

BRAIN WAVES

October 2022

Message From BHC Director:

It is so great to see everyone back on campus! Being back in person is both energizing and catalyzing, especially when it comes to propelling research forward. According to a 2017 study published by the Journal of Experimental Social Psychology, face-to-face communication promotes innovative thinking, clearer communication, and leads to stronger relationships. That's exactly what we did this past year. Inside this fall newsletter, you can read about our distinguished public lecture, the Oskar

Fischer Prize symposium, Viva Science at the Witte Museum, and much more. The Brain Health Consortium is spreading its wings and expanding transdisciplinary research. Something exciting is happening soon and we can't wait to announce it later this year. As we continue to get vaxxed or boosted, I look forward to meeting you at one of our on-campus events in the year ahead.



Dr. Jenny Hsieh

What's Inside:

- ♦ ***UTSA is Officially Tier One***
- ♦ ***2022 So Far...***
- ♦ ***Student Research & Awards***
- ♦ ***Cell Analysis Core***
- ♦ ***Transdisciplinary Research***
- ♦ ***Welcoming New Faculty***

♦ ***And More!***

UTSA[®] MAKES R1 STATUS

WE MADE IT!

Coming in to 2022 UTSA can proudly claim the title of being a Tier One University, having an R1 rating from the Carnegie Classification of Institutions of Higher Learning. President Eighmy said it best:



“Carnegie R1 is a historic waypoint on our trajectory to transform UTSA into one of the nation’s great public research universities”.

- President Eighmy

This R1 classification is derived from the “very high” level of research rigor and activity supported by the University and puts us squarely in competition in with other R1 Institutions such as UT-Austin, UT-Dallas, Texas A&M, Texas Tech, Rice and another newcomer this past year with Baylor.

None of this would be possible without the potent combination of leadership from Vice President for Research, Economic Development, and Knowledge Enterprise (VPREDKE) Dr. Bernard Arulanandam and the amazing research Faculty throughout UTSA. On a bittersweet note, Dr. Arul has recently left us to join another R1 ranked school at Tufts University to become their Vice Provost for Research and we wish him all the best. For the research faculty that remain here to continue driving UTSA forward, there is excellent ground to build upon in this new R1 arena. Over a five-year period UTSA’s research expenses more than slightly doubled from \$68 million to \$140 million as of FY 2021 with a whopping 300+ funded grants per year over that time.

Another vital component of our new R1 status, aside from amazing research efforts, is the academic support that goes along with it. Not only did we grow our research portfolio but overall enrollment, retention, and number of doctoral students who were awarded degrees increased. During this same period of time UTSA's doctoral enrollment spiked almost 20% and a new Ph.D. in Psychology was approved with another program under review for a new Ph.D. in Molecular Microbiology and Immunology.

Part of the mission of the Brain Health Consortium, and UTSA, is to educate and train the next generation of scientists, propelling them into a career of novel scientific and human therapeutic discovery. We can't wait to see what the coming years offer and wish continued success to all in their endeavors.

Full Article Here:

<https://www.utsa.edu/today/2021/12/story/utsa-attains-carnegie-r1-classification.html>



*Birds
Up!*



COVID-19 UPDATE

The University continues to monitor both national and local developments in their efforts to maintain an operationally safe and effective campus environment.

With a **new resource page** up and running as a one-stop-shop for all things COVID related, the Recovery Operations Team is set to respond as needed for the benefit of everyone impacted.

We look forward to this Fall semester as more classes and events are being shifted from a remote/hybrid status to hybrid/face-to-face availability.

Despite the return of competition for parking spaces we definitely welcome the return of all the faces and hustle and bustle back in our common areas.

Please remember to stay safe and should there be any questions or concerns feel free to reach out to the Recovery Team via the link provided.

VISIT:

<https://www.utsa.edu/ba-administration-operations/services/recovery-operations/>

for more Covid related
information.



BHC WELCOMES NEW FACULTY



The Brain Health Consortium would like to welcome

Chantal Fahmy, PhD

to the BHC family!

Dr. Fahmy is an Assistant Professor with the Department of Criminology and Criminal Justice in the College of Health, Community and Policy (HCAP).

Dr. Fahmy comes to UTSA from Arizona's PhD program, by way of St. Louis as an External Fellow, and brings with her an impressive assortment of research experience, publications, mentoring, and academic service.

