# DISCOVER

EXPLORE
RESEARCH
CREATIVITY
DISSECT
COMMUNICATE
SCHOLARSHIP
INVESTIGATE

## UTEP DISCOVER 2018

ABSTRACTS & ARTIST STATEMENTS

COURI UTEP

# UTEP DISCOVER
# ABSTRACTS & ARTIST STATEMENTS

## Spring 2018

Laura A. Diaz-Martinez, Editor
Karina Canaba, Associate Editor
Nallely Medina, Assistant Editor

CAMPUS OFFICE OF UNDERGRADUATE RESEARCH INITIATIVES

## EDITOR'S NOTE

This year COURI instituted DISCOVER, a celebration of all events highlighting undergraduate research, scholarly and creative activities on campus happening at the end of the spring semester (April-May). Through DISCOVER and the annual COURI Spring Symposium UTEP celebrates the projects being conducted by our undergraduate students in all disciplines on campus. We hope that these campus-wide celebrations continue to raise awareness of the importance of undergraduate research, scholarly and creative activities, not only as high impact practices for the students but also as an important driver of research and innovation on campus.

This year, Discover highlighted nine events on campus:

- 2018 COURI Spring Symposium, featuring presentations by 172 undergraduate researchers, scholars and artists
- Mock symposium organized by the student-led organization ResearChain, which allowed students to practice their presentations before the Spring Symposium
- Healthy Eating Active Living (HEAL U) Paso del Norte Research Symposium, featuring a poster session where students presented their research
- Violin & Viola Recital featuring music undergraduate students in Dr. Stephen Nordstrom's Violin & Viola studio performing a series of group concertos based on research they conducted on the music of Antonio Vivaldi.
- Department of Music Honors Recital, including a variety of music pieces performed or composed by Honors students.
- Liberal Arts Honors Program Symposium where Honors students from all majors in the College of Liberal Arts present their independent study projects conducted under the mentorship of faculty in the college.
- Human vitality, the capstone dance concert. This dance concert is the culminating project of this year's graduating dance majors. The concert is fully produced by the students, from choreography to costumes and marketing.
- Civil Engineering Projects Showcase. Senior Civil Engineering students present their concept designs for a project to establish autonomous truck transport from the Tornillo/Guadalupe Port of Entry to the Fabens Airport.
- Annual Juried UTEP student Art Exhibition. Each year selected works of art and designed created by undergraduate students in the Department of Art are showcased as part of this public exhibit. The works are selected by a team of Fine Arts Jurors. This year student works will be adjudicated by two renowned artists: visual artist Betsabeé Romero and illustrating designer Craig Frazier.

The Annual 2018 COURI Spring Symposium was the largest celebration of Undergraduate Research, Scholarly and Creative Activities on campus to date with 172 undergraduate presenters. These students represented 25 departments from the Colleges of Education, Engineering, Health Sciences, Liberal Arts and Science, as well as the Schools of Pharmacy and Nursing. Participation of students from diverse disciplines and departments signals campus-wide engagement of students in research, scholarly and creative projects and is a testament of the commitment from UTEP faculty to providing avenues for students to engage in this high-impact experience.

Laura A. Diaz-Martinez, Ph.D.
COURI Associate Director
April 30, 2018

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**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

# ACKNOWLEDGEMENTS

**Institutional Support**
Diana Natalicio, President
Richard Adauto, Executive Vice-President
Carol Parker, Provost
Roberto A. Osegueda, Vice-President for Research
Gary Edens, Vice-President for Student Affairs
John Wiebe, Associate Provost for Research

**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 Projects (ORSP)
UTEP Office of the Provost
UTEP Border Biomedical Research Center (BBRC)
UTEP Green Fund
UTEP Interdisciplinary Research Fund
UTEP Center for Environmental Resource Management (CERM)
National Institutes of General Medical Sciences (NIGMS)
National Institutes of Health (NIH)
National Institutes on Minority Health & Health Disparities (NIMHD)
National Institute on Drug Abuse (NIDA)
National Nuclear Security Administration
National Science Foundation (NSF)
National Oceanic and Atmospheric Adinistration (NOAA)
United States Department of Energy
United States Department of Agriculture (USDA)
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**Symposium Organization**
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**COURI Workshop Sponsors**
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Dr. Laura Diaz-Martinez, COURI Associate Director
Dr. Lourdes Echegoyen, COURI Director
Karina Canaba, COURI Assistant Director

## DISCOVER AGENDA

| | |
|---|---|
| **RESEARCHAIN MOCK SYMPOSIUM** | April 13th<br>2:00 PM – 5:00 PM<br>CCSB 1.0204 |
| **COURI SPRING SYMPOSIUM** | April 21st<br>10:00 AM – 2:30 PM<br>Undergraduate Learning Cent |
| **VIOLIN/VIOLA RECITAL** | April 22nd<br>1:30 PM – 3:00 PM<br>Fox Fine Arts Recital Hall |
| **DEPARTMENT OF MUSIC HONORS RECITAL** | April 27th<br>1:30 PM<br>Fox Fine Arts Recital Hall |
| **LIBERAL ARTS HONORS PROGRAM SYMPOSIUM/ INDUCTION CEREMONY** | May 3rd<br>5:00 PM – 7:00 PM<br>Union East, Templeton Ste |
| **HUMAN VITALITY CAPSTONE DANCE CONCERT** | May 3 – 5th, 7:00 PM<br>May 6th, 3:00 PM<br>Fox Fine Arts 452 |
| **SENIOR ENGINEERING PROJECTS: CONCEPT DESIGN FOR AUTONOMOUS TRUCKS** | May 4th<br>10:00 AM<br>Business 318 - 319 |
| **ANNUAL JURIED UTEP STUDENT ART EXHIBITION RECEPTION** | May 4th<br>5:00 – 7:30 PM<br>Rubin Center L-Gallery |
| **ANNUAL JURIED UTEP STUDENT ART EXHIBITION** | May 4th – August 10th<br>Rubin Center L-Gallery |

# 2018 COURI Spring Symposium

**2018 COURI SPRING SYMPOSIUM PROGRAM**
April 21, 2018

| TIME | | LOCATION |
|---|---|---|
| 10:00 am – 11:15 pm | **Poster & Oral Presentations: Session A** | UGLC Lobby |
| 12:00 pm – 1:15 pm | **Poster & Oral Presentations: Session B** | UGLC Lobby |
| 1:15 pm - 2:15 pm | **Graduate School Recruitment** | UGLC Lobby |
| 2:15 pm | **Awards Announcement and Concluding Remarks** | UGLC Lobby |

**Recruiters visiting UTEP**

- Clemson University
- George Mason University
- Pennsylvania State University
- Purdue University
- Texas Tech University Health Sciences Center
- The University of Texas at El Paso
- University of Kentucky – Lexington
- University of Michigan - Ann Arbor
- University of North Texas
- University of Notre Dame
- University of Texas Health Sciences Center at San Antonio

## 2018 COURI SPRING SYMPOSIUM TECHNICAL PROGRAM

### SESSION A

^ Undergraduate presenter, * Faculty mentor

**2A** **Investigating the editorial difficulties of Ben Jonson's Volpone: A hands-on solution**
Cassandra M. Kuntz^, Andrew J. Fleck *

**3A** **Transfronteriza: A study of the creative process**
Marayah A. Vigo^, Sandra P. Lopez Ramirez*

**4A** **Deriving plate correspondences between rat brain atlases through feature-based matching and dynamic programming**
Jose G. Perez^, Olac Fuentes, Arshad M. Khan*

**5A** **PHAROS Based Tbio Protein Drug Discovery Techniques**
Ibrahim Salama^, Claire Govea^, Suman Sirimulla*

**6A** **A guideline for the assessment of uniaxial creep and creep-fatigue data and models**
Ricardo Vega^, Calvin M. Stewart*

**7A** **Analysis of prosody around turn starts**
Gerardo Cervantes^, Nigel G. Ward*

**8A** **Assessment of sensory function in individuals dealing with homelessness**
Daisy C. Alvarado^, Meagan Kendall*

**9A** **Characterization of shape memory polymer parts fabricated using material extrusion 3D printing technique**
Mariana Castaneda^, Carlos A. Garcia Rosales, Hoejin Kim, Mario F. Garcia, Bill Tseng, Yirong Lin*

**10A** **Correlations between the development of one year olds and social determinants in Panama**
Vicente Cobos^, Janeth A. Hernandez^, Delfina C. Dominguez, Nestór Sosa*

**11A** **Data analysis of community assessment on diabetes risk perception among Hispanic men**
Rebecca A. Drennan^, Jeannie B. Concha*

**12A** **Development of Monolithic Constitutive Model for Additive Manufacturing (AMM) Process**
Hector S. Perez^, Syed Z. Uddin, Diana B. Montes Carrera, Jack F. Chessa*

**13A** **Energy modules integration for engineering and science education in K12 classrooms**
Jarenny E. Santiesteban^, Norman D. Love, Yirong Lin, Lourdes E. Echegoyen*

**14A** **Fabrication and characterization of pulsed-laser deposited Ba0.8Ca0.2CexTi1-xO3 (BCCT) thin films**
Cristian D. Grijalva^, John G. Jones, Ramana Chintalapalle*

**15A** **Formulation of fluasterone topical nanoemulsion**
Maya A. Ruiz^, Rahul S. Kalhapure, Pradeep K. Bolla, Victor A. Rodriguez, Jwala Renukuntla*

**16A** **In-situ vs ex-situ calibration comparison of Tekscan™ prosthetic socket pressure transducers for better pressure distribution recording**
Pablo I. Servin^, Meagan Kendall*

**17A** **Low sample volume CD4+ T cell counting for low-resource communities**
Jeffrey W. Beard^, Jacen S. Moore*

**18A** **Mechanical and optical properties of tungsten doped hafnium oxide nanocrystalline thin films**
Marlyn Garcia Torres^, Ann Uribe, Ramana Chintalapalle*

**19A** **Multifunctional sensing using 3D printed MWCNTs/BaTiO3/PVDF nanocomposite**
Bethany R. Wilburn^, Hoejin Kim, Luis A. Chavez, Yirong Lin*

**20A Open-caged fullerene derivatives as efficient electron transporting materials in perovskite solar cells**
Frank Perez^, Edison Castro, Albert Avtigas, Luis Echegoyen*

**21A Reactive strength index validity of vertical jump measuring devices**
Matthew P. Gonzalez^, Samuel Montalvo, Ileana A. Jarquin, Shantal N. Oropeza, Sandor Dorgo*

**22A The effects of different warm-up protocols on power output in college age gymnasts**
Shantal N. Oropeza^, Samuel Montalvo, Matthew P. Gonzalez, Ileana A. Jarquin, Sandor Dorgo*

**23A Tuning of mechanical and electrical properties of 3D printed carbon nanotube-photopolymer nanocomposites through in-situ dispersion**
Jaime E. Regis^, Luis A. Chavez , Luis C. Delfin-Manriquez, Yirong Lin*

**24A Work in progress: A vibrotactile biofeedback device for clinical use during early stages of amputee rehabilitation**
Ricardo Vela, Jr.^, Meagan Kendall*

**25A A single bout of exercise improves skeletal muscle lipid droplet morphology**
Victoria Rosas^, Matthew Maldonado, Cesar Meza, Jeffrey D. Covington, Armando Varela-Ramirez, Sudip Bajpeyi*

**26A An effective vaccine candidate for Chagas disease**
Janet J. Olivas^, Susana Portillo, Eva Iniguez, Brenda G. Zepeda, Igor C. Almeida*

**27A Antibacterial screening of pyridinium bromide amphiphiles and their copper adducts**
Evelyn Hernandez^, Homero I. Dominguez, Andrew Pardo, Miguel A. Carrillo-Alvarado, Delfina Dominguez, Juan C. Noveron*

**28A Changes of expression of membrane bound variant-surface proteins (VSPs) during encystation and cyst production by Giardia**
Breanna C. Pence^, Vanessa Enriquez, Siddhartha Das*

**29A Chronic Ethanol Exposure Enhances Male Courtship in Drosophila melanogaster**
Prescilla Garcia-Trevizo^, Ana I. Fernandez, Paul R. Sabandal, Kyung-An Han*

**30A Comparisons of the variability in diurnal CO2 flux in different aquatic ecosystems in Barrow, Alaska**
Fabian A. Uribarri^, Vanessa Lougheed*

**31A Crystallization of ADP and ATP bound Phi-EL Chaperonin for X-Ray Crystallography**
Daniel H. Von Salzen^, Jay M. Bhatt, Ricardo A. Bernal*

**32A Domain and residue requirements for FKBP52, B-catenin, and AR Interactions**
Kathia E. Rodarte^, Nina R. Ortiz, Marc B. Cox*

**33A Duck behavior at Keystone Heritage Park**
Andrea Chavez^, Philip Lavretsky*

**34A Effects of Cryopreservation and Lyophilization on Mesenchymal Stem Cells**
Gabriel Garcia^, Luis Solis, Thomas Boland*

**35A Effects on vegetation in the Chihuahuan Desert due to herbicide treatments**
Isabel L. Torres^, Kathleen Schaeffer, Jennie McLaren*

**36A Ethanol stimulates differentiation of primary neurons in culture and increases microtubule assembly rate in vitro**
Luisa M. Sanchez^, Patricia Lozano, Laura Diaz-Martinez, Manuel Miranda-Arango, Sukla Roychowdhury*

**37A Identification of *Francisella tularensis* lipid extracts activating Natural Killer T (NKT) cells**
Priscilla Del Valle ^, Trevor T. Duarte, Charles T. Spencer*

**38A** **Immunohistochemical analysis of metronomic chemotherapy and CTLA-4 immunotherapy treated tumors**
Luis C. Reza^, Karla Parra, Paloma A. Valenzuela, Natzidielly Lerma, Alejandra Gallegos, Georgialina Rodriguez, Lucero Rojas, Urban Emmenegger, Teresa Di Desidero, Guido Bocci, Mitchelle S. Felder, Marian Manciu, Robert A. Kirken, Giulio Francia*

**39A** **Localized migration of T-cell Acute Lympoblastic Leukemia into the central nervous system**
Michael A. Brissette^, Kumail Kumail, Collin Bill, Charlotte Vines*

**40A** **Mapping functional domains of Poly (ADP-ribose) Polymerase-1 implicated in HIV-1 infection**
Christopher R. Farmer^, Alejandra Pina, Zachary S. Martinez, Cosette Perez, Susana Sanchez, Manuel Llano*

**41A** **Movement of *Aedes aegypti* and *Aedes albopictus* mosquitoes along highways in Panama**
Marcela I. Diaz^, Carmelo Gomez, Jose Loaiza*

**42A** **Nicotine withdrawal produces sex differences in the expression of nicotinic subunits a4 and b2 in the interpeduncular nucleus**
Montserrat C. Garcia Arreguin^, Victor L. Correa, Rodolfo J. Flores, Laura E. O'Dell*

**43A** **Pigmentation effects on mortality in bdelloid rotifers when exposed to UVR**
Rachael Apodaca^, Maribel Baeza, Elizabeth Walsh*

**44A** **Post-natal PCR-based recovery of ZIKV suggests infection of fetal tissue in the absence of maternal viremia**
Brianna B. Sanchez^, Maxim D. Seferovic, Gregory Valentine, Catherine S. Eppes, Michelle Turely, Kjersti Aagaard*

**45A** **Regulatory mechanisms dictating the activity of post-translational modification systems in mammalian cells**
Arely V. Diaz^, German Rosas-Acosta*

**46A** **Skeletal muscle glucose metabolism is affected by dietary fat composition**
Alondra Rodriguez^, Victoria Rosas, Cesar A. Meza, Armando Varela-Ramirez, Sudip Bajpeyi*

**47A** **Studying the role of the mitochondrial protein Drp1 in mitosis**
Seham Azzam^, Madison Berger^, Pavel Gonzalez, Erica Herrera, Laura Diaz-Martinez*

**48A** **The APO structural conformation of the phage EL encoded chaperonin**
Maria I. Grajeda^, Ricardo Bernal*

**49A** **The intracellular redistribution hypothesis of stimulant drug addiction: Role of the dopamine vesicular transporter in sensitization**
Adelis M. Cruz^, Jeremiah Ramos, Adriana Vasquez, Priscilla Parada, Eddie Castañeda*

**51A** **Tracking Greening on the UTEP Green Roof Using Repeat Photography**
Meela Grey^, Vanessa Lougheed*

**52A** **Zebrafish larvae: An emerging system for the study of melanoma metastasis**
Jennifer K. Love^, Anita Quintana*

**53A** **Application of machine learning to eruption forecasting for active volcanoes in the Aluetian and TransMexican volcanic belts**
Rebecca E. Platt^, Justin R. Parra, Olac Fuentes, Vladik Kreinovich, Elizabeth Y. Anthony*

**54A** **Bioactivated carbon-alginate composite materials for bisphenol A removal in water**
Fernanda Lugo^, Wen Yee Lee*

**55A** **Development of gold, silver, palladium and platinum nanoparticle synthesis using sodium rhodizonate supported on titanium dioxide for the catalytic reduction of 4-nitrophenol and methyl orange**
Jose A. Rosales^, Md T. Islam, Noemi Dominguez, Juan C. Noveron*

**56A Evolution of the spin-flop antiferromagnetic transition in Mn_2SiS_4-x Se_x (x = 0-4) and the emergence of magnetic frustration**
Adrian Cosio^, Raju Baral, Srinivasa R. Singamaneni, Magdalena Fitta, Bayrammurad Saparov, Harikrishnan S. Nair*

**57A Formulation of furosemide-silver complex loaded solid lipid nanoparticles**
Carlos A. Meraz^, Pradeep Kumar Bolla, Rahul Kalhapure, Victor Rodriguez, Jwala Renukuntla*

**58A HSA and Myoglobin protein structure at distinct temperatures using deep eutectic solvents**
Omar Aviña^, Sitri E. Puentes^, Jose L. Bañuelos

**59A Investigating the varying toxicities within consumer gem products and assessing human health risk**
Sara J. Mahmoud^, Jorge Gardea-Torresdey*

**60A Magnetic and transport properties of pristine and transition metal doped two dimensional MoS2 van der Waals nanocrystals**
Adrian Cosio^, Jose Cosio, Luis Martinez, Christian L. Saiz, Srinivasa R. Singamaneni*

**61A Mineralogical and sedimentological analysis of valley fever susceptibility in West Texas**
Alison V. Segura^, Juan P. Maestre, Kerry Kinney, Thomas E. Gill*

**62A Rapid and accurate detection of Mycobacterium tuberculosis on a PDMS/paper hybrid microfluidic chip**
Sergio Barrios^, Maowei Dou, Xiujun Li*

**63A SAXS studies of the nano-structure and dynamics of ionic liquid and organic solvent binary systems**
Carlos R. Cuellar^, Matt Thompson, Peter Cummings, Jose L. Banuelos*

**64A Strontium isotopic analysis to trace calcium sources in soil salts from a flood-irrigated dryland**
Karen S. Valles^, Anna Ortiz, Lixin Jin*

**65A Structure and interactions in surface-modified iron-oxide nanoparticles for biological applications**
Bruce N. Lomeli^, Ezequiel A. Moreno, Jie Xu, Jose L. Banuelos*

**66A Sulfur isotopic study of igneous rocks from the Central Kenya Peralkaline Province, East Africa Rift**
Anthony J. Marrufo^, Ben Brunner, Elizabeth Anthony, Gail Arnold*

**67A The Cuauhtemoc Aquifer: Depleting water table, predicting precipitation using regression analysis**
Zeltzin Y. Tapia^, Hugo A. Gutierrez*

**68A Two-photon flow cytometry with laser scanning 2D airy beams**
Andres M. Reyes^, Aurelio Paez, Chunqiang Li*

**69A Using geophysical methods to predict particle size distribution of soils in the Upper Rio Grande Valley in El Paso, Texas** Victoria Moreno^, Diane I. Doser*

**70A An ethnographic study of laughter that occurred in a high school students' science internship**
Jaime A. Cano^, Pei-Ling Hsu*

**71A Attitudes in the workplace**
Jessica Hernandez^, Jonathan Covarrubias, Adam K. Fetterman*

**72A Bilingual recognition memory for concrete and abstract words in high-constraint sentences**
Juan C. Etienne^, Randy S. Taylor, Wendy S. Francis*

**73A Breaking social stigmas that prevent effective communication with people in the autism spectrum**
Camila Trespalacios^, Maria D. Flores*

**74A Challenges encountered and lessons learned by mediators during the cogenerative dialogues between scientists and high school students**
Yamile A. Urquidi-Cerros^, Pei-Ling Hsu*

**75A Changes in group perceptions over time: Applying a memory consolidation paradigm to the study of prejudice**
Grace Flores-Robles^, Manal Aboargob, Amber K. Lupo, Michael A. Zarate*

**76A Cultural constructs associated with smoking and drinking in Hispanic college students**
Analisse Acosta^, Perla Perez, Jennifer Kim, Viridiana Martinez, Illiana Medina, Theodore V. Cooper*

**77A Hopes and expectations of youth in economically stressed neighborhoods in Central America: A regional exploratory study**
Jessica Ayala^, Paola Chavez, Mark Lusk*

**78A Learning how to conduct a systematic review through researching patient-provider communication surrounding birth**
Paulina A. Ambert^, Adelle D. Monteblanco, Ophra Leyser-Whalen*

**79A Life stories: Losses, poverty, abuse and sense of life purpose in Los Guido-Desamparados, Costa Rica**
Ana Fuentes^, Gabriel Ibarra-Mejia, Norma Lau*

**80A Opportunities to impact HPV vaccination rates: Recommendations for strengthening relationships between healthcare practitioners and patients**
Danielle Fincham^, Gabriel Frietze, Jessica M. Shenberger-Trujillo*

**81A Personality in recommender systems: Identifying traits to improve the performance of collaborative filtering algorithms**
Francisco Arriaga Pazos^, Hector R. Tejada, Adam K. Fetterman*

**82A Student placed at at-risk and alternative schools: The influence of mental health and alternative schooling**
Gisselle Garcia^, Maria C. Morales*

**83A The impact of meaning and gesture on associative and item memory performance**
Alan Barrera^, Andrea Bencomo^, Ashley S. Bangert*

**84A The role of context variability in bilingual memory for concrete and abstract words**
Manuel R. Meléndez Luján^, Wendy S. Francis*

**85A This Is My Brave: Challenging mental illness stigma through theater**
Sofia Macias^, Diana Rivera-Macias, Kristin Kosyluk*

**86A Two speakers, one word: Reusing the words of one's conversation partner in a dominant and a non-dominant language**
Aziz A. Atiya^, Dacia C. Hernandez^, Alina Anchondo, Iva Ivanova*

**87A Using storytelling for effective science teaching: A case study of an exemplary scientist**
Karina Valadez^, Pei-Ling Hsu*

## SESSION B

^ Undergraduate presenter, * Faculty mentor

**1B** **How does Alexander Technique directly affect Vocal Resonance and Airflow?**
Jasmine A. Fernandez^, Blythe D. Cates*

**2B** **Making an album: Songwriting, recording and producing original music**
Maria F. Lozano Gomez^, Christopher E. Reyman*

**3B** **Vamos para Los Angeles: Place, space, and cultural citizenship in popular discourse(s) on immigration**
Summer N. Masoud^, Richard D. Pineda*

**4B** **Directed strongly regular graph (24,10,5,3,5)**
Enrique Salcido^, Art Duval*

**5B** **PHAROS Based Tbio Protein Drug Discovery Techniques**
Ibrahim Salama^, Claire Govea^, Suman Sirimulla*

**6B** **A 3D-Printable water filter using molecular imprinted ion-exchange membrane for selective separation of copper ion.**
Sara A. Linn^, Mauro J. Ruiz, Juan C. Noveron*

**7B** **Algae bloom control: Remediation and prevention**
Madison Bencomo^, Julieta Saucedo, Ivonne Santiago*

**8B** **Antibacterial furosemide-silver complex loaded chitosan nanoparticles**
Julian Franco^, Victor Rodriguez, Rahul S. Kalhapure, Pradeep Kumar Bolla, Stefani Perez, Carlos A. Meraz, David V. Ramos, Maya Ruiz, Jwala Renukuntla*

**9B** **Bridge prioritization and preservation on Route 66**
Sarah M. Ballard^, Jeffrey Weidner*

**10B** **Correlations between the development of one year olds and social determinants in Panama**
Vicente Cobos^, Janeth A. Hernandez^, Delfina C. Dominguez , Nestór Sosa*

**11B** **Development of a low-cost prosthetic ankle device to enhance the performance of a basic prosthetic foot**
Daniel E. Garcia^, Lucas J. Galey, Aaron Nystrom, Roger V. Gonzalez*

**12B** **Effects of fatty acid composition in a high fat diet on skeletal muscle mitochondrial biogenesis**
Isaac N. Gandara^, Cesar Meza, Armando Varela-Ramirez, Sudip Bajpeyi*

**13B** **Evaluation of phosphate as a remediation strategy for lead contaminated soils**
Elena Eguiarte^, Jesus Placencia, William Hargrove*

**14B** **Fabrication of thermoelectric materials using combustion synthesis**
Rodrigo I. Mesta^, Sergio Cordova , Evgeny Shafirovich*

**15B** **High capacity regenerable styrene-butadiene adsorbent for the removal of lead (Pb+2) from water**
Ricardo Saenz-Arana^, Tariqul Islam, Juan C. Noveron*

**16B** **Kinematic analysis and hydraulic integration of a mechanical four-bar prosthetic knee**
Luis F. Aranda^, Lucas J. Galey, Roger V. Gonzalez*

**17B** **Lung nodule detection and classification using MATLAB**
Hope F. Cervantes^, Wei Qian*

**18B** **Method development for the analysis of Bisphenol A in milk using a solventless techniques- SBSE/TD GC/MS**
Angela M. Encerrado^, Wen-Yee Lee*

**19B** **Nonword repetition in bilingual children with language impairment**
Isabel A. Cano^, Connie Summers*

**20B** **Presence of enteric viruses in surface water and water after treatment for human consumption in the Great Metropolitan Area of Costa Rica**
Erick Rodriguez^, Gabriel Mejia-Ibarra, Luz M. Chacón Jiménez*

**21B** **Structural determinants of health and glycemic control among adults with Diabetes Mellitus**
Karla P. Vidrio^, Vivian Vilchez, Ana L. Solano, Mark Lusk*

**22B** **Three dimensional bioprinting with furfuryl-gelation to create complex geometries**
Erick Dominguez^, Shweta A. Kumar, Nishat Tasnim, Binata Joddar*

**23B** **Upper-extremity rehabilitation assistive device**
Bianca Montano^, Uriah Astorga, Thompson Sarkodie-Gyan*

**24B** **Geotechnical properties of granular base materials for transportation engineering applications**
Ivan A. Rodriguez^, Soheil Nazarian*

**25B** **A model system for cells deficient in mitochondrial MAVS**
Claudia Ayala^, Marvin O'Ketch, Dominik Schenten*

**26B** **Amyloid beta is a risk factor for Parkinson's disease**
Alejandra Gomez^, Lois Mendez, Gabriela Henriquez, Armando Varela, Mahesh Narayan*

**27B** **Anthropometric measures predict vertical Jump height and reactive strength index**
Ileana A. Jarquin^, Samuel Montalvo, Matthew P. Gonzalez, Shantal N. Oropeza, Sandor Dorgo*

**28B** **Assessing the abundance of duck species at Keystone Heritage Park**
Lorian Flores^, Andrea Chavez, Philip Lavretsky*

**30B** **Common gamma chain cytokines regulate serine phosphorylation of Janus Tyrosine Kinase 3**
Daniela F. Diaz^, Robert A. Kirken, Georgialina Rodriguez*

**31B** **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 R. Farmer, Zachary S. Martinez, Manuel Llano*

**32B** **Detection of *Cryptosporidium spp.* and *Giardia intestinalis* in aqueducts of the Greater Metropolitan Area of Costa Rica**
Claudia A. Huereca^, Rosario Achí, Luz Chacón, Eric Morales, Gabriel Ibarra*

**33B** **Drivers of CO2 flux from open water and vegetated margins of an Arctic tundra pond**
Rocio C. Ronquillo^, Vanessa Lougheed*

**34B** **Effects of changes in precipitation patterns on soil nutrient availability in an arid grassland**
Violeta Mendoza Martinez^, Jennifer Holguin, Scott L. Collins, Jennie R. McLaren*

**35B** **Effects of differential use of a resource hotspot on season and sex-specific variation in movement strategies by *Crotalus atrox***
Sydney Segovia^, Dominic L. Desantis, Jerry Johnson*

**36B** **Enduring effects of antidepressant exposure on sensitivity to cocaine in female c57BL/6 mice**
Miguel A. Arenivar^, Sergio D. Iniguez*

**37B** **Expression and Purification of human Period Truncated (hPERt) Protein for Structural Studies**
Joseph N. Fresquez^, Sophia Salazar, Victoria Miranda, Neha Chauhan, Larissa Salcido, Emma Lansley, Supriyo Ray, Chuan Xiao*

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# Humanities, Creative & Performing Arts

# How does Alexander Technique directly affect Vocal Resonance and Airflow?

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Alexander Technique, a postural and relaxation technique which is used to relieve tension in the body, is commonly used by performing artists such as dancers, singers, actors and instrumentalists to help improve their performance. Specifically, singers who have used this technique have noticed improvements in confidence, vocal tone, and ease in their movements onstage. Many universities and conservatories have Alexander Technicians on-staff and offer courses in the technique for musicians and theatre majors because it is known to help improve performance. Although Alexander Technique is popular among performers, there have been no known studies that measure how this technique affects airflow and resonance in singers. We worked with two Alexander Technicians to see how this technique affects airflow and resonance. We used the vocal technology program, VoceVista, to indirectly measure airflow and resonance in college voice students prior to working with a technician and again at the end of an Alexander session. We observed that a majority of the students had noticeable improvements in their airflow and resonance immediately after postural changes were implemented.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

**Recommended Citation:**
**Fernandez, Jasmine; Cates, Blythe. "How does Alexander Technique directly affect Vocal Resonance and Airflow?" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1428**

# Investigating the editorial difficulties of Ben Jonson's Volpone: A hands-on solution

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The way that early modern literature was printed was very susceptible to errors that affected the ultimate outcome of the text. We are preparing a new edition of an early modern play, Ben Jonson's comedy *Volpone*, for student use. *Volpone*was published twice in a short time span—1607 in a quarto and 1616 as part of a folio—and Jonson's original manuscript no longer exists. Since two slightly different editions of the play appeared within just a few years of each other, the modern editor must make decisions about which text to use. Our task is to examine "textual variants"— points in the play where the 1607 printing and the 1616 printing differ—and to help resolve the problem of which words to include in the modern edition. There are a variety of reasons that may explain the variations between these texts: 1) errors, 2) revision, and 3) censorship. In regards to censorship, texts and plays that were printed in the Jacobean era had to be approved by multiple gatekeepers in order to be printed and avoid trouble. Through the approach of scientific bibliography, we use the physical process of printing and the physical aspects of these texts as clues as to how the textual variants of this play came about. Determining the probable causes of the variations of this play will provide insight as to how the process behind printing a work affects how the work in question should be engaged with.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Kuntz, Cassandra; Fleck, Andrew. "Investigating the editorial difficulties of Ben Jonson's Volpone: A hands-on solution" (2018).**
***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1379**

# Making an album: Songwriting, recording and producing original music

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As an artist, I have always contemplated music as an open doorway to a dream-like state, a sense and sentiment of floating in a trance. I see it as a nostalgic voyage into the subconscious as we make our own intimate relationships with our perception, reflecting on memories, emotions and feelings with the guidance of music and how we relate to it. This project is a personal introspection of these concepts and how they can be applied while creating my music, as well as the development and exploration of the best ways to express my artistic vision. I approach my artistic work while I keep these characteristics always present as an inspiration. The compositions of this project have developed as a recreation of feelings that remain resonating through my life, as moments and memories that I try to revive, incorporating sounds that are hoped to create a dream-like environment. I have found that the most organic and genuine means to achieve my artistic vision must come from a very intimate place in myself, therefore I strive to be honest and raw with the way I sing, write and compose. This project aims to break some of the common boundaries of music composition, with surreal and sometimes unintelligible lyrics, accompanied with quiet and haunting melodies and a more abstract and open creative approach. Ultimately, the intention of these compositions is to invite listeners into a place where they can have a connection to the way I relate to music.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

**Recommended Citation:**
**Lozano Gomez, Maria ; Reyman, Christopher. "Making an album: Songwriting, recording and producing original music" (2018).**
***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1401**

# Vamos para Los Angeles: Place, space, and cultural citizenship in popular discourse(s) on immigration

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Cultural citizenship is the practice by which a group that is excluded civically cultivates a sense of belonging by affirming their rights while maintaining their cultural identity. Such citizenship practices include affirmations of socio-cultural and political engagement and cultural manifestation. A prominent example of this cultural manifestation is film, where Latinx creatives have found their voice. This research will examine how this cultural cultivation is presented within the expressive space of film to discern the effectiveness of the visual arguments. The respective film's visual arguments will be examined via elements of cultural citizenship such as depictions of family structures, depoliticized plot lines, depictions of opportunity, and through use of language. This research paper will use the frameworks of cultural citizenship, language as argument, and visual argument to stitch together a sense of the Latinx immigrant identity in the urban and transitory space of Los Angeles, California. This research will serve as evidence of not only the effectiveness of expressive space as a platform for the development of cultural citizenship, but will also argue in favor of the credibility for the theory of visual argument. The research's focus on immigrant identity and cultural citizenship practices is for the purpose of crafting a set of literary guidelines to serve as a tool with which audiences of Latinx film can be more critically conscious.

**Funding Source: Meritus**

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**Recommended Citation:**
**Masoud, Summer; Pineda, Richard. "Vamos para Los Angeles: Place, space, and cultural citizenship in popular discourse(s) on immigration" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1396**

# Transfronteriza: A study of the creative process

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As a dancer, I wish to push myself to experience different types of dance in different settings. I want to train outside of traditional dance forms, and analyze how breaking the boundaries of “style” changes the way I look at movement. As a choreographer, I wish to challenge myself to experiment with incorporating different dance styles in my works. Trhough my studies of different dance forms, I want to shift how I impact my community with dance, and how that impact affects my creative process. I am curious to engage in the creation of dances that are not monopolized by one choreographic opinion, but driven by a multitude of experiences. I am particularly interested in the relationship between collected data and movement, and how movement ideas can be pulled from concrete items. There are often preconceived notions and stereotypes associated with studying dance. Through my studies and practices, I wish to change the way I relate to those associations and create a movement vocabulary that is unique to my experiences in the field.

Funding Source: COURI, Vice President of Student Affairs

**Recommended Citation:**
**Vigo, Marayah; Lopez Ramirez, Sandra. "Transfronteriza: A study of the creative process" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1421**

# Social Sciences

# Cultural constructs associated with smoking and drinking in Hispanic college students

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Few studies have assessed smoking and drinking relative to cultural constructs. The aims of this study were to assess current smoking and weekend drinking, as well as potential cultural construct correlates of use behaviors in a Hispanic college student sample. College students ($N$=345; 72.2% female; Age $M$=20.13, $SD$=3.922) completed and online consent process and battery of surveys which included measures of: smoking status, average number of drinks per weekend, familism, acculturation, Latino/a values, fatalism, and perceived microaggressions. Logistic (current smoking) and linear regression (average weekend drinks) analyses assessed the associations between use and cultural constructs. Any current smoking (39.1%) was statistically significantly associated with (Cox and Snell $R_2$=.106): male gender (OR=1.8), acculturation (OR=.559), and the media microaggression subscale of the Revised Racial and Ethnic Microaggression Scale (OR=.71). Average number of weekend drinks ($M$=2.3, $SD$=6.8) was statistically significantly associated with increased assumptions of inferiority perceived microaggressions (Adjusted $R_2$=.076; $p$<.05). The inverse association between smoking and acculturation is inconsistent with convergence and acculturative stress theories of addictive behaviors, however is consistent with past empirical findings on the border (e.g., Cooper et al., 2011). That smoking was associated with decreased exposure to positive media images of people of color and that weekend drinking was associated with increased perceived assumptions of inferiority by others provides burgeoning evidence that smoking and drinking may be associated with perceived microaggressions.

