen by Robert Schumann

Samantha Davalos[1,^]

[1]*The University of Texas at El Paso.*

Robert Schumann (1810-1856) was a German composer, pianist, and music critic in the Romantic period. Schumann was a student of law before he decided to pursue a musical career as a pianist. Unfortunately, Schumann injured his hand and he was unable to continue his virtuosic piano dreams; leaving him to concentrate on composing. His works range from choral and chamber works, opera, orchestral, and many Lieder. Lieder und Gesänge aus 'Wilhelm Meister', Op. 98a is Schumann's setting of songs based off characters from the novel Wilhelm Meister's Apprenticeship by Johann Wolfgang von Goethe, published in 1795-96; *Heiß mich nicht reden, heiß mich schweigen* is the fifth song in the set which portrays Goethe's character Mignon. *Heiß mich nicht reden, heiß mich schweigen* displays the emotional turmoil brought onto Mignon by her obligation to withhold a secret. Schumann carefully used key relationships in this piece along with text painting. The piece is written in E minor, opening in a foreshadowing funeral march style. You can feel Mignon's conflict with the opening text "Don't ask me to speak rather bid me be silent!" The forward driving feel created by the piano in this section displays a feeling of anxiousness and Mignon's need to confide in someone. Schumann then uses C major to highlight the text and give the listener a feeling of hope for Mignon. This key is carried over the text "The sun in its due time drives away the darkness of the night". Shifting modes to E major in the last section we hear a return of the opening text. However, even in this major key Mignon sounds exhausted by her torment. The resolve sounds distant when sung with a speech like recitative quality.

Heiß mich nicht reden…	Don't ask me to speak…
Heiß mich nicht reden heiß mich schweigen, *Denn mein Geheimniß ist mir Pflicht;* *Ich möchte dir mein ganzes Innre zeigen,* *Allein das Schicksal will es nicht.*	Do not ask me to speak rather bid me be silent, I am bound by my secret; I long to reveal my innermost self, but Fate will not allow it.
Zur rechten Zeit vertreibt der Sonne Lauf *Die finstre Nacht, und sie muß sich erhellen;* *Der harte Fels schießt seinen Busen auf,* *Mißgönnt der Erde nicht die tiefverborgnen Quellen.*	The sun in its due time drives away the darkness of night; light must appear. The impenetrable rock opens itself up, for the earth does not begrudge its deeply hidden springs.
Ein jeder sucht im Arm des Freundes Ruh, *Dort kann die Brust in Klagen sich ergießen;* *Allein ein Schwur drücht mir die Lippen zu* *Und nu rein Gott vermag sie aufzuschließen.*	Everyone seeks rest on the arm of a friend; there the heart can pour forth its lament. But an oath seals my lips, And only a God can open them again.

Funding Acknowledgement: N/A

Samantha Davalos. "*Heiß mich nicht reden, heiß mich schweigen* by Robert Schumann". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M10

L'Abbandonata by Saverio Mercanante

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In 1838 Mercandante lost the sight of one eye, making travel difficult, and he returned to Naples, where he felt at home. Even though he eventually lost the sight of his second eye, he continued to compose by dictating to his students. "L'Abbandonata" is dedicated to Giuseppjna Verdi (1815-1897), who was Verdi's second wife. Known during her career as Giuseppina Strepponi, she had been a very popular prima donna in the years in which Mercadante's operas were being produced in Milan and in northern Europe. The song was published in 1869 in an *Album per canto* published by Ricordi, Milan, to raise money for the ailing poet, Francesco Maria Piave. The melodic line of "L'Abbandonata" is typically melancholic and Neapolitan, with long phrases. The first and third poetic stanzas are set to music in minor and the second and fourth in major, as the abandoned woman hopes for Heaven. Mercandante's dramatic outbursts require extremes of dynamics. Pianissimo is the most frequent dynamic marking in this song, and fortissimo ranks next. This composition was written not only to please listeners but to wrench their hearts. Ms. Gonzalez performed "L'Abbandonata" at the Singing competition Rio Grande NATS Chapter, where she obtained first place winner in the 2nd Year College/Independent Studio Category and Most Promising Singer award.