Her main areas of research interest cover Prisoner reentry, institutional corrections, social support, public health, and deviant subcultures.

We are excited to see what new developments Dr. Fahmy brings to the table and she is already off to a great start, see our SEED Grant Awards section below!

Feel free to check out more about Dr. Fahmy and HCAP at

<https://hcap.utsa.edu/criminal-justice/>

EVENTS AT

A GLANCE...

Distinguished Public Lecture – Dr. Olson

Our Distinguished Public Lecture series continued in Spring '22 with Dr. Eric Olson, Professor and Chair, Molecular Biology from UT Southwestern Medical Center. The BHC was proud to host Dr. Olson's talk on using CRISPR/Cas9 gene editing to combat one of the most debilitating neuromuscular disorders Duchenne Muscular Dystrophy. The research that Dr. Olson and his lab are doing paves the way for the use of CRISPR gene editing in the clinic and offers hope for mankind.



Oskar Fishcher Prize Symposium

The BHC partnered with VPREDKE to host the culmination of a multi-year competition to catalyze the most innovative ideas surrounding Alzheimer's Disease. The OFP was graciously funded by Dr. James Truchard, co-founder of National Instruments. This undertaking to synthesize a larger picture of AD from the many puzzle pieces was inspired by the original work of Oskar Fischer. A day full of scientific rigor, amazing presentations, and future collaborations provided a bright outlook on the field.

Viva Science!

The BHC was delighted to join other departments from UTSA to show our academic and research prowess at a public, community wide event called Viva Science SA! The event is hosted by our sister institution UT Health SA and this year we took over the Witte Museum's Mays Family Center for a day of fun, poster presentations, and engaging young minds.



TRANSDISCIPLINARY

Research at UTSA



Stem Cells and Precision Medicine

John McCarrey

Research in Dr. McCarrey's lab is centered on the development, differentiation, and epigenetic regulation of mammalian germ cells and stem cells. The lab uses epigenomics approaches such as genome-wide methylation and transcriptome analysis.

Website: <https://www.utsa.edu/sciences/labs/JohnMcCarrey/>



Neuroengineering

Dhireesha Kudithipudi

Dr. Kudithipudi's research interests are in neuromorphic computing, brain inspired AI algorithms, novel computing substrates (e.g.: memristors), energy efficient machine intelligence, and AI-Platforms. Her team has helped pave a path to creating artificial intelligence platforms inspired by the brain and in development of neuromemristive AI platforms with continual learning capabilities.

Website: <https://www.nuailab.com/>



Psychology and Behavior

Leslie Neely

Dr. Neely's work centers on progressing the treatment of children with autism with the science of applied behavior analysis (ABA). ABA therapy focuses on modifying the environment to teach skills, treat maladaptive behavior, and improve pro-social behaviors. She is also interested in developing pre-emptive treatment for infants and toddlers at-risk for autism as well as advancing telehealth and innovative technologies currently used.

Website: <https://www.abautsa.com/>



Neuroscience

Francesco Savelli

Dr. Savelli is a computer scientist and AI researcher turned neuroscientist. His area of interest is in the use of perceptual information of external landmarks (e.g., from the visual system) and the internal sense of motion (e.g., from the vestibular or motor systems) to dynamically create your sense of location relative to a mental map of the surrounding environment.

Website: <https://www.utsa.edu/sciences/neuroscience-developmental-regenerative-biology/faculty/FrancescoSavelli.html>

SEED Grant *Winners*

October 1, 2022 through July 31, 2023

\$30,000 awarded: \$15,000 per researcher, two new projects

Nicole Wicha



Effect of mild traumatic brain injury on predictive processing in language comprehension

Wicha, professor of neuroscience, developmental and regenerative biology, and Swan, assistant professor of psychology, are the co-PIs on the project. Traumatic brain injury (TBI) impacts 2.5 million people in the U.S. annually, with 13% experiencing chronic cognitive symptoms that can impact quality of life. Wicha's team is exploring how TBI is impacting language comprehension and reducing predictive ability to understand. The team is leveraging their expertise in neurobiology of language, speech-language pathology after TBI—working with UT Health San Antonio—and meta-analysis of TBI factors—in collaboration with the college for Health, Community and Policy—with the long-term goal of informing clinical practice by quantifying the effect of TBI on language comprehension.