**Funding Source: BUILDing Scholars**

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**Recommended Citation:**
**Acosta, Analisse; Perez, Perla; Kim, Jennifer; Martinez, Viridiana; Medina, Illiana; Cooper, Theodore. "Cultural constructs associated with smoking and drinking in Hispanic college students" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1290**

# Scaffolding students to develop project ideas in a project- based learning environment

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Project-based learning (PBL) has been considered an effective teaching approach that can help students engage and investigate real-world problems. However, research found that many instructors encountered difficulty in helping students develop appropriate project ideas because of the complexity of science inquiry and students' lack of knowledge about PBL. The purpose of this ethnographic study is to investigate how scientists help high school students to develop their project ideas in a 7-month science internship program. In this program, one scientist and his/her laboratory team worked with 9 high school students to conduct scientific projects based on students' interests. This study includes eight different groups from various disciplines, such as chemistry, biology, engineering, immunology, etc. We analyzed the nature of internship activities and the interaction between the instructors and students before they presented their project proposals publicly. The data sources include about 384 video hours of real time internship interactions, field notes, pictures and artifacts used in the internship. Using the self-directed learning model as a guiding framework, we identified four different types of interactions that guide students to develop their project ideas, including authoritative, instructor-directed, instructor- guided, and student- directed activities. In particular, instructor-directed activities were used the most among participants and as time goes by, students gained more autonomy in their internship activities. As a result, all high school students successfully presented and communicated their project proposals to their families and friends. This study provides insights that can serve as references for educators, especially scientists, to help students formulate project ideas.

**Funding Source: NSF DRL 1322600**

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**Recommended Citation:**
**Acuna, Valerie; Hsu, Pei-Ling. "Scaffolding students to develop project ideas in a project-based learning environment " (2018).**
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# Learning how to conduct a systematic review through researching patient-provider communication surrounding birth

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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 learn how to conduct a proper systematic review on the theme of patient-provider communication in the prenatal context by addressing the research question: How do women view their providers' communication skills? A search of 2 social science online databases and 7 keywords for research published from 2000-2018 was conducted. A record was kept of the databases, specific key words, and number of relevant articles. The databases EBSCO Academic Search Complete, and Sociological Abstracts were used with a combination of the key words: patient-provider, communication, prenatal care, women, and perception. Out of 258 articles, a total of 6 articles have been deemed relevant and reviewed, with 2 coming from bibliographies of the other 4 articles. We have seen that there is little focus on the research of women's perceptions of their provider's communication skills. The few articles found focused on themes of psychological effects, teenage mothers, birth experience appraisals, health behavior change, maternal anxiety, and women's experiences of prenatal care from different providers. 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.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Ambert, Paulina; Monteblanco, Adelle; Leyser-Whalen, Ophra. "Learning how to conduct a systematic review through researching patient-provider communication surrounding birth" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1406**

# Perceptions of childhood sexual abuse

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Childhood Sexual Abuse (CSA) myths are inflexible, stereotypical ideas about sexual abuse, victims, and perpetrators. Examination of these myths has shown a reoccurring phenomenon known as victim-blaming; shifting responsibility from perpetrator to victim. However, previous studies have lacked an in-depth exploration of less typical abuse scenarios such as those involving male victims or female perpetrators. Using a vignette that varied perpetrator gender, victim gender, victim age, and relationship, participants were asked if they believed the story, the type of punishment the perpetrator would receive, and to distribute blame between victim and perpetrator. Results indicated that male participants were overall less likely to believe and more likely to blame victims. Male perpetrators were generally punished more harshly than female perpetrators. Older victims and male were less likely to be believed, as well as scenarios involving female perpetrators. Belief in the vignette correlated negatively with blaming the victim, but was unrelated to recommended punishment. These findings highlight the unique challenges that CSA victims who experience less stereotypical (male perpetrator, female victim) abuse face, and society's perceptions about these less common abuse scenarios.

**Recommended Citation:**
**Aragon , Desiree; De Roos, Melissa; Curtis, Shelby; Jones, Daniel . "Perceptions of childhood sexual abuse" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1331**

# Personality in recommender systems: Identifying traits to improve the performance of collaborative filtering algorithms

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The shift from TV watching to online streaming opens the doors to a new way of studying the psychology of entertainment by taking advantage of one of the technologies employed by streaming platforms: recommender systems. Prior research has demonstrated that including Big 5 personality scores in a Collaborative Filtering (CF)-based recommender system enhances the system's performance (Hu & Pu, 2011), but no research has explored potential effects of personality traits other than the Big 5, nor isolated the individual contribution of each trait to improvement on the system's performance. We collected Big 5, Need for Cognition, Sensation Seeking, Metaphor Use, and Self-Location personality scores for 2,416 users, along with individual TV shows and film rating histories from the online community MyAnimeList. We used a CF recommender algorithm that combines users' rating histories with their personality scores on 9 measures to produce a user-to-user similarity that was used to produce recommendations. We then conducted a hierarchical linear regression to identify each trait's contribution to variance in recommendations' accuracy. Ultimately, we will identify the highest contributing traits and conduct a regression in a second sample to confirm their level of contribution. We argue that recommender technologies provide us with records of individuals' media preferences that have high ecological validity, while also allowing us to study the contributions that users' personality traits have in predicting their media preferences, thus constituting a new way of studying the psychology of entertainment.

**Recommended Citation:**
**Arriaga Pazos, Francisco; Tejada, Hector; Fetterman, Adam. "Personality in recommender systems: Identifying traits to improve the performance of collaborative filtering algorithms" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1368**

# Two speakers, one word: Reusing the words of one's conversation partner in a dominant and a non-dominant language

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Alignment is the tendency of speakers in dialogue to copy aspects of each other's utterances (e.g., words, structure, accent; Pickering & Garrod, 2004). Alignment seems to aid communicative success, but little is known about its functioning in the two languages of bilinguals. Here, we look at the alignment of word choice. Such *lexical alignment* might be greater in a non- dominant than in a dominant language, because production in a non-dominant language is effortful (e.g., Ivanova & Costa, 2008), and reusing a conversational partner's words would reduce the effort of word retrieval. Conversely, lexical alignment might be less in a non-dominant than in a dominant language, because comprehension is more effortful in a weaker language (Francis & Gallard, 2005), and thorough comprehension is necessary for alignment to occur. In our study, English-dominant and Spanish-dominant bilinguals played a picture-matching game with a confederate in Spanish. On critical trials, participants named objects which were either previously named by the confederate with a dispreferred but acceptable name (e.g. *mano*[Sp. hand] for *puño*[Sp. fist];*alignment condition*) or were not previously named by the confederate (*control condition*). Participants produced ~15% more dispreferred responses in the alignment than in the control condition ($p < .001$). This alignment effect was ~11% more in the non-dominant than in the dominant language, a non-significant difference (but note that data collection is on going). These findings suggest that the shallower non-dominant language comprehension does not preclude alignment, and that alignment might reduce the processing burden of speaking a non-dominant language.

**Recommended Citation:**
**Atiya, Aziz; Hernandez, Dacia; Anchondo, Alina; Ivanova, Iva. "Two speakers, one word: Reusing the words of one's conversation partner in a dominant and a non-dominant language" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1360**

# Hopes and expectations of youth in economically stressed neighborhoods in Central America: A regional exploratory study.

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Youth make up twenty percent of Central America's population and are an expression of major sectors of Central American societies. This project seeks to explore the self-perception, exclusion, the ideals of the future and the ways of reaching their goals that youth living in economically stressed neighborhoods of Central America have. Data is to be collected through a 61 open and close ended question questionnaire of youth in five Central American countries to include Costa Rica, Nicaragua, El Salvador, Guatemala, and Honduras. Volunteers will administer three hundred surveys in an economically stressed neighborhood of each country's capital (N=1,500). Interviewees will include young men and women ages 14-24 years who work or study or do neither. It is expected to provide a description and analysis of current and future case scenarios of Central American youth and present to governments, community organizations, and participant communities with the gathered results as to give way to an open regional discussion. The results of this study may have implications for further understanding of the demands of youth in impoverished neighborhoods.

**Recommended Citation:**
**Ayala, Jessica; Chavez, Paola; Lusk, Mark. "Hopes and expectations of youth in economically stressed neighborhoods in Central America: A regional exploratory study." (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1303**

# The impact of meaning and gesture on associative and item memory performance.

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Previously, we demonstrated that the use of gestures at encoding led to poorer associative memory (memory for the pairing between items) between two meaningful items, but better memory for the individual items comprising the pair (Rodriguez, Barrera, Tellez & Bangert, 2016). Creating gestures may have led to stronger representations of the individual items in memory that competed with encoding of the pairing. To explore whether gestures might lead to associative benefits under other conditions, in the current study, we assessed the effect of the meaningfulness of items within a pair on associative memory under two study conditions: gesture vs. simple study. In experiment 1 stimuli consisted of name-occupation pairs that involved either two semantically-meaningful items (i.e. Mr. Baker – journalist) or one meaningless and one meaningful item (i.e. Ms. Kimball – cashier). Experiment 2 consisted of name-face pairs that were either both semantically meaningless or involved a name that was semantically meaningful. We again found that gesturing impaired associative memory performance when compared to simple study. However, the benefit of gesture for item memory was not replicated. Poorer associative memory performance appeared to be driven by increased false alarms to recombined pairs of items from the original studied pairs. These results suggest that use of gestures at encoding may simply take up resources that would normally be allocated to encoding the pairs, regardless of the meaningfulness of the items being studied.

**Recommended Citation:**
**Barrera, Alan; Bencomo, Andrea; Bangert, Ashley. "The impact of meaning and gesture on associative and item memory performance." (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1307**

# Impact of anti-immigration laws on the health and quality of life of immigrants

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Immigration has always been a part of U.S. History and ever since it started, the government has set regulations on it. Nowadays, anti-immigration laws exist as a broad and legal way to regulate legal and illegal immigration. Using social psychology theory, I will look at the impact of anti-immigrations laws such as SB4 and HB1070 and changes in programs such as Deferred Action for Childhood Arrivals (DACA) have on the health and quality of life of immigrants in the United States. If the impact is present, I will analyze what these anti-immigration laws are doing to change the quality of life, health, and the overall well-being of immigrants' lives. This will be achieved by doing a content analysis of interviews conducted with immigrants in news reporting both in English and Spanish. Since immigrants are a large part of the U.S. population and it is also on the rise, this problem is important to address. The results will not only show how this anti-immigration laws are affecting immigrants' lives, but will also show that it is a problem affecting other members of the communities, including citizens and minority groups, as well.

**Recommended Citation:**
**Bejarano, Nayla; Lechuga, Michael. "Impact of anti-immigration laws on the health and quality of life of immigrants" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1382**

# An ethnographic study of laughter occurred in a high school students' science internship

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Research shows that one of the key factors that contributes to the success of the internship for the students is their interactions with scientists. That is, the quality of the student-scientist interaction plays a crucial role in influencing the quality of students' science learning experience. However, scientists sometimes can be intimidating because of the complexity of scientific language and advanced knowledge involved in their scientific practice. The purpose of this ethnographic study is to investigate how an exemplary scientist engaged high school students with humor in a 7-month science internship. The scientist worked with nine high school students and supported them to conduct scientific projects during weekends and summer time. The data sources for this study include about 100 hours of internship videos and hundreds of pages of transcriptions. Drawing on the framework of "Appropriate Uses of Humor by Teachers," we identified six categories of humor that produced laughter among students in the internship: (1) personification, (2) critical/cynical, (3) story telling of college experience, (4) college life stereotypes, (5) acting performance, and (6) creative language usage. In particular, our analysis showed that the scientist used "critical/cynical" and "acting performance" the most to engage students in the internship. Our findings conclude that the intimidation issue of scientists can be reduced by enacting appropriate use of humor in scientific practice. These findings can serve as references for instructors, especially scientists, to enact humor that can engage students and reduce the intimidation they might have on their students.

**Funding Source: NSF No. DRL 1322600**

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**Recommended Citation:**
**Cano, Jaime; Hsu, Pei-Ling. "An ethnographic study of laughter occurred in a high school students' science internship" (2018).**
***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1291**

# The impact of stress on risk perceptions and risk behaviors

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As more states in the U.S. begin to legalize marijuana, the rates of using marijuana and alcohol in combination prior to driving may rise. Research suggests that small amounts of alcohol and marijuana consumed independently results in minimal impairment on driving performance, however, driving performance is dramatically impaired when the two substances are consumed simultaneously. The present study investigated the impact of stress on the perceived risk of Driving Under the Influence of Small Amounts of Marijuana and Alcohol (DUI-SAMA). In addition, the study examined the impact of stress on risk behaviors. Participants were randomly assigned to a stress or no stress condition and three hypotheses were tested: $H_1$) moderate levels of social stress would increase a participant's willingness to DUI-SAMA under urgent and non-urgent conditions; $H_2$) moderate levels of social stress would decrease the perceived risk of DUI-SAMA; and $H_3$) moderate levels of stress would increase risk-taking behavior as indexed by performance on the BART. The hypotheses were not supported and the present study found that social stress decreased a participant's willingness to DUI-SAMA under urgent conditions and did not influence semi-urgent or non-urgent conditions. Group differences were not detected when examining the perceived risk of DUI-SAMA or risk-taking behavior as indexed by performance on the BART. Exploratory analyses suggest that marijuana users perceived less risks associated with DUI-SAMA and increased willingness to DUI-SAMA in urgent and non-urgent conditions.

**Funding Source: BUILDing SCHOLARS**

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**Recommended Citation:**
**Chacon, Lauren; Frietze, Gabriel; Cohn, Lawrence; Shenberger-Trujillo, Jessica. "The impact of stress on risk perceptions and risk behaviors" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1293**

# Enhancing introductory biology students' conceptual understanding of and attitudes towards osmosis and diffusion through an interactive learning module

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A developed understanding of osmosis and diffusion is imperative to the comprehension of advanced biological processes that are addressed in the curriculum, including neural signal transduction and cellular transport. However, current research indicates that undergraduate students often possess difficulty in comprehending and applying core principles associated with osmosis and diffusion, as presented within introductory biology learning contexts. In an effort to enhance student learning of the aforementioned topics within introductory cell and molecular biology courses at our institutions, we therefore developed, implemented, and evaluated an interactive, three-session module. Module activities included: a) standard lecture with Clicker questions; b) a graphic organizer exercise on osmosis/diffusion, tonicity, and transport; c) a kinesthetic activity in which students played the parts of solute/water molecules and transporters; and d) a 15-minute video review with embedded thought questions. A quasi-experimental, pre-/post-test approach was used to evaluate students' conceptual understanding (as measured via the Osmosis and Diffusion Concept Assessment [Fisher *et al.*, 2011]) of and affect toward both the content presented in the module and module activities themselves. Paired t-tests with Bonferroni correction revealed a statistically significant increase in student knowledge over the course of the intervention ($p < 0.010$ for all comparisons across both institutions), as well as increases in students' self-reported confidence in understanding module content ($p < 0.001$ for all comparisons across both institutions). Frequency analyses further suggested that >85% of students found the various components of the module informative and beneficial to their own learning.

**Funding Source: NIH BUILDing SCHOLARS**

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**Recommended Citation:**
**Esparza, David; Schormann, Sebastian; Jones, Anna; Raut, Samiksha; Olimpo, Jeffrey. "Enhancing introductory biology students' conceptual understanding of and attitudes towards osmosis and diffusion through an interactive learning module" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1329**

# Bilingual recognition memory for concrete and abstract words in high-constraint sentences

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In the present study we investigated the effects of concreteness, frequency, and language proficiency on recognition memory for words presented in high-constraint sentences. The *context availability*framework states that it is easier to access associated context information for concrete words than for abstract words, and that is why concrete words are remembered better. Memory performance in recognition tasks also shows an advantage for low frequency words over high frequency words. Based on the context availability framework, we hypothesized that in high-constraint sentence contexts, the memory advantage for concrete over abstract words would be eliminated. We examined the effect of concreteness in an experiment with 64 English- Spanish bilingual participants reading high constraint sentences. Sentences were constructed that were highly predictive of a final target word, which could be concrete or abstract in meaning. Participants read the sentences out loud and attempted to memorize the target words. In the recognition test, participants viewed the studied target words and words that were not studied and indicated which words they had seen in the sentences. In contrast to our previous experiments with isolated words or low-constraint sentences, concrete words were not recognized better than abstract words. Therefore, the results support the context availability framework. We also examined the effects of word frequency and language. Low-frequency words were better recognized than high-frequency words, and words in the less proficient language were numerically but not significantly better recognized than words in the more proficient language.

**Funding Source: National Institutes of Health, National Science Foundation**

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**Recommended Citation:**
**Etienne, Juan ; Taylor, Randy; Francis, Wendy. "Bilingual recognition memory for concrete and abstract words in high-constraint sentences" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1338**

# Opportunities to impact HPV vaccination rates: Recommendations for strengthening relationships between healthcare practitioners and patients

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The Human Papilloma Virus (HPV) is the most common sexually transmitted infection. A vaccine that prevents the HPV strains most likely to cause genital warts and cervical cancer is available for females and males. The vaccine comes in a three- dose series and is recommended for children ages 11-12. The CDC recommends that the HPV vaccination be received no later than age 26 (females) or 21 (males). As such, there is a critical period of opportunity to increase HPV vaccination adherence. The goal of the current study is to assess healthcare practioner perceptions pertaining to HPV and the HPV vaccine. Additionally, the study will access healthcare practioner perceptions related to patient behaviors. Approximately 59 healthcare practitioners were recruited for the study. Participants completed an online survey assessing attitudes and perceptions related to the HPV vaccine and their patients. The results of our study document barriers to HPV vaccination adherence and critical opportunities for intervention throughout the healthcare field. Findings will be disseminated to healthcare providers and stakeholders in the community to impact practices related to HPV vaccinations.

**Funding Source: National Institutes of Health (BUILDing SCHOLARS)**

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**Recommended Citation:**
**Fincham, Danielle; Frietze, Gabriel; Shenberger-Trujillo, Jessica. "Opportunities to impact HPV vaccination rates: Recommendations for strengthening relationships between healthcare practitioners and patients" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1317**

# Changes in group perceptions over time: Applying a memory consolidation paradigm to the study of prejudice

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Research suggests that activation of the amygdaloid complex allows for acquisition and retention of lasting emotional memories. This retention is enhanced by post-learning stress and replay of overlapping memories through time delays containing sleep. While these mechanisms are established in the formation of memories, it remains unknown which of these mechanisms (e.g., stress, sleep, etc.) are important in the formation of prejudice. In the present study, we examined the impact of post-learning stress on the retention of social information over time. Participants were required to learn information about social (i.e., Latino and African-American) targets and were tested on that information after short (2-6 hours) and long (48 hours) delays in time. Results demonstrated that sleep (i.e., a long delay in time) facilitated the consolidation of positive information compared to negative information when traits were collapsed across target groups. Target race differentially impacted consolidation such that for negative trait and valence ratings, Latino targets were rated more negatively than African- American targets. Stress did not enhance the consolidation of negative social information except for negative traits paired with African-American targets after a short delay in time. Our findings quantify the effect that consolidation plays in the formation of social representations (e.g., prejudice) and supports the use of a memory consolidation paradigm in social perception research.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Flores-Robles, Grace; Aboargob, Manal; Lupo, Amber; Zárate, Michael. "Changes in group perceptions over time: Applying a memory consolidation paradigm to the study of prejudice " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 142**

# Life stories: Losses, poverty, abuse and sense of life purpose in Los Guido-Desamparados, Costa Rica

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Although life expectancy has increased, the level of quality of life of the elderly has remained stagnant. This is especially true of marginalized elderly populations, such as the population of Los Guido, Desamparados, Costa Rica. The aim of this project was to analyze the living situation of the elderly and understand the implications of loss, poverty, abuse and sense of life purpose across a lifetime. We hypothesized that the presence of greater losses, abuse and poverty would lead the participant to reflect on their lives negatively. Life history interviews were performed in order to understand the events that shape the individual's perspectives regarding the themes of loss, poverty, abuse and sense of life purpose. The sample consisted of six elderly adults who were 60 years or older, and reside within the impoverished district of Los Guido. We found that all participants were victims of abuse during their childhood, as well as currently, but failed to acknowledge these experiences as abusive. Patterns of abuse and losses across all life stages were observed. Participants reflected on their lives positively, even though they acknowledged they had lived difficult lives. During the later stages of life, the elderly adult reflects on their life experiences to evaluate their lives. Despite painful experiences, the elderly will reflect positively and show a fundamental need for making a difference. Although the elderly adult feels closer to death and the idea of dying, their spirituality allows them to give death a different meaning.

**Funding Source: National Institutes of Health**

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**Recommended Citation:**
**Fuentes, Ana; Ibarra-Mejia, Gabriel; Lau, Norma. "Life stories: Losses, poverty, abuse and sense of life purpose in Los Guido-Desamparados, Costa Rica" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1384**

# Student placed 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 of student placement at 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 illness and learning disabilities, in contrast to ¨bad"behavior, are the primary motivators for being sent to at risk schools. 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.

**Funding Source: NIH**

**Recommended Citation:**

**Garcia, Gisselle; Morales, Maria. "Student placed at at-risk and alternative schools: The influence of mental health and alternative schooling" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 134**

# Attitudes in the workplace

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Wrongness admission is the act of publicly admitting one is wrong. People tend to avoid wrongness admission out of not wanting to seem incompetent, but prior research suggests that there are positive benefits to admitting one is wrong. In the workplace, employees who experience positive feeling states are often more satisfied with their jobs. A possible source of positive feelings are supervisors who engage in wrongness admission. In an online Qualtrics survey study conducted on Sona (*N = 29 ),* we predicted that workplace positive affect would mediate the relationship between supervisor wrongness admission and job satisfaction. We found preliminary support for our hypothesis such that there were significant relationships between each of the variables of interest, however there was no mediational effect found. As such, we plan on running another study with an increased sample size.

**Recommended Citation:**
**Hernandez, Jessica; Covarrubias, Jonathan; Fetterman, Adam. "Attitudes in the workplace" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1364**

# The continuum of mom-talk types about contraception and sex

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Although contraceptive use is perceived by parents and adolescents to be one of the most important health topics to discuss, there is a large amount of variance in style and effectiveness of communication (Akers et al, 2010). Research on the effects of these contrasting styles has yielded contradictory results. We conducted qualitative interviews with 20 undergraduate Latinas. Coding revealed that mother-daughter conversation types about sexuality and contraception fell into four categories, irrespective of daughters' sexual practices. These talk types fell along a continuum with *"open"*( *n*=4) and *"no talk"*( *n*=3) at the poles. The majority of the talks were in the two middle categories, which were limited, rather than in-depth conversations that provided guidance. The *"be careful"* (*n*=7) category fell closer to the *no talk* end of the continuum and tended to use risk language to describe contraception and sexuality with insinuations that sex should wait until marriage. A slightly different category fell closer to the *open* end of the continuum consisted of insinuations about *"responsible sex"*( *n*=6) happening at the right time with the right person. Daughters in the *no talk*and *be careful*conversation categories tended to be more religious, have higher rates of sexual activity, did not discuss sex with their siblings, and had family members with histories of unplanned pregnancies. Only daughters in the *open*category were comfortable discussing sex with their siblings. As daughters reflected on these conversations, they made assumptions about their mothers' statements and views due to the lack of straight forward communication.

**Funding Source: National Institutes of Health**

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**Recommended Citation:**
**Jenkins, Virginia; Leyser-Whalen, Ophra. "The continuum of mom-talk types about contraception and sex" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1398**

# This Is My Brave: Challenging mental illness stigma through theater

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This Is My Brave (TIMB) is a theatre-based mental illness stigma change program grounded in the principles of contact-based stigma reduction and storytelling. TIMB aims to end the stigma surrounding mental illness by sharing personal stories of individuals overcoming mental illness through poetry, essay and original music. Entertainment-Education (EE) is a process of purposely designing and implementing a media message to both entertain and educate. Framing TIMB as a form of EE, we conducted an online RCT examining the impact of TIMB relative to a comparison and control condition on outcomes including stigma, affirming attitudes, and attitudes towards treatment seeking and examining EE constructs (character identification, character homophily, and character empathy) as mediators of change. Findings support the following: the efficacy of TIMB for reducing desire for social distance from people with mental illness, and decreased perceptions of difference from people with mental illness (there were no differences found between the comparison and TIMB conditions). Additionally, regression analyses were conducted to examine whether Entertainment-Education related variables predicted changes in outcomes for the TIMB and comparison conditions. Regressions yielded some preliminary support for background homophily (perceptions that the character is from the same socioeconomic background as the audience member/participation) as a significant predictor of changes in social distance. In conclusion, this RCT provides some support for the TIMB program as a mechanism for reducing discrimination towards individuals with mental illness.

**Recommended Citation:**
**Macias, Sofia; Rivera-Macias, Diana; Kosyluk, Kristin. "This Is My Brave: Challenging mental illness stigma through theater" (2018).**
***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1313**

# The role of context variability in bilingual memory for concrete and abstract words

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Previous studies have shown an advantage for concrete over abstract words in recall tasks (e.g. Steyvers & Malmberg, 2003) and an advantage for L1 over L2 (e.g. Francis, Liaño, & Taylor, 2018). The present study examined whether *context variability*, the number of different contexts in which a word can appear, helps to explain these concreteness and language effects. Concrete and abstract words were selected that were high or low in context variability, and the four groups of words were matched on their frequency in English and Spanish. Ninety-six English-Spanish bilingual participants studied 8 sets of 12 words each, with 4 sets in each language, one for each word type. Immediately after studying each set, participants recalled the words in any order. As in previous research, participants recalled more concrete words than abstract words and more L1 words than L2 words. We predicted an advantage for words with high context variability, but no difference regarding context variability was observed. However, there was an interaction of concreteness and context variability, such that there was a high context availability advantage for abstract words but not for concrete words. However, abstract words with high context variability were not recalled as well as concrete words, so context variability is not a good explanation for the recall difference between concrete and abstract words. Context variability did not interact with language, so it does not help to explain the recall difference between L1 and L2 words.

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**Recommended Citation:**
**Meléndez Luján, Manuel; Francis, Wendy. "The role of context variability in bilingual memory for concrete and abstract words" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1318**

# Leveraging the teachable moment to improve brief interventions in healthcare

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The burden of physical injury in the United States is high, and alcohol use is a major contributing factor. Research supports the effectiveness of brief interventions in responding to alcohol-related physical injuries, but there is no established understanding of the circumstances for which a brief intervention works. A major rationale for implementing brief interventions in hospital settings is that these are ideal for capitalizing on the temporal proximity and salience of a ‘teachable moment’; namely, the experience of an injury. As well, a dearth of research attempts to understand the process by which a ‘teachable moment’ may lead to changes in alcohol use. Furthermore, there is no guiding theoretical framework for understanding the impact of the ‘teachable moment’ on alcohol use outcomes. Using a grounded theory approach, the current study consists of a secondary analysis of transcripts (n=27) of lived experiences of ‘teachable moments’ as told by Hispanic men that drank heavily and were previously admitted to a Level 1 Trauma Center due to injury. Core analytic techniques include theoretical sampling, initial coding, focused coding, constant comparison, and memo writing. Of the 27 interviews, 9 transcripts have undergone initial coding, open coding phase, and focused coding. Coders identified an initial 32 codes related to teachable moments. A coding scheme is developing and current findings are preliminary and require further development. Impacts of this study include the advancement of our understanding of mechanisms of change underlying brief interventions in the hospital setting. Such advancements may clarify existing ambiguities in the literature and inform the development of more effective interventions, which may in turn reduce the public health burden of injury.

**Funding Source: National Institutes of Health (NIH)**

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**Recommended Citation:**
**Najera, Sarah; Robles, Eden; Castro, Yessenia; Field, Craig. "Leveraging the teachable moment to improve brief interventions in healthcare" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1390**

# 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 oppression, 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.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

**Recommended Citation:**
**Ortiz, Jessica; Reza-Lopez, Elva. "Mujeres Sin Fronteras help create a just world through the stories of El Paso women who fight against injustice" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1418**

# The role of personality and emotion in wrongness admission

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The majority of factual arguments will conclude in at least one party being wrong. However, actual wrongness admission seems rare. Wrongness admission is the act of one publicly stating that they once held an inaccurate attitude. Recent research investigating why people do or do not admit, has shown that wrongness admission depends on personality and emotional factors. This project continues this line of research. We hypothesize based on previous research that an individual high in agreeableness, honesty/humility, and openness will be most likely to admit they are wrong. In addition, we predict that those high in Machiavellianism will also be more likely to admit, whereas those high in narcissism will be less likely to admit they are wrong. In terms of emotion, we hypothesize that wrongness admissions will be associated with more positive emotion and less negative arousal. To investigate these hypotheses, we are conducting an experiment where participants have the opportunity to admit they are wrong or not to a confederate, after stating an inaccurate opinion. They will then fill out questionnaires related to their current feelings and personality. We will also investigate whether the pattern of emotional consequences of wrongness admission differs by personality. These results will provide further information as to the causes and consequences of wrongness admission.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Pedregon, Casie; Fetterman, Adam. "The role of personality and emotion in wrongness admission" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1363**

# Altered sensitivity to the rewarding properties of cocaine in adult female c57bl/6 mice exposed to fluoxetine during adolescence

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Accumulating preclinical evidence indicates that early-life exposure to psychotropic medications results in long-lasting altered behavioral responses to drugs of abuse – suggesting a risk of enhanced drug liability, later in life. However, to date, these preclinical experimental approaches have been conducted, primarily, using male subjects. This is surprising, given that females are more likely than males to be diagnosed with mood-related disorders, and thus, to be prescribed with antidepressant medications within their lifetime. Therefore, to examine whether long-lasting alterations to the rewarding properties of drugs of abuse are exhibited as a result of juvenile antidepressant exposure, we exposed adolescent female mice to the selective serotonin reuptake inhibitor fluoxetine (FLX, Prozac). Specifically, female C57BL/6 mice were treated with FLX (250 mg/L, in water) during adolescence (postnatal days [PD] 35-49) and later assessed in adulthood (PD 70+) on behavioral responsivity to cocaine (0, 2.5, 5, and 7.5 mg/kg) place conditioning (CPP). Our results show that adult female mice pretreated with FLX during adolescence displayed a decreased preference for environments previously paired with moderately low doses of cocaine, when compared to saline pretreated controls.

**Recommended Citation:**
**Preciado, Joshua; Iñiguez, Sergio. "Altered sensitivity to the rewarding properties of cocaine in adult female c57bl/6 mice exposed to fluoxetine during adolescence" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1351**

# Association with delinquent peers: Influence on adolescents’ rule orientation

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Adolescents are highly influenced by their peers. Research suggests that adolescents who associate with delinquent peers are more likely to engage in delinquent behavior. However, it is unclear whether peers’ delinquency affects adolescents’ beliefs about whether rules should be followed. The present study aims to examine whether adolescents’ affiliation with delinquent friends is associated with adolescents’ orientation toward following rules. To address this, an online questionnaire was administered to 118 adolescent participants aged 13 to 17 years. Adolescents responded to one item “How many of your close friends have engaged in criminal activity?” on a 5-point Likert response scale, ranging from (1) None of them to (5) All of them. Participants also completed a 12-item measure of rule orientation (Fine et al., 2016) which asks adolescents to indicate whether and under which conditions it is acceptable for people to break rules. A mean score of rule orientation was calculated from these 12 items; a higher value on this score indicates a greater orientation to follow the law. A linear regression analysis revealed a negative association between delinquent friend association and rule orientation; $t(118) = -2.559$, $p = .012$, $R2 = .054$. As hypothesized, adolescents with more delinquent friends tended to have a lower orientation to following rules and feel there were more situations that would justify breaking the rules than adolescents with fewer delinquent friends. Future research should explore whether peers’ influence on adolescents’ delinquency operates by affecting adolescents’ rule orientation, as this could identify a potential area for intervention

**Funding Source: American Psychology Law Society**

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**Recommended Citation:**
**Reyes, Joseph; Purser, Elizabeth; Hernanez, Vanessa; Viruet, Amri; Thomas, April. "Association with delinquent peers: Influence on adolescents’ rule orientation" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1356**

# Breaking social stigmas that prevent effective communication with people in the autism spectrum

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There is limited research regarding the Autism Spectrum Disorder (ASD) and its relationship with communication. This study identifies effective protocol on how to communicate with Autistic people without making them feel uncomfortable or excluded. The purpose of this research is to initiate the conversation on how communication theories can create an effective model for ASD people. The study looks to develop social justice by incorporating ASD people to general society. The theoretical frame for this investigation is *Erving Goffman's Theory of Social Stigma,* explaining the causes on how individuals are mentally classified by others in an undesirable, rejected stereotype rather than in an accepted, normal one. He defined a stigma as a special kind of gap between virtual society identity and actual social identity. This study voices the testimonies of the stigmatized individuals because they will provide first-hand information on how to break the barriers to create an effective communication process. A qualitative methodology was used to collect eleven in-depth face-to-face interviews from a convenient sample of people diagnosed in the spectrum, their parents, and ASD experts. Results indicated that for parents of Autistic children the top communication barriers are the assumption of effective communication, the use of stereotypes, and stigmatizing them. For those diagnosed with ASD the barriers are lack of self-control, fear of not being accepted and fear of being mocked. According to ASD experts there should be more research and social leadership in order to inform those who don't know anything about ASD.

**Recommended Citation:**
**Trespalacios, Camila; Flores, Maria. "Breaking social stigmas that prevent effective communication with people in the autism spectrum" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1300**

# Common morphosyntactic errors in English and Spanish among bilingual preschoolers.

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Early identification and treatment of language disorders are associated with better language outcomes. One of the greatest challenges faced by speech-language pathologists (SLPs) working with children from culturally and linguistically diverse (CLD) populations is differentiating between language difference and language disorder. Previous studies have demonstrated that morphosyntax measures in English and Spanish help identify language impairment among bilingual preschoolers. The purpose of the current study was to examine the most common individual morphosyntactic errors produced by CLD preschool children in both English and Spanish. Scores from the morphosyntax subtests of the Bilingual English Spanish Oral Screener (BESOS) were analyzed. These tasks included morphosyntactic forms that are difficult for children with language impairments. The BESOS was administered to a total of 45 children between the ages of 3 and 6. Thirty-three participants completed the subtest in both English and Spanish, 9 participants completed the subtest in English only, and 1 participant completed the subtest in Spanish only. An item analysis was performed to examine morphosyntactic errors. Preliminary results indicated that participants had greater difficulty with subjective and direct object clitic forms in Spanish. In English, verb tense errors were the most common error type. These results emphasize the need for researchers and clinicians to assess morphosyntax across all the languages a child uses.

**Recommended Citation:**
**Trujillo, Stephanie; Summers, Connie; Smith, Vanesa. "Common morphosyntactic errors in English and Spanish among bilingual preschoolers." (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1335**

# Challenges encountered and lessons learned by mediators during the cogenerative dialogues between scientists and high school students

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The partnership between high school students and scientists allows students to participate in more advanced scientific practice, such as analyzing data and communicating science. During the process of conducing science inquiry, students can exercise their critical thinking and understand the contribution of scientific practice to the society. However, working with scientists can also be difficult for students because of the complexity of scientific language and advanced knowledge used by scientists. The pedagogical tool of cogenerative dialogues (cogens) with the presence of a mediator appears to be a potentially useful practice to enhance the communication between instructors and students. The purpose of this study is to understand what challenges cogen mediators encountered and what lessons they learned while conducting cogens between scientists and high school students. Cogen sessions were conducted as part of a 7-month science internship where students developed projects with scientists, such as chemists, biologists, engineers, etc. Through a thematic analysis, we classified data collected from video recorded individual interviews with eight cogen mediators. Our analysis identified four common challenges and nine lessons learned by cogen mediators. In particular, the most frequent challenge mediators encountered is that "participants sometimes did not talk equally or respectfully listen to others" and the most common lesson learned is that cogen mediators need to "be attentive, patient, respectful, empathetic, supportive with participants". These findings can serve as references for educators to facilitate the collaboration between different groups of stakeholders, such as students and scientist, to enhance their communication.