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Rebeca Gonzalez-Maldonado. "*L'Abbandonata* by Saverio Mercanante". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M11

Suite del Recuerdo by Jose Luis Merlin

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José Luis Merlin is an Argentinian composer who began his musical exploration in 1967. His compositions are heavily influenced by the traditional rhythms and dances of his native country. The collection of pieces, *Suite Del Recuerdo* is reminiscent of an amalgamation of different South American styles. It opens with the piece "Evocación," which translates to the word "evocation," meaning "to call forth," or "to summon." The piece opens softly, with beautifully melodic lines, followed by a more vigorous dance movement. A "Zamba" is an Argentinian folk dance that is syncopated in ways that allow for smooth, and not overly energetic dancing. The closing piece to the entire suite is "Joropo" which is a Venezuelan dance that is much more upbeat and spirited. Preparing this complex piece has been a work that has required both concentration and dedication. The performer must balance their focus between clear rhythmic articulation and projecting one's solo artistry. It is also rewarding to explore Merlin's melodies throughout the suite as a whole, in addition to considering each in isolation, focusing on rhythmic activity. The guitar is very versatile instrument, and South American influences have become a major staple of the repertoire. Merlin's works have been brought to life many times before and generations of guitarists will continue to do so long into the future.

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Adam Hernandez. "*Suite del Recuerdo* by Jose Luis Merlin". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M12

Ode to Mario by Cesar Huizar: A piece in the style of Koji Kondo

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As a child, I used to play a lot of video games. They were an escape from reality and an opportunity to experience vast and rich worlds. There were interesting characters and amazing set pieces that drove the story, and the background music was second to none at setting the perfect tone for the game.

One of the games I played growing up was "Super Mario Bros", which is probably one of the most iconic video games of all time. Just as famous as the game itself is its main theme, which has become synonymous with video game music. Although video game music has come a long way since 1985, there was a particular charm about this game's music that was captured even with the limited instrumentation of the 8-bit wave synthesizer of the Nintendo Entertainment System.

Thus, I decided to write a piece in the style of the music of the Mario games. To accomplish this goal, I needed to study the techniques used by the composer for the Mario games, Koji Kondo. Kondo's music is characterized often by a very catchy and chipper tone, inviting listeners to let their inner child surface and have fun. He achieves this mood by making the melody energetic with dramatic syncopation and by emphasizing chord tones to make the tune easy to sing. I used these techniques in building the main theme of Ode to Mario. Other times Kondo utilizes longer notes and interval ranges to create a broad and dramatic feel, which is reflected in the middle section of my composition.

Using Koji Kondo's music as a model and with the guidance of Dr. Dousa, through this piece I hope I can share that same feeling of excitement and unadulterated fun that video game music has given me.

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Cesar Huizar. "*Ode to Mario* by Cesar Huizar: A piece in the style of Koji Kondo". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M13

Concerto for Trombone by Ida Gotkovsky

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Ida Gotkovsky is a prolific French composer of the late 20th and 21st centuries. Having studied at the National Conservatory of Music in Paris under Oliver Messiaen and Nadia Boulanger, Gotkovsky has received numerous awards for her compositions, including the Prix Blumenthal, Prix Pasdeloup, Prix de Composition International de Divonne les Bains, Medaille de la Ville de Paris, and Prix Lily Boulanger, among others. Gotkovsky's compositional style implements many modern musical techniques such as mixed meter, mode usage, self-borrowing of rhythmic and melodic motives, and has composed for nearly every instrument, voice, and ensemble.

Gotkovsky's *Concerto for Trombone* was composed in 1978 for the Concours du Conservatoire National Superieur de Musique de Paris. The first movement, *Lyrique*, begins with the marking Allegro agitato tumultuoso where an ascending piano line and a dramatic trombone entrance take the listener through a turbulent and evocative musical journey. In her characteristic style, Gotkovsky incorporates many of the previously mentioned musical techniques as well as polyrhythm, cadenzas, and an ominous timbral shift through the use of a straight mute. Although this piece was seldom performed after its original publication, this piece has gained greater recognition in recent years. This concerto will be performed at the Robert Marsteller Solo Trombone Competition at the International Trombone Festival in Muncie, Indiana on July 2019.

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Christopher Terrazas. "*Concerto for Trombone* by Ida Gotkovsky". (2019) UTEP DISCOVER 2019: COURI Spring Symposium Abstracts, ID=M14