Wicha Lab: <https://www.utsa.edu/sciences/labs/NicoleWicha/>

Chantal Fahmy



The Long-Term Impact of Traumatic Brain Injury on Reentry after Incarceration: A Vulnerability Assessment

Chantal Fahmy, Assistant Professor of Criminology and Criminal Justice, and Alicia Swan are Co-PIs on the project. Other researchers on the project include Alex Testa, formerly a UTSA professor who is now at UT Health Houston, and Katherine Kelton, a post-doctoral fellow at the Veterans Administration (VA). Their aim is to gather information on mild TBI exposures and their effect on the long-term health and behavior of the individuals. Research points to repeated TBI leading to increased aggression and harmful behaviors—thereby feeding the cycle of crime and imprisonment. They see this work as particularly timely and relevant for Bexar County and beyond and hope their work will shed some light on issues that can be fixed.

Fahmy Lab: <https://hcap.utsa.edu/directory/chantal-fahmy-ph-d/>

The Brain Health Consortium (BHC) Collaborative Seed Grant (CSG) program, sponsored by the Office of the Vice President for Research, Economic Development, and Knowledge Enterprise (REDKE) at The University of Texas at San Antonio (UTSA), is offering seed grants to support collaborative research at UTSA. These grants support a broad range of trans-disciplinary research that may yield fundamental insights into the mechanisms underlying brain disorders.

For SEED Grant announcements: <https://research.utsa.edu/fund-dev/find-funding/seed-grants.html>

STUDENT RESEARCHER



Amber Lyle



Amber Lyle is a Graduate Research Assistant working with Dr. Alicia Swan from the Psychology Department in the College for Health, Community and Policy (HCAP).

She is focused on Traumatic Brain Injury (TBI) outcomes as it pertains to Military Veterans and their healthcare via behavioral and functional testing. In analyzing TBI data from this population she also seeks to help understand and improve substance abuse disorders, headaches, chronic pain and overall programmatic assistance being offered to Veterans.

Tell us how you got involved in brain research?

I first got involved with brain research when, after taking an undergraduate course with Dr. Alicia Swan, I fell in love with physiological psychology, specifically behavioral and functional outcomes following a traumatic brain injury. When the class was over I took the initiative to reach out to Dr. Swan and subsequently joined her lab. That decision propelled me into brain research and I've never looked back.

What has surprised you the most in working with the brain?

My favorite and most surprising facet of the brain and the work I am a part of surrounds neuroplasticity. I am fascinated by the concept that we can form and reorganize synaptic connections, especially following an injury, and throughout the healing journey individuals go through.

What are your top two research questions right now?

My top two research questions right now are (1) Will severity of headaches significantly impact or predict overall functional impairment in Veterans with mild traumatic brain injury, regardless of all other socio-demographic variables (e.g., sex, military branch)? (2) Can we utilize dynamic, whole health approaches to predict substance use disorders in individuals who have sustained a mild traumatic brain injury in effort to create more effective management strategies for struggling Veterans?

Swan Lab Research: <https://www.swanlab.org/>

SPOTLIGHT

On Student **Research**



Jake Lehle, B.S.

Doctoral Student

Jake is a 5th-year doctoral student who is targeting graduation from the Developmental and Regenerative Sciences (DRS) Doctoral Program in the upcoming Fall semester. As a part of Dr. John McCarrey's lab, Jake has been interested in studying the mechanisms that regulate the proper establishment of epigenetic programming following embryonic and germline reprogramming events and how changes to the epigenome due to chemical exposures during these developmental windows have the potential to predispose the onset of disease states that can be maintained across multiple generations.

To overcome the limitations of doing these studies in live animals, Jake has acquired techniques and experiences culturing many different mice cell types outside of the animal in a dish. This allows to better model how exposure to chemicals can damage individual cell types in a more rapid and highly focused manner than what is possible in the animal. During his time at UTSA Jake has published three research articles, one of which he is the first author of. In June of 2022, Jake submitted another first-author research article to BMC Bioinformatics detailing improvements to a software pipeline called wg-blimp that is used to profile the epigenome for changes in DNA methylation.

Jake's changes to this pipeline resulted in >7x acceleration in processing speed so that data that used to take a week to analyze can now be done in a single day. Going forward, Jake plans on continuing to pursue a career in research and is currently interviewing for postdoctoral positions in Texas as well as California. Jake ultimately hopes that his passion for this research topic and previous work will allow him to establish his own lab as an independent researcher following his postdoctoral training.