**Funding Source: NSF No. DRL 1322600**

**Recommended Citation:**
**Urquidi-Cerros, Yamile ; Hsu, Pei-Ling. "Challenges encountered and lessons learned by mediators during the cogenerative dialogues between scientists and high school students" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1296**

# Using storytelling for effective science teaching: A case study of an exemplary scientist

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With the rapidly increasing number of STEM jobs in America, many scientists, mathematicians, engineers, and technology professionals have come together to encourage students into pursuing STEM careers by teaching and engaging them in the subjects of mathematics and science. However, scientists have challenges of communicating science to the public, mostly due to the complex language of scientific jargons and terminologies. The purpose of this ethnographic research is to demonstrate how an exemplary scientist, Dr. Smith, used storytelling to teach science in a 7-months internship program for high school students. Data sources include 420 hours of real-time videos, field notes, and individual student interviews. Drawing on the Labov's Model as our theoretical framework, we analyzed 112 stories in terms of different components of stories, purposes, and setting in which they were told to better understand how stories could be used to communicate science. Our analysis suggested that the main purpose of Dr. Smith's storytelling is to teach scientific concepts to students and most of Dr. Smith's story incidents occurred in a laboratory, during research, and when he was faculty. Doing so allows Dr. Smith to make the majority of the stories relevant and relatable to what the students were experiencing in the science internship. Moreover, cogenerative dialogues provides more opportunities for Dr. Smith to tell more and diverse stories and can serve as an educational space to engage students into science. Science educators can use these findings to build their storytelling practice in order to communicate science to students more effectively.

**Funding Source: National Science Foundation 1322600**

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**Recommended Citation:**
**Valadez, Karina; Hsu, Pei-Ling. "Using storytelling for effective science teaching: A case study of an exemplary scientist" (2018).**
***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1267**

# What are my legal rights? Parents and adolescents knowledge of legal rights

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Limited research has examined what adolescents know about the law, as the majority of research has focused on adults' legal knowledge. The existing research suggests that parents and adolescents do not fully understand their Miranda rights during police interrogations, but much remains unclear regarding their broader understanding of legal rights and how they come to learn about legal rights. The present study aims to examine whether there is a link between what parents and adolescents know about adolescents' legal rights. To address this issue, 118 parent-adolescent dyads completed an online questionnaire about their legal knowledge. Parents and adolescents answered four questions about adolescents' legal rights (i.e., rights to an attorney, confront witnesses, bail, and jury trial). Questions were scored dichotomously, such that a point was given for correct answers and no points were given for incorrect answers. A summary score of these four items was calculated, with higher values indicating greater knowledge of adolescents' legal rights. A Pearson's bivariate correlation revealed a positive association between parents' and adolescent's knowledge of adolescents' legal rights, $r = .273$, $p = .004$. That is, the more parents know about legal rights, the more adolescents know about their legal rights. This research brings to light the importance of increasing parents' legal knowledge, as knowledge of the law and legal rights may be transmitted from parents to adolescents. Future research should examine whether adolescents explicitly learn about their legal rights from parents and how parents teach their children such information.

**Funding Source: American Psychology-Law Society**

**Recommended Citation:**
**Vasquez, Tiffany; Reyes, Joseph; Perez, Britney; Moran, Roberto; Misra, Kiran; Thomas, April. "What are my legal rights? Parents and adolescents knowledge of legal rights " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1330**

# Engineering, Computational & Applied Sciences

# Assessment of sensory function in individuals dealing with homelessness

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Sensory function is the body's process of receiving stimuli from the environment, transmitting it to the brain, and eliciting the proper response. Sensory deficits result in increased or decreased sensitivity to stimuli and can reduce an individual's abilities, independence, and quality of life. A not fully elucidated issue of homelessness is the increased risk of sensory deficits. Homeless individuals have been reported to have a poor neuropsychological functioning, decreased perceptuomotor function, and increased prevalence of sensory issues. An evaluation of the sensory function of homeless individuals is important as sensory functions have been associated with daily competence and functional independence. The specific aim of this research project is to assess the sensory function of homeless individuals and identify specific deficits. This study will assess individual senses, their integration, and the individual's self-identified level of functional independence to identify if homeless individuals exhibit decreased sensory function and its relationship to self-identified functional independence. Approximately, 50 homeless individuals from 10 shelters across the City of El Paso will be assessed for sensory function (visual, auditory, gustatory, olfactory, and tactile), sensory integration discrepancies, and functional independence. Participants will participate in an interview regarding sensory deficits as part of the inspiration phase of the Human-Centered Design (HCD) process. These results will provide insight into the challenges homeless individuals may encounter when attempting to successfully exit homelessness. The data collected will be used to direct the development of an intervention to improve sensory function using an HCD approach.

**Funding Source: National Institutes of Health**

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**Recommended Citation:**
**Alvarado, Daisy; Kendall, Meagan. "Assessment of sensory function in individuals dealing with homelessness" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1391**

# Kinematic analysis and hydraulic integration of a mechanical four-bar prosthetic knee

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The LIMBS four-bar Injection-Molded (IM) prosthetic knee is a low-cost solution for Above Knee (AK) amputees. The prosthetic's geometric design allows the amputee to support their weight up to 5º of knee flexion, where the knee naturally retreats to a null flexion. However, a more natural gait cycle requires further flexion and kinematic response of the knee at the weight bearing stage. The limited and passive weight support system depends completely on the geometrical design of the knee. The inability of the prosthetic knee to support weight through 96% of its flexion range endangers the patient to stumble and fall. By hydraulically controlling the motion of the knee as it flexes, it is possible to more closely imitate natural gait and execute stumble control. Knees with hydraulic control in the market are expensive due to the fees involved in medical regulation and technological price inflation. The project aims to integrate hydraulic control to the current IM model while maintaining affordability. To add a hydraulic cylinder to the prosthetic knee, a mechanical re-design of the architecture is necessary. A kinematic analysis of the geometry was performed in order to identify the optimum location of the piston; this entailed a cross-section comparison of the forces and torques involved in controlling the knee flexion. The architectural redesign must minimize model alterations and size, while maximizing control. This research is aimed to aid those in need of a functional prosthetic at a low cost.

**Funding Source: LIMBS International**

**Recommended Citation:**
**Aranda, Luis; Galey, Lucas; Gonzalez, Roger. "Kinematic analysis and hydraulic integration of a mechanical four-bar prosthetic knee" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1270**

# Bridge prioritization and preservation on Route 66

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Eligible bridges around the United States receive funding every year for replacement or rehabilitation. The main criterion for allocation of this funding is based on engineering aspects (e.g., life safety, condition, functionality), often leaving the historical value of the bridge at the bottom of the importance level. One of the main historical roads known in America is Route 66 also known as the “Mother Road.” This route was the road to opportunity in the 1930s. A large number of bridges with historical significance carry the route and represent an integral part of the history of the Mother Road. This research will analyze bridges along Route 66 and create a prioritization list that will incorporate both the historical significance and engineering characteristics of each bridge putting both aspects at the same importance factor. Limit states such as structural safety, geotechnical safety, operations, and historical preservation will be looked at for each bridge and from there will go into further analysis of each limit state. After analyzing relevant limit states, a risk factor will be created and used to rank the bridges from highest to the lowest prioritization accordingly. This list can be used to show which bridges need replacement or rehabilitation based on both the engineering and historical aspects of the bridge, and which bridges are in danger of losing historical significance based on engineering alone.

**Funding Source: National Park Service: Route 66 Corridor Preservation Program, COURI, Vice President of Student Affairs**

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**Recommended Citation:**
**Ballard, Sarah ; Weidner, Jeffrey. "Bridge prioritization and preservation on Route 66" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1431**

# Low sample volume CD4+ T cell counting for low- resource communities

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White blood cell quantification is a critical aspect of assessing treatment efficacy and disease progression in patients with immunodeficiency disorders such as human immunodeficiency virus (HIV). High complexity testing such as flow cytometric quantification of CD4 and CD8 T cell counts involves expensive instrumentation that requires clean laboratory environments and trained medical professionals. However, rates of HIV and the need for care is highest in low-resource communities lacking the capability to utilize and maintain financially and technically demanding medical instruments. The purpose of this study was to develop a prototype of an economical, robust, and user-friendly instrument to quantify white blood cells specifically for use in low-resource communities. The conceptual design of this instrument was based on spectroscopic techniques commonly used in modern cell counters such as flow cytometers. Using a Thorlabs silicon diode and two Hamamatsu photomultiplier tubes (PMT), an Arduino 101 microcontroller was used in conjunction with a simple optical set up to test the instrument's sensitivity to quantitate a known value of polystyrene microbeads in a cocktail designed to simulate human T cells. The instrument will be further tested for accuracy prior to testing on human samples. Device calibration will be performed using isolated human CD4+ T cell samples from healthy individuals and correlated to standardized counts obtained from a flow cytometer as the Gold Standard. Future developments will involve the design of a closed-system cuvette device to reduce infectivity risk from HIV positive samples as well as a user-friendly interface to expand point-of-care testing capabilities.

**Funding Source: COURI**

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**Recommended Citation:**
**Beard, Jeffrey; Moore, Jacen. "Low sample volume CD4+ T cell counting for low-resource communities" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1299**

# Algae bloom control: Remediation and prevention

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This study examines the effectiveness of a holistic dual process for the prevention and remediation of algae blooms in small lakes and drinking water sources. The prevention of algae blooms is explored using phytoremediation for Nitrate (NO3-) and Phosphate (PO4-3) removal, necessary components for algae growth. The roots of four perennial plants —Rain lily, Horsetail, Regal mist, and African iris— were tested for NO3- and PO4-3 removal using a modified procedure by McFarlane and Yanai (2006) with a hydroponic solution as well as with water samples collected from Ascarate Lake in El Paso, Texas and Parque Central in Ciudad Juárez, Mexico. The remediation of algae blooms is explored with the use of a natural clinoptilolite zeolite from the St. Cloud Mine in Winston , NM impregnated with Copper Sulfate (CuSO4) (Cu-Z). Batch studies using Cu-Z were made with solutions containing chlorella algae as well as with water collected from both Ascarate and Parque Central Lakes. The use of phytoremediation for the water from the lakes showed a significant decrease in NO3- and PO4-3, especially with the African Iris and Horsetail. We will evaluate the use of these plants in floating islands in Lake Ascarate. The use of Cu-Z showed promising results by reducing the amount and rate of algae growth in water, as evidenced by the decrease in chlorophyll A and B. The use of Cu-Z to prevent algae growth in drinking water storage tanks is being evaluated for water collected from storage tanks in colonias in El Paso and Ciudad Juárez.

**Recommended Citation:**
**Bencomo, Madison; Saucedo, Julieta; Santiago, Ivonne. "Algae bloom control: Remediation and prevention" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1429**

# Nonword repetition in bilingual children with language impairment

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Language processing measures have recently been investigated as alternative methods of assessment for culturally and linguistically diverse populations. One such measure, nonword repetition (NWR), shows potential as a valid tool to assess children's ability to process language, in contrast to knowledge-based concepts that may be biased against bilingual children. NWR tasks are related to phonological skills and vocabulary acquisition. The purpose of the current study was to investigate NWR performance of bilingual Hispanic children with language impairment (LI) compared to the performance of typically developing bilinguals (TD). In addition, the relationships between NWR performance across two languages and receptive vocabulary, grammaticality, and sentence repetition (SR) were examined. Participants included 26 Spanish-English bilingual children between the ages of 6 and 9 who were divided into two groups, 13 TD bilinguals and 13 bilinguals with LI. Children in the LI group were matched on age, gender, and academic grade with a corresponding participant in the TD group. A test battery was administered to each participant to examine receptive vocabulary, grammaticality, SR, and NWR performance for each group. Preliminary results revealed that children in the TD group performed higher on the NWR tasks in both languages than children in the LI group. Accuracy on NWR performance decreased as word length increased for both groups. There were also more correlations with other language measures for the TD group compared to the LI group. These findings support the use of NWR tasks with bilingual children.

**Recommended Citation:**
**Cano, Isabel; Summers, Connie. "Nonword repetition in bilingual children with language impairment " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1266**

# Characterization of shape memory polymer parts fabricated using material extrusion 3D printing technique

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Shape memory polymer (SMP) is capable of recovering its original shape from a high degree of deformation by applying an external stimulus such as thermal energy. This research presents an integration of two commercial SMP materials, DiAPLEX and Tecoflex, and a material extruding printer to fabricate SMP parts and specimens. The material properties such as Young's modulus of the specimens was examined as a process output. Furthermore, stress-strain curve, strain recovery, instant shape- fixity ratio, long-term shape-fixity ratio, and recovery ratio of SMP specimens during a thermo-mechanical cycle were investigated. The material extrusion (ME) fabrication settings for the SMP specimens were defined by implementing a design of experiments (DOE) with temperature, velocity, and layer height as process variables. It was concluded that through main effect and iteration plots, fabrication parameters have an impact on Young's modulus and there exists a minimum iteration among variables. In addition, Young's modulus variation of the DiAPLEX and Tecoflex specimens was mostly caused by velocity and layer height parameters respectively. Moreover, results showed that SMP specimens were able to recover from high levels of deformation.

**Funding Source: NSF, DOE**

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**Recommended Citation:**
**Castaneda, Mariana; Garcia Rosales, Carlos; Kim, Hoejin; Garcia, Mario; Tseng, Bill; Lin, Yirong. "Characterization of shape memory polymer parts fabricated using material extrusion 3D printing technique" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1280**

# Analysis of prosody around turn starts

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To allow a robot to communicate with more natural timing, we want to improve our performance on the turn taking problem. Specifically, we wish to predict whether someone will speak or not in the near future in a conversation. We previously created a neural network that uses prosodic features to solve this problem. We would like to improve our performance by further analyzing prosodic features in the vicinity of times when someone starts speaking. This analysis may provide us clues as to which prosodic features are good indicators that someone will start to speak. We define our area of interest to be a window of 2.5 seconds before a turn start to 2.5 seconds after. Our approach was to compute the prosodic features across multiple conversations, average them across our area of interest, and then plot them. We used this approach for two different datasets, and made plots for both. One dataset was a conversation between two people, and the other dataset was a conversation between a robot and a user. We found some patterns that may help us to predict when someone will next speak in a conversation.

**Funding Source: Toyota**

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**Recommended Citation:**
**Cervantes, Gerardo; Ward, Nigel. "Analysis of prosody around turn starts" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1407**

# Lung nodule detection and classification using MATLAB

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Lung cancer causes approximately 156,000 deaths each year and only has a 1% survival rate if it has progressed to stage IV. Diagnosing lung cancer in the later stages has a high probability of mortality. Due to this, there is a great need to develop a way to detect lung cancer early on so that the number of deaths decreases. Advances have been made over the years in detecting it while still in the early stages using computer aided diagnostics (CADx), but there is still room for improvement such as reducing errors (false positives) which would make it more precise. A new technique that is being used involves utilizing radiomics and gene expression to determine if there is a common gene among lung cancer patients. In this study MATLAB will be used to detect and classify lung nodules with the task being to decrease false positives. By taking numerous features such as size, texture, and image intensity we can determine if there is a commonality between different patients. This could prove to be helpful when treating a patient with similar cancer types and nodules.

**Recommended Citation:**
**Cervantes, Hope; Qian, Wei. "Lung nodule detection and classification using MATLAB" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1370**

# Correlations between the development of one year olds and social determinants in Panama.

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Health disparities and social inequalities are present in Latin America and in Hispanic communities living in the United States. Social determinants play a big role on the health of individuals, families and communities. The purpose of this study is to understand how diverse social characteristics of health corresponding to mothers in the region of Panamá relate to the Bayley test scores of their one year old . Observed characteristics include: ethnicity, clinical site, educational level, income, domestic violence, alcohol/drug-tobacco use, broken family unit, marital status and access to care. **Methods:** The research focuses on secondary data obtained from two clinics in Panamá. The data included information from 215 mothers who completed a self- reported questionnaire and their child's Bayley scales score. The Bayley Scales of Infant and Toddler Development- III is used to measure the cognition, language and motor skills. Based on the scales, the scores were regrouped into superior or not superior categories. **Results:**There was a significant difference found in the independent variables of clinical site (P value = 0.006). Other differences within ethnicity looking at Mulattos vs. other ethnicities (P value= 0.013), and indigenous groups vs. other ethnicities (P value= 0.026).**Conclusion:** Children who attended the clinical site 24 de Diciembre showed a greater number in the classification superior under the Bayley cognitive scale, compared to the clinic of Tocumen. In addition, the ethnicity of Mulatto was classified as the most superior in the Bayley cognitive scale compared to indigenous group, classified as the least superior.

**Funding Source: National Institute of Health**

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**Recommended Citation:**
**Cobos, Vicente; Hernandez , Janeth; Dominguez , Delfina; Sosa, Nestór. "Correlations between the development of one year olds and social determinants in Panama. " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1344**

# Three dimensional bioprinting with furfuryl-gelation to create complex geometries

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An important advantage of 3D bioprinting in tissue engineering is the ability to duplicate the complexity of biological organs or tissues *in vitro*in order to translate to clinical applications. 3D bioprinting holds great promise in the field of regenerative medicine and therapeutics as it can create complex structures in a layer by layer manner, which makes it possible to imitate native tissues. Current bioinks lack both the high printability and the biocompatibility required in this respect. Hence, the development of bioinks that are capable of both properties is needed. In the current study, a novel furfuryl-gelatin bioink, crosslinkable by visible light, was used for creating cell laden structures with high fidelity. Lattice mesh geometries were printed in a comparative study to test against the properties of a traditional rectangular patch. After 3D printing and crosslinking, both structures were subjected to rheological and swelling assays, SEM and FACS analysis. The results showed that the lattice structure was relatively more porous and also that the cells seeded within the lattice underwent more proliferation from 24 hours to 72 hours with respect to the rectangular sheet wherein the cell proliferation rate was more consistent for the same duration, affirming that the lattice was a better pattern for the fabrication of cell laden scaffolds.

**Funding Source: NIH**

**Recommended Citation:**
**Dominguez, Erick ; Kumar, Shweta; Tasnim, Nishat ; Joddar, Binata . "Three dimensional bioprinting with furfuryl-gelation to create complex geometries " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1328**

# Data analysis of community assessment on diabetes risk perception among Hispanic men

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The goal of this research is to conduct a descriptive analysis of the pilot Community Assessment of Hispanic Men's Diabetes Risk Perception study. Hispanic/Latino (H/L) men face health inequalities in diabetes. Hispanic/Latino men, particularly of Mexican descent, are burdened by the diabetes epidemic with a prevalence that is 150% higher than in non-Hispanic whites and 25% higher than in H/L women. Hispanic men also delayed medical care, which increases hospitalization and length of stay. The aim of the assessment is to identify biopsychosocial factors associated with engagement in diabetes prevention and self-care behaviors and inform the development of a men's specific diabetes education program. The aim of this research is to describe the data collected. Methods: Data come from the 2017 Community Assessment (N=80 males) which was conducted at three community settings (i.e. UTEP, UTEP basketball event, Southwest University). The survey includes 32 questions designed to assess awareness of local diabetes programs, diabetes knowledge, diabetes causation beliefs, diabetes status/risks, attitudes about diabetes and health risks, and risks of developing diabetes or complications, intent to engage in a healthy lifestyle, and benefits/barriers for engaging in healthy, and sociodemographic information. The study is IRB approved. SPSS software will be used to analyze data using descriptive and frequency statistics and create visual representations of the data via graphs. Results and Conclusion: The findings of this research will be used to inform the development of a men's specific diabetes program in El Paso, TX to improve equity and access to diabetes program among men.

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**Recommended Citation:**
**Drennan, Rebecca; Concha, Jeannie. "Data analysis of community assessment on diabetes risk perception among Hispanic men" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1316**

# Evaluation of phosphate as a remediation strategy for lead contaminated soils

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Exposure to lead in the environment can affect the development of the brain and nervous system resulting into a low IQ, convulsion, and even death in children. Previous research has shown that high levels of soil lead are common in central El Paso due to a number of factors including legacy contamination from ASARCO and near the highway corridors, from lead gasoline. Over the summer 2017 a survey of lead level contamination was conducted in central El Paso. By using a hand held X- ray Fluorescence device. Lead concentrations ranged from 19 - 817 ppm (g/m$^3$). Values over 300 ppm, soil samples were analyzed for total lead and bioavailable lead by using the PBET extraction method. During the fall semester 2017 the objective was to lower lead concentration and bioavailability. In the incubation study for the fall, phosphate was added in five doses in the form of calcium dihydrogen phosphate. Soil lead reacts with phosphate to form an insoluble compound, pyromorphite. Phosphate did not have a significant effect. This might be due to the relatively high pH levels in the soil, resulting in low lead solubility. For spring 2018 phosphate addition might be more effective in lowering bioavailable lead by lowering the pH of the soil. A second soil incubation study was conduced in which the soil pH was lowerd by adding sulfiric acid and then phosphate. Results for the buffering capacity of the soil will be presented along with the effectiveness of the acid treatments in increasing lead availability.

**Funding Source: CERM**

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**Recommended Citation:**
**Eguiarte , Elena ; Placencia , Jesus; Hargrove , William . "Evaluation of phosphate as a remediation strategy for lead contaminated soils " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1286**

# Method development for the analysis of Bisphenol A in milk using a solventless techniques – SBSE/TD GC/MS

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Bisphenol A (BPA) is an Endocrine Disrupting Chemical (EDC) of great concern because of its capability to mimic hormone functions, causing several health issues. BPA is used in the production of plastics and epoxy resins, which makes it widely spread in the environment. To date studies have reported BPA's capability to leak into a variety of food sources -such as canned food, bread, cereals, cheese, and milk. Our study focused on monitoring BPA and other EDCs present in milk, since milk is considered to be a major food source for infants. Existing methodology for BPA detection in milk can be tedious and require the use of organic solvents. Even so, the recovery of BPA is only about 60% due to the lipid contents that hinder the extraction efficiency. This project was aimed to develop a simple, solventless, and sensitive method capable of detecting BPA in milk. A solventless sample preparation technique called stir-bar sorptive extraction (SBSE) coupled with Thermal Desorption/Gas Chromatography/Mass Spectrometry (TD/GC/MS) was used. We investigated factors, i.e. pH, sonication, and temperature, that could improve the recovery of BPA from milk. The results showed that pH does not affect the extraction efficiency, while higher temperature with one hour of sonication improves the BPA recovery from milk by 22%. In summary, an optimized method using SBSE/TD/GC/MS was developed to achieve 41% recovery of BPA in milk. This optimized methodology could be an effective procedure to monitor BPA in milk to assess the human health risks posed by exposure to BPA.

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**Recommended Citation:**
**Encerrado, Angela; Lee, Wen-Yee. "Method development for the analysis of Bisphenol A in milk using a solventless techniques – SBSE/TD GC/MS" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1304**

# Antibacterial furosemide-silver complex loaded chitosan nanoparticles

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The rise of resistant bacteria has become a leading threat worldwide. Attempts are being made to introduce novel antibacterial systems to combat resistance. The goal of this study was to formulate chitosan nanoparticles (CSNPs) of recently reported silver complex of furosemide (Ag-FSE) to enhance its solubility and antibacterial efficacy. Synthesis of Ag-FSE complex was performed using a literature reported method.[1]CSNPs were formulated via ionotropic gelation and ultrasonication techniques. Size, polydispersity index (PDI) and zeta potential (ZP) of Ag-FSE loaded CSNPs were determined using dynamic light scattering (DLS) technique. Our primary goal was to obtain CSNPs with sizes < 300 nm along with a low PDI, and high ZP value to reduce risk of particulate aggregation. At 3 and 5 minutes sonication (30% amplitude) sizes obtained were above 300 nm. After increasing sonication time to 10 minutes the values were 261.3 ± 12.23 nm, 0.195 ± 0.023, and 42.8 ± 1.31 mV, respectively. Further, Ag-FSE loaded CSNPs were investigated for size, PDI and ZP. Size, PDI, and ZP were 257.5 ± 5.132 nm,0.185 ± 0.014, and 30.7 ± 5.48 mV respectively at 5 % loading whereas at 10 % loading the values were 216.6 ± 26.8 nm, 0.194 ± 0.021, and 25.8 ± 3.05 mV, respectively. We have successfully optimized Ag-FSE loaded CSNPs for size, PDI and ZP. Further studies such as physicochemical characterization and antibacterial activity are under way.

[1]Lustri, Wilton R., “Spectroscopic Characterization and Biological Studies In Vitro of a New Silver Complex with Furosemide: Prospective of Application as an Antimicrobial Agent.”

**Funding Source: NIH**

**Recommended Citation:**
**Franco, Julian; Rodriguez, Victor; Kalhapure, Rahul ; Bolla, Pradeep Kumar; Perez, Stefani; Meraz, Carlos ; Ramos, David; Ruiz, Maya; Renukuntla , Jwala. "Antibacterial furosemide-silver complex loaded chitosan nanoparticles" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1332**

# Effects of fatty acid composition in a high fat diet on skeletal muscle mitochondrial biogenesis

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High fat diets (HFD) have been shown to impair skeletal muscle mitochondrial content/function resulting in impaired lipid oxidation, obesity, insulin resistance and type 2 diabetes. However, it is not clear how dietary fatty acid composition may impact mitochondrial content in skeletal muscle. **PURPOSE:**The purpose of this study was to determine the effects of HFD, differing in fatty acid composition, on skeletal muscle mitochondrial content (OXPHOS) and regulator of mitochondrial biogenesis peroxisome proliferator-activated receptor gamma coactivator 1-alpha (PGC1α). **METHODS:**Male Sprague Dawley rats were fed a Western-style (21% fat; 41% energy) HFD for 9-weeks, then divided into one of three HFD groups for an additional 6 weeks; a control chow group followed a 15-week lower fat diet. Animals consumed either a) low fat Chow diet (CD) (4.8 % fat; 0.74% saturated; 2% mono; 1.77% poly; n=6), b) mixed fat Western diet (WD) (21% fat; 9.76% saturated; 7.68% mono; 3.48% poly; n=6), c) HFD rich in monounsaturated fatty acids (MUFA) (21% fat; 2.82% saturated; 16.01% mono; 2.18% poly; n=6), or d) HFD rich in polyunsaturated fatty acids (PUFA) (21% fat; 2% fat; 2.97% mono; 16% poly; n=7). After 15 weeks, mitochondrial markers were assessed by measuring OXPHOS and PGC1α protein contents in soleus muscle using Western immunoblotting and quantified with Odyssey CLx imaging. **HYPOTHESIS:** We hypothesize that a HFD rich in saturated fatty acids will result in greater reductions in OXPHOS and PGC1α proteins in skeletal muscle compared to HFD rich in unsaturated fatty acids.

**Recommended Citation:**
**Gandara, Isaac; Meza, Cesar; Varela-Ramirez, Armando; Bajpeyi, Sudip. "Effects of fatty acid composition in a high fat diet on skeletal muscle mitochondrial biogenesis" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1419**

# Development of a low-cost prosthetic ankle device to enhance the performance of a basic prosthetic foot

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Losing a foot due to an amputation has tremendous living and biomechanical consequences, especially with regards to gait. Amputees have limited biomechanical functions including reduced walking speed and gait symmetry, and increased energy needed to ambulate. When someone in a third world country loses a limb, they not only lose their functional abilities, but also their way of life. Since the Solid Ankle Cushion Heel (SACH) foot is aesthetically pleasing, many amputees in third world countries prefer it, despite its reduced functionality. Therefore, the question that this project seeks to address is how to give the amputees more functionality while still utilizing the SACH foot. To solve this problem, an ankle device that is compatible with the SACH foot will be developed. A thorough literature review was conducted to see what type of ankle devices are available today and which type of ankle structure would solve this problem. A decision matrix was constructed to serve as a decision tool to see which structure best fits this project. Design specifications were also developed; they are quantitative aims that the device should accomplish. Once the type of structure for the device is decided by the decision matrix, a prototype can be designed, built, and tested within the design specifications. Based on the decision matrix it was found that a single-axis ankle with a rubber control will be used. Currently a prototype is being built to increase the mobility of the foot while still utilizing the SACH foot.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Garcia, Daniel; Galey, Lucas; Nystrom, Aaron; Gonzalez, Roger. "Development of a low-cost prosthetic ankle device to enhance the performance of a basic prosthetic foot" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1322**

# Mechanical and optical properties of tungsten doped hafnium oxide nanocrystalline thin films

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Hafnium oxide ($HfO_2$) is a high temperature refractory material with a high chemical stability, wide band gap ($E_g$ ~5.7 eV) and a high dielectric constant (*k* ~25). While there are efforts in the literature on the effect of metal doping (such as Al, Cu) to tune the structural and electronic properties of $HfO_2$films, not much is known about tungsten (W) doping effects into $HfO_2$. However, doping the refractory metal (such as W) into a hard dielectric ($HfO_2$) will have implications to design materials and devices for advanced device applications. In the present work, W-doped $HfO_2$thin films were deposited by radio frequency magnetron sputtering, where the amount of W into $HfO_2$is varied. X-ray diffraction (XRD) studies indicate the predominant (-111) peak of the monoclinic $HfO_2$, while the incorporation of W induces amorphization. Based on the experimental data and analyses, a structure-composition-property relationship in W-doped $HfO_2$ films is established.

**Funding Source: Partnership for Research and Education in Materials (PREM), National Science Foundation (NSF)**

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**Recommended Citation:**
**Garcia Torres, Marlyn; Uribe, Ann; Chintalapalle, Ramana. "Mechanical and optical properties of tungsten doped hafnium oxide nanocrystalline thin lms" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1301**

# Reactive strength index validity of vertical jump measuring devices

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The Reactive Strength Index (RSI) is a measure of explosive strength and is used to predict how an individual will perform with plyometric exercises. PURPOSE: The purpose of this project was to validate different reactive strength index measuring devices. METHODS: This study used 49 physically active University students (25 = Males, 24 = Females; Mage = 23.51, SD ± 3.8249). The subjects perform a 5 minute self-paced jog on a treadmill as part of a general warm up followed by an 8 minute specific dynamic warm up. Subjects then performed 3 repetitions of the drop jump (DJ) on the Force plates from a 0.3 m box. RSI was measured using Force Plates by dividing the Vertical Jump Height by the ground contact time. RSI was also measured using an accelerometer based device (Push-Band) worn on their waist, with an I-Phone 7plus used to record and analyze the RSI on two video apps (MyJump2 and What'sMyVert), and a photoelectric cell system (Optojump) that was placed beside the force plates; with the force plates being used as the gold standard. An Intra-class correlation was used to analyze the correlation between these devices. RESULTS: Compared to the force plates, the MyJump2 app had a strong correlation (r=0.744), the Optojump and Push-Band had a moderate-to-low correlation (r=0.498 and r=0.349). CONCLUSION: Our analysis indicates that the MyJump2 app is a possible alternative to expensive laboratory equipment for measuring RSI.

**Inter-Item Correlation Matrix**

| | Push Band | My Jump 2 App | OptoJump | Force Plate |
|---|---|---|---|---|
| Push Band | 1.000 | .450 | .172 | .349 |
| My Jump 2 App | .450 | 1.000 | .565 | .744 |
| OptoJump | .172 | .565 | 1.000 | .498 |
| Force Plate | .349 | .744 | .498 | 1.000 |

**Funding Source: N/A**

**Recommended Citation:**
**Gonzalez, Matthew; Montalvo, Samuel; Jarquin, Ileana; Oropeza, Shantal; Dorgo, Sandor. "Reactive strength index validity of vertical jump measuring devices" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1325**

# Fabrication and characterization of pulsed-laser deposited Ba0.8Ca0.2CexTi1-xO3 (BCCT) thin films

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Intrinsic and doped barium titanate ($BaTiO_3$) thin films have drawn considerable interest in recent times due to their second order nonlinear response, ferroelectric properties, and electro-optic properties. Co-doping approach, which proved to be quite successful with many of the multifunctional materials, has been attractive to tailor the structural, optical, electrical and mechanical properties of barium titanate ceramic thin films. Therefore, in the present work, the Ca,Ce co-doped barium titanate materials were considered to obtain tunable optical properties. $Ba_{0.8}Ca_{0.2}Ce_xTi_{1-x}O_3$(BCCT) thin films with fixed Ca content and variable Ce content were fabricated using pulsed-laser deposition (PLD). While such BCCT thin films are anticipated to have applications in electro-optic and memory devices, a detailed characterization has been performed to understand the effect of Ce on the structural and optical properties of resulting BCCT films. BCCT films with a nominal thickness of 90 nm were deposited onto quartz and low-impedance Silicon wafers heated to 400 ºC. X-ray diffraction (XRD), spectroscopic ellipsometry (SE) and nano-mechanical were performed to understand the effect Ce on the structure and properties. The results indicate that the BCCT films were amorphous. All the BCCT films were optically transparent. The band gap decreases with increasing Ce content. The results and analyses will be presented and discussed in the context of utilizing these films in contemporary electronic and optical device application.

**Funding Source: National Science Foundation (NSF), Minority Leaders Research Collaboration Program (ML RCP)**

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**Recommended Citation:**
**Grijalva, Cristian; Jones, John; Chintalapalle, Ramana. "Fabrication and characterization of pulsed-laser deposited Ba0.8Ca0.2CexTi1-xO3 (BCCT) thin films " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1358**

# A 3D-Printable water filter using molecular imprinted ion- exchange membrane for selective separation of copper ion.

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Membranes are commonly used industrially for the treatment and removal of heavy metals from polluted water. Nevertheless, the lack of selectivity of currently available membranes is an important challenge that needs to be addressed in order to target specific ions such as copper and elicit its removal from contaminated sources. The current project focuses on specificity by creating defined pore sizes in which heavy metal ions will be trapped both by charge attraction and spatial distribution. Our results show that coating the surface of the PEG based membrane with copper acrylate increases the efficiency of copper absorption as compared to previous models lacking surface coating. Preliminary UV-vis analysis reflects promising absorption capabilities with opportunity for improvement in this ongoing project.

**Funding Source: PREM**

**Recommended Citation:**
**Linn, Sara; Ruiz, Mauro; Noveron, Juan. "A 3D-Printable water filter using molecular imprinted ion-exchange membrane for selective separation of copper ion." (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1359**

# Fabrication of thermoelectric materials using combustion synthesis

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NASA continues to use radioisotope thermoelectric generators (RTGs) to power their deep space missions. In these devices, radioactive decay of plutonium-238 generates heat, which is then converted into electricity. With the limited availability of plutonium, a way to improve RTGs' efficiency is strongly sought after. One of the best ways would be to assemble the RTGs with superior thermoelectric materials that possess metal-like electrical conductivity and glass-like thermal conductivity, which is difficult to achieve. One way of reducing the thermal conductivity is by nanostructuring the material, but this is also difficult to achieve for large-scale production. This project examines a promising method, called mechanically activated self-propagating high-temperature synthesis (MASHS), which can yield products with high purity at a low cost and is scalable. The experimental procedure involves mixing magnesium silicide ($Mg_2Si$) and silicon oxide ($SiO_2$) followed by a short-time, high-energy milling in a planetary ball mill. The obtained mixture is compressed into a pellet using a hydraulic press and then ignited with a hot tungsten wire in an argon-filled chamber. The reaction mechanisms are studied with differential scanning calorimetry and a chemical kinetic model is being developed based on these results.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Mesta, Rodrigo; Cordova , Sergio; Shafirovich, Evgeny. "Fabrication of thermoelectric materials using combustion synthesis " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1345**

# Upper-extremity rehabilitation assistive device

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In the United States, strokes are the most frequent cause of adult disability. In fact, according to the New England Journal of Medicine, 65% of patients cannot use the affected hand six months after having suffered a stroke. Currently, scientists have developed upper limb robotic rehabilitation assistance for these patients, in order to increase the efficacy of their rehabilitation through high intensity repetitive motion. Most commercially available robots, however, lack mobility due to the use of minimal degrees of freedom and restraint of design to one or two planes. The proposed assistive rehabilitation device was designed to have at least five degrees of freedom and work in 3 planes for free range of motion. The device design has been simulated on SOLIDWORKS, prior to prototyping, in order to prove a high range of mobility and seamless motion. Once the prototype is completed, the motion displayed through motion simulation will be correlated with the actual motion displayed by the prototype. Accuracy of the design will be dependent on the correlation between the design and the prototype. If accuracy is achieved, the upper extremity rehabilitation device would provide a more effective design to current assistive rehabilitation techniques.