McCarrey Lab Research: <https://www.utsa.edu/sciences/labs/JohnMcCarrey/>





Tina Rodgers

Ph.D. Candidate of Biomedical Engineering

Tina Rodgers is a doctoral candidate graduating this fall semester with a Ph.D. in Biomedical Engineering. Her degree is part of a collaborative program between UT Health San Antonio and UTSA Biomedical Engineering and Chemical Engineering Department.

During the last year of her MS training, she joined the Macromolecular Bio-Interfaces Laboratory under the supervision of Dr. Gabriela Romero Uribe, where she continued with her PhD research work. Tina was the first graduate student joining Dr. Romero Uribe's laboratory and she played a critical role in the establishment of the research laboratory and team. Tina's motivation to join the lab was her fascination with gene editing therapies and their potential to cure diseases if advanced to the clinic. One of the major challenges in advancing gene therapies is the ability to deliver genes into cells for editing. Tina's first research project was the engineering of a polymer-based nanoformulation that encapsulated short plasmid constructs.

With this project Tina mentored her first undergraduate student. For her PhD dissertation, Tina is engineering a biomimetic carrier for the treatment of glioblastoma, a devastating disease that has no cure. After all possible treatments, patients' survival is typically no more than 15 months. For this project Tina is engineering a rabies virus-like polymeric nanocarrier for the delivery of therapeutic genes across the blood-brain-barrier (BBB) and into glioblastoma tumors.

Currently, Tina is working on writing her last manuscript for publication and her PhD dissertation, as she is planning to defend and graduate this Fall semester.

After completion of her PhD, Tina would like to continue her scientific career either in academia or in research and development in the industry.

Romero Lab Research: <https://ceid.utsa.edu/guribe/>

Student Grants

Announcements

Congratulations to the growing body of students being awarded F31 grants.

Shannon Landon

Defining the Specificity and Dynamics of Peripheral Sour Taste Circuits



(Goal) To identify the synaptic partners and observe the dynamics of taste circuits in the peripheral taste system, I will use GRASP (GFP Reconstitution Across Synaptic Partners), a novel technique that utilizes the reconstitution of genetically encoded split GFP proteins. Therefore, my objective is to genetically identify potential gustatory neuron-taste receptor cell synaptic partners and to characterize synaptic dynamics during taste cell turnover.

Courtney McMahon

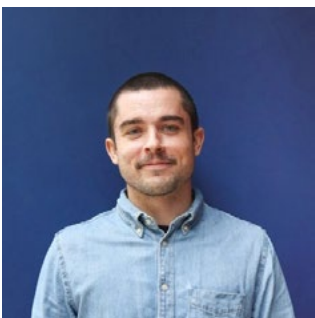
Modeling Prenatal COVID-19 Exposure Using Human Cortical Organoids and Mouse Models



(Goal) With the effects of a SARS-CoV-2 infection on the brain still poorly understood, and the potential for viral transmission from the mother to the fetus unknown, it is imperative to gain insight into the apparent ability of COVID to invade multiple systems. We believe that a SARS-CoV-2 infection during pregnancy and the resulting inflammation can trigger neurodevelopmental changes in the fetal brain that lead to a disruption of brain structure and function.

James Jones

Network properties of the globus pallidus pars externa



(Goal) Synaptic networks of neurons in the basal ganglia produce stable spatiotemporal patterns of spiking which encode will, movement, sensation, and learning. The external globus pallidus (GPe) is a synaptic network of inhibitory, oscillatory neurons and an intersection of many pathways within the basal ganglia. The goal of my research is to determine how oscillating GPe neurons produce spatiotemporal patterns of spiking in the GPe through the local inhibitory network, and how signals from separate basal ganglia pathways are transformed by the GPe network.

New Courses:

Fall 2022

FRONTIERS OF HUMAN PLURIPOTENT STEM CELLS

Register Via ASAP: BIO 5813 / NDRB 4153

Class Meeting Times:

Tuesdays & Thursdays
8:30AM - 9:45 AM

***Class Limited To 12 Participants**

Announcing a 3-credit hands-on lab and lecture course where students work individually and in groups to learn the developmental principles and practical techniques on how to make human induced pluripotent stem cell (hiPSC) lines.