**Funding Source: National Institutes of Health**

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**Recommended Citation:**
**Montano, Bianca; Astorga, Uriah ; Sarkodie-Gyan, Thompson. "Upper-extremity rehabilitation assistive device " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1415**

# The effects of different warm-up protocols on power output in college age gymnasts

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Gymnastics is a sport that requires rapid display of explosive power through different jumps. Purpose : The objective of this project is to investigate the effects of a static, dynamic, and a combination of static and dynamic warm-up protocols on power output. Methods: II Gymnasts (9 males, 2 females; Af.ige 23.18, SD ± 2.52) participated in this cross-over experimental design. After obtaining baseline measures, the subjects were randomly placed into four groups: **(1)** static (ST), (2) dynamic (DY), (3) static + dynamic (ST+DY), and (4) dynamic + static (DY+ST). Gymnasts were measured on a Countermovement Jump (C:MJ), Squat Jump (SQJ), Drop Jump (DJ), and a Back Flip Test (BFT). We used a photoelectric cells device to measure power output. Paired t-tests were used to observe mean differences between baseline measures and each of the warm-up protocols. Results: The DY and DY+ST protocols showed to be significantly different from baseline values on power output ($p < 0.05$) in the CMJ. The ST, DY, and DY+ST protocols also showed to be statically different from baseline on the SQJ ($p < 0.05$). Finally, the ST protocol decreased statistically from baseline in the BFT (4337.2 ± 2397.6w to 1026.7 ± 873.2w; $p < 0.05$). Conclusions: The addition of dynamic movements appear to enhance power output in the C:MJ and SQJ. However, the addition of static exercises appears to hinder power output in the BFT. Practical applications: Gymnasts looking to improve their power output through jumping might benefit from adding dynamic exercises in their warm ups.

**Paired Samples T-Test on Power Output**

| | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | Lower | Upper | | | |
| Pair 1 Power CMJ Baseline - Power CMJ Dynamic | -386.56909 | 524.58441 | 158.16815 | -738.98969 | -34.14849 | -2.444 | 10 | .035 |
| Pair 2 Power CMJ Baseline - PowerCMJDS | 3491.60727 | 842.69748 | 254.08285 | 2925.47540 | 4057.73914 | 13.742 | 10 | .000 |
| Pair 3 Power SQJ Baseline - Power SQJ Static | 3277.16000 | 877.38078 | 264.54026 | 2687.72757 | 3866.59243 | 12.388 | 10 | .000 |
| Pair 4 Power SQJ Baseline - Power SQJ Dynamic | -395.14364 | 502.43898 | 151.49105 | -732.68673 | -57.60054 | -2.608 | 10 | .026 |
| Pair 5 Power SQJ Baseline - Power SQJ DY+ ST | -198.64364 | 245.35518 | 73.97737 | -363.47549 | -33.81178 | -2.685 | 10 | .023 |
| Pair 6 Power Backflip Baseline - Power Backflip Static | 3310.47480 | 1969.20699 | 880.65614 | 865.38137 | 5755.56823 | 3.759 | 4 | .020 |

**Funding Source:** ***N/*A**

**Recommended Citation:**
**Oropeza, Shanta!; Montalvo, Samuel; Gonzalez, Matthew ; Jarquin, Ileana; Dorgo, Sandor. "The effects of different warm-up protocols on power output in college age gymnasts" (2018). COURI Symposium Abstracts, Spring 2018, ID= 1333**

# Deriving plate correspondences between rat brain atlases through feature-based matching and dynamic programming

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The rat brain is one of the most widely studied brains among all animals. Many experiments at multiple different scales have been performed on it and numerous rat brain atlases have been published. Several rat brain atlases are now available online, however, correspondences between the several different atlases are not well defined. If these correspondences were available, neuroscientists who already mapped their data to one atlas could more easily translate their data to the other atlases. We propose an algorithm that can match complete Nissl-stained tissue images to atlas plates and use it to find correspondences between plates of two different atlases. Our proposed algorithm uses the Scale Invariant Feature Transform (SIFT) for feature- based matching to create a matrix of similarities between atlas plates from two different atlases and then finds the correspondences between the atlases through dynamic programming. We demonstrate the effectiveness of this algorithm by using it on the Swanson (2004) and Paxinos & Watson (2014) atlases and having the results evaluated by an expert in the field of manual mapping. Through these correspondences, we provide a first step towards the development of a unified spatial model of the brain with registered consistent datasets from diverse studies across multiple scales.

**Funding Source: NIH**

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**Recommended Citation:**
**Perez, Jose; Fuentes, Olac; Khan, Arshad. "Deriving plate correspondences between rat brain atlases through feature-based matching and dynamic programming" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1339**

# Development Of Monolithic Constitutive Model for Additive Manufacturing (AMM) Process

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As additive metal manufacturing (AMM) has grown in the past decade, there has become a need to research better methods to improve the AMM process with different types of alloys. There is a lack of research on the effects of AMM processes on the resultant's properties; thus, the effect of AMM process on the properties needs to be researched more effectively. Currently, there have been complications with porosity and residual stresses of Aluminum-6061 when put through the AMM process. This is a concern since Aluminum-6061 has a notably high strength to density ratio compared to many other metal alloys, making it a better option. This research aims to develop a monolithic powder/melt/solidification pathway model that is capable of mathematically representing the material's thermal and mechanical response from AMM processes for aluminum-6061. This will be done by developing a Distributed Flux (DFLUX) and User Defined Material (UMAT) FORTRAN subroutines for ABAQUS 6.14 software.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Perez, Hector; Uddin, Syed; Montes Carrera, Diana; Chessa, Jack. "Development Of Monolithic Constitutive Model for Additive Manufacturing (AMM) Process" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1414**

# Open-caged fullerene derivatives as efficient electron transporting materials in perovskite solar cells

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Perovskite Solar Cells (PSCs) have shown a remarkable increase on photo-conversion efficiency (PCE), from 3.8% in 2009, to 22.1% in 2016. The good electron transporting and solution processable properties of most fullerene derivatives make them the most popular electron transporting materials (ETMs) in PSCs. To the best of our knowledge, the influence of different adducts on the PCEs of fullerene-based PSCs has not been fully explored to date. In this work, we report open-caged fullerene derivatives and their overall performance as the ETMs in PSCs.

**Funding Source: National Science Foundation**

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**Recommended Citation:**
**Perez, Frank; Castro, Edison ; Avtigas, Albert; Echegoyen, Luis. "Open-caged fullerene derivatives as efficient electron transporting materials in perovskite solar cells" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1275**

# Tuning of mechanical and electrical properties of 3D printed carbon nanotube-photopolymer nanocomposites through in-situ dispersion

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This study presents the fabrication and mechanical characterization of functionalized Multi-Walled Carbon Nanotubes (CNT) reinforced photopolymer nanocomposites. CNT was used for its high electrical conductivity as well as its mechanical robustness. The fabrication of composites of this nature through additive manufacturing is a concept that has not been thoroughly explored. In this study, parametric studies were held to find settings that would allow the fabrication of functionalized CNT through stereolithography (SLA) 3D printing. In addition, the mechanical properties of functionalized composites under tensile stress were tested. An improvement of 77.4% and 64.0% in the Youngs modulus was observed over pristine resin from both random and aligned CNT while an improvement of 20.1% in the UTS was observed when aligning the CNT demonstrating the tuning capabilities of this fabrication method.

**Funding Source: NSF PREM**

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**Recommended Citation:**

**Regis, Jaime; Chávez , Luis; Delfin-Manriquez, Luis; Lin, Yirong. "Tuning of mechanical and electrical properties of 3D printed carbon nanotube- photopolymer nanocomposites through in-situ dispersion" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1361**

# Presence of enteric viruses in surface water and water after treatment for human consumption in the Great Metropolitan Area of Costa Rica

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Although water treatment plants are used to make water safe for human consumption, they may still lack the methodology to detect enteric viruses (EV). This is mainly due to EV being very laborious to detect since they are of low concentration in high volumes of water and standardized, rapid methods are not currently available. The objective of this project is to analyze water before and after treatment for the detection of enteric viruses which can be of great health concern to the people of Costa Rica. This study incorporated filtering by adsorption and elution using microporous filters to concentrate viral particles. Polymerase Chain Reaction (qPCR) in Real Time was used to detect Rotavirus and Norovirus Genotype 1 and 2 along with somatic Coliphages as viral contamination indicators. Somatic Coliphages were detected throughout all surface waters and after treatment in 2 different sampling tours, along with positive (qPCR) results at a few locations for both Rotavirus and Norovirus G1. For the samples that were tested, methods used did yielding positive results in detecting viral pathogens of interest.

**Funding Source: National Institute of Health (NIH)**

**Recommended Citation:**
**Rodriguez, Erick; Mejia-Ibarra, Gabriel; Chacón Jiménez, Luz. "Presence of enteric viruses in surface water and water after treatment for human consumption in the Great Metropolitan Area of Costa Rica" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1309**

# Geotechnical properties of granular base materials for transportation engineering applications

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The objective of this project is to evaluate several types of materials in terms of variations in stiffness with moisture content as part of the implementation of a quality control program. The purpose of this activity is to establish correlations between the moduli of compacted geomaterials under field and laboratory conditions. The following laboratory tests are used: 1) Sieve analysis which consist of separating the material into different sizes according to the Texas Department of Transportation TxDOT test method Tex-200 -F. These gradations are used for preparing consistent mixes with different water contests to develop the moisture-density (MD) curves to determine the optimum conditions where the materials exhibit high stiffness, and lower permeability. 2) Repeated Load Resilient Modulus test as per American Association of State Highways and Transportation (AASHTO) T-307, to obtain the moduli of the materials under different states of stress. This information is used to evaluate the variations in moduli with moisture content under constant compaction energy, to establish relationships between the modulus and the degree of saturation and correlate the field and laboratory moduli

**Funding Source: Center for Transportation Infrastructure Systems (CTIS), Vice President for Student Affairs, COURI**

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**Recommended Citation:**
**Rodriguez, Ivan; Nazarian, Soheil. "Geotechnical properties of granular base materials for transportation engineering applications" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1432**

# Formulation of fluasterone topical nanoemulsion

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Non-alcoholic fatty liver disease (NAFLD) and non-alcoholic steatohepatitis (NASH) are the diseases as a result of lipid invasion (hepatic triglycerides) to the liver. Although reversible, if not treated, cirrhosis may develop and will become non- reversible [1]. Fluasterone (FLS), a steroidal drug, has shown its effectiveness in treating NAFLD/NASH. However, its poor solubility and oral bioavailability limits its uses. In addition, FLS forms toxic metabolites. Therefore, the aim of this study is to develop a novel transdermal nanoemulsion of FLS to improve its bioavailability and reduce toxicity caused by hepatic first pass metabolism. Oleic acid (OA) was selected as a lipid phase for nanoemulsion as it acts as a transdermal permeation enhancer. Solubility of FLS was determined in various surfactants, and based on the results, solutol HS 15 was selected as a surfactant for nanoemulsion. Various ratios of OA and solutol HS 15 were used to formulate nanoemulsion. Based on the results, the ratio of 1:1 was selected. Size, polydispersity index (PDI) and zeta potential (ZP) of optimized nanoemulsion was determined using a dynamic light scattering technique. Results showed 137.71 ± 1.32, 0.227 ± 0.01 and -28.0 ± 2.64 mV respectively. Further studies on FLS incorporation efficiency and in vitro transdermal permeation using cadaver skin are in progress.

**Reference:** Tolman KG, Dalpiaz AS. Treatment of non-alcoholic fatty liver disease. *Therapeutics and Clinical Risk Management*. 2007;3(6):1153-1163.

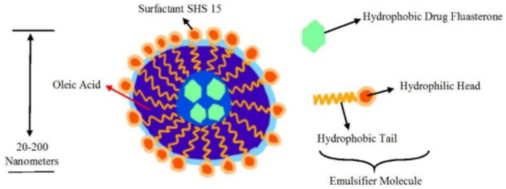


**Figure 1.** Schematic of formed nanoemulsion globule.

**Recommended Citation:**
**Ruiz, Maya; Kalhapure, Rahul; Bolla, Pradeep; Rodriguez, Victor; Renukuntla, Jwala. "Formulation of fluasterone topical nanoemulsion" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1388**

# High capacity regenerable styrene-butadiene adsorbent for the removal of lead (Pb+2) from water

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Lead is a naturally occurring toxic metal that can be found in the earths crust. In the past, lead was used to make water infrastructure and paint, which has left several regions severely contaminated. According to the World Health Organization (WHO), children are especially vulnerable to lead contamination, as lead poisoning can cause adverse effects on the development of their brain and nervous system. Lead can also cause higher blood pressure and kidney damage for adults; and miscarriage, stillbirth, premature birth and minor malformations in babies of pregnant women. According to the Center for Disease Control and Prevention (CDCP), approximately 535,000 U.S children from 1-5 years old had blood lead levels of 5 µg/dL. As a solution to this problem, the lead removal capabilities of a novel sulfonated styrene-butadiene adsorbent were tested. The batch experiments took into consideration the pH and concentration of the solution. In addition, a column filter was employed to test the application of the adsorbent. The ICP-OES tests done on the results showed excellent adsorptive capacity for lead. It was also noted that at higher pH, the adsorption of lead was favored.

**Recommended Citation:**
**Saenz-Arana, Ricardo; Islam, Tariqul; Noveron, Juan. "High capacity regenerable styrene-butadiene adsorbent for the removal of lead (Pb+2) from water" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1346**

# PHAROS Based Tbio Protein Drug Discovery Techniques

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Drug discovery is an intensive process that requires a great amount of time, money, and other resources. Due to the high impact, both positive and negative, that drugs have on the community, many precautions must be taken in order to minimize the risk of errors and side affects on the user. In our lab, Chemistry and Bioinformatics techniques are used to help aid with the early stages of drug discovery process. For this project, which has been primarily conducted by the undergraduate researchers in the lab, the aim was to find lead compounds for five proteins that were found in the PHAROS database. These five proteins were specifically chosen due to their development level (Tbio). Tbio proteins are described as not having known drug or small molecule activities. In this project, homology models were created for each individual protein using I-TASSER. Pharmacophore modeling was used to predict ligands that could potentially bind to each protein. In addition, structure based methods such as molecular dynamics and virtual screening were used to further investigate potential ligands. Lastly, machine- learning techniques were used to predict estimated ligand-protein affinity. Ultimately, the data collected in this project can be used in further stages of drug discovery.

**Recommended Citation:**
**Salama, Ibrahim; Govea, Claire; Sirimulla, Suman. "PHAROS Based Tbio Protein Drug Discovery Techniques" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1424**

# Directed strongly regular graph (24,10,5,3,5)

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A Directed Strongly Regular Graph (DSRG) is a directed graph described by parameters ($n$, $k$, $\mu$, $\lambda$, $t$), where $\mu$counts the paths of length 2 from a vertex $x$to a vertex $y$if there is not a directed edge from $x$to $y$, $\lambda$counts the paths of length 2 from a vertex $x$to a vertex $y$if there is a directed edge from $x$to $y$, and $t$count paths of length 2 from a vertex to itself, $n$is the number of vertices, and $k$ is the in- and out-degree of each individual vertex. A Directed Strongly Regular Graph with parameters (24,10,5,3,5), might be possible to construct. We will be breaking down the adjacency matrix into smaller blocks of Cayley Graphs of groups of order 8 to attempt to construct a graph with the desired parameters. Restrictions can be made in this case, since $\mu$= $t$. Further, the order in which the Cayley Graphs blocks are added to the adjacency matrix will aid the in the construction of the DSRG.

**Funding Source: NSF**

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**Recommended Citation:**
**Salcido, Enrique; Salcido, Enrique; Duval, Art. "Directed strongly regular graph (24,10,5,3,5)" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1403**

# Energy modules integration for engineering and science education in K12 classrooms

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The Consortium for Integrating Energy System in Engineering and Science Education (CIESESE) was established with the goal to prepare future engineers and scientists pursuing a career in energy systems. CIESESE created a partnership with Sandia National Laboratories, National Energy Technology Laboratory (NETL), Puerto Rico Energy Center (PREC), The Recinto Universitario de Mayaguez, The Universidad del Turabo, Miami Dade College, the University of New Mexico (UNM), and the University of Texas at El Paso in order to accomplish this goal.
One of the goals of the Consortium is to prepare the next generation of engineers and scientists, starting at grade levels as early as kindergarten. For this purpose, a team of students and faculty at UTEP have developed educational modules for grade levels K-12 in collaboration with the NASA MUREP Aerospace Academy (MAA), another outreach center on campus. These educational modules will cover concepts such as storing, generating, and distributing energy. The modules include PowerPoint presentations, in-class projects and activities, and worksheets for the different grade levels. Multiple summer and fall camps were held to educate both students and teachers. These modules have already been incorporated into various classrooms by participating teachers in the El Paso area and are publicly available on the UTEP CIESESE website http://engineering.utep.edu/ciesese.

**Funding Source: Department of Energy/ National Nuclear Security Administration under Award Number(s) DE-NA0003330**

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**Recommended Citation:**
**Santiesteban, Jarenny; Love, Norman; Lin, Yirong; Echegoyen, Lourdes. "Energy modules integration for engineering and science education in K12 classrooms" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1278**

# In-situ vs ex-situ calibration comparison of Tekscan™ prosthetic socket pressure transducers for better pressure distribution recording.

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In the areas of prosthetic socket development, there has been a clear distinction between the methodologies and processes used to calibrate pressure sensors that are intended to record and map pressure distributions inside a prosthetic socket when it is being worn by a patient. These calibration practices summarize into two major categories, in-situ calibration which means the pressure sensor is being calibrated while attached to the site of testing, and ex-situ calibration, in which the pressure sensor is calibrated on a different surface than the one it will be tested, and then transferred to the testing surface. Because of such irregularity of calibration practices, this research project focuses on gathering testing information from both scenarios and comparing these in order to determine if such calibration practices differ from one another and if they do, determine which practice is the best to be used for research purposes. In this research project, Tekscan pressure sensing transducers were calibrated on in-situ and ex-situ, and results were analyzed to determine if there was an advantage in the preference of performing one calibration practice over the other one. The results of this project clearly demonstrate that the use of in-situ calibration leads to better and more accurate reading and mapping of pressure distributions inside a prosthetic socket.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Servin, Pablo; Kendall, Meagan. "In-situ vs ex-situ calibration comparison of Tekscan™ prosthetic socket pressure transducers for better pressure distribution recording. " (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1417**

# A guideline for the assessment of uniaxial creep and creep-fatigue data and models

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Components of machinery in the energy generation field undergo long periods of operation or stress under elevated temperatures which results in mechanical deformation called "creep." Creep is a mechanism that engineers must account for when designing to prevent and predict failure in important and costly operations such as power generation in power plants. The problem lies in identifying a reliable method of knowing how to predict creep due to the numerous amounts of prediction models that exist. It is not always clear for an engineer to know which creep prediction model will fit the specific criteria for what they are designing for. To aide in this process, a creep database and an accompanying creep prediction code is used. The database will offer extensive information on different experimental creep data, which was extracted from various sources such as national labs and papers from academia, that can represent the different design scenarios that a design engineer might encounter. A MATLAB routine will be executed to use the experimental data and predict creep with various prediction models within the routine. The MATLAB routine will also compare the various models and give an analysis of which creep prediction is the best and most accurate for the user's design criteria.

**Funding Source: Department of Energy, COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Vega, Ricardo; Stewart, Calvin. "A guideline for the assessment of uniaxial creep and creep-fatigue data and models" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1399**

# Work in progress: A vibrotactile biofeedback device for clinical use during early stages of amputee rehabilitation

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Following an amputation, lower-limb amputees are prone to asymmetric weight bearing on their residual limb. Asymmetric loads placed onto one's residual limb are abnormal, and can lead to balance disorders, gait asymmetry, and Deep Tissue Injury (DTI) if exposure to such loads persists. Said complications can arise due to loss of sensory function and can result in prolonged rehabilitation periods. This study, although a work in progress, therefore aims to test the effectiveness of a novel vibrotactile biofeedback device on lower-limb amputees and able-bodied subjects as a means to determine if vibrotactile feedback is an effective rehabilitative tool for helping individuals better understand how to apply weight onto each limb symmetrically. A previously designed system consisting of piezoresistive force sensors and vibration motors is currently being updated to encompass wireless capabilities via Bluetooth technology. A testing protocol that will be used to determine the effectiveness of the device as a rehabilitation tool is presented here. The increased sensory perception this device offers aims to reduce the unnecessary pressure load on the residual limb to decrease the risk of DTI and to shorten the rehabilitation process by stimulating balance and, thus, an expeditious return to normal gait patterns. Human trials in which the device will be tested will be conducted in the near future upon completion of the redesigned prototype.

**Funding Source: National Institutes of Health**

**Recommended Citation:**
**Vela, Jr., Ricardo; Kendall, Meagan. "Work in progress: A vibrotactile biofeedback device for clinical use during early stages of amputee rehabilitation" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1353**

# Structural determinants of health and glycemic control among adults with Diabetes Mellitus

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**Introduction:** Non-communicable diseases, also called chronic diseases, kill 40 million people each year of different ages, regions, and countries (World Health Organization, 2017). Nowadays, men and women have a more active and fast pace of life (Public Health, 2012), which leads them to neglect fundamental aspects of daily life, which can lead to a non-communicable disease. A non-communicable disease is defined as long-term conditions with a generally slow progression, or chronic disease (WHO, 2016). **Materials and Methods:** Quantitative design, cross-sectional descriptive type. For this study, a non-probabilistic sampling was made up of 42 participants. For the measurement of the variables (gender, level of education and HbA1C), the participants' files were accessed. **Results:** The participants were 19 men and 23 women. In terms of HbA1C, the mean of all participants was 8.905%, the minimum of 5.0% and the maximum of 13.6%, with a standard deviation of 2.1801. As far as glycemic control is concerned, 23.8% of the participants have a control within normal range and 76.2% have a control out of normal range. **Conclusions:** It is important to consider the structural determinants of health as a public health and nursing problem due to various factors such as gender and level of education. This requires an intensive work on the part of the health sector, educational institutions, society, but especially in nursing aimed at instilling a quality of life through a better first level of care and teach each individual a responsible self-care, and with it, the reduction of diabetes.

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**Recommended Citation:**
**Vidrio, Karla; Vilchez, Vivian; Solano, Ana; Lusk, Mark. "Structural determinants of health and glycemic control among adults with Diabetes Mellitus" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1288**

# Multifunctional sensing using 3D printed MWCNTs/BaTiO3/PVDF nanocomposite

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This research studies multifunctional sensing capabilities of nanocomposites composed of poly(vinylidene) fluoride (PVDF), $BaTiO_3$(BT), and multiwall carbon nanotubes (CNTs) fabricated by fused-deposition modeling (FDM) 3D printing technique. It was proven that the FDM 3D printing process provides homogeneous dispersion of nanoparticles, alleviating agglomeration of nanoparticles, and reducing micro-crack/voids in matrix which can enhance their dielectric property compared with traditional nanocomposites manufacturing methods. We demonstrated that by utilizing unique advantages of this material combination and 3D printing technique, sensing capabilities for temperature and strain can be engineered with different content variations of BT and CNTs inclusion. It is observed that the sensing capability for temperature change in the range from 25 to 150 °C can be improved as both BT and CNTs inclusions increase and is maximal with 1.7wt.%-CNTs/60wt.%-BT/PVDF nanocomposites; while sensing capability for strain change in the range from 0 to 10 mm is maximal with 1wt.%-CNTs/12wt.%-BT/PVDF nanocomposites. In addition, it is found that the best combination for mechanical toughness is 1wt.%-CNTs/12wt.%-BT/PVDF with 24.2 MPa and 579 % in ultimate stress and strain respectively. Increasing CNTs and BT particles gradually increase piezoelectric coefficient (d31) by 0.13 pC/N with 0.4 wt%-CNTs/18 wt%-BT. These results provide not only a technique to print piezoelectric nanocomposites but also unique materials combination for sensor application. With FDM three-dimensional (3D) printing, simplifying the fabrication process as well as lowering cost in lieu of greater design flexibility are driving forces for this new direction of sensor development.

**Funding Source: National Science Foundation**

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**Recommended Citation:**
**Wilburn, Bethany; Kim, Hoejin; Chavez, Luis; Lin, Yirong. "Multifunctional sensing using 3D printed MWCNTs/BaTiO3/PVDF nanocomposite" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1277**

# Life Sciences

# Pigmentation effects on mortality in bdelloid rotifers when exposed to UVR

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Ultraviolet radiation (UVR) reaching the Earth's surface is increasing due to changing climate patterns. UVR negatively affects aquatic life by mutating DNA and reducing lifespan.Bdelloid rotifers are aquatic microinvertebrates that exhibit a tolerance to UVR and can survive periods of drought. During this period of desiccation, bdelloids go into a state of suspended development called anhydobiosis. This may be especially true for highly pigmented *Pleuretra lineata*found in rock pools located in El Paso, TX. The objective of this study is to determine the effects of desiccation and UVR on bdelloids with high (HP), moderate (MP), or no pigmentation (NP). We hypothesized that the degree of pigmentation and length of desiccation will influence survival after UVR exposure.*P. lineata*were desiccated for one (1D) or seven (7D) days. They were exposed to low (130 µW/cm$^2$) mid (375 µW/cm$^2$) or high (500 µW/cm$^2$) UVR for 2 hrs, and percent survival was assessed after 48 hrs. Results indicate that HP desiccated for 1D and exposed to low UVR had the highest survival rate (mean±SD, 85±5) and NP desiccated for 7D and exposed to high UVR had the lowest (34±3). Tukey post hoc tests indicated a significant difference in recovery between HP vs. NP ($p<0.0001$) and MP vs NP ($p=0.0009$). Similarly, reduced desiccation period led to increased survival ($p=0.0038$). Future work will include repeating exposures with no desiccation time. This study increases our understanding of how seasonal climatic changes affect organisms living in ephemeral waters, and the role pigmentation plays in their survival.

**Funding Source: TIERRA, NSF**

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**Recommended Citation:**

**Apodaca, Rachael; Baeza, Maribel; Walsh, Elizabeth. "Pigmentation effects on mortality in bdelloid rotifers when exposed to UVR" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1397**

# Enduring effects of antidepressant exposure on sensitivity to cocaine in female c57BL/6 mice

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Preclinical literature demonstrates that exposure to psychotropic medications result in altered behavioral responses to drugs of abuse, suggesting altered drug abuse liability. However, to date, these animal studies have been conducted primarily using male subjects. This is surprising, given that females, when compared to males, are more likely to be diagnosed with mood-related disorders, and thus, be prescribed with psychotropic medications such as antidepressants. As such, the purpose of this study is to examine for potential alterations in reward-related behavior, as a function of the selective serotonin reuptake inhibitor, fluoxetine (FLX). Specifically, our goal is to examine if FLX pre-exposure alters responses to cocaine in adult female c57BL/6 mice. To do this, subjects were exposed to FLX (in their drinking water, 250 mg/l) from postnatal days (PD) 70-84. Twenty- one days later (PD105+), mice were assessed on behavioral responsivity to cocaine (0, 2.5, 5.0, 7.5 mg/kg) using the conditioned place preference paradigm – a traditional model used to evaluate drug-seeking behavior in mice. Our data demonstrate that FLX pre-exposed female mice display decreases in the total time spent in the cocaine-paired compartment, when compared to saline pre-treated controls exposed to the same doses of cocaine. Collectively, our findings suggest that exposure to FLX leads to prolonged decreases in sensitivity to the rewarding properties of cocaine, in adult female mice. Thus, questioning the safety of antidepressant exposure in the female population.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Arenivar, Miguel; Iniguez, Sergio. "Enduring effects of antidepressant exposure on sensitivity to cocaine in female c57BL/6 mice" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1274**

# A model system for cells deficient in mitochondrial MAVS

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Recognition of microbial products by pattern recognition receptors (PRRs) plays a critical role in the generation and regulation of adaptive immune responses. While the role of membrane-bound PRRs such as Toll-like receptors is clearly recognized in this process, much less is known about the function of cytosolic PRRs. Rig-I-like receptors are sensors of microbial RNA in the cytosol. Upon activation, they signal via the signaling adaptor MAVS to induce the cellular response. MAVS (also known as IPS-1) locates to both mitochondria and peroxisomes and the two pools of MAVS induce overlapping but distinct sets of genes. To investigate the function and differences between these two pools of MAVS during West Nile Virus infection, we have created here an i*n vitro* system that will allow us to monitor the cellular response of mouse cells that only express the peroxisomal MAVS.

**Funding Source: National Institutes of Health**

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**Recommended Citation:**
**Ayala, Claudia; O'Ketch, Marvin; Schenten, Dominik. "A model system for cells deficient in mitochondrial MAVS " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1292**

# Studying the role of the mitochondrial protein Drp1 in mitosis

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Genomic instability due to improper distribution of chromosomes during mitosis has been implicated in many diseases, most notably cancer. Accurate segregation of chromosomes in mitosis requires the formation of a bipolar spindle. Preliminary studies in our lab suggested that the mitochondrial fission protein Drp1 (dynamin-related protein 1) has a role in mitosis. The objective of this project is to study the role of Drp1 in mitosis with a focus on elucidating the molecular mechanisms by which Drp1 contributes to spindle formation and mitotic progression. Molecular cell biology techniques such as gene silencing using small interfering RNA (siRNA), chemical inhibitors, and immunofluorescence microscopy were used to test these objectives. Our results show Drp1 inhibition leads to deformed and multipolar spindles, suggesting that Drp1 may have a role in spindle formation. Since Drp1 has been shown to bind microtubules in interphase cells, we will study whether this microtubule binding ability is important for the role of Drp1 in mitosis. In addition, the potential role of mitochondrial functions and other mitochondrial proteins in mitosis will be addressed.

**Funding Source: NSF DUE 1565063, NIH**

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**Recommended Citation:**
**Azzam, Seham; Berger, Madison; Gonzalez, Pavel; Herrera, Erica; Diaz-Martinez, Laura. "Studying the role of the mitochondrial protein Drp1 in mitosis" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1272**

# Identifying novel anti-cancer drugs that induce apoptosis

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The main objective for screening anti-cancer drugs is to find compounds with enhanced cytotoxicity and selectivity for cancer cells. Our focus is to identify compounds that exert their cytotoxicity through the induction of programmed cell death. Malignant breast cells or lymphocytes that do not undergo apoptosis can lead to cancers such as breast cancer and lymphomas. The Differential Nuclear Staining Assay is a live cell imaging assay used in the lab that is used to discern among live and dead cells. Using this assay, we want to determine the cytotoxic concentration at which 50% ($CC_{50}$) of the cell population is dead. We will screen various anti-cancer drugs on a panel of cell lines that include breast cancer and lymphomas, as well as non-cancerous cell lines to select compound with a low $CC_{50}$, which implies high cytotoxicity in cancerous cell lines but not in non-cancerous cell lines. The Annexin V-FITC assay detect phosphatidylserine externalization, one of the hallmarks of apoptosis, and JC-1 Mitochondrial depolarization assay, which monitors the membrane potential and is a distinctive feature of intrinsic programmed cell death, are fluorescence-based assays that will identify the pathway of cell death induced by the compound. By doing this, we can identify compounds with the potential to be used in clinical studies as they target cancer cells but might not have the detrimental side-effects associated with chemotherapy. We aim to identify and characterize a novel compound with anti-breast cancer and anti-lymphoma activities that selectively induce cell death in cancer cells through apoptosis.

**Funding Source: BUILDing SCHOLARS program**

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**Recommended Citation:**
**Balderrama, Karol ; Aguilera , Renato; Contreras , Lisett; Aguilera, Renato. "Identifying novel anti-cancer drugs that induce apoptosis " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1362**

# Understanding the impact of Wood bison on soil processes in Arctic grasslands

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The reintroduction of species into their historic range can have many ecological benefits, in contrast it may also result in unforeseen impacts such as altering soil processes which may modify competition amongst endemic plant species, or cause alterations in ecosystem functions. In the Yukon of Canada, the reintroduction of wood bison (*Bison bison athabascae*) has resulted in unexpected population increases which may have detrimental impacts on montane grassland ecosystems. Soil samples were obtained from 5-year old bison exclosures and control plots across multiple sites to determine how soil processes are affected by bison presence and absence. Here we discuss preliminary analysis of the impact of bison on soil processes. Recognizing the impact of reintroduced species on ecosystem functions can provide insight into the effects of reintroductions on habitats and influence conservation targets for managers in the future.

**Funding Source: TIERA, UTEP**

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**Recommended Citation:**
**Barrera, Oj; Roy, Austin; McLaren, Jennie. "Understanding the impact of Wood bison on soil processes in Arctic grasslands" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1400**

# Localized migration of T-cell Acute Lympoblastic Leukemia into the central nervous system

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In T-Cell Acute Lymphoblastic Leukemia (T-ALL) malignant T-Cells migrate into the Central Nervous System (CNS) where they hide from traditional treatments, requiring intrathecal chemotherapies and cranial irradiation; both having lasting negative health affects. CNS targeting by T-ALL malignancies was shown to be mediated by Chemokine Receptor 7 (CCR7) expressing T-Cells and their interaction with Chemokine Ligand 19 and 21 (CCL19/CCL21) (Buonamici, 2009). However specific biochemistry of this process is unknown, but can originate from the activation of CCR7 causing intracellular adhesion/migration to endothelial cells via β1, β2 integrin subunit heterodimers with I-like α integrin subunits. To study this, brains from male wild type mice and male $CCR7^{-/-}$ mice were harvested and dissected into four sections: Olfactory bulbs, Cerebellum, and Right and Left Cerebrums. The tissues were pushed through a 45μm cell filter into artificial cerebrospinal fluid, which were later used as chemoattractant in a Cell Chemotaxis Assay Chamber with CFSE stained CEM's as an active T- cell model. Chemotactic behavior was measured by finding the average localization of cells per variable via fluorescent microscopy on a polycarbonate membrane. This will show the significance that gender, brain region, and/or mutation will have on the invasion of T-Cells into the CNS, allowing for new research on integrin binding assays and *in vivo* studies to give opening to advanced pharmacological medicines and treatment.

**Funding Source: NSF DUE 1565063**

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**Recommended Citation:**
**Brissette, Michael; Kumail, Kumail; Bill, Collin; Vines, Charlotte. "Localized migration of T-cell Acute Lympoblastic Leukemia into the central nervous system" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1305**

# Population genetics, a "secret" tool against Chagas Disease?

Olivia Calderon[1^], Lourdes M Perez[1], Andreia Verrisimo[2], Brittny Blakely[3], Alvaro Romero[3], Rosa A Maldonado[1], Camilo Khatchikian[1*]

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The kissing bug Triatoma rubida (Hemiptera: Reduviidae) is a vector of Trypanosoma cruzi, the etiological agent of the Chagas disease. This insect is commonly found along the West Texas-Mexico border area, presenting high T. cruzi incidence, which makes this system extremely relevant for the public health. In the present study, we used a population genetic modeling framework to assess the demography and genetic structure of the insect population in this relevant area. Sampling included an isolated rural location and various locations associated with different degrees of urbanization and changes in the land use. We extracted DNA from the collected samples and sequenced both mitochondrial and nuclear loci in order to calculate genetic indexes, demographic estimators, and population dynamics among sampled locations. Our results suggest some differentiation between the sampled locations, which can been related with changes in land use or demographic changes among the insects present in the different locations.

**Funding Source: UTEP Vice President for Student Affairs, COURI, Border Biomedical Research Center (BBRC), National Institutes on Minority Health and Health Disparities (NIMHD), National Institutes of Health (NIH)**

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**Recommended Citation:**
**Calderon, Olivia; Perez, Lourdes ; Verrisimo, Andreia; Blakely, Brittny; Romero, Alvaro; Maldonado, Rosa; Khatchikian, Camilo. "Population genetics, a "secret" tool against Chagas Disease? " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1369**

# Duck behavior at Keystone Heritage Park

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Keystone Heritage Park is one of the two desert wetlands in El Paso, it is 52 acres, 4000 years old, and a Bi-national Desert Wetland Upper Valley in the historic Rio Grande floodplain [1]. Data was collected on duck behavior. Ducks display different types of behaviors such as: feeding/dabbling, swimming, diving, walking, preening, resting, flying, calling, aggressiveness, mate/courtship display, and others. It is important to collect and understand waterfowl behavior as it provides essential information towards the ecology and resource requirements of the various species. Ducks are ecologically important because they are seed dispersers and food resources for predators [2]. We predict that there will be a larger proportion of feeding/dabbling behavior displayed by ducks than any other. Duck behavior was observed twice a week, once in the morning and in the afternoon in the fall of 2017, and once a week on the afternoons of 2018. On the data collected there were no statistical differences in overall proportion of behaviors displayed in the mornings versus afternoons in 2017 along with behaviors displayed in afternoons of 2017 and 2018. Suggesting that ducks use Keystone wetland for all their major needs similarly in the morning and afternoon. Swimming along with feeding/dabbling made up most of the displays seen at Keystone Heritage Park in the morning and afternoon, and thus supporting my hypothesis.

**References:**

[1] “Wetlands.” (2015). Retrieved November 16, 2017, from http://keystoneheritagepark.com/birds-wetlands/wetlands-2 [2] “Living with Wildlife in Illinois.” (2017). Retrieved November 22, 2017, from http://web.extension.illinois.edu/wildlife/directory_show.cfm?species=mallard

**Recommended Citation:**
**Chavez, Andrea; Lavretsky, Philip. "Duck behavior at Keystone Heritage Park" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1320**

# The intracellular redistribution hypothesis of stimulant drug addiction: Role of the dopamine vesicular transporter in sensitization

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Repeated exposure to amphetamine (AMPH) produces behavioral sensitization, an enhanced response, that propagates craving and relapse in drug addiction. Sensitization also explains how environmental stimuli consistently paired with drug use become discriminant cues. Moreover, the motor responses to repeated AMPH exposure also display sensitization. Behavioral sensitization is mediated by a neurochemical sensitization reflected by increases in dopamine (DA) overflow. Taken together, this evidence suggests that different DA pathways mediating parallel corticostriatothalamocortical loops are similarly affected. The aim of this study was to explore whether the vesicular monoamine transporter (VMAT) mediates sensitization of AMPH- evoked rotational behavior produced in rats with unilateral nigrostriatal DA lesions. To accomplish this, rats were assigned to different groups: 1) Saline, 2) Low Tetrabenazine (TBZ, a VMAT blocker, 0.5 mg/kg), 3) Hi TBZ (1.75 mg/kg), 4) AMPH (1.5 mg/kg, ip), 5) AMPH + Low TBZ, and 6) AMPH + Hi TBZ. VMAT function was blocked with TBZ during a sensitizing regimen of AMPH or saline (1.0 ml/kg) treatment (1 injection/day/7 days). One week later, a challenge trial was conducted in which all groups received AMPH only. Rotational behavior ($90^{o}$turns) was measured during the sensitizing regimen and the challenge trial. There were no significant differences during the ascending phase (first 40 min). During the peak phase (second 40 min), the low dose of TBZ blocked AMPH sensitization. During the descending phase (last 40 min), the high dose of TBZ blocked sensitization. These data suggest further studies may elucidate a role of VMAT in addictive brain mechanisms.

**Funding Source: The Helen M.C. and J. Edward Stern Endowed Professor of Psychology, the National Institute of General Medical Sciences of the National Institutes of Health**

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**Recommended Citation:**

**Cruz, Adelis; Ramos, Jeremiah; Vasquez, Adriana; Parada, Priscilla; Castaneda, Eddie. "The intracellular redistribution hypothesis of stimulant drug addiction: Role of the dopamine vesicular transporter in sensitization" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1413**

# 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 tularemia, a severe and often fatal disease of humans and other mammals. Previous work from our lab suggests that Natural Killer T (NKT) cell activation reduces the inflammatory response and subsequent cascade of inflammatory cytokines (cytokine storm) associated with bacterial infections both in-vitro and in- vivo during challenge by *F. tularensis*. This is evidenced by reduced IL6 production by macrophages co-cultured with purified NKT cells. It is known that glycosphingolipids, specifically alpha galactosylceramide (alpha-GalCer), are potent activators of NKT cells when presented in the context of the CD1d receptor. We hypothesized that *F. tularensis*produces a glycosphingolipid that is responsible for the protective effect seen in co-culture experiments. In this study, lipids were extracted from *F. tularensis*cultures and glycolipids were enriched using solid phase extraction (SPE) silica column chromatography. Plate bound CD1d was then probed with lipid extract fractions from the *F. tularensis*cultures, and co-cultured with NKT hybridoma cells followed by measurement of T cell receptor (TCR) engagement by ELISA. We found that the glycolipid enriched SPE fraction activated NKT cells, whereas the phospholipid-enriched fraction had no effect. These results suggest the activation of NKT cells could be potentially linked to the production of a glycolipid produced by *F. tularensis*. Further applications of these findings will include analysis of the glycolipid fractions that showed an activation of NKT cells to find the specific lipid using mass spectrometry.

**Funding Source: NIH**

**Recommended Citation:**
**Del Valle , Priscilla; Duarte , Trevor; Spencer , Charles . "Identification of Francisella tularensis lipid extracts activating Natural Killer T (NKT) cells" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1327**

# Common gamma chain cytokines regulate serine phosphorylation of Janus Tyrosine Kinase 3

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Janus Tyrosine Kinase 3 (JAK3) is a protein encoded by the JAK3 gene involved in cytokine-receptor mediated intracellular signal transduction. JAK3 is a member of the JAK family and is closely related to JAK1, JAK2, and Tyrosine Kinase 2 (TYK2). JAK 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 two new phosphoserine (pS) sites on JAK3: S448 and S449. These serine residues are found sequentially within 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 these two residues are conserved amongst various species as well as amongst JAK family members, we believe that they play an important role in JAK3 function. To test this hypothesis we stimulated the human natural killer like cell line, YT, with interleukin (IL)-2, IL-4, IL-7, IL-9, and IL-15 and cellular JAK3 protein was separated by gel electrophoresis. Western blot analysis was performed using phosphospecific antibodies against JAK3 pS448 and pS449. This study determined that IL-2 and IL-15 turned on pS449 signal strongly while pS448 was undetectable. Additionally, a kinetic analysis was performed for IL-2 and IL-15 activation of pS449 for up to 60 minutes which showed a delayed induction compared to tyrosine phosphorylation. These results provide the first evidence of identification and characterization of serine phosphorylation of Jak3.

**Funding Source: BUILDing SCHOLARS**

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**Recommended Citation:**
**Diaz, Daniela; Armendariz, Daniel; Kirken, Robert; Rodriguez, Georgialina. "Common gamma chain cytokines regulate serine phosphorylation of Janus Tyrosine Kinase 3" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1386**

# Movement of *Aedes aegypti* and *Aedes albopictus* mosquitoes along highways in Panama

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The number of dengue cases has been directly correlated with the re-colonization of Aedes aegypti, the primary vector, after the failure of eradication campaigns led in the 1950's. In Panama *Aedes aegypti*has been present since before the construction of the Canal. However, *Aedes albopictus*, also vector of dengue, was introduced in 2002. Recent studies have suggested roads and the transport of used tires as being major contributors to the expansion of Aedes mosquitoes. This study aimed to validate the roads prediction model, as well as investigating which of both species was more prevalent along highways. Another goal was to establish the use of Matrix Assisted Laser Desorption Ionization Time of Flight (MALDI-TOF) for rapid identification of mosquito eggs. Three methods of field sampling were used: ovitraps to collect eggs, active surveillance to collect larvae and pupae, and manual aspirators to collect adults. Twenty sites at used tire garages along major highways in Panama were selected as study sites. Preliminary results show that *Aedes albopictus*has colonized new areas in Panama along highways and has higher presence frequency. MALDI-TOF does produce protein profiles for both species but better analysis and the building up of a profile library would help produce more accurate identifications.

**Funding Source: National Institute of Health (NIH 5T37MD001376-13)**

**Recommended Citation:**
**Diaz, Marcela; Gomez, Carmelo; Loaiza, Jose. "Movement of Aedes aegypti and Aedes albopictus mosquitoes along highways in Panama" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1323**

# Regulatory mechanisms dictating the activity of post- translational modification systems in mammalian cells

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Mammalian cells have developed effective response mechanisms to survive a wide range of environmental stresses. Among those response mechanisms, post-translational modifications (PTMs) appear to constitute critical mediators required for cell survival during stress. Remarkably, the activity of the most critical PTMs appear to be dramatically enhanced under stress. However, little is known about the mechanism underlying the increases observed. While transcriptional regulation plays an essential role in modulating overall gene expression in mammalian cells, our current knowledge indicates that transcriptional regulatory mechanisms appear to play a very limited role in regulating the activity of most PTMs systems in the cell. These findings suggest a role for post-transcriptional regulatory mechanisms as the main modulators of the activity of PTMs systems in the cell. One of the most important post-transcriptional mechanisms for controlling gene expression is alternative splicing. Alternatively spliced forms of a gene transcript may lead to complex feedback mechanisms that can have profound effects in the regulation of its own expression. Through polyribosome profiling and quantitative PCR, we have demonstrated that the transcript for one important post-translational protein modifier undergoes alternative splicing and is therefore likely to produce alternative gene products that could modulate various processes in the cell. Determining the roles of the alternatively spliced- products of various genes involved in post-translational modification events in the cell is critical to providing further insight into how both individual proteins, and the proteome at large, are regulated in the cell.

**Recommended Citation:**
**Diaz, Arely; Rosas-Acosta, German . "Regulatory mechanisms dictating the activity of post-translational modification systems in mammalian cells" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1352**

# 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.

**Funding Source: Texas Tech University Health Science Center El Paso, Center of Emphasis in Neuroscience, BUILDing SCHOLARS**

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**Recommended Citation:**
**Diaz-Pacheco, Valeria; Vidal-Martinez, Guadalupe; De Leon, Jocelyn; Barragan, Jose; Perez, Ruth. "Impact of FTY720-Mitoxy on movement and cognition in multiple system atrophy mice" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1366**

# Mapping functional domains of Poly (ADP-ribose) Polymerase-1 implicated in HIV-1 infection

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Poly (ADP-ribose) Polymerase-1 (PARP-1) is a cellular enzyme implicated in multiple biological processes, including DNA repair and regulation of transcription. We 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. Similarly, PARP-1 inhibitors targeting the DNA-binding domain in the N-terminal region promotes HIV-1 replication, whereas inhibitors of the catalytic site, located in the C-terminus of the protein, fail to enhance viral replication. To better characterize the mechanism of action of PARP-1, we evaluated the role of different protein domains in its anti-viral activity. CD4+ T cells lacking endogenous PARP-1 (KO) were engineered to express PARP-1 full-length (BC), or the N-terminal (N) or C-terminal (C) domains, or a mutant lacking the nuclear localization signal (ΔNLS). Expression of these PARP-1 variants were verified by immunoblot analysis. HIV-1 susceptibility of these cell lines were determined by infection with the HIV-1 infectious molecular clone NL-43. Viral replication was followed by measuring p24 levels in the cell supernatant by ELISA. In these experiments, we found that HIV-1 replicated more efficiently in KO cells, and that re-expression of PARP-1 full-length impairs viral replication. Similar inhibitory effects were observed when PARP-1N-terminal region or the ΔNLS were expressed in KO cells; however, despite the robust levels of expression, the C-terminal region of PARP-1 did not impair HIV-1 replication. These results support our hypothesis that the anti-HIV-1 activity of PARP-1 requires the DNA-binding domain present in the N-terminus but does not require active transport into the nuclear compartment.

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**Recommended Citation:**
**Farmer, Christopher; Pina, Alejandra; Martinez, Zachary ; Perez, Cosette; Sanchez, Susana; Llano, Manuel. "Mapping functional domains of Poly (ADP-ribose) Polymerase-1 implicated in HIV-1 infection" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1311**

# Assessing the abundance of duck species at Keystone Heritage Park

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Keystone is a wetland and botanical garden located in El Paso. This wetland is home to many species of birds, including ducks. Ducks are an important animal species to the environment, mainly wetlands and lakes. They are important because they act as natural filters, by cleaning the water and soils. Just like with any other animal species, it is very important to have a wider biodiversity of ducks species to maintain a sustainable environment in which there is a balance between species. The purpose of this research was to observe (1) the patterns in abundance of ducks through time; (2) how the amount of duck species change through time; and (3) which species stay the most and what new species come in. It is believed that by the end of the investigation, the biodiversity of species will increase, the Mallard Duck population will increase and the Northern Shoveler population will keep steady. To test this, we made a trip to Keystone and counted the different types of ducks, by looking through a Scatter Scope. To identify them, one must look at the pattern of feathers, body shape and color of the different types of the bodies. Each day, two trials of counting would be performed which would help obtain more data. After gathering everything, the data was imputed in a line graph to show the rate increases and decreases for each of the species. In the end the data rejected the hypothesis, as Mallard rates had no actual pattern and NS population decrease.

**Recommended Citation:**
**Flores, Lorian; Chavez, Andrea; Lavretsky, Philip. "Assessing the abundance of duck species at Keystone Heritage Park" (2018).**
***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1408**

# Expression and Purification of human Period Truncated (hPERt) Protein for Structural Studies

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The circadian rhythm, the biological clock, is a 24-hour physiological change cycle in response to environmental cues such as light, heat, food, etc. Disruption of this cycle has been implicated in multiple health problems such as mental disorder, sleep disorder, obesity, diabetes, etc. At the molecular level, the daily rhythm is regulated mainly by four core proteins named Brain Muscle ARNT Like-1 (BMAL-1), Circadian Locomotor Output Cycles Kaput (CLOCK), Cryptochrome (CRY), and Period (PER). Within the molecular cycle, levels of CLOCK and BMAL-1 proteins rise leading to the expression of CRY and PER proteins. As the levels of the CRY and PER proteins rise, with a time delay, they form complexes that disrupt the function of CLOCK and BMAL-1, stopping the production of CRY and PER and finishing the cycle. In the four essential circadian core proteins, PERIOD is the biggest one with molecular weight of about 140 kDa, containing multiple domains including multiple *PAS*domains. *PAS*domain also exists in CLOCK and BMAL-1. In this research, the *PAS*domains of human PER (hPERt) was cloned and inserted into bacteria expression system in order to obtain recombinant protein for structural and functional studies. hPERt recombinant protein was purified from bacteria using affinity chromatography followed by size exclusion chromatography. Dynamic light scattering (DLS) was performed to determine homogeneity of the purified hPERt. Circular dichroism was performed to show that the purified hPERt was correctly folded. The resultant high purity soluble hPERt provide the foundation for future crystallization and structural determination. Atomic structure of hPERt will provide critical insights into its regulatory mechanism of the circadian rhythm.

**Funding Source: BUILDing SCHOLARS program funded by National Institute of General Medical Sciences of NIH, National Research of General Medical Sciences of NIH**

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**Recommended Citation:**

**Fresquez, Joseph; Salazar, Sophia; Miranda, Victoria; Chauhan, Neha; Salcido, Larissa; Lansley, Emma; Ray, Supriyo; Xiao, Chuan. "Expression and Purification of human Period Truncated (hPERt) Protein for Structural Studies" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1427**

# Effects of Cryopreservation and Lyophilization on Mesenchymal Stem Cells

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Lyophilization is a current method applied in industry that desiccates material by a sublimation process, effectively removing water from the substance. The ultimate benefit from this process is a prolonged storage or "shelf-life" and a significant decrease in contamination possibilities. For these two reasons, we are investigating if lyophilization can be adapted to extend the shelf-life of mesenchymal stem cells for applications in regenerative medicine. The aim of the project is to test the cell viability and proliferation of the mesenchymal stem cells exposed to the freeze-drying and lyophilization process. Primary mesenchymal stem cells are grown to confluence, trypsinized and re-suspended in CrySOfree DMSO-free freezing media. Cell suspensions are subsequently atomized at a concentration of 40,000 cells/spray into culture wells. The wells are frozen in -80°C for 24 hours, and subsequently lyophilized, then treated resuscitated with media and incubated. Once at confluency, cells are cultured for 7-14 days with Osteogenesis Differentiating medium. Osteogenic differentiation is examined via alkaline phosphatase assay. Preliminary analysis of data shows successful rehydration and differentiation of bone-marrow derived mesenchymal stem cell lines through this preservation process. The implications of this is significant for space exploration, developing countries, and regenerative medicine purposes in the military. The lyophilization process of stem cells imply their capacity for being stored much more efficiently than the current leading method: freezing. Being turned into "powder" form provides efficiency in storage, as the cells may be able to be transported and reanimated wherever needed without the requirement of expensive freezing and thawing methods.

**Funding Source: NIH**

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**Recommended Citation:**
**Garcia, Gabriel; Solis, Luis; Boland, Thomas. "Effects of Cryopreservation and Lyophilization on Mesenchymal Stem Cells" (2018).**
***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1314**

# The role of caloric expenditure on exercise-induced improvements in insulin sensitivity and maximal aerobic capacity

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Background: Exercise training is an effective means of improving insulin sensitivity, mitochondrial function and maximal aerobic capacity ($VO_{2max}$). Running economy – the energy used at a given submaximal running speed – has been shown to improve with exercise training. However, it is not known whether total caloric expenditure during a prescribed moderate intensity exercise training program, impacts the degree of improvements in insulin sensitivity and $VO_{2max}$. Purpose: To investigate if total caloric expenditure during 8 weeks of aerobic exercise is a determinant of exercise-induced improvements in insulin sensitivity and maximal aerobic capacity in healthy, sedentary, Hispanic males. Methods: 20 participants underwent 8 weeks of combined exercise training (35 min aerobic at 60-75% $VO_{2max}$ followed by 6 full-body resistance exercises) 3x/week. Insulin sensitivity was measured via the gold standard hyperinsulinemic euglycemic clamp and $VO_{2max}$ was measured using ParvoMedics 2400 metabolic measurement system during a standardized graded treadmill exercise test. Resting oxygen consumption ($VO_2$) was assessed following an overnight fast with a metabolic measurement system. Caloric expenditure during each aerobic exercise session was calculated with a modified ACSM formula: VO2 (mL/kg/min) = (Resting $VO_2$ mL/kg/min) + (0.2 × treadmill speed) + (0.98 × treadmill speed × treadmill grade). Calorie expenditure (kcal/min) = (VO2(L/min )*5 (L/kcal). Statistical analyses were performed using GraphPad Prism 7.0. Hypothesis – we hypothesize that greater calorie expenditure during aerobic exercise training will be associated with a greater degree of improvement in insulin sensitivity and $VO_2$max after 8 weeks of exercise training.

**Funding Source: COURI, UTEP Vice President of Student Affairs**

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**Recommended Citation:**
**Garcia, Mario; Meza, Cesar; Amador, Manuel; Bajpeyi, Sudip. "The role of caloric expenditure on exercise-induced improvements in insulin sensitivity and maximal aerobic capacity" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1334**

# Nicotine withdrawal produces sex differences in the expression of nicotinic subunits a4 and b2 in the interpeduncular nucleus

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Recent work has revealed that the medial habenula-interpeduncular nucleus (MHb)-(IPN) pathway modulates the aversive states produced by nicotine withdrawal. This pathway has a high expression of nicotinic acetylcholine receptors (nAChRs), namely the $\alpha_4\beta_2$receptor complex. Previous work has shown systemic administration of $\alpha_4\beta_2$receptor antagonists elicits physical signs of withdrawal. However, the role of $\alpha_4\beta_2$receptors in the IPN in modulating affective states produced by nicotine withdrawal is unclear. Furthermore, it is unclear if sex differences in nicotine withdrawal are modulated in the IPN. Thus, this study compared gene expression of $\alpha_4$ and $\beta_2$receptor subunits in the IPN of female and male rats during withdrawal. Female and male rats were implanted with a pump that delivered nicotine. Fourteen days later, rats received saline or the nAChR antagonist, mecamylamine to precipitate withdrawal. An hour later, physical signs and anxiety-like behavior were assessed. After testing, the IPN was dissected and $\alpha_4$ and $\beta_2$mRNA expression was assessed using RT-qPCR. The results revealed that female rats displayed an increase in anxiety-like behavior during withdrawal that was larger than males. Interestingly, male rats displayed a significant increase in the expression of both $\alpha_4$ and $\beta_2$mRNA levels; however, this effect was absent in females. These data suggest that sex differences in nicotine withdrawal are modulated, in part, via $\alpha_4\beta_2$receptors in the IPN. Future studies are needed to explore whether $\alpha_4\beta_2$receptors in the IPN protect against the behavioral effects of nicotine withdrawal.

**Funding Source: National Institute of Drug Abuse (NIDA) and BUILDing SCHOLARS**

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**Recommended Citation:**
**Garcia Arreguin, Montserrat; Correa, Victor; Flores, Rodolfo; O'Dell, Laura. "Nicotine withdrawal produces sex differences in the expression of nicotinic subunits a4 and b2 in the interpeduncular nucleus" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1395**

# Chronic Ethanol Exposure Enhances Male Courtship in Drosophila melanogaster

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Alcohol consumption in low doses disinhibits sexual behavior in humans, however, in high doses, alcohol suppresses physiological responses (Crowe & George, 2012). In addition, alcohol increases dopamine neuron's activity, causing pleasurable feelings. Moreover, binge drinking is linked to alcohol dependence which can later develop to substance abuse. To gain a better understanding on the mechanisms of pleasure-seeking behaviors under the effect of alcohol, we utilized *Drosophila melanogaster*as our animal model. We focused on the effects of chronic ethanol exposure on male courtship behaviors towards female flies. A group of 33 male flies was exposed to ethanol vapor for six consecutive days. On the 7 $^{th}$day, individual male flies were coupled with a virgin female in a courtship chamber and then video recorded for 1 hour. We scored and analyzed the total amount of time the males spent courting females (courtship index), courtship initiation time, copulation initiation and copulation duration. Ethanol exposed males displayed earlier onset as well as higher levels of courtship activity toward female flies, but no differences in copulation initiation and duration, compared to the age-matched control group (no ethanol exposure) male flies. This suggests that chronic ethanol exposure enhances male courtship behavior, which may represent a pleasure-seeking behavior. This research could help narrow the knowledge gap in understanding the underlying mechanisms of pleasure-seeking behaviors and their linkage to the addiction and use of other substances.

**Funding Source: NSF**

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**Recommended Citation:**
**Garcia-Trevizo, Prescilla; Fernandez, Ana; Sabandal, Paul; Han, Kyung-An. "Chronic Ethanol Exposure Enhances Male Courtship in Drosophila melanogaster" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1425**

# Amyloid beta is a risk factor for Parkinson's disease

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Misfolded, aggregated proteins are a common participant in the development of neurodegenerative diseases. For instance, Parkinson's disease (PD) is characterized by intracellular aggregates composed of the proteins α-synuclein and synphiliin-1 in dopaminergic neurons. Alzheimer's disease (AD) presents with amyloid beta fibrils in the brain. The aggregation of these proteins can lead to mitochondrial stress, thus generating reactive oxygen species (ROS) and reactive nitrogen species (RNS) which can act on other proteins causing misfolding, ultimately producing a domino effect and resulting in apoptosis. Furthermore, recent research has shown that amyloid beta can have the similar effects to that of the rotenone model for PD. However, amyloid beta acts in a prion like manner, recruiting other proteins to misfold as well. This suggests that PD and AD are not as different as previously thought. The Beta-amyloid fragment (25-35) [11-mer] has been tested for its prion-like behavior on the mammalian cell line SH-SY5Y, along with two variants; a reverse sequence (35-25) and a scrambled sequence, on its amino acid sequence specificity. These experiments have shown that, indeed, amino acid order plays an important role on the peptide's pathogenesis. While the native (25-35) amyloid beta fragment shows significant cell damage through various assays (including cytotoxicity assay, Western Blot, Apoptosis assay), the reverse and scrambled variants do not present significant pathogenic outcomes..

**Recommended Citation:**
**Gomez, Alejandra; Mendez, Lois; Henriquez, Gabriela; Varela, Armando; Narayan, Mahesh. "Amyloid beta is a risk factor for Parkinson's disease" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1355**

# The APO structural conformation of the phage EL encoded chaperonin

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A protein's three-dimensional conformation results from interactions between side chains of constituent amino acids. However, proteins may become misfolded and may result in diseases due to the accumulation of misfolded protein aggregates. Chaperones are proteins that aid and facilitate the folding of other proteins, these act as catalysts that facilitate assembly without being part of the final complex. Phi-EL is a chaperonin encoded by bacteriophage EL that infects *Pseudomonas aeruginosa*and is an ortholog to groEL. Phi-El is unique due to its ability to refold large proteins through a ring separation mechanism. Phi-EL is found in three different conformations, ATP bound, ADP bound and APO or nucleotide-free. The conformational changes in Phi-El more than double the volume of the single-ring internal chamber, therefore, permitting the chaperonin to accommodate lager proteins. The goal of this project is to determine the structure of the APO conformation of Phi-EL through the use of cryo-electron microscopy.

**Recommended Citation:**
**Grajeda, Maria ; Bernal, Ricardo. "The APO structural conformation of the phage EL encoded chaperonin" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1347**

# Tracking Greening on the UTEP Green Roof Using Repeat Photography

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Green Roofs are an excellent platform for both research and education. Different plants are better adapted to growing on green roofs; however, preliminary work indicated that native forbs and wildflowers could be very successful in our region. Therefore, we created plots of these species. To track the growing rate and success of each of these plots we used two sources of imagery: A Time Lapse camera, positioned in a tower which photographs the exact same plot (Forb Mix) six times a day, and a hand-held digital camera which is used manually to take pictures of the same plots about twice a week. Using a pheno- software, we can track greening and graph the data processed by the software to better understand how each plot is thriving in a quantitative measure. This type of technology needs to be tested for the green roof and related to phenological patterns. According to the phenological patterns displayed in our graphs, it can be concluded that lone native species will thrive more successfully as opposed to a forbs mix. Possible contributing or confounding variables that may influence peaks or dips in graphs can be due to the angularity of the photos, as well as camera quality.

**Funding Source: UTEP Green Fund, TIERA**

**Recommended Citation:**
**Grey, Meela; Lougheed, Vanessa. "Tracking Greening on the UTEP Green Roof Using Repeat Photography" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1326**

# The effects of alcohol on social preferences in the prairie vole

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Prairie voles (*Microtus ochrogaster*) are socially monogamous rodents that display pair-bonding and biparental care. Unlike rats and mice, prairie voles also readily drink alcohol, which makes them an ideal model system for studying the effects of voluntary alcohol consumption on human-relevant social behaviors. We hypothesized that alcohol consumption would disrupt social attachments in both sexes. To test this hypothesis, adult voles were housed together and provided access to both water and a 10% ethanol solution. Control pairs were only provided access to water. Previous studies have shown that acute alcohol exposure during the initial cohabitation can prevent partner preferences formation. Therefore, access to alcohol was removed after pairs had weaned their first litters, and they were allowed to raise an additional two litters before examining their social preferences. Preferences for their familiar mate or a novel member of the opposite sex were examined during a 3-hour social preference test. Both members of experimental groups were tested on successive days one week after the birth of their fourth litters. We predicted that pairs with prior alcohol consumption would show deficits in pair-bonding and spend more time with the novel individual or affiliate equally with both. Analysis of daily fluid consumption revealed that alcohol pairs consumed moderate amounts of alcohol (approximately 9.9 ml/day) confirming that prairie voles spontaneously drink alcohol. Additionally, patterns of alcohol consumption were relatively stable and did not vary much over the course of the study. We will present the effects of prior alcohol consumption on partner preferences.

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**Recommended Citation:**
**Grinceviciute, Ruta; Vidal, Quiana; Perry, Adam; Cushing, Bruce. "The effects of alcohol on social preferences in the prairie vole" (2018).**
***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1387**

# Antibacterial screening of pyridinium bromide amphiphiles and their copper adducts

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Emerging resistance to current drug strategies in bacterial infections is a diverse modern threat that needs to be addressed. This emerging challenge has often stifled progress in the discovery of new compounds with biocidal activity and often is met with the neglect of mechanism of action studies of simpler molecules. In this study, a series of simple pyridinium amphiphiles with and without copper are studied not only for their potency but their mechanism of action on Escherichia coli and Staphylococcus aureus. Derivatives with varying alkyl chain lengths and their copper adducts were synthesized and assessed for their in vitro toxicity using the Kirby-Bauer disk diffusion method. In a 96-well plate format, the MICs of the free ligands have been identified. Preliminary results in contrast with other reports show that the shorter alkyl chain lengths present more toxicity. The copper adducts present the same trend with an increase in antimicrobial activity. The information obtained from this study could aid in the discovery of adjuvants and other antibiotics for known antibiotics or novel scaffolds.

**Funding Source: Ralph and Kathleen Ponce De Leon Endowment**

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**Recommended Citation:**
**Hernandez, Evelyn ; Dominguez, Homero; Pardo, Andrew; Carrillo-Alvarado, Miguel; Dominguez, Delfina; Noveron, Juan. "Antibacterial screening of pyridinium bromide amphiphiles and their copper adducts " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1372**

# Detection of Cryptosporidium spp. and Giardia intestinalis in aqueducts of the Greater Metropolitan Area of Costa Rica

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Objective: Water treatment techniques to eliminate pathogens and make water safe for human consumption are constantly evolving. Methods including chlorination and filtration are commonly used to treat and purify water, but they may not be 100% effective against parasites such as Giardia intestinalis and Cryptosporidium spp. Methods: This study sought to evaluate the efficacy of methods including filtration and fluorescent antibody tagging to identify Giardia intestinalis and Cryptosporidium spp. in water samples.
Results: G. intestinalis cysts were identified in two superficial rivers and Cryptosporidium spp. oocysts were detected in one superficial river. No cysts or oocysts were detected in the water treatment plant after chlorination. Conclusions: This study demonstrates that the presence of Cryptosporidium spp. and Giardia intestinalis does exist in the superficial water systems feeding the water treatment plant. These findings also suggest that there is a risk of Giardiasis and/or Cryptosporidiosis for the approximately 70,000 people who consume water treated at this plant.

**Funding Source: NIH**

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**Recommended Citation:**
**Huereca, Claudia; Achí, Rosario; Chacón, Luz; Morales, Eric; Ibarra, Gabriel. "Detection of Cryptosporidium spp. and Giardia intestinalis in aqueducts of the Greater Metropolitan Area of Costa Rica" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1283**

# Anthropometric measures predict vertical Jump height and reactive strength index

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The vertical jump height (VJH) and the reactive strength index (RSI) are two important measures of explosiveness and reactiveness in the strength and conditioning field. The purpose of this study was to determine if anthropometric measures predict VJH and RSI. **Methods:**51 physically active subjects (26 = males, 25 = females; $M_{age}$= 23.4, SD ± 3.7) participated in this study. We measured height and weight on a physician's scale, Body Fat percentage (BF %) using a Bioelectrical Impedance Machine, and Leg length (LL) by measuring the distance between the ankle and the greater trochanter. Subjects performed a 5-minute jog followed by an 8-minute dynamic warm up. Subjects then performed a 3-repetitions of the countermovement jump on two force plates, followed by 3-repetitions of the drop jump from a 0.3 m box, with 1-minute rest in between jumps. A Regression Analysis was conducted to determine the predictors of VJH and RSI. **Results:** We observed that BF %, LL, and Leg length-to-Height ratio (LLHr) predict VJH ($p < 0.05$). RSI values appear to be only predicted by BF% ($p < 0.01$).**Conclusion:** Our analysis indicate that BF%, predicted VJH and RSI; LL and LLHr also predicted VJH but not RSI. In addition, BMI did not predicted VJH or RSI. We also observed that LL or LLHr do not predict RSI. **Practical Applications:** Individuals looking to improve their VJH and RSI might want to pay detail attention to their BF% levels.

**Funding Source: N/A**

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**Recommended Citation:**
**Jarquin, Ileana; Montalvo, Samuel; Gonzalez, Matthew; Oropeza, Shantal; Dorgo, Sandor. "Anthropometric measures predict vertical Jump height and reactive strength index" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1340**

# Long-lasting effects of ketamine exposure during adolescence on sensitivity to cocaine in adulthood

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Major depressive disorder (MDD) is commonly diagnosed in children and adolescents, and when left untreated, results in negative consequences that extend into adulthood. It is estimated that adolescents who suffer from MDD are likely to develop anxiety-related illnesses and that up to 25% eventually develop substance abuse disorder (Lewinsohn, et al., 1993). Consequently, this has resulted in a disproportionate increase in the prevalence of antidepressants prescribed to populations below 20 years of age. Recently, the non-competitive N-methyl- D-aspartate (NMDA) receptor antagonist, ketamine, has been shown to be an effective treatment for MDD. However, little is known about the potential long-term consequences of exposure to ketamine during early development (Parise, et al., 2013). This is particularly important to examine, given ketamine's abuse potential. To address this issue at the preclinical level, we examined whether juvenile ketamine exposure results in long- lasting changes in sensitivity to the rewarding effects of cocaine (i.e., drug reward). Specifically, male c57BL/6 mice were exposed to ketamine (0 or 20 mg/kg) during adolescence (PD 35-49) and were later assessed in adulthood (PD 70+) for behavioral responses to cocaine (0, 2.5, 5, 7.5, 10 or 20 mg/kg) place conditioning (CPP). Here we show that when compared to saline pre-treated controls, adult mice pre-treated with ketamine during adolescence resulted in enhanced preference to the environment previously paired with moderate doses of cocaine. Together, our data suggests that exposure to ketamine during adolescence increases sensitivity to drug-reward in adulthood.

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**Recommended Citation:**
**Lira, Omar; Garcia, Israel; Iñiguez, Sergio . "Long-lasting effects of ketamine exposure during adolescence on sensitivity to cocaine in adulthood " (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1282**

# Zebrafish larvae: An emerging system for the study of melanoma metastasis

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Melanoma is the most dangerous form of skin cancer, resulting in an estimated 10,000 deaths in the United States, annually. If melanoma is not treated early it becomes difficult to treat because it is highly metastatic, spreading to other parts of the body. Thus, additional treatment options for the most invasive types of melanoma are necessary. Recent evidence suggests that there is a correlation between the expression of genes that regulate cholesterol metabolism and prognostic outcome. These data strongly suggest that drugs which inhibit cholesterol synthesis might have anti-tumor properties. Statins are a class of drugs that target the cholesterol synthesis pathway and are an FDA approved method for treating high cholesterol in adults. Statins target the cholesterol synthesis pathway by inhibiting the rate limiting step rate limiting step of the pathway, thus reducing the amount of cholesterol produced by a cell. However, the anti-tumor properties of statins remain highly debated and poorly understood. To determine whether statins have anti-metastatic properties, we have developed a zebrafish model of melanoma metastasis. Our results suggest that murine metastatic melanoma cells can be positively engrafted into zebrafish larvae and provide the strong possibility that zebrafish are a cost-effective model system to address the anti-tumor properties of statin drugs.