Students will learn how to differentiate these into functional human tissues in vitro, including neurons that fire action potentials and cardiomyocytes that beat. Topics include: Human iPSC reprogramming and basic stem cell culture, generation and assembly of 3D neural cultures and 2D cardiomyocytes, quality control and assay implementation, i.e. viral infection, genetic engineering, functional imaging, and electrophysiology. Join us to learn about this revolutionary technology that allows the study of developmental mechanisms in humans and the roots of human diseases.

Email jenny.hsieh@utsa.edu for questions

Instructor: *Dr. Jenny Hsieh*



Department of Neuroscience, Developmental
and Regenerative Biology

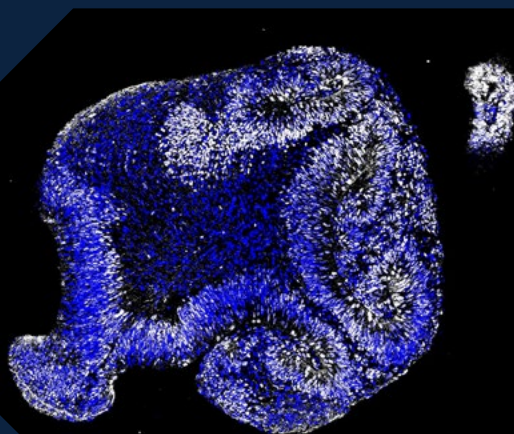
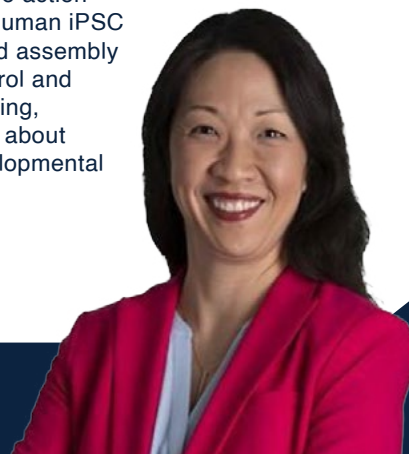


Photo Credit: Erin Hurley



CRN 21585 Fall 2022 T/R 8:30a-9:45a in-person SEB 2.172

Topics include: Human iPSC reprogramming and basic stem cell culture, generation and assembly of 3D neural cultures and 2D cardiomyocytes, quality control and assay implementation (viral infection, genetic engineering, functional imaging, and electrophysiology).

New Courses:

Fall 2022

NDRB: 3463

BRAIN DISEASES

Announcing new 3-credit hours survey course starting in Fall 2022 that is a study of selected major brain diseases and neurological disorders, their underlying causes and treatments, with an emphasis on molecular mechanisms.

The course covers developmental disorders, psychological and mood disorders, and neurodegenerative disorders. Scheduled topics may include Down syndrome, ADHD, autism spectrum disorders, schizophrenia, anxiety, depression, prion diseases, Alzheimer's disease, Parkinson's disease, frontotemporal lobar dementias, and chronic traumatic encephalopathy. While an emphasis is placed on underlying mechanisms and causes, especially the interplay between genetics and environment, particular attention is given to understanding the complexities of the diseases and disorders and the reasons for the difficulties in treating these diseases.

No textbook is required for the course.

Meeting Times:

Monday, Wednesdays, Fridays
9:00AM - 9:50AM

Instructor:

Dr. T Chris Gamblin

Email:

truman.gamblin@utsa



Department of Neuroscience, Developmental
and Regenerative Biology

New Courses:

Enroll This Fall 2022!

NDRB: 4953/BIO 6973

Space And Time In The Brain

Prerequisites: *The course assumes knowledge of basic neuroscience concepts, such as neurons, synapses, action potentials, and neurotransmitters. If these terms sound unfamiliar to you, you will need to do some additional study or take an introductory course.*

When you navigate a familiar environment, you don't need a map because the map is already in your brain. But where in the brain? And how can networks of neurons conjure up a map of your surroundings?

This course covers what we know about these questions from animal and human studies. You will learn about place cells, grid cells, and other spatial cells found within and beyond the hippocampal formation. Recently, scientists have observed that these cells also appear to signal the passage of time, suggesting that the brain uses common mechanisms to process space and time while forming memories.

Most topics in this course are still open to lively research and debate. Thus, the emphasis will be on developing a critical perspective rather than on extensive memorization.

Meeting Times:

Tuesdays & Thursdays
4:00 PM - 5:15 PM

Instructor:

Dr. Francesco Savelli