**Recommended Citation:**
**Love, Jennifer; Quintana, Anita. "Zebrafish larvae: An emerging system for the study of melanoma metastasis" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1430**

# Novel surface active agent´s antimicrobial and antibiotic potential

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Ten surfactants such as modified bile acids and adamantane derivatives developed by the UCR chemistry department have been evaluated for their potential antibacterial and disinfectant activity. Tests for the antibacterial effects of the surfactants were performed on three certified ATCC bacterial strains (*Escherichia. coli ATCC 25922, Pseudomonas. aeruginosa ATCC 14502, and Staphylococcus. aureus ATCC 6538*) and one multidrug resistant strain (MDR *P. aeruginosa*), obtaining minimum inhibitory concentrations (MIC) ranging from 256 ug/ml to 8ug/ml. Plate counting to determine susceptibility of CFU's after exposure to larger doses resulted in the disinfectant potential rating. It was observed that dimers of the bile acids were generally less effective, probably due to their large size, aggregation tendencies and precipitation while the adamantine compounds and monomeric cholic acid derivatives were slightly more effective. Though most compounds are suspected to be bactericidal, one showed bacteriostatic effects. While all surfactants are known to have aggregation properties, more studies must be developed to understand the relationship between the solubility, aggregation, and the biological activity, as is the action pathway of each of these compounds. Surfactants derived from bile acids are potent antimicrobials. The search for potent antimicrobial compound and antibiotics continues in the arms race against antibacterial resistant microbes and superbugs.

**Funding Source: MHIRT**

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**Recommended Citation:**
**Lugo, Fernanda; Barrantes, Kenia. "Novel surface active agent´s antimicrobial and antibiotic potential" (2018). *COURI Symposium Abstracts, Spring 2018*, ID= 1281**

# Effects of changes in precipitation patterns on soil nutrient availability in an arid grassland

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Precipitation timing and quantity influences a majority of different ecological processes, such as above ground productivity and nutrient cycling, especially in dryland ecosystems. Increases in temperature with global warming may affect hydrologic cycling patterns and air circulation, resulting in altered precipitation systems. It is predicted that in the future arid regions will experience extended droughts and variation in monsoon season timing. A long-term experiment was established in 2012 in two southwestern North American arid grasslands to evaluate the effects of extended drought and shifted monsoon precipitation timing on desert ecosystem processes. Plots were created in two grasslands dominated by *Bouteloua gracilis*(blue grama grass) and *Bouteloua eriopoda*(black grama grass). Each grassland contained ten replicates of ambient (control plots) and two treatments including (1) a reduction by 66% in growing season precipitation (severe drought) and (2) a shifted monsoon treatment where the control quantity of rain was delayed for six weeks after the natural monsoon ended. In June, July and October of 2017, five soil core samples were collected from each plot (13 cm depth). An assessment of available soil nutrients (e.g., nitrate, phosphate and ammonium) and pH was performed. Soil nutrients levels were determined by colorimetric assay. Results for these are still pending. Soil pH was determined using an electrode meter. A non-significant trend of an increase in alkalinity was observed in chronic drought treatments in both sites, with no change in delayed monsoon treatments' alkalinity in both locations. The study of the impacts of projected climate conditions on arid land soils is of extreme importance as it is a crucial component to the survival of vegetation and other organisms in the desert ecosystem.

**Funding Source: Sevilleta REU Program, National Science Foundation, Fish and Wildlife Service, Sevilleta LTER**

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**Recommended Citation:**
**Mendoza Martinez, Violeta; Holguin, Jennifer; Collins, Scott; McLaren, Jennie. "Effects of changes in precipitation patterns on soil nutrient availability in an arid grassland " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1279**

# Sex differences and hormone fluctuations influence the nicotine withdrawal syndrome in rats

Tania G Miramontes^, Rodolfo J Flores, Kevin Uribe, Bryan Cruz, Victor Correa, Luis M Carcoba , Laura E O'Dell*

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**Background:**Female rats display greater stress produced by nicotine withdrawal as compared to males. However, it is unclear if the magnitude of stress produced by withdrawal fluctuates across the 4-day estrous cycle in female rats. This study compared physical signs and negative affective states produced by withdrawal in male rats and in females that were tested during different phases of the estrous cycle. **Methods:** Rats were implanted with a pump that delivered nicotine for 14 days. On the test day, separate groups received vehicle or the nicotinic receptor antagonist, mecamylamine, to precipitate withdrawal. Rats were then tested for the physical signs of withdrawal and anxiety-like behavior. After testing, plasma levels were collected and analyzed for corticosterone levels using ELISA procedures. Females received vaginal lavage procedures to verify the phase of the estrous on the test day. **Results:**Nicotine withdrawal produced physical signs to the same extent in females and males. However, the magnitude of anxiety-like behavior and corticosterone release was larger in female versus male rats. Importantly, females displayed higher levels of anxiety-like behavior and corticosterone release during the metestrus and diestrus phase of estrous, as compared to rats that were tested in proestrus or estrus. Since progesterone levels peak during metestrus and diestrus, our data suggest that high levels of progesterone may enhance the degree of stress produced by nicotine withdrawal in female rats. **Conclusions:**The negative affective states produced by withdrawal are higher in females than males, and progesterone may enhance the stress produced by withdrawal in females.

**Recommended Citation:**
**Miramontes, Tania; Flores, Rodolfo; Uribe, Kevin; Cruz, Bryan; Correa, Victor; Carcoba , Luis; O'Dell, Laura . "Sex differences and hormone fluctuations influence the nicotine withdrawal syndrome in rats" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1416**

# An effective vaccine candidate for Chagas disease

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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)GlcNAcα (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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**Recommended Citation:**
**Olivas, Janet; Portillo, Susana; Iniguez , Eva; Zepeda, Brenda; Almeida, Igor. "An effective vaccine candidate for Chagas disease" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1383**

# Nicotine exposure modulates neuronal cytoskeleton by altering Gβγ/pGSK3β mediated pathway

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Background:Tobacco use is a major public health concern. It is well established that the main addictive agent in tobacco, nicotine, interferes with neural communication. However, the underlying molecular mechanisms by which nicotine alters neuronal pathways are not well understood. Recent results from our laboratory indicate that nicotine disrupts microtubule (a major component of neuronal cytoskeleton) organization in neurons and neurite formations. Goal:The goal of the present study is to understand the key molecular mechanisms that modulate microtubules (MTs) in neurons, in response to nicotine exposure. Since Gβ, an important component of GPCR pathway, and pGSK3β (phosphorylated GSK3β), a downstream effector of tyrosine kinase receptor (Trk A), coordinate to regulate MT modulation in neurons, our hypothesis is that nicotine alters/disrupts microtubule structure in neurons through the Gβ/PGSK3β pathway. Methods:To conduct the study, Wistar rats and PC12 cells were exposed to nicotine and subjected to immunohistochemistry, immunoblot, and confocal microscopic analysis. Results/Conclusion: We found that nicotine exposure in rat brain altered tubulin/MTs organization in neurons of the nucleus accumbens (NAcc), a brain region associated with nicotine addiction. Immunoblot analysis reveals that chronic nicotine exposure inhibited the expression of Gβ and pGSK3β by 22% and 42% respectively in NAcc. However, no significant changes were observed in Prefrontal Cortex (PFC). Using cultured PC12 cells, we observed that *in vitro*nicotine exposure reduced neurite formation, altered MTs, and increased co-localization of Gβ, GSK3β, and MTs. These studies suggest that alteration of neuronal cytoskeleton by Gβγ/pGSK3β may contribute to nicotine abuse and addiction.

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**Recommended Citation:**
**Palacios, Clarissa; Cruz, Bryan ; Castañeda, Karen; Miranda, Manuel; O'Dell, Laura; Roychowdhury, Sukla. "Nicotine exposure modulates neuronal cytoskeleton by altering G /pGSK3 mediated pathway" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1367**

# Changes of expression of membrane bound variant- surface proteins (VSPs) during encystation and cyst production by Giardia

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*Giardia lamblia*is an intestinal protozoan responsible for waterborne illness or “giardiasis” worldwide. *Giardia* exists in two morphologic forms: a replicative trophozoite and an infective cyst. The surface of *Giardia* trophozoites is covered with unusually high cystein-rich (~12%) variant-specific surface proteins (VSPs) with a repeating -C-X-X-C- motif that protects the parasite in the harsh environment of the small intestine. The expression of VSPs changes spontaneously during replication, encystation (cyst formation), or excystation (release of trophozoites from cysts). This phenomenon is known as “antigenic variation” and may aid in *Giardia’s*ability to escape the host’s immunity and to cause infection. However, it is not known how VSPs are re-organized and removed from the surface of trophozoites during encystation and subsequently replaced by cyst- wall proteins. Using a *Giardia* cell line overexpressing TSA417 (an important members of VSP family of proteins), we demonstrate that the expression of TSA 417 is decreased as encystation progresses from trophozoites to cysts. We also found for the first time that TSA 417 is located in membrane microdomains (lipid rafts) and migrates to the detergent-resistant phase, indicating its association with raft domains. Confocal analysis is currently underway to determine if TSA 417 is internalized during encystation and degraded in lysosomal-like vesicles (called peripheral vacuoles) and subsequently replaced by the cyst- wall proteins that shape the structure and morphology of cysts. Understanding the dynamics of VSP expression and internalization should serve as potential targets for developing anti-giardial therapy in the future.

**Funding Source: National Science Foundation, National Institutes of Health, Border Biomedical Research Center**

**Recommended Citation:**
**Pence, Breanna; Enriquez, Vanessa; Das, Siddhartha. "Changes of expression of membrane bound variant-surface proteins (VSPs) during encystation and cyst production by Giardia" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1404**

# 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 be 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.

**Funding Source: NIH**

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**Recommended Citation:**

**Pina, Alejandra; Garcia, Sara; Farmer, Christopher; Martinez, Zachary; Llano, Manuel. "Correlation between the chromatin-binding activity and subcellular distribution of Poly (ADP-ribose) Polymerase-1 and its effect on HIV-1 replication" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1312**

# Mechanism of 6 kDa Early Secreted Antigenic Target Protein inside Phagosomes

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Tuberculosis is the ninth leading cause of death worldwide. This disease affects the lungs of around 1.7 billion individuals, killing 10 million people each year. *Mycobacterium tuberculosis*, the pathogenic agent which causes the disease, is more virulent than other *Mycobacterium* strains, having a higher transmissibility as well as a higher mortality rate. So far, the mechanism of pathogenesis of *M. tuberculosis* is not fully unraveled. It has been proved that the type VII secretion system, found in *M. tuberculosis,*secretes some major proteins involved in virulence, such as 6kDa Early Secreted Antigenic Target protein (ESAT-6) and 10kDa Culture Filtrate Protein (CFP-10). Once *M. tuberculosis*has been engulfed, these two proteins allow the bacterium to escape from the phagosome by translocating from the phagolysosome into the cytosol and thus, preventing lysis. However, this mechanism of action to escape the phagosome is still unclear. To decipher the mechanism, a mimicking membrane, called nanodisc, will be produced. This membrane-like is composed of lipids surrounded by an amphiphile protein, called membrane scaffold protein (MSP). ESAT-6 tagged protein will be constructed, expressed and purified, as well as the MSP. In the first step, self-assembly of nanodiscs will be assessed to obtain reproducible empty nanodiscs. Secondly, those nanodiscs will be used to incorporate ESAT-6. The labeling of the tagged protein will give indication of the structure of the putative pore formed by ESAT-6.

**Funding Source: NIH**

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**Recommended Citation:**
**Reyes, Luis; Oxaran, Virginie; Sun, Jianjun. "Mechanism of 6 kDa Early Secreted Antigenic Target Protein inside Phagosomes" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1422**

# Immunohistochemical analysis of metronomic chemotherapy and CTLA-4 immunotherapy treated tumors

Luis C Reza[1^], Karla Parra[1], Paloma A Valenzuela[1], Natzidielly Lerma[1], Alejandra Gallegos[1], Georgialina Rodriguez[1], Lucero Rojas[1], Urban Emmenegger[2], Teresa Di Desidero [3], Guido Bocci[4], Mitchelle S Felder[5], Marian Manciu[1], Robert A Kirken[1], Giulio Francia[1]*

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Cancer treatment for patients often includes maximum tolerated doses of chemotherapy, however it is often associated with tumor drug resistance and high toxicity. Metronomic chemotherapy is a new modality that suggests the administration of chemotherapy at lower doses but higher frequency. A second recently novel concept is immunotherapy, this therapy aims to unleash the restrained potential of the immune system to successfully mount an effective immune response against the cancer at hand. A monoclonal antibody against Cytotoxic T-Lymphocyte Associated protein 4 (CTLA-4) is a therapy that aims to suppress the immune checkpoint of T-cells, and allow for continued effector responses risking an autoimmune disease. Metronomic chemotherapy has immunostimulatory effects that could potentially offer a synergistic effect while used in combination with treatments such as anti-CTLA-4. EMT-6 murine breast cancer cell lines were subcutaneously and orthotopically implanted into Balb/c mice. These were then treated with either low-dose CTX, anti-CTLA-4, low-dose gemcitabine, and different combos amongst these. The growth of the tumors and weight of mice was assessed throughout the experiment and once the humane end-point was reached the tumors were extracted and embedded in paraffin to assess immune infiltration and blood vessel density. Gemcitabine was shown to be the most effective synergistic partner for anti- CTLA-4 regardless of the schedule of drug administration being either sequential or simultaneous administration. Gemcitabine monotherapy showed an increased number of CD4 positive cells intra tumor as compared to the control. Reduced blood vessel density assessed by CD31 was reduced only in low dose cyclophosphamide.

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**Recommended Citation:**
**Reza, Luis; Parra, Karla; Valenzuela, Paloma; Lerma, Natzidielly; Gallegos, Alejandra; Rodriguez, Georgialina; Rojas, Lucero; Emmenegger, Urban; Di Desidero, Teresa; Bocci, Guido; Felder, Mitchelle; Manciu, Marian; Kirken, Robert; Francia, Giulio. "Immunohistochemical analysis of metronomic chemotherapy and CTLA-4 immunotherapy treated tumors" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1287**

# Domain and residue requirements for FKBP52, B- catenin, and AR Interactions

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The Androgen Receptor (AR) is a steroid hormone-regulated transcription factor that influences the growth and development of prostate cancer. The treatments currently available focus on androgen deprivation, but with this approach tumors recur and patients develop castration resistant prostate cancer (CRPC) since AR signaling remains intact. Due to the importance of the AR in the development of prostate cancer, identifying therapeutic agents that will interfere with the mechanisms of AR signaling is a potential approach towards identifying a successful treatment for CRPC. Previous research has demonstrated a potentiation in AR signaling through the interaction between the co-chaperone FKBP52 and β-catenin. It is because of this synergistic upregulation that this project will focus on identifying the domain and residue requirements needed for the interaction between FKBP52, β-catenin, and AR. Previous studies demonstrated that several mutations in β-catenin amino acid residues prevent the protein's interaction with AR, resulting in a decrease of AR signaling. It is therefore hypothesized that the mutated residues described are necessary for β-catenin to interact with FKBP52 and AR, which are then needed for AR potentiation. Through co-immunoprecipitation assays, it was found that the mutated β-catenin amino-acid residues are needed for it to interact with FKBP52, thus affecting AR activity as well. Ultimately, the results gleaned from these studies will provide the identification of novel mechanisms and targets that will potentially lead to the development of novel drugs that will specifically treat CRPC.

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**Recommended Citation:**

**Rodarte, Kathia; Cox, Marc; Ortiz, Nina; Cox, Marc. "Domain and residue requirements for FKBP52, B-catenin, and AR Interactions" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1371**

# Skeletal muscle glucose metabolism is affected by dietary fat composition

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High fat diets (HFD) are linked to obesity and type 2 diabetes (T2D). Reports have shown that replacement of saturated fatty acids (SFA) in HFD, with unsaturated (mono- (MUFA) and poly-unsaturated (PUFA)) fatty acids, reduces the risk for obesity and T2D. The purpose of this study is to determine the effects of HFD, differing in fatty acid composition, on muscle glycogen synthesis. Male Sprague Dawley rats were fed a 9-week Western-style (WD) (21% fat by weight; 41% energy) HFD. Then animals were randomized to different HFD groups for 6 weeks; a control chow group (CD) followed a 15-week lower fat diet. Animals consumed either a) low fat CD (4.8 % fat), b) mixed fat WD (21% fat; 9.76% saturated; 7.68% mono; 3.48% poly), c) HFD rich in MUFA (21% fat; 16.01% mono) d) HFD rich in PUFA (21% fat; 16% poly). After 15 weeks, glycogen, glucose transporter (GLUT4), glycogen synthase kinase (GSK3b) and lipid contents were measured in muscle via immunohistochemistry. Glycogen content was greater ($p=0.04$) in animals fed a WD compared to CD (AU±SEM; CD: 4.41±0.04; WD: 4.74±0.13; MUFA: 4.54±0.08; PUFA: 4.54±0.11; one-way ANOVA $p=0.11$). A HFD rich in PUFA resulted in impaired GLUT4 content ($p=0.02$) compared to a CD (CD: 77.38±2.22; WD: 63.46±3.80; MUFA: 61.49±8.46; PUFA: 52.84±5.13; $p=0.03$). There were no significant effects on lipid content. A HFD, with high SFA, resulted in greater glycogen storage that is not explained by elevated GLUT4. Future experiments will evaluate the effects of dietary fatty acids on GSK3b to explain these results.

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**Recommended Citation:**
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# Drivers of CO2 flux from open water and vegetated margins of an Arctic tundra pond

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The Arctic tundra has traditionally been viewed as a net carbon sink; however, the gradual rise in temperature may be causing carbon dioxide ($CO_2$) release from permafrost at a faster rate. For this study, $CO_2$ concentrations in the water were monitored continuously over a 14-day period during the summer of 2017 from a single Arctic tundra pond near Utqiaġvik, AK using a $CO_2$data logger. Climate data was collected from the nearest weather station. The goal was to see how $CO_2$flux differs among open water and the vegetated margins, and the role of climate on these fluxes. Average aquatic $CO_2$concentrations were highest from the vegetated margins (2729 µatm) than the open water sites (1328 µatm), with both acting as a source of atmospheric $CO_2$. Highest $CO_2$concentrations at both sites were observed during a period of exceptionally warm weather, with a maximum temperature of 20.4 degrees C and a solar irradiance peak of 618 $W/m^2$. The associated implications with high levels of $CO_2$flux that come with warmer temperatures and from the currently expanding vegetation margins can affect the balance of carbon flux at the landscape level.

**Funding Source: National Science Foundation**

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**Recommended Citation:**
**Ronquillo, Rocio ; Lougheed, Vanessa. "Drivers of CO2 flux from open water and vegetated margins of an Arctic tundra pond" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1295**

# A single bout of exercise improves skeletal muscle lipid droplet morphology

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We have previously showed that high fat overfeeding (HF) results in a reduction in the density of smaller lipid droplets located in the peripheral region of skeletal muscle fibers. This decrease was associated with HF-induced weight gain and insulin resistance. However, it is not clear how exercise (an elevated fat oxidation state), affects lipid droplet size. The purpose of this study is to determine the effects of a single bout of endurance exercise on skeletal muscle lipid content and lipid droplet size. 20 healthy male volunteers (age: 24±5 years; BMI: 23.6±1.8 kg/m$^2$) participated in a single bout of endurance exercise on a cycle ergometer @ 65%maximal aerobic capacity for 1.5-2 hours (650 kcal). Muscle biopsies were obtained from the vastus lateralis immediately before and after exercise. Intramuscular lipid was measured via immunohistochemistry technique and images were captured using confocal microscopy. Image analysis were done using ImageJ software. One bout of long duration endurance exercise did not change intramuscular lipid content (mean ± SEM 727.21 ± 41.46 to 682.08 ± 41.86 AU; p=0.11). However, there was a significant increase in smaller peripherally located lipid droplet after one bout of exercise (0.65 ± 0.02 to 0.70 ± 0.21 AU, p=0.01). An acute bout of aerobic exercise resulted in an increase in smaller lipid droplet density without an alteration in total intramuscular lipid content. These results provide important foundation for future research to understand the molecular mechanism of lipid oxidation linking lipid droplet size and mitochondrial lipid oxidation capacity.

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**Recommended Citation:**
**Rosas, Victoria; Maldonado, Matthew ; Meza, Cesar; Covington, Jeffrey D; Varela-Ramirez, Armando ; Bajpeyi, Sudip . "A single bout of exercise improves skeletal muscle lipid droplet morphology" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1411**

# Ethanol stimulates differentiation of primary neurons in culture and increases microtubule assembly rate in vitro

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**Background**: Alcohol is one of the most accessible and abused drug world wide, and a major public health concern. Despite this, little is known about the effects of alchol at the molecular level. It is well established that alcohol interferes with the ability of neurons (brain cells) to send, receive, and process information. Previous studies from our laboratory have shown that short- term exposure of ethanol in NGF (nerve-growth factor)-differentiated PC12 cells disrupted pre-formed neurites and decreased the level of microtubule (MT) assembly. However, co-incubation of ethanol stimulated NGF (nerve-growth factor)-induced neurite outgrowth and differentiation of PC12 cells. **Goal:**To elucidate the effect of ethanol in neurons, we established neuronal primary cultures from newborn rat brains. **Methods:**Cells from the cortex and subcortex of 1 to 3 day old mice were collected to grow on plates and exposed to ethanol. The samples were subjected to whole cell lysis followed by western blotting, or confocal microscopic examination during different time periods.**Results and Conclusion** : Confocal microscopy showed an increase in processes of ethanol treated neurons as well as a healthier structure and well connectivity among neurons. Primary neruons that were allowed to grow for a longer time showed no significant changes after ethanol treatment. An in vitro microtubule polymerization assay was performed which indicated an increase in rate of MT polymerization after ethanol treatment. The result suggests that ethanol stimulates differentiation of developing primary neurons and could be mediated by stimulation of rate of MT assembly observed in the presence of ethanol.

**Funding Source: BBRC (NIH)**

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**Recommended Citation:**
**Sanchez, Luisa; Lozano, Patricia ; Diaz-Martinez, Laura ; Miranda-Arango, Manuel; Roychowdhury, Sukla. "Ethanol stimulates differentiation of primary neurons in culture and increases microtubule assembly rate in vitro" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1377**

# Post-natal PCR-based recovery of ZIKV suggests infection of fetal tissue in the absence of maternal viremia

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The introduction of Zika virus (ZIKV) to South America was concomitant with discovery of strain variations affecting the fetal brain, collectively termed Congenital Zika Syndrome (CZS). Although it is established viremic pregnant mothers may pass infection, it remains unknown if ZIKV infection is transplacental, and if it persists in the mother outside the viral window of detection. Recent reports show ZIKV to infect fetal trophoblasts*in vitro* , and we hypothesize ZIKV can persist in fetal tissues (specifically trophoblasts *in vivo*) despite detectability in the infected mother.
Placenta, cord, and membrane samples were collected from four cases of women from ZIKV endemic areas, reporting consistent symptoms, and some whose fetus presented with ultrasound abnormalities. Viral RNA was TRIzol extracted, and cDNA libraries prepared for two step nested-PCR probing against viral genome. N-PCR product was ran on both gel electrophoresis and a bioanalyzer chip.
Clinical testing of ZIKV in maternal blood was negative for all patients at time of delivery, however, two patients tested positive by either PCR or IgM earlier in pregnancy and clinical ultrasound identified congenital abnormalities in all but one fetus. All cases showed clear bands indicating fetal tissues samples were infected with ZIKV. This study furthers our understanding of the transplacental spread and transient nature of ZIKV, and highly suggests need additional testing for neonatal with potential ZIKV infection. Such testing regardless of maternal results, may reveal further CZS cases helping the Centers of Disease Control and Prevention (CDC) understand impact and spread of Zika virus.

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# Effects of differential use of a resource hotspot on season and sex-specific variation in movement strategies by Crotalus atrox

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Patterns of animal movement and space use reflect individual responses to spatiotemporal variation in the distribution of critical resources (e.g., food, water, shelter sites, mating partners) in the environment. In this context, patterns of habitat use are an important consideration due to potential variation in local resource abundances. We are investigating the effects of differential habitat use, season, and sex on variation in movement strategies by Crotalus atrox in the northern Chihuahuan Desert. On our study site, ephemeral cattle tanks or ponds have created discrete resource hotspots that contain an abundance of shelter (i.e., vegetation), prey (i.e., rodents and lagomorphs), and water relative to surrounding native habitats, and, as a result, might influence the movement and spatial strategies of snakes using these features. Using radio telemetry, we have monitored movement and space use of 24 C. atrox (12 males and 12 females) over three consecutive active seasons (2015-Present). In general, studied snakes have displayed season and sex-specific patterns of movement expected under the polygamous mating system, as males increased movement during mating seasons in mate-searching efforts while females showed no seasonal differences. However, relative to snakes in native habitats, those using tank habitats displayed lower measures of movement and smaller home range sizes across seasons, possibly due to the spatial clustering of resources (including conspecifics) around these hotspots. These preliminary results indicate that patterns of habitat use and behavioral plasticity might play a key role in the movement strategies employed by C. atrox on our study site.

**Funding Source: National Science Foundation**

**Recommended Citation:**
**Segovia, Sydney; Johnson, Jerry; Desantis, Dominic; Johnson, Jerry. "Effects of differential use of a resource hotspot on season and sex-specific variation in movement strategies by Crotalus atrox" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1374**

# Effects on vegetation in the Chihuahuan Desert due to herbicide treatments

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Introduction: Over time the effects of woody plant encroachments into grasslands have made changes to biodiversity, ecosystem structures, and processes [1]. The Chihuahuan desert prior to the 20th century was defined as a perennial grassland that provided excellent foraging and soil stabilization [2]. It is important to preserve and restore landscapes to their reference ecosystems because this prevents soil loss and decrease in species diversity. In the Chihuahuan desert the restoration of grasslands is through woody plant removal via large scale herbicide treatments as the primary tool because current grass cover is too sparse to support the use of fire [3]. Along with the Bureau of Land Management and the USDA-ARS Jornada Experimental Range we are working to restore the Chihuahuan desert ecosystem to its reference condition as a grassland. In our research we are calculating vegetation data percentages to scale up vegetation coverage and soil properties to determine if there are any differences between treatment and non-treatment plots. Preliminary analysis is currently underway on data collected in the fall of 2017.

References: [1] John M.C. (2014) Restoration Ecology, 22, 336-344. [2] Brandon T.B. (2015) Rangelands, 244-246. [3] John
M.C. (2014) Restoration Ecology, 22, 336-344.

**Funding Source: Bureau of Land Management and the USDA-ARS Jornada Experimental Range**

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**Recommended Citation:**
**Torres, Isabel; Schaeffer, Kathleen; McLaren, Jennie . "Effects on vegetation in the Chihuahuan Desert due to herbicide treatments" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1341**

# The roles of estrogen receptors in social preferences in female prairie voles

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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), a selective ERα agonist (PPT), a 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 (scored for the presence of mating) followed by a 3-hour social preference test. During preference tests, females could choose to huddle with their familiar partner or a novel male, and the huddling duration with each was used to determine preferences. E2 significantly increased mating. VEH- and DPN-treated females rarely mated and both displayed significant partner preference. Neither E2- nor PPT-treated females displayed partner preferences. Collectively, these data suggest that ERα inhibits selective attachments in female prairie voles and is insufficient on its own to support mating.

**Funding Source: National Institutes of Health**

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**Torres, Dina; Landeros, Jose; Perry, Adam; Cushing, Bruce. "The roles of estrogen receptors in social preferences in female prairie voles" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1393**

# Comparisons of the variability in diurnal CO2 flux in different aquatic ecosystems in Barrow, Alaska

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Heat concentration at the Earth's poles, coupled with carbon rich permafrost in the Arctic, leaves the possibility of release of $CO_2$or $CH_4$due to increased photorespiration. The aim of this study was to examine the variations in diurnal carbon dioxide ($CO_2$) flux of three tundra water bodies: a pond, river and a lake; all of which may be releasing CO2 through photorespiration. Located in Barrow, Alaska, sites were monitored continuously using Campbell loggers and Vaisala $CO_2$sensors for an eight to twelve-day period during peak growing season. The pond, river, and lake had average $CO_2$concentrations of 1333, 1358, and 512 µatm, respectively; all sites were sources of $CO_2$, with concentrations greater than atmospheric $CO_2$(388 µatm). The largest $CO_2$release was from the pond (4190 µatm), corresponding to relatively high downward total solar irradiance values of 617 W/m2. Solar radiation, paired with temperature, explained much of the variability in $CO_2$within all three water bodies. Accurately recording PAR and temperature at multiple sites with CO2 flux monitoring at each site could give better insight as to the exact effects of solar irradiance on CO2 release in the Arctic.

**Funding Source: National Science Foundation**

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**Recommended Citation:**
**Uribarri, Fabian; Lougheed, Vanessa . "Comparisons of the variability in diurnal CO2 flux in different aquatic ecosystems in Barrow, Alaska " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1289**

# Prevalence and molecular characterization of ESBL Enterobacteriaceae clinical isolates recovered from El Paso-Cd. Juárez, México Border Region

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Hospital and community acquired Extended Spectrum Beta-Lactamase (ESBLs) are a global health concern. Reliable identification is not always straightforward and can be challenging, so their prevalence is likely underestimated. The purpose of this study was to investigate the prevalence of multi-drug resistant *E. coli* strains carrying genes for ESBLs and efflux pump activity. ESBL producing *E.coli* clinical samples were collected from patients being treated at four different hospitals in the Cd. Juarez-El Paso southwest border region. Selected most common ESBL genes (CTX, SHV and TEM) were amplified by PCR. The cartwheel method was used to detect efflux pumps. Our results show that he prevalence of multi- resistant gene bearing isolates was 48% for TEM, 8% CTX-M and 4% SHV, however 40% contained both CTX-M and SHV. A screening for efflux pumps revealed that 76% of our 26 collected samples were positive for efflux activity.

**Funding Source: BUILDing Scholars**

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**Recommended Citation:**
**Victoria, Alexia; Dominguez, Delfina. "Prevalence and molecular characterization of ESBL Enterobacteriaceae clinical isolates recovered from El Paso-Cd. Juárez, México Border Region" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1402**

# Crystallization of ADP and ATP bound Phi-EL Chaperonin for X-Ray Crystallography

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Protein folding is an important process that determines a protein's proper conformation to preserve biological function. However, many proteins may become misfolded and may lead to disease from an accumulation of misfolded protein aggregates. Chaperonins aid cells by targeting misfolded proteins and providing a safe space to allow them to refold back into their native conformation. Phi-EL, a chaperonin encoded by bacteriophage EL that infects *Pseudomonas aeruginosa*, has been found to be homologous to the most common chaperonin in bacteria, Gro-EL. However, what makes Phi-EL unique is its ability to refold larger proteins due to a ring separating mechanism. Phi-EL can be seen in three different conformations, ATP bound, ADP bound, and a conformation with no nucleotide, termed APO. The goal of this project is to determine the structure of both the ADP and ATP conformations of Phi-EL by X-ray Crystallography. A Hampton Index HT crystal screening kit was used to test crystal growth on 96 different conditions. The best crystals with sharp edges and of larger size grew in the presence of 0.2 M Ammonium Citrate tribasic pH 7.0 with 20% polyethylene glycol 3,350. Optimization of the favored condition was tested at different concentrations of polyethylene glycol using a hanging drop method, revealing that a mixture 10-11% PEG 8000 and 15% Glycerol would form the best crystals. These crystals were then sent to a synchrotron, where they were found to diffract to a maximum resolution of 8 Angstroms. From here, we hope to improve our methods in order achieve an even higher resolution.

**Funding Source: NSF**

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**Recommended Citation:**
**Von Salzen, Daniel; Bhatt, Jay; Bernal, Ricardo. "Crystallization of ADP and ATP bound Phi-EL Chaperonin for X-Ray Crystallography" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1378**

# Physical Sciences

# HSA and Myoglobin protein structure at distinct temperatures using deep eutectic solvents

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Proteins lose functionality and often aggregate in extreme environments such as high temperatures. Deep eutectic solvents (DESs) may delay a protein's ability to aggregate thus prolonging their active state. The objective of this research is to determine whether DESs, such as reline and glyceline, can protect target proteins from aggregating over a wide range of temperatures. By using Small Angle X-ray Scattering (SAXS) to analyze the nanometer-scale solution-state structure of both Human Serum Albumin (HSA) and Myoglobin, in solvents H2O, reline, and glyceline, over a temperature range of 5 – 80 °C, we can compare structural changes, including the onset of aggregation, in the different solvents. Comparing these solvents' effects on two different proteins may provide information about whether the DESs may be applied more broadly to other types of proteins, and provide guidance designing new, optimized DESs. In SAXS experiments carried out, an x-ray beam is transmitted through a thin-walled capillary that contains a 5 mg/ml solution of either HSA or Myoglobin, and the signal from x- rays scattered at small angles with respect to the incident beam are analyzed to obtain nanoscale electron density differences. Measurements were taken at increments of either 5°C or 10°C to observe the temperature-dependent structure of the protein. Temperature-dependent protein size parameters, aggregation onset temperatures, and aggregate characterization will be presented. Finding DESs which protect proteins from temperature extremes can impact society, particularly in parts of the world where it is not possible to provide refrigeration to keep medicines from perishing.

**Funding Source: Rise to the Challenge Bridge Program, EPCC, NIH**

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**Recommended Citation:**
**Aviña, Omar; Puentes, Sitri; Bañuelos, Jose. "HSA and Myoglobin protein structure at distinct temperatures using deep eutectic solvents" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1380**

# Synthesis of Titanium complexes for Nitrogen activation and methylidene formation

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Titanium metal complexes supported by the cyclopentadienyl (Cp) anion ligand have been extensively studied over several decades. Two important areas of such species are nitrogen activation and methylidene chemistry. It has been recently shown that alkylated titanocene complexes of the type $Cp^*Ti(CH_2SiMe_3)_3$ ($Cp^* = \eta^5$-$C_5Me_5$) bearing Cp ligands are capable of splitting dinitrogen under mild conditions. Similarly, molecules of the type $Cp_2TiMe_2$have been known to access transient methylidenes capable of facile carbonyl olefination. In our laboratory, we have been investigating the coordination chemistry of imidazolin-2-iminato ligands (ImN), which can be considered as Cp-ligand electronic analogs. Motivated by the recent nitrogen fixation chemistry of titanocene alkyl compounds and the versatility of Cp-[Ti] methylidenes, we have begun investigating the reactivity of ImN-[Ti] complexes. We envision that the enhanced modularity and electron donation of the ImN-ligand will streamline access to $N_2$fixation and methylidene chemistry. In support of this idea, we have synthesized a novel $N_2$-derived $[Ti_6N_6]$ dicubane cluster under mild conditions employing our ImN system. Unfortunately, we have not been able to engage in conclusive ImN-[Ti] methylidene behavior to a significant extent so far.

**Funding Source: COURI (Provost Office)**

**Recommended Citation:**
**Baeza, Miguel; Aguilar, Rolando; Fortier, Skye. "Synthesis of Titanium complexes for Nitrogen activation and methylidene formation" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1426**

# Rapid and accurate detection of Mycobacterium tuberculosis on a PDMS/paper hybrid microfluidic chip

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Tuberculosis (TB) is a common airborne disease caused by *Mycobacterium tuberculosis*bacteria (Mtb). TB is still among the major causes of disability and disease worldwide, especially in low and medium level economy countries. Current TB diagnostic methods are time consuming (e.g. bacterial culture), expensive and require high-tech laboratory equipment and facilities not available in low economy countries. The purpose of this project is to develop a Polydimethylsiloxane (PDMS)/paper hybrid microfluidic device that integrates the novel loop-mediated isothermal amplification (LAMP) DNA amplification method for rapid TB diagnosis. This hybrid device would facilitate a rapid and sensitive detection of TB at lower cost compared to current methods. A hybrid microfluidic chip was designed to perform the LAMP method with two Mtb gene specific primers, resulting in a highly specific test. Yes/no results of the test can be analyzed within an hour by using a portable UV light to observe the fluorescence. This microfluidic approach has been found to have a low limit of detection, allowing the amplification of the target DNA with only a few copies. This low-cost device holds great potential for point-of-care (POC) detection of TB in low- resource settings.

**Funding Source: NIH**

**Recommended Citation:**
**Barrios, Sergio; Dou, Maowei; Li, Xiujun. "Rapid and accurate detection of Mycobacterium tuberculosis on a PDMS/paper hybrid microfluidic chip" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1336**

# Investigation of antibiotic residues in Rio Grande in El Paso and Sunland Park

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The existence of antibiotic resistant organisms in our environment has resulted in an emerging international public health crisis with few effective antimicrobial agents to combat these bacteria. The Alliance for the Prudent Use of Antibiotics (APUA) estimates that in the U.S. alone, the costs for fighting antibiotic resistant organisms range from $24 to $38 billion annually. An increased understanding of this resistance could lead to better sense of how to prevent the production of these bacteria and their spread. The extent of the presence of antibiotic resistance in our area is largely unknown. In this study, we analyzed the presence of 10 common antibiotics in water and sediment samples over time in the El Paso area. Samples were prepared by Solid Phase Extraction technique, following by Liquid Chromatography/Tandem Mass Spectrometry. All water and sediment samples contain antibiotics, i.e. 100% occurrence. The most commonly found antibiotics are sulfamethoxazole, ampicillin and trimethoprim. In general, the number of antibiotics found are higher in water than in sediment. The samples collected from the sites that are located close to an animal facility were found to have higher levels of antibiotics. During the irrigation season, the levels of antibiotics increased. The results give insight on how to modify future administration of antibiotics to minimize effects that are currently present.

**Funding Source: Marsh Foundation**

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**Recommended Citation:**
**Blattner, Jonathan; Dominguez, Delfina; Bauer, Stephanie; Ellis, Cameron; Lee, Wen-Yee. "Investigation of antibiotic residues in Rio Grande in El Paso and Sunland Park" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1373**

# Evolution of the spin-flop antiferromagnetic transition in Mn_2SiS_4-x Se_x (x = 0-4) and the emergence of magnetic frustration

Adrian Cosio[1^], Raju Baral[1], Srinivasa R Singamaneni[1], Magdalena Fitta[2], Bayrammurad Saparov[3], Harikrishnan S Nair[1]*

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Olivine structure type ($A_2BX_4$) materials have an orthorhombic symmetry and relatively small tetrahedral ions and large octahedral ions. Due to the geometry of these structures, magnetic frustration is possible at the *A*site. These structures are well known semiconductors with applications in optoelectronics, thermoelectric and photovoltaics. For the olivine chalcogenide $Mn_2SiS_{4-x}Se_x$(x = 0-4), the evolution of its spin-flop antiferromagnetic phase transition was investigated. The magnetic and thermal behavior of the compounds were studied as a variation in the amount of S and Se. Room temperature X-ray diffraction measurements were performed, as well as specific heat and magnetization measurements. Results showed that all samples crystalized in the orthorhombic *Pbnm*space group. The specific heat measurements showed an antiferromagnetic phase transition at $T_N$~ 84 K for $Mn_2SiS_4$with a linear decrease in transition temperature as S was substituted with Se. The magnetic susceptibility of the compounds confirmed the phase transitions revealed in the specific heat measurements. The magnetization measurements revealed clear low temperature anomalies, which, to the best of our knowledge are reported for the first time. These anomalie are indicative of short-range order pointing towards the underlying magnetic frustration in the saw-tooth lattice of $Mn^{2+}$. This also correlated with the very low magnetic entropy recovered from the magnetic specific heat. The spin- flop critical field shows a non-linear trend with the x hinting at a softening of the magnetic lattice with Se-doping for intermediate values.

**Funding Source: UTEP-Startup fund; NSF**

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**Recommended Citation:**
**Cosio, Adrian; Baral, Raju; Singamaneni, Srinivasa; Fitta, Magdalena; Saparov, Bayrammurad; Nair, Harikrishnan. "Evolution of the spin-flop antiferromagnetic transition in Mn_2SiS_4-x Se_x (x = 0-4) and the emergence of magnetic frustration" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1298**

# Magnetic and transport properties of pristine and transition metal doped two dimensional MoS2 van der Waals nanocrystals

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Magnetism in two dimensional van der Waals nanocrystals has been gaining increasing research interest in the scientific community in realizing the long range ferromagnetic order and in search of new class of room temperature magnetic semiconductors for next generation spintronics applications. We report on the magnetic and transport properties of hydrothermally grown few-layered (~4-6) pristine and transition metal (10% of Co, Ni, and Mn) doped $MoS_2$nanocrystals (NCs), with the particle size of 25-30 nm. The crystal structure, morphology, valence states, and phase formation were studied using x-ray diffraction, transmission electron microscopy, x-ray photo absorption spectroscopy, and Raman spectroscopy. Magnetic properties were studied by employing Quantum Design versa lab VSM and PPMS. The pristine (undoped) $MoS_2$ NCs showed a mixture of canted anti-ferromagnetic and ferromagnetic behavior. While Co, Ni, and Fe doped $MoS_2$NCs revealed room temperature weak ferromagnetic nature, Mn doped $MoS_2$NCs showed room temperature paramagnetism, predominantly. We find that the temperature dependent magnetic behavior could be well described by modified Curie-Weiss (CW) law for all the materials that were investigated. The CW constant (θ) suggests that the ground state is canted antiferromagnetic phase associated with uncompensated electron spins.

**Funding Source: UTEP start up grant**

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**Recommended Citation:**
**Cosio, Adrian; Cosio, Jose; Martinez, Luis; Saiz, Christian; Singamaneni, Srinivasa. "Magnetic and transport properties of pristine and transition metal doped two dimensional MoS2 van der Waals nanocrystals" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1412**

# SAXS studies of the nano-structure and dynamics of ionic liquid and organic solvent binary systems

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Room-temperature ionic liquid (RTIL) mixtures, as electrolytes in supercapacitors, have desirable properties in comparison to conventional electrolytes. We studied the nano-structural properties of mixtures of the RTIL, $BMIM^+[TFSI]^-$, with organic solvents: acetonitrile, dichloromethane, benzene, toluene, and tetrahydrofuran. The mass percentage at which macroscopic phase separation is visible in each RTIL / solvent mixture was determined by slowly increasing the solvent concentration. Small Angle X-ray Scattering (SAXS) measurements at RTIL mass percentage lower than the phase separation concentrations were carried out to determine whether nano-heterogeneity is present leading up to macroscopic phase separation, and to characterize its structural properties; these same measurements were then replicated at different temperatures ranging from -10 °C to 40 °C. Our x-ray scattering measurements provides us statistically-averaged structural information over length scales of 0.25 nm to 60 nm. We find an excess scattering at low-Q (large length scales) compared to the expected scattering from a simple mixture of two liquids, suggesting nanometer-scale composition fluctuations. We describe the system's approximately 1 nm-size heterogeneity and its dependence on temperature. We propose a model based on the solvent's physicochemical properties to explain the complex mixing mechanics of acetonitrile and tetrahydrofuran with $BMIM^+[TFSI]^-$. Results and analyses of the length scales of the heterogeneity, and changes in intermolecular coordination in these systems will be discussed.

**Recommended Citation:**
**Cuellar, Carlos; Thompson, Matt; Cummings, Peter; Banuelos, Jose. "SAXS studies of the nano-structure and dynamics of ionic liquid and organic solvent binary systems" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1343**

# Electrocatalytic properties of transition metal doped MoS2 nanocrystals

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In this work, we studied the electrocatalytic properties of hydrothermally grown transition metal doped (10% of Co, Ni, Fe and Mn) 2H-$MoS_2$nanocrystals (NC's). To study the hydrogen evolution reaction (HER) performance, polarization curves were measured for the undoped and doped $MoS_2$NC's. At the over potential of $\eta$ = -300 mV, the current densities (j), listed from greatest to least, are as follows: j($FeMoS_2$) = 4.05, j($CoMoS_2$) = 3.00, j($MoS_2$) = 2.09, j($NiMoS_2$) = 1.5 mA/$cm^2$, and j($MnMoS_2$) = 52 uA/$cm^2$. This sequence, from greatest reaction activity to lowest, was seen to be true between 372.8 mV and -169.6 mV. The order of overall reaction activity found from Tafel slopes is as follows: $CoMoS_2$> $MoS_2$> $NiMoS_2$> $FeMoS_2$> $MnMoS_2$. In addition, the electrochemical impedance spectroscopic measurements indicated that Fe doped $MoS_2$ NC's had the best conductivity and charge transfer ability, while Mn-doped $MoS_2$ had the lowest.

**Funding Source: NSF-PREM program (DMR – 1205302), Wiemer Family for awarding Student Endowment for Excellence, UTEP start-up grant**

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**Recommended Citation:**
**Delgado, Jose; Martinez, Luis; Saiz, Christian; Cosio, Adrian; Wu, Yanyu; Villagran, Dino; Singamaneni, Srinivasa. "Electrocatalytic properties of transition metal doped MoS2 nanocrystals" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1365**

# Nanoparticle-templated synthesis of porous carbon for the removal of organic pollutants from water

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Clean water, besides being a basic human right, is an essential need for all of us. Despite this, clean water is becoming scarcer than ever due to the rise in population and pollution. Current water-purification methods can be expensive or not fully efficient. This is why we should focus on finding ways to give easy and affordable access to clean water to as many people as possible. What we seek to do is to create a high surface-area nanofoam that is free of petrochemicals. To build the core of the foam, zinc oxide and titanium dioxide nanoparticles are carbonized along with glucose in a furnace. Zinc oxide nanoparticles are then removed, leaving a high surface area nanoporous carbon foam with titanium dioxide nanoparticles. This super-hydrophobic nanofoam is expected to have the ability to trap organic pollutants such as polycyclic carbons, fluorocarbons, and aromatics, among others. Furthermore, titanium dioxide nanoparticles are going to enable the regeneration of our nanofoam material by creating reactive oxygen species when exposed to UV-light. Tests were performed against pharmaceuticals such as Tetracycline, Oflaxin, as well as organic pollutants such as Naphtol, Naphtalene, and Bisphenol A. The characterization of the material includes XRD, TEM, BET, and EDS analysis and kinetic studies. With this organic nanofoam it will be possible to produce drinking water with a small amount of material capable of cleaning water more rapidly than the average activated carbon filter.

**Recommended Citation:**
**Escobosa, Alma; Barrera, Luis; Noveron, Juan. "Nanoparticle-templated synthesis of porous carbon for the removal of organic pollutants from water" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1354**

# Addition of nitrogen and its effect on the production of uranium metallofullerenes

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Actinide EMFs represent an intriguing and unexplored area of EMF chemistry. Recently there have been successes in producing the mono-uranium EMF species U@$C_{74}$, U@$C_{82}$, and U@$C_{86}$when using the gasses $O_2$, $SO_2$, and $CO_2$. However, fullerene species were missing between U@$C_{74}$and U@$C_{82}$, as well as the U@$C_{84}$species. Recently when 20 Torr $N_2$gas was added, the missing species were able to be produced for the first time, in addition to the previously obtained U@$C_{74}$, U@$C_{82}$, and U@$C_{86}$species. Interestingly with the addition of $Fe_xN$ (x=2-4) we saw not only the increase in the yield of mono-uranium EMF species but also more diverse species such as U@$C_{72}$. In order to produce this, soot containing uranium EMFs was obtained from graphite rods filled with uranium oxide and graphite powder (weight ratio of U/FexN/C = 1.96:1:2.5) under an atmosphere of 200 torr He, 20 torr $N_2$and a small amount of $Fe_xN$ (x=2-4) in a conventional Kratschmer-Huffman arc- discharge reaction. The soot was then Soxhlet-extracted for six and a half hours using $CS_2$. Besides the U@$C_{74}$, U@$C_{82}$, and U@$C_{86}$, the most abundant species produced were U@$C_{80}$and U@$C_{84}$, followed by U@$C_{72}$and U@$C_{76}$. Multistage HPLC separation yielded pure isomers of U@$C_{72}$, U@$C_{76}$, U@$C_{80}$and U@$C_{84}$in reasonable amounts. Two of these compounds have been successfully characterized by single-crystal X-ray diffraction. In addition, after further step separations, one uranium nitride cluster metallofullerenes, namely, U2N@$C_{78}$, could be obtained.

**Funding Source: NIH (BUILDing SCHOLARS), NSF**

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**Recommended Citation:**
**Esper, Ronda; Cai, Wenting; Echegoyen, Luis. "Addition of nitrogen and its effect on the production of uranium metallofullerenes" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1308**

# Using drone imagery to create a 3D model of the HI- SEAS Mars analog site, Mauna Loa Volcano, Hawaii

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Before astronauts are sent to Mars they must be trained to successfully operate on Mars's environment. Such training takes place at HI-SEAS (Hawai'i Space Exploration Analog and Simulation), located on the north slope of Mauna Loa volcano on the Big Island of Hawai'i. Mission simulations can span several months with the longest being 12 months. Each simulation tests how small teams (4-6 simulated astronauts) work in isolation and to practice geological operations for work on Mars. The objective of this research is to use a drone to acquire high-resolution imagery of the HI-SEAS analog site to create detailed maps of the area, including 3D point clouds and digital elevation models (DEMs). The drone data will also be merged with high-resolution LiDAR scans of the interior of the HI-SEAS habitat to produce a virtual reality (VR) environment for crew training purposes. Aerial imagery of a ~2 $km^2$area surrounding the HI-SEAS habitat was acquired with a total of 18 flights that were conducted to in late November 2017. Data was acquired by a 3DR Solo quadcopter flying at ~90 m above the ground carrying a GoPro Hero 4 Black visible- wavelength, high definition camera. The data was then processed using Agisoft PhotoScan Professional software to generate 3D surface models. A low resolution model has been made from a total of 4,983 photographs to produce a point cloud with 35,535,590 points. An interactive model of the HI-SEAS analog site has also been uploaded to Sketchfab. Before astronauts are sent to Mars they must be trained to successfully operate on Mars's environment. Such training takes place at HI-SEAS (Hawai'i Space Exploration Analog and Simulation), located on the north slope of Mauna Loa volcano on the Big Island of Hawai'i. Mission simulations can span several months with the longest being 12 months. Each simulation tests how small teams (4-6 simulated astronauts) work in isolation and to practice geological operations for work on Mars. The objective of this research is to use a drone to acquire high-resolution imagery of the HI- SEAS analog site to create detailed maps of the area, including 3D point clouds and digital elevation models (DEMs). The drone data will also be merged with high-resolution LiDAR scans of the interior of the HI-SEAS habitat to produce a virtual reality (VR) environment for crew training purposes. Aerial imagery of a ~2 $km^2$area surrounding the HI-SEAS habitat was acquired with a total of 18 flights that were conducted to in late November 2017. Data was acquired by a 3DR Solo quadcopter flying at ~90 m above the ground carrying a GoPro Hero 4 Black visible- wavelength, high definition camera. The data was then processed using Agisoft PhotoScan Professional software to generate 3D surface models. A low resolution model has been made from a total of 4,983 photographs to produce a point cloud with 35,535,590 points. An interactive model of the HI-SEAS analog site has also been uploaded to Sketchfab.

**Recommended Citation:**
**Garcia, Kiana; Hurtado, Jose. "Using drone imagery to create a 3D model of the HI-SEAS Mars analog site, Mauna Loa Volcano, Hawaii" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1357**

# Regenerable adsorbents via the sulfonation of peanut shells for water treatment

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The current state of water filtration technology is resource ineffective and expensive, creating a need for low-cost, reusable, and easily obtainable filtration methods, especially in low resource areas. The contamination of water with organic dyes and antibiotics is particularly harmful to human ecology, thereby necessitating their remediation. Of the many water treatment methods available, adsorption shows a high level of utility; therefore, our study proposes the synthesis of highly regenerable adsorbents through the sulfonation of inexpensive and recyclable biomasses. This study's focus was on high-volume adsorbents derived from functionalized peanut shells for the effective removal of pollutants from water. In addition, our research produced a magnetic variant of the peanut shell adsorbent embedded with $Fe_3O_4$, thus improving its reusability. The adsorbent was utilized to remove methylene blue (MB), and tetracycline (TC) under contact time, pH, and concentration dependent conditions. The maximum adsorption capacity for MB was found to be 833 mg/g, 555 mg/g, and 476 mg/g at pH 10, 7, and 3.25 respectively. The maximum adsorption capacity for TC was found to be 303 mg/g and 285 mg/g at pH 3.75 and 7.0, respectively. Adsorption experiments with MB, and TC performed with tap water yielded similar results. The magnetic adsorbent variation displayed similar high adsorption capacities along with magnetic separation capabilities from water. Following these results, our product could yield low maintenance, high-capacity filters for the purpose of removing harmful organic dyes and antibiotics from water sources.

**Funding Source: USDA**

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**Recommended Citation:**
**Guinto, Thomas; Islam, Tariqul; Noveron, Juan. "Regenerable adsorbents via the sulfonation of peanut shells for water treatment" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1420**

# Application of magnetic low-cost absorption material based on biomass derivatives for organic dyes and antibiotics from aqueous solution.

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Organic dyes and antibiotics are an important class of anthropogenic pollutants in water. Therefore, their removal is an indispensable part of wastewater treatment. Among various methods, adsorption occupies a prominent place. However, there has been growing interest in making adsorbents at low-cost, eco-friendly, and affordable in low resource areas by using the cheap and reusable material. Biomass, as a renewable material, could be utilized as a good adsorbent towards the removal of various toxics pollutants from water. This study shows the preparation of super high-capacity re-generable magnetic adsorbent derived from Pine Cone. The magnetic property of the adsorbent allowed its magnetic separation from water, regeneration as well as utilization. This magnetic pinecone based adsorbent demonstrated a fast adsorption kinetics and high adsorption capacity. Adsorption of cationic dyes (methylene blue) and antibiotic (Tetracycline) was studied in terms of pH, contact time, and initial dye concentration

**Funding Source: USDA**

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**Recommended Citation:**
**Hernandez, Cesar ; Islam , Tariqul ; Noveron , Juan . "Application of magnetic low-cost absorption material based on biomass derivatives for organic dyes and antibiotics from aqueous solution. " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1376**

# Structure and interactions in surface-modified iron-oxide nanoparticles for biological applications

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Often the functions of biomolecules are highly specialized, resulting in the targeting of a particular process. In the synthesis of nanomaterials, control over size and shape is an important factor in developing nanoparticles for a target application. Nanoparticles are showing exceptional uses in biomedical applications such as drug delivery and antigen vaccination due to their distinct tailorable properties. In this project, we explore methods to modify the surface properties of iron-oxide nanoparticles and investigate their structural properties to obtain insights about their suitability for biomedical applications. The co-precipitation method produces surface-modified iron-oxide nanoparticles with an organic outer layer that should be tailorable. Small-angle x-ray scattering (SAXS) is a nanostructure characterization technique that provides quantitative information about nanoparticle size, shape, and interactions. Nanoparticles in solution scatter the x-ray beam and measuring the angle-dependent intensity distribution of x-rays, produces an I(Q) graph. Applying models to the I(Q) graph then gives structural information regarding the NPs. SAXS results of iron-oxide nanoparticles will allow us to distinguish between the iron core and organic surface, and if present, allow characterization of the type of aggregation occurring between NPs. We will compare this system to anaerobically synthesized iron-sulfide nanoparticles (from a different project) which show a mass fractal aggregate structure. The organic outer layer in the iron oxide system should prevent aggregation, and analyzing the low- angle region of our data will provide confirmation. Successful synthesis and characterization of this system enables further studies of the influence of NPs on biological processes, including protein-folding related-problems.

**Funding Source: MARC**

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**Recommended Citation:**
**Lomeli, Bruce; Moreno, Ezequiel; Xu, Jie; Banuelos, José. "Structure and interactions in surface-modified iron-oxide nanoparticles for biological applications" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1350**

# Bioactivated carbon-alginate composite materials for bisphenol A removal in water

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The presence of endocrine disrupting compounds (EDCs) such as Bisphenol A (BPA) in our water supply is threatening nature, wildlife and humans. These compounds, often found as additives in plastic production, and can leach out of cosmetics, food, packaging and building materials. Being used in industry as well as in personal products, EDCs can get into sewage and end up in wastewater, where they may cause mutations and hormonal imbalance. Wastewater treatments are not regulated or designed to remove EDCs. This research focuses on improving removal of EDCs from water and wastewater. Activated carbon-alginate (ACA) composite materials in the form of sorbent beads were created by encapsulating carbon in alginate, and then characterized to identify a more effective sorbent for the elimination of BPA. ACA was effective in fully removing BPA from water samples in static conditions. Subsequent incorporation into dynamic conditions showed successful elimination of BPA. To enhance ACA's performance in BPA removal, biofilms on sorbent material was added to increase removal capabilities, since the finite number of pores on activated carbon can be rehabilitated with the use of BPA degrading bacteria. Bacterial consortia of local strains of *Bacillus, Citrobacter* and *Pantoea* isolated from the Rio Grande were used to compare effectiveness against ACA beads alone, and with biofilm seeded ACA. Bacteriological degradation coupled with sorptive material was shown to be most effective in the removal of Bisphenol A from water. These alternate composite materials may help create schematics to implement in water treatment plants or household filters.

**Funding Source: BUILDing Scholars**

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**Recommended Citation:**
**Lugo, Fernanda; Lee, Wen Yee. "Bioactivated carbon-alginate composite materials for bisphenol A removal in water" (2018).**
***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1271**

# Investigating the varying toxicities within consumer gem products and assessing human health risk

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Lead contamination has recently become more evident through its several outlets of exposure, one of particular notice being consumer-made products. Lead contamination can therefore be easily distributed and mass produced affecting a wide demographic of people ranging from children to adults. Now more than ever consumers face a great risk of coming into contact with toxic jewelry items. As reported by the DTSC, Department of Toxic Substances Control, dangerously high amounts of lead within jewelry are being passed off as real and expensive gemstones. Severe health implications consequently arise based on prolonged exposure and easy absorbance of the skin when in contact with toxic jewelry. With the little literature that is available on assessing risk from toxic jewelry, it is imperative to not only research the matter further but to develop a protocol that can later be established for market regulation. Therefore, the aim of this study is to investigate and identify the varying toxicities found within gemstones in order to properly assess human health risk. A sample of 100 gemstones gathered from different locations was used in order to create a diverse set. Refractive index, X-Ray diffraction, and conductivity assays were utilized in characterizing the gems. Statistic methods were further implemented to assess human health risk.

**Funding Source: Building SCHOLARS**

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**Recommended Citation:**
**Mahmoud, Sara; Gardea-Torresdey, Jorge. "Investigating the varying toxicities within consumer gem products and assessing human health risk " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1405**

# Sulfur isotopic study of igneous rocks from the Central Kenya Peralkaline Province, East Africa Rift

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The East African Rift, specifically the Kenya segment, has many geothermal power plants. We focus on volcanoes associated with geothermal plants in the Central Kenya Peralkaline Province northeast of Nairobi. We determined the sulfur concentration and isotope composition for five sets of samples from different volcanoes along this zone. The questions we seek to answer are; is the isotope composition of the sulfur inventory homogeneous within single samples, do different samples from the same volcano have similar isotope signatures, and do the overall values differ from mantle sulfur. Answering these questions is important because it will tell us whether the sulfur gases in hydrothermal fluids, such as sulfur dioxide and hydrogen sulfide, exsolved directly from magmas and allow us to make preliminary interpretations about partitioning between different sulfur gases. The data also allow us to assess if release of such gases takes place in a catastrophic fashion and provides quantitative constraints on how much sulfur gas escapes into the atmosphere, which is important, because sulfur emissions affect cloud formation, which impacts Earths' climate. Most bulk samples fall in a range of sulfur isotope values that are typical for mantle sulfur, while the sulfur content of the samples varies considerably. A subset of isotope values falls outside of the mantle sulfur range. Our findings raise the question if our current method is appropriate, particularly for samples with low sulfur content. To address this, future work will employ a total sulfur reduction distillation method for samples with low whole rock sulfur concentrations.

**Recommended Citation:**
**Marrufo, Anthony; Brunner, Ben; Anthony, Elizabeth; Arnold, Gail. "Sulfur isotopic study of igneous rocks from the Central Kenya Peralkaline Province, East Africa Rift" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1310**

# Formulation of furosemide-silver complex loaded solid lipid nanoparticles

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Antibiotic resistance is one of the serious challenges globally because of: i) overuse and misuse of antibiotics and ii) poor new antibiotic pipeline. Silver complex of furosemide (Ag-FSE) was reported to have antibacterial activity but, it has poor solubility1. Therefore, aim of the study was encapsulation of Ag-FSE into solid lipid nanoparticles (SLNs) for enhancing solubility and antibacterial activity. Ag-FSE was synthesized following a reported procedure2. Glycerol monostearate (GMS) SLNs were prepared using hot homogenization and ultrasonication technique. Effects of surfactants, surfactant concentration, and sonication time on size, polydispersity index (PDI), and zeta potential (ZP) of blank SLNs were evaluated. Ag-FSE and GMS were heated at 75$^{o}$C and 1% surfactant solution heated separately at same temperature was added. Mixture was homogenized (5000 rpm) and sonicated (20% amplitude). Sizes of blank SLNs using dynamic light scattering with poloxamer, Solutol HS15, tween80, Cremophore RH40 and tween20 was 177.2±3.99, 356.4±53.88, 113.4±9.03, 352.9±158.4, and 6548±1814, respectively. Although the size of SLNs with 1% w/v tween80 was less compared to poloxamer, the PDI was better with poloxamer (0.401±0.099 vs. 0.145±0.035). Increase in the concentration of poloxamer did not have any significant effect on size, PDI and ZP of blank SLNs. Increase in sonication time resulted in reduction of size of blank SLNs. Size of Ag-FSESLNs was <200 nm with acceptable PDI and ZP. Further characterization of Ag-FSE-SLNs is underway.

**Funding Source: NIH**

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**Recommended Citation:**
**Meraz, Carlos; Bolla, Pradeep Kumar; Kalhapure, Rahul; Rodriguez, Victor; Renukuntla, Jwala. "Formulation of furosemide-silver complex loaded solid lipid nanoparticles " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1381**

# Using geophysical methods to predict particle size distribution of soils in the Upper Rio Grande Valley in El Paso, Texas.

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Soil particle size can influence the success of plant growth. This is an important quality to consider for environmental restoration. Recent studies have found that geophysical analyses of soils can give insight into their particle size distribution. It would be useful to have a quick, non-invasive method of identifying soil types; this study aims to use geophysics for that reason. The field site for this study is a recreational area called Valley Creek Park in El Paso, Texas. Efforts have been made to restore this area by planting riparian species such as cottonwoods, which tend to have higher survival rates in coarse-grained, non-saline soils, as their root systems are not very tolerant of salts and tend to be shallow. This study utilizes a magnetometer survey to estimate grain size variations These magnetics readings will be compared to data from laser diffraction particle size analyses of soils from the same area to test the validity of using magnetics to estimate grain size of soils. Preliminary analysis of magnetics data shows many variations in readings along the transect; however the observed anomalies appear to be too large to attribute to grain size variations alone. The results from the laser diffraction particle size analysis show varying particle size distributions not only at various locations within the study site, but variations with depth as well. This is likely due to earlier deposition in historic channels of the Rio Grande which are no longer existent due to channelization of the river in the 1930's.

**Funding Source: TIERA Grant**

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**Recommended Citation:**
**Moreno, Victoria; Doser, Diane. "Using geophysical methods to predict particle size distribution of soils in the Upper Rio Grande Valley in El Paso, Texas. " (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1297**

# Application of machine learning to eruption forecasting for active volcanoes in the Aluetian and TransMexican volcanic belts.

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The goal of the project is to improve the accuracy of eruption forecasting by developing data-driven algorithms of volcanic eruptions and use these insights to address fundamental questions of eruption dynamics. The pilot study on the Aleutian Volcanic Arc in Alaska used a dataset of magnitudes of seismic events from 37 volcanoes from 1998-2016 by querying the Advanced National Seismic System. The data were applied to prediction models, also known as machine learning. Our second stage is to use seismic data (provided by CENAPRED) and sulfur dioxide emissions from the Popocatépetl volcano located in the TransMexico Volcanic Belt. These data will broaden the dataset needed for the machine learning algorithms. We are also using using ArcGIS and Java to display the data and interpret the results in relation to the locations of the epicenters. In the preliminary work in the Aleutian Volcanic Arc, the algorithms improved the prediction accuracy and were able to identify important geological features. Focusing on volcanoes such as Redoubt which has recent and frequent seismic activity, results in more accurate prediction of volcanic eruptions. For instance, clustering techniques found clusters of seismic events related to active magma chambers resting beneath the vent. We are applying algorithms from the pilot study to the TransMexico Volcanic Belt, with specific emphasis on the currently active Popocatepétl. We have chosen Popocatepétl because of its proximity to Mexico City. Developing successful algorithms to improve eruption forecasting will have a significant scientific and socioeconomic impact locally as well as globally.

**Funding Source: ConTex Collaborative Grant**

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**Recommended Citation:**
**Platt, Rebecca; Parra, Justin; Fuentes, Olac; Kreinovich, Vladik; Anthony, Elizabeth. "Application of machine learning to eruption forecasting for active volcanoes in the Aluetian and TransMexican volcanic belts." (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1276**

# Metal -mediated synthesis of crystalline carbon materials by the principle of crystal inheritance

Paulette Ramirez[1^], Jesus A Garza[2], Juan C Noveron[2]*

[1] *Department of Chemistry and Biochemistry, The University of Texas at El Paso.*
[2] *Department of Chemistry, The University of Texas at El Paso.*

Highly structured carbon-based materials are very attractive for adsorption and electrochemical applications. Materials such as carbon nanotubes, graphite and graphene are widely used due to their prominent adsorptive and conductive properties. These carbon materials exhibit exceptionally high crystal and electronic qualities due to their conjugated sp2 carbon structures. However, controlling the size and shape of these materials is a complicated and expensive process. This project aims to achieve control over domain size and morphology of graphene crystals by using cobalt (II) and zinc (II) as growth directors. The hydrocarbon precursor involved in this process is N-pyridinylbenzamide (NPBA), which is then complexed in a 2:1 ratio to one of the aforementioned transition metals. The newly formed complex is then subjected to flash carbonization under anaerobic conditions followed by metal extraction from the carbonized compound, resulting in a highly structured porous carbon material. In order to confirm carbonization and crystallinity, these compounds were characterized with FT-IR spectroscopy and X-ray diffraction both before and after carbonization. SEM images were also collected in order to observe morphological changes of these materials. Electrochemical properties along with their adsorption properties will also be further explored.

**Recommended Citation:**
**Ramirez, Paulette; Garza, Jesus; Noveron, Juan. "Metal -mediated synthesis of crystalline carbon materials by the principle of crystal inheritance" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1389**

# Expression of folate receptor (FR-alpha) and proton coupled folate transporter (PCFT) on RPCEC and HCEC cell line

David V Ramos[^], Pradeep Bolla, Rahul Kalhapure, Jwala Renukuntla*

*School of Pharmacy, The University of Texas at El Paso.*

Folate carrier mediated system could be potentially used for the targeted delivery of folate conjugated prodrugs and folate decorated nanoparticles. The purpose of this study is to evaluate the expression of folate receptor (FR-α) and proton coupled folate transporter (PCFT) on rabbit primary corneal epithelial cell line (rPCEC) and human corneal epithelial cell line (HCEC). Qualitative polymerase chain reaction (Q- PCR) analysis was performed to confirm the existence of FR-α and PCFT on rPCEC and HCEC cell lines at mRNA level. Protein expression was confirmed by western blot analysis. Co-localization and expression of FR-α and PCFT on plasma membrane and nuclear membranes was further confirmed by using confocal microscopy. FR-α and PCFT were abundantly expressed in the rPCEC and HCEC cell lines at mRNA level. Western blot analysis had proved the protein expression for FR-α and PCFT in rPCEC and HCEC cell lines. Confocal microscopy studies have also confirmed the co-localization of FR- α and PCFT on plasma membrane and nuclear membranes in both rPCEC and HCEC cell lines. This work for the first time has demonstrated the expression of FR-α and PCFT in rPCEC and HCEC primary corneal cell lines. FR-α and PCFT carrier mediated expressed on rabbit cornea and human cornea can be exploited for targeted delivery of folate conjugated drug/nanoparticles across cornea. Ocular drug delivery using folate carrier mediated system can increase the bioavailability of small molecules with permeability and solubility issues.

**Recommended Citation:**

**Ramos, David ; Bolla, Pradeep; Kalhapure, Rahul; Renukuntla, Jwala. "Expression of folate receptor (FR-alpha) and proton coupled folate transporter (PCFT) on RPCEC and HCEC cell line" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1392**

# Two-photon flow cytometry with laser scanning 2D airy beams

Andres M Reyes^, Aurelio Paez, Chunqiang Li*

*Department of Physics, The University of Texas at El Paso.*

In vivo flow cytometry is used for medical diagnosis, classification, detection, and the quantifying of circulating tumor cells, immune cells, and red blood cells. This is possible by use of lasers, but recent work has diminished detection depth, sampling size and resolution since the lasers used were infrared, or commonly Gaussian and became diffracted by living tissue. Thus, we use Airy beams to improve the resolution, detection depth and sample size of whatever is being scanned. For this experiment a self-repairing and non-diffracting beam called an Airy beam is used to generate a light-sheet for two-photon flow cytometry in counting fluorescent particles in microfluidic channels. By comparing the intensity and signal of fluorescence micro-beads with a Photo-Multiplier Tube (PMT) and the shape of the beam produced by a Spatial Light Modulator (SLM), we are able to see what shape of the laser produces the best signal. After replicating the process that is currently used for in vivo flow cytometry, an Airy Beam file was uploaded to the SLM to test the efficiency of micro-bead detection. After a few trials of setting the appropriate wavelength, frequency and voltage a correct shape was found that maximized the signal on the PMT showing the efficiency of using Airy beams to detect fluorescent particles.

**Funding Source: National Science Foundation**

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**Recommended Citation:**
**Reyes, Andres; Paez, Aurelio; Li, Chunqiang. "Two-photon flow cytometry with laser scanning 2D airy beams" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1284**

# Development of gold, silver, palladium and platinum nanoparticle synthesis using sodium rhodizonate supported on titanium dioxide for the catalytic reduction of 4-nitrophenol and methyl orange

Jose A Rosales[1^], Md T Islam[2], Noemi Dominguez[3], Juan C Noveron[2]*

[1] *Department of Chemistry and Biochemistry, The University of Texas at El Paso.*
[2] *Department of Chemistry, The University of Texas at El Paso.*
[3] *Department of Metallurgical & Materials Engineering, The University of Texas at El Paso.*

We reveal sodium rhodizonate as a reducing and stabilizing agent to form gold (Au), silver (Ag), palladium (Pd), and platinum (Pt) nanoparticles (NPs) of controlled size at 100$^{o}$C. The rhodizonate-stabilized NPs easily bind to titanium dioxide ($TiO_2$) while sustaining relevant catalytic activity of each metal used. The catalytic activity of the $TiO_2$NPs nanocomposites is established by the reduction of 4-nitrophenol (4-NP) with sodium borohydride ($NaBH_4$) and methyl orange (MO) with formic acid in water. This study was done to determine which metal NPs on a $TiO_2$solid support have a faster catalytic activity for both the reduction of 4-NP and MO from their kinetic rate constants over a period of ten minutes. Sodium rhodizonate mediated synthesis of the Au, Ag, Pd, and Pt NPs represent a general route for functionally active catalysts with a wide range of potential applications.

**Funding Source: NSF, NEWT**

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**Recommended Citation:**
**Rosales, Jose ; Islam, Md; Dominguez, Noemi; Noveron, Juan. "Development of gold, silver, palladium and platinum nanoparticle synthesis using sodium rhodizonate supported on titanium dioxide for the catalytic reduction of 4-nitrophenol and methyl orange" (2018).** ***UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*****, ID= 1324**

# Self-assembly of polymeric ligands using a scaffold DNA origami platform for heavy metal absorption in water filtration applications.

Carlos A Saucedo[1^], Mauro Ruiz[2], Juan Noveron[1]*

[1] *Department of Chemistry, The University of Texas at El Paso.*
[2] *Department of Metallurgical & Materials Engineering, The University of Texas at El Paso.*

Scaffolded DNA origami is a widely used technology for self-assembling precisely structured nanoscale objects that contain a large number of addressable features Once the DNA has taken the shape of the model, the compound can be used to create complex three-dimensional structures, as well as DNA hybrid materials. Alternatively, double-stranded DNA (dsDNA) can be used as well to fabricate integrated DNA origami structures, and the convergence of two ssDNA scaffold strands can be used to reliably assemble integrated DNA nanostructures from dsDNA templates. The present work consists of synthesizing cationic polymeric compounds to bind to the negatively charged DNA in order to create nanostructured materials. The materials are to be irradiated under UV light for polymerization of the ligands added. The ligands that will be used to bind to the DNA exhibit large molecular weights, so they could be seen under transmission electron microscopy. Our target compounds will be tested for absorption of heavy metals in water filtration applications.

**Funding Source: NSF-PREM 1205302**

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**Recommended Citation:**

**Saucedo, Carlos; Ruiz, Mauro; Noveron, Juan. "Self-assembly of polymeric ligands using a scaffold DNA origami platform for heavy metal absorption in water filtration applications." (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1342**

# Mineralogical and sedimentological analysis of valley fever susceptibility in West Texas.

Alison V Segura[1^], Thomas E Gill[1], Juan P Maestre[2], Kerry Kinney[3], Thomas E Gill[1]*

[1] *Department of Geological Sciences, The University of Texas at El Paso.*
[2] *Department of Civil, Architectural, and Environmental Engineering, University of Texas at Austin.*
[3] *Department of Civil, Architectural and Environmental Engineering, University of Texas at Austin.*

Valley Fever (*coccidioidomycosis*) is a disease existent in the arid regions of the Western Hemisphere, caused by a soil dwelling fungus (*coccidioides immitis*) that spreads through dust. In El Paso, Texas, dust storms are common during the winter to spring transition regionally influenced by high winds, drought, and human activity that may increase emissions of dust and Valley Fever susceptibility. The City of El Paso's Department of Public Health identified 18 cases of coccidioidomycosis in 2017. Valley Fever is detrimental to human health; lack of research related to transmission pathways of this infectious disease in a desert region promotes the need for analysis of the dust accumulated within and outside of households for possible valley fever transmission. This project investigates the sedimentological and biological characteristics of both indoor and outdoor dust in El Paso for the presence of valley fever spores and geological properties that may be influencing dust deposition and transport. Dust and soil collected in El Paso is being compared to samples collected in Austin (where valley fever is not existent) to link or contrast properties that may make a region more susceptible to Valley Fever spore cultivation. DNA analysis at University of Texas- Austin of dust for presence of valley fever spores both indoor and outdoor dwellings, as well as mineral and particle size analysis characterizing soil and dust properties will be performed for dust collected in the El Paso area and compared to data to determine the extent of coccidioides immitis spores in the local environment.

**Funding Source: NSF DUE 1565063**

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**Recommended Citation:**
**Segura, Alison; Gill, Thomas; Maestre, Juan; Kinney, Kerry; Gill, Thomas. "Mineralogical and sedimentological analysis of valley fever susceptibility in West Texas." (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1348**

# The influence of surface water on ground water in the Rio Grande

Nicole Serrano^, Diane Doser*

*Department of Geological Sciences, The University of Texas at El Paso.*

Rio Grande water is used for irrigation in parts of New Mexico, Texas, and Mexico. Throughout the Rio Grande cycle, this water interacts and mixes with the ground water. The focus of my study is to observe the change in ground water quality near the Rio Grande and compare it to surface water quality over a period of time to determine how the surface water impacts the ground water. I predict that the levels of phosphorus and nitrogen will increase in the ground water during months when the river flows but that the salinity will not be affected. Using an auger, we dug to the water table in October 2017. We gathered four soil samples at 4 different depths within the hole and one surface water sample within the river. The soil samples were leached and we used an IPC mass spectrometer to determine the levels of trace elements within the samples. We used a YSI Probe to test the pH, total dissolved solids (TDS), electroconductivity (EC), and temperature of the water. In November 2017 we gathered water from a monitoring well located near the site of our soil. We compared these values to the values collected from the river water and noticed significant differences between the samples. The ground water had higher levels of EC and TDS and the pH of the ground was unusually low and will have to be tested again.

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**Recommended Citation:**
**Serrano, Nicole; Doser, Diane . "The influence of surface water on ground water in the Rio Grande" (2018). *COURI Symposium Abstracts, Spring 2018*, ID= 1315**

# The Cuauhtemoc Aquifer: Depleting water table, predicting precipitation using regression analysis

Zeltzin Y Tapia^, Hugo A Gutierrez*

*Department of Geological Sciences, The University of Texas at El Paso.*

The peri-urban city of Cuauhtemoc is located in the valley of mountainous topography in the state of Chihuahua, Mexico. Its rural agricultural area is of paramount economic importance, as they are the biggest producers of apples and pears in the country. The only source of water for this area comes from the extraction of the underlying aquifer. According to Mexico’s National Commission of Water (CONAGUA), in 2015 they reported “115.2 million cubic meters of water are recharged annually, compared to an annual discharge of 192 million cubic meters.” The acute annual deficit of this natural water source leaves us with the question: how much longer before this resource is completely exhausted? In order to obtain more relevant data of recharge around the aquifer, precipitation data was retrieved from 81 weather stations across the state of Chihuahua. Using a liner regression analysis and DEM data, the correlation between elevation and precipitation was calculated in order to estimate precipitation values closer to the study area.

**Funding Source: Tierra**

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**Recommended Citation:**
**Tapia, Zeltzin; Gutierrez, Hugo. "The Cuauhtemoc Aquifer: Depleting water table, predicting precipitation using regression analysis" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1375**

# Strontium isotopic analysis to trace calcium sources in soil salts from a flood-irrigated dryland

Karen S Valles^, Anna Ortiz, Lixin Jin*

*Department of Geological Sciences, The University of Texas at El Paso.*

In the El Paso region, agricultural activities are supported by the flood irrigation method. We hypothesize that flood irrigation leads to the buildup of calcite and causes the release of CO2. The research site is a pecan farm in Tornillo, Texas were the flood irrigation is used. This project aims to identify if flood irrigation is the cause of high calcite formation rates in the soil. Strontium has a similar ionic radius as calcium, and often substitutes calcium in calcium-rich minerals, including calcite. By analyzing the isotopes of strontium 87Sr/86Sr, we can infer the source of the strontium and therefore also the source of the calcium [1]. Since the pecan farm is treated with large amounts of water, we hypothesize that the source of the strontium (and thus Ca) in calcite will be the irrigation water. Soil samples of two different sites in the pecan farm were collected. An elution process was then performed on these samples to separate the strontium from the soil. Water leachate samples were tested for evaporate salts (water soluble salts) and the acid leachates were tested for pedogenic carbonates (includes calcium). In addition to irrigation water, there could be other sources of strontium including dust, fertilizer, rain, and pre-existing calcium from the bedrock. The results from the strontium analysis showed that the samples from the Pecan3 and Pecan4 sites had a similar ratio of 87Sr/86Sr to the irrigation water. We can infer that the source of the Strontium for the soil is the irrigation water.

**Funding Source: National Science Foundation**

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**Recommended Citation:**
**Valles, Karen; Ortiz, Anna; Jin, Lixin. "Strontium isotopic analysis to trace calcium sources in soil salts from a flood-irrigated dryland" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1321**

# Study of the Planetary Boundary Layer (PBL) structure in the city of El Paso, Texas for high ozone days in the summer of 2017

Claudia N Villalobos[1^], Nakul N Karle[1], Suhail Mahmud[2], Rosa Fitzgerald[3]*

[1] *Department of Geological Sciences, The University of Texas at El Paso.*
[2] *Department of Computer Science, The University of Texas at El Paso.*
[3] *Department of Physics, The University of Texas at El Paso.*

The Texas Commission on Environmental Quality (TCEQ) provides daily ozone forecast during the ozone forecast season (May 1 – Oct. 31) for the El Paso metropolitan region. The TCEQ monitoring site (UTEP C12/A125/X151) located at the University of Texas at El Paso (UTEP) reported 10 eight-hour high value ozone days in 2017. The most intriguing feature was that 4 out of those 10 high ozone days were consecutive days ranging from June 4-7, 2017. The general nature of the PBL is to be thinner in high-pressure regions than in low-pressure regions[1]. Since El Paso is located in a low pressure region, the PBL is at higher altitudes throughout the troposphere. A comprehensive 7-day study of the PBL structure is performed from June 2-9, 2017. A Vaisala Ceilometer (CL-31), the TCEQ website, and WRF simulations were used to obtain data. This work will contribute towards a better understanding of pollutant concentrations and Planetary Boundary Layer structure over the city of El Paso.

**Funding Source: NOAA/EPP**

**Recommended Citation:**
**Villalobos, Claudia; Karle, Nakul; Mahmud, Suhail; Fitzgerald, Rosa. "Study of the Planetary Boundary Layer (PBL) structure in the city of El Paso, Texas for high ozone days in the summer of 2017" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1273**

# Structural studies of Acyl-Carrier proteins in 6-Deoxyerythronolide B Synthase

Gerardo Zavala[1^], Zilong Wang[2], Saket Bagde[3], Chu-Young Kim[3*]

[1] *Department of Chemistry and Biochemistry, The University of Texas at El Paso.*
[2] *Department of Chemistry, National University of Singapore.*
[3] *Department of Chemistry, The University of Texas at El Paso.*

Polyketides are secondary metabolites produced by various plants, insects, fungi and bacteria many of which are potent antibacterial agents. In general, these natural product drugs have a highly complex structure, rendering their total synthesis highly impractical. Hence, there is great interest in understanding how nature synthesizes these life-saving molecules. Polyketides are synthesized inside cells by large, multi-functional enzymes called polyketide synthases. One such enzyme is 6-deoxyerythronolide B synthase (DEBS) which is composed of multiple catalytic domains organized into modules. One of these domains is the acyl-carrier protein (ACP), which serves as a tethering point for the growing polyketide chain during natural product biosynthesis. DEBS contains a total of seven ACPs, each possessing similar but non-identical amino acid sequences. To date, only the solution NMR structure one of these domains has been resolved. We are using X-Ray crystallography to resolve the atomic-resolution structure of all the ACPs found in DEBS. The structural knowledge gained in this study is expected to help engineer the DEBS protein for bioproduction of novel polyketide antimicrobial drug derivatives.

**Funding Source: National Institutes of Health**

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**Recommended Citation:**
**Zavala, Gerardo; Wang, Zilong; Bagde, Saket; Kim, Chu-Young. "Structural studies of Acyl-Carrier proteins in 6-Deoxyerythronolide B Synthase" (2018). *UTEP DISCOVER 2018: COURI Spring Symposium Abstracts*, ID= 1410**

# 2018 Department of Music
# Viola/Violin Studio Recital

## 2018 DEPARTMENT OF MUSIC VIOLA/VIOLIN STUDIO RECITAL PROGRAM

**THE VIRTUOSITY OF VIVALDI**
**Studio Recital**

| | |
|---|---|
| Featuring | The Violin and Viola Studio of Dr. Stephen Nordstrom |
| Performing Works of | Antonio Vivaldi (1678-1741) |
| With | Dr. Nayeli Dousa, Harpsichord |

April 22, 2018
1:30 pm
UTEP Fox Fine Arts Recital Hall

***Introduction***
Dr. Stephen Nordstrom

***The Virtuosity of Vivaldi***
Shannon Clark

***Concerto for Strings in G Major "alla Rustica", RV 151***
***I. Presto***
***II. Adagio***
***III. Allegro***

Johanny Barbosa, Alejandra Ortiz, Emilio Montoya,
George Munoz, Suzanne Graham, Bethany Portillo,
Kyndal Braswell, Ramon Valenzuela, Octavio Macias,
Javier Navarro, Jose Tarango, Tom Woo
Dr. Nayeli Dousa, Harpsichord

***Concerto for Four Violins in E minor, Op. 3 #4, RV 550***
***I. Andante***
***II. Allegro assai***
***III. Adagio***
***IV. Allegro***

Suzanne Graham, Johanny Barbosa,
George Munoz, Kyndal Braswell

***Concerto for Two Violins in A minor, Op. 3 #8, RV 522***
***I. Allegro***
***II. Larghetto e spiritoso***
***III. Allegro***

Alejandra Ortiz and Bethany Portillo

**BRIEF INTERMISSION**

***Chamber Concerto in G Major for Two Violas and Violin***
***(Arrangement of Lute Concerto in DM, RV 93)***

***I. Moderato***
***II. Largo***
***III. Allegro***

Octavio Macias, Javier Navarro, violas
Ramon Valenzuela, violin
with Alberto Macias, cello

***Concerto for Four Violins in B minor, Op. 3 #10, RV 580***

***I. Allegro***
***II. Largo, Larghetto***
***III. Allegro***

Johanny Barbosa, Tom Woo,
Emilio Montoya, Jose Tarango

***Concerto for Two Mandolins in G Major, RV 532***
***(Arranged for string orchestra by Stephen Nordstrom)***

***I. Allegro***
***II. Andante***
***III. Allegro***

Johanny Barbosa, Alejandra Ortiz, Emilio Montoya,
George Munoz, Suzanne Graham, Bethany Portillo,
Kyndal Braswell, Ramon Valenzuela, Octavio Macias,
Javier Navarro, Jose Tarango, Tom Woo
Dr. Nayeli Dousa, harpsichord

# Artist Statements

# Antonio Vivaldi – *Concerto for four violins in B minor, Op. 3 #10, RV 580*

Johanny Barbosa, violin
Tom Woo, violin
Emilio Montoya, violin
Jose Tarango, violin

*Department of Music*

The *Concerto for Four Violins in B Minor, RV 580* is the tenth concerto in the collection *L'estro armonico*. It was written approximately in 1711 shortly before its publication. It is essentially a violin concerto divided between four soloists, along with string orchestra and harpsichord, which was typical of the time. Throughout the concerto, each violin part plays its own solo passages in alternation, but is also presented in pairs and as a quartet. This leads to interesting textures in the piece and startling rhythmic fireworks.

The sharp rhythms of the first movement give the concerto an almost angry and aggressive tone. This movement is the most substantial, with solo passages traded off between each of the four violins and separated by tutti sections. One of the more memorable moments in all of Vivaldi's compositions occurs in the middle of the second movement. After a half cadence in the tonic key, each of the four violins realizes a series of chords in a different metrical subdivision, creating an enigmatic and complex rhythmic puzzle. The third movement is similar to the first movement in its aggressive rhythmic character, with more intricate writing between the violins, in a sort of fast-paced baton race. This concerto, like many others in the opus 3 set, came under the hands of Johann Sebastian Bach, who, recognizing the great talent of Vivaldi, transcribed the work for four harpsichords.

**Recommended Citation:**
**Barbosa, Johanny; Woo, Tom; Montoya, Emilio; Tarango, Jose. "Antonio Vivaldi – Concerto for four violins in B minor, Op. 3 #10, RV 580" (2018). *UTEP DISCOVER 2018: Viola/Violin Studio Artist Statements.***

# Antonio Vivaldi – *Concerto for four violins in E minor, Op. 3, #4, RV 550*

Suzanne Graham, violin
Shannon Clark, violin
George Munoz, violin
Kyndal Braswell, violin

*Department of Music*

The *Concerto for Four Violins in E minor* is from Vivaldi's opus 3 set of 12 concertos titled, *L'estro Armonico,* which was published in 1711. It is in 4 movements, which is not commonly seen in concertos of the Baroque era. Almost every other concerto written by Vivaldi follows the typically three-movement format of fast-slow-fast. In this way, the *Concerto in E minor* almost acts like a Baroque sonata for four violins. In each of the four movements Vivaldi passes solo lines back and forth between the violins. He also groups them in pairs throughout, sometimes having one pair of violins answer the other. The passing of parts between each of the violins helps create a balance of sound within the group. This coupled with the matching articulations and rhythms makes the piece sound at times like only one violin.

The first movement is Andante, and acts more like an introduction in the popular French Overture style of the Baroque era. In this movement and the other three you can easily hear a pattern of terraced dynamics and frequent dotted rhythms. The second movement that follows is fast-paced and energetic, with attention being placed on the driving and active rhythms between the violin parts. The brief third movement is in a slower tempo and connected to the fast fourth movement with a cadence in the dominant key. The suspenseful chord leads into the upbeat final movement where we can see Vivaldi at his finest.

**Recommended Citation:**
**Graham, Suzanne; Clark, Shannon; Munoz, George; Braswell, Kyndal. "Antonio Vivaldi – Concerto for four violins in E minor, Op. 3, #4, RV 550" (2018) *UTEP DISCOVER 2018: Viola/Violin Studio Artist Statements.***

# Antonio Vivaldi - *Chamber Concerto in G Major, RV 93*

Octavio Macias, viola
Javier Navarro, viola
Ramon Valenzuela, violin

*Department of Music*

Among the many concertos Vivaldi wrote for stringed instruments are a few that he wrote with plucked instruments in mind. Two of the more popular instruments of the Baroque era that Vivaldi wrote for were the lute and mandolin. The *Chamber Concerto in G Major* is an arrangement of the *Lute Concerto in D Major, RV 93*, which was composed around 1730. The original instrumentation calls for one lute, two violins, cello, and harpsichord. This arrangement by Dr. Nordstrom has been transcribed for two violas, one violin, cello, and harpsichord. In its original form, this concerto is now often performed on the guitar, rather than the lute, which is an outdated instrument that has left the concert stage almost entirely. Our arrangement is inherently different because it is played on a bowed stringed instrument, rather than the lute, which is a plucked instrument. It has also been transcribed down a fifth to bring out the natural resonance of the viola through the use of open strings.

In this concerto, the two violas and violin have the bulk of material, with the harpsichord and continuo cello making up the basso continuo group that focuses on chord changes and setting the foundational bass. The first viola, or lute part, plays significant solo passages throughout, which alternate with tutti passages in the other two melodic instruments. The effect is that of call and response between the first viola and the second viola and violin. The beautiful *Largo* second movement acts like a calming interlude, where the ever-present dotted rhythms of the melody give way to extempore ornamentation during repeats. The concerto finishes with a jaunty, fast third movement that is both cheerful and joyful. Like the second movement, the repeated sections create opportunities for improvisation in the first viola part, as was typical of music in the Baroque era.

**Recommended Citation:**
**Macias, Octavio; Navarro, Javier; Valenzuela, Ramon. "Antonio Vivaldi – Chamber Concerto in G Major, RV 93" (2018). *UTEP DISCOVER 2018: Viola/Violin Studio Artist Statements.***

# Antonio Vivaldi – *Concerto for two violins in A minor, Op. 3 #8, RV 522*

Alejandra Ortiz, violin
Bethany Portillo, violin

*Department of Music*

The *Concerto for Two Violins in A minor, RV 522* is written for two violin soloists, string orchestra and harpsichord. It is a 3-movement concerto that follows the typical fast-slow-fast format of concertos in the Baroque era. This piece is part of the collection of violin concertos Vivaldi published in 1711 as his opus 3, titled *L'Estro armonico*, or the "Harmonic Inspiration". Throughout the work, the violins either play in unison, call and response, or one as the soloist, the other as the accompaniment. The parts are often written to sound like one violin playing continuously in double stops.

Vivaldi uses many common Baroque string techniques in the solo passages of this piece, including frequent use of bariolage, or the rapid alternation of notes on two or more adjacent strings, and ornamentation such as trills and mordents. The trills are used often in the second and third movements to enhance a note or to emphasize the conclusion of a cadence. The work is also a fine example of Vivaldi's fondness for anapestic patterns, where two notes on a strong beat are followed by one note on a weak beat. This can be seen in each movement of the piece, but most especially in the final movement. The *Concerto No. 8 in A minor for Two Violins* is one of the more popular of Vivaldi's concertos for multiple violins. It is frequently heard in concert today and is a perfect example of the technical possibilities that can be achieved by two violins.

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**Recommended Citation:**
**Ortiz, Alejandra; Portillo, Bethany. "Antonio Vivaldi – Concerto for two violins in A minor, Op. 3 #8, RV 522" (2018). *UTEP DISCOVER 2018: Viola/Violin Studio Artist Statements.***

# 2018 Department of Music Honors Recital

## 2018 DEPARTMENT OF MUSIC HONORS RECITAL PROGRAM

April 27, 2018

**The University of Texas at El Paso Department of Music**
**Presents**

**^ undergraduate student**

Johanny Veiga Barbosa, violin

“Cantares” from *Poema en forma de Canciones* Joaquín Turina (1882-1949)

Lidia Chavez^, soprano
Flor de la Garza, piano

“Deja Que Salga La Luna” Jose Alfredo Jimenez (1926-1973)
arranged by Jose L. Rios (b. 1990)

Rocio Manriquez^, mezzo-soprano
Flor de la Garza, piano

*Rhapsody No. 1 in B minor, Op. 79* Johannes Brahms (1833-1897)

Carmen Quesada^, piano

“The Swan” from *The Carnival of the Animals* Camille Saint-Saëns (1835-1921)

Perla Cardenas^, cello
Alex Loaeza, piano

**Pi Kappa Lambda Inductees – Dr. Steve Wilson**

**Pi Kappa Lambda**, an honor society, was founded at Northwestern University, Evanston, Illinois, in 1918. The first member was Peter Christian Lutkin, then Dean of the School of Music, whose initials in their Greek equivalent were selected for the name of the Society, Pi Kappa Lambda:

The emblem of the Society is a visible expression of the honor and esteem with which each member is regarded. It is designed in the form of a Grecian lyre incorporating the ancient symbols of Music and Drama with the Greek letters of the Society.

"Almen se non poss'io" Vincenzo Bellini (1801-1835)

Jasmine Fernandez^, soprano
Elvira Spector, piano

*Sleep* Esai Cantú^ (b. 1996)

I.
II.

Rita Canava, flute
Aaron Gomez, clarinet
Paul Reid, trumpet
Anthony Yrigoyen, vibraphone
Justin Anderson, marimba
Esai Cantú^, guitar
Orlando Barajas, viola
Miguel Martinez, cello

*Chain* Kazunori Miyake (b. 1963)

Trice Mayhall, marimba

*Sonatine* Eugene Bozza (1905-1991)

I. Allegro vivo
II. Andante ma non troppo
IV. Allegro vivace

Pablo Palacios and Isaac Ponce^, trumpets
Ashley Venegas, horn
Christopher Gonzalez, trombone
Milton Johnson, tuba

**Outstanding Music Students – Dr. Stephen Nordstrom, Dr. Steve Wilson**

Perla Cardenas^, *Outstanding Senior in Music Education*
Esai Cantú^, *Outstanding Senior in Music Theory/Composition*
Maria Lozano Gomez^, *Outstanding Senior in Commercial Music*
Caitlin Huizar, *Outstanding Senior in Music Performance*
Christopher Gonzalez, *Outstanding Graduate Student in Music Performance*
Raul Ricardo Dominguez, *Outstanding Graduate Student in Music Performance*
Flora Newberry, *Outstanding Graduate Student in Music Education*

**Outstanding Performers – Dr. Stephen Nordstrom, Dr. Steve Wilson**

# Artist Statements

# Esai Cantú - *Sleep*

Esai Cantú

*Department of Music*

**Sleep**, a work for larger chamber ensemble, aims to capture the experience of falling asleep and finding oneself in a dream, amid waves of confusion, structured chaos, and temporary respite. The first movement opens with a lyrical and metrically free melody played by the viola, accompanied by cello and electric guitar. It is meant to evoke the sense of falling asleep: transitioning from a state of wakefulness to one of rest. A highly chromatic variation of the same melody follows, this time presented by the clarinet and accompanied by a fuller ensemble. This statement highlights the deformative power of dreams, with the closing vibraphone gesture marking the official entrance into the land of the unknown.

The second movement is characterized by jagged interjections and syncopated rhythmic figures, which contribute to the sense of instability throughout much of the piece. In the middle section, which represents the zenith of confusion, an atonal theme is presented and passed around the ensemble before it is fragmented and elaborated further. It is then weaved into a thickening contrapuntal soup that culminates in a climactic unison ensemble presentation of the theme. Material from the beginning of the movement is then reprised in varied forms, before a final melodic gesture is passed around and triumphantly marches the dreamer, at long last, out of the abyss.

The instrumentation of this piece includes Flute, Clarinet, Trumpet, Vibraphone, Marimba, Electric Guitar, Viola, and Cello. These intstruments were chosen primarily to project the mellow timbre I associate with dreaming, although departures from that timbral space do occur.

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**Cantú, Esai. "Esai Cantú - Sleep" (2018). *UTEP DISCOVER 2018: Department of Music Honors Recital Artist Statements.***

# Camille Saint Saëns - “The Swan” from *The Carnival of the Animals*

Perla Cardenas

*Department of Music*

Camille Saint Saëns (1835-1921) was a French composer, pianist, and organist. He began taking piano lessons at age two with his aunt and composed his first work at age three. He studied composition with Pierre Maledin at age three. Later, he studied organ and composition at the Paris Conservatory. Not only did he excel in music, but also in his academic studies, particularly in languages, geology, astronomy, and advanced mathematics. He was the organist at the Church of Madeleine for 20 years. From 1861 to 1865, he taught at the Niedermeyer school. Some of his students include Gabriel Faure and Andre Messager. He is mainly remembered for his symphonic poems. Some of his most popular pieces include *Danse Macabre*, *Le carnaval des animaux, Symphony No. 3,* and *Samson et Dalila.*

*Le Cygne* (The Swan) is the penultimate movement from *Le carnaval des animaux* (The carnival of the animals). It was written in February 1886 in a small Austrian village following an unsuccessful concert tour of Germany. Originally, it was written for two pianos and cello, but when it was officially published it was arranged for a single piano and cello. This piece is a humorous fantasy, which is a composition written free in form and inspiration, usually for a solo instrument. Each movement in the work portrays a different animal in a fun way, making it a perfect work for children’s concerts. It was premiered on Shrove Tuesday, March 9, 1886 at a private concert by cellist Charles Lebouc. Saint Saëns did not want *Le carnaval des animaux* to be published in his lifetime for fear that it would detract from his “serious” composer image. *Le Cygne* is the only movement he allowed to be published, while the rest were published after his death.

The piece begins in andantino grazioso in 6/4 compound duple meter with rippling sixteenths in the piano, which represent the swan’s feet paddling underwater. The cello enters with a gliding melody portraying the swan dancing across the water. It is in the key of G major. Every note in the piece is legato and should be played as connected as possible even during bow changes. Dynamics range from pianissimo to mezzo forte to reflect the delicate nature of a swan.

When learning this piece, I listened to different recordings and arrangements to get ideas, including a video of the famous ballerina, Anna Pavlova, dancing “Dying Swan” in 1907. Notable arrangements include cello and harp, saxophone and piano, and Theremin and piano. I also experimented with different fingerings, bowings, and vibrato speed. Fingering choice affects the phrasing, so one must choose when to shift and decide how to connect the shift. One may decide to use unconventional fingerings to avoid shifting, as seen in Daniil Shafran’s performance, or choose to emphasize certain shifts. The color can be changed by crossing to the A string or continuing the phrase on the D string. One must take care to not break the phrases and have smooth, graceful bow changes. Vibrato speed is up to the performer and can vary from wide and fast like Daniil Shafran, to wide and slow like Yo-Yo Ma.

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# Joaquín Turina - “Cantares” from *Poema en forma de Canciones*

Lidia Chavez

*Department of Music*

Joaquín Turina (1882-1949) primarily started his studies in medicine. He then abandoned everything that interfered with music and began taking voice lessons. He quickly became well known in Seville as a composer and, from 1897, as a pianist. His early successes prompted him to travel and Turina gradually became well known in artistic circles. His friendship with Manuel de Falla influenced his ideas on the proper character of Spanish music. Turina accepted this guidance, and with time was considered one of the most highly regarded Spanish composers. Some of his more esteemed pieces include *Sinfonía sevillana*, and his opera *Jardín de oriente.*

In 1918, Turina set music to five of Campoamor's poems and created the song collection *Poema en Forma de Canciones. "*Cantares," the third song in the cycle, depicts a heart-broken woman who, through her cries of despair, expresses how she is going mad without the love of her life. Turina choses parts of Campoamor's poem expressively  exclaiming and repeating phrases. Though the words he chooses are strong, the core passion comes from the profoundly passionate Spanish sound that Turina encapsulated.

This piece depicts sadness and desperation to the point where joyous moments are practically hallucinated by this woman to bring hope to

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# Vicenzo Bellini – *Almen se non poss'io*

Jasmine Fernandez

*Department of Music*

**Vincenzo Bellini (1801–1835)** was an Italian composer of the bel canto era who was known for his expressive and long melodic lines. Although he died at a young age, he produced many works in his lifetime: ten operas, seven symphonies, twenty-eight sacred vocal works and twenty-three secular vocal works. He is most famous for his operas such as *I Capuleti ed i Montecchi, La Sonnambula,* and *Norma.* In his vocal works he often placed more emphasis on the vocal line by having sparse accompaniment so much of the dramatic and musical weight is left to the singer. His music has been sung by many opera greats such as Maria Callas and Luciano Pavarotti.

***Almen se non poss'io*** is an arietta, or short aria, from *Composizioni da Camera,* fifteen songs for voice and piano by Bellini, which was published by Ricordi on the 100th anniversary of his death. This collection contains songs of different Italian genres such as, *romanzes*, *ballatas*, and *ariettas*. This *arietta* resembles Bellini's operatic style with fluid and melodic phrases and use of cadenzas. The short cadenzas throughout the song preview and lead to the final cadenza at the end which covers a larger range and includes the highest notes in the song. In this song, a lover hopes that although they cannot be with their beloved, their love will follow them.

| ***Almen se non poss'io*** | ***At least, if I am not able*** |
|---|---|
| Almen se non poss'io<br>seguir l'amato bene,<br>affetti del cor mio,<br>seguitelo per me. | At least, if I am not able<br>to follow my beloved,<br>you affections of my heart,<br>go with him for me. |
| Già sempre a lui vicino<br>raccolti amor vi tiene<br>e insolito cammino<br>questo per voi non è. | Already near him always,<br>Love keeps you gathered,<br>and the path to him is not<br>an unfamiliar one for you. |

Translation from The LiederNet Archive.

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# José Alfredo Jiménez – Deja que salga la luna

Rocio Manriquez

*Department of Music*

**José Alfredo Jiménez (1926-1973)** was a Mexican composer and singer most famously known for composing *rancheras* and *huapangos*, which originated in the cities of Mexico during the 1950s and '60s. Though he had no musical training and did not know how to play an instrument, he composed over 1,000 songs, about love, heart-break, and the acceptance of fate. Jiménez' songs have been sung by hundreds of big-name artists and are considered to be an integral part of Mexican culture, due to their simple melodies and melodramatic poetry.
**Deja Que Salga La Luna** is written in the Mexican *huapango* style, which is characterized by the slow muted, ¾ rhythm in what is typically the guitar accompaniment. The arrangement is intended to provide the dramatic lines of the theme in the piano without the need of a mariachi, while also adding a kind of Baroque flair in the moving bass line. The song is famous for its use of *falsete*, which is the term for when the singer purposefully breaks and switches from chest to head voice, similar to a yodel.

***Deja Que Salga La Luna***

Deja que salga la luna,
Deja que se meta el sol,
Deja que caiga la noche
Pa' que empiece nuestro amor.

Deja que las estrellitas
Me llenen de inspiración
Para decirte cositas
Muy bonitas, corazón.

Yo sé que no hay en el mundo
Amor como el que me das
Y sé que noche con noche
Va creciendo más y más.

Cuando estoy entre tus brazos
Siempre me pregunto yo:
Cuanto me debía el destino
Que contigo me pago?

Por eso es que ya mi vida
Toda te la entrego a tí,
Tú que me diste en un beso
Lo que nunca te pedí.
Deja que salga la luna.

***Let the Moon Come Out***

Let the moon come out,
Let the sun set,
Let the night fall
So that our love can start.

Let the little starts
Fill me with inspiration
To tell you things
Very beautiful, my love.

I know there is no love in the world
Like the one that you give me.
And I know that night after night
It grows more and more.

When I am in your arms
I always ask myself
How much did destiny owe me
That it paid me with you?

That is why my life
I give entirely to you,
You that gave me in a kiss
What I never asked from you.
Let the moon come out.

**Recommended Citation:**

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# Eugene Bozza - *Sonatine*

Isaac Ponce

*Department of Music*

Eugene Bozza was a French Contemporary composer and Violinist. He remains one of the most prolific composers of chamber music and wind instruments. With over 100 chamber works many of which are for wind ensembles. He wrote five symphonies along with operas, ballets, large choral works, wind band music, concertos, as well as large brass and wind ensembles. Although his larger works are rarely ever played outside of France, his name is known all over the world and his chamber music continues to be performed in venues everywhere.

His extremely challenging Sonatina for Brass Quintet is one of his most sought out works. One would not grasp the difficulty of the piece by listening to it. When played well, the Sonatina is light, fun, charming, and extremely playful. However, to the musicians performing it, the piece could be a challenge. Along with extremely technical passages, Bozza exposes each player forcing them to be 100% focused on their contribution to the ensemble. Other challenging aspects of the piece include its constantly changing meter which can range from 3/4 to 3/8 to 6/8 and 2/4. The ensemble must be completely in sync in order to pass around his beautiful melodies from player to player. This piece is extremely fun once all technical aspects are put aside, when a quintet presents this piece it showcases each musician well and allows the players to show off in a manner that only Bozza can pull off so elegantly.

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**Ponce, Isaac. "*Eugene Bozza - Sonatine*" (2018). *UTEP DISCOVER 2018: Department of Music Honors Recital Artist Statements.***

# Johannes Brahms - *Rhapsody No. 1 in B minor, Op. 79*

Carmen Quesada

*Department of Music*

Born in Germany in 1833, Johannes Brahms is considered to be one of the leading composers of the Romantic Era. Brahms had a humble upbringing as his seamstress mother and musician father struggled to make ends meet. Although initially introduced to music by his father, Brahms received an in depth musical education from the famous musician, Eduard Marxsen. During his studies with Marxsen, Brahms helped his family financially by playing the piano in different establishments and teaching. Brahms's career did not take off until he was twenty years old, which is when he met Robert and Clara Schumann; two well established composers of the time. Robert Schumann was impressed by the young Brahms's compositions and he helped Brahms to publish his works and achieve fame. Brahms's “Rhapsody No. 1” in B minor was the first of a set of two rhapsodies that he composed in 1879. The term “rhapsody” has its Greek origins and is used to describe something that is highly emotional and expressive. In music, the label is generally given to pieces that are free of form or structure, much like an improvisation. In the case of this particular rhapsody, the former definition is better suited as the piece has a very clear ABA structure and can be described as highly emotional. The outer sections of the piece are in the somber key of B minor and are characterized by agitated chords and thick textures. The lyrical middle section is completely contrasting as it is in the sweet key of B major and is characterized by a calm singing melody over an arpeggiated accompaniment. The tumultuous rhapsody ends with a lyrical coda that closes the piece in B major.

The piece is full of passion like the title would suggest and as a performer, I like to relate this passion to a popular theory about Brahms's personal life. Music historians hypothesize that while Brahms never married, he was secretly in love with Clara Schumann. Brahms could never act upon the love he felt for his good friend as she was married to Robert Schumann. The rapid outer sections of this piece remind me of an agonizing expression of yearning for someone one cannot have, while the calm middle section is a happy dream where one freely imagines what life would be like with said person.

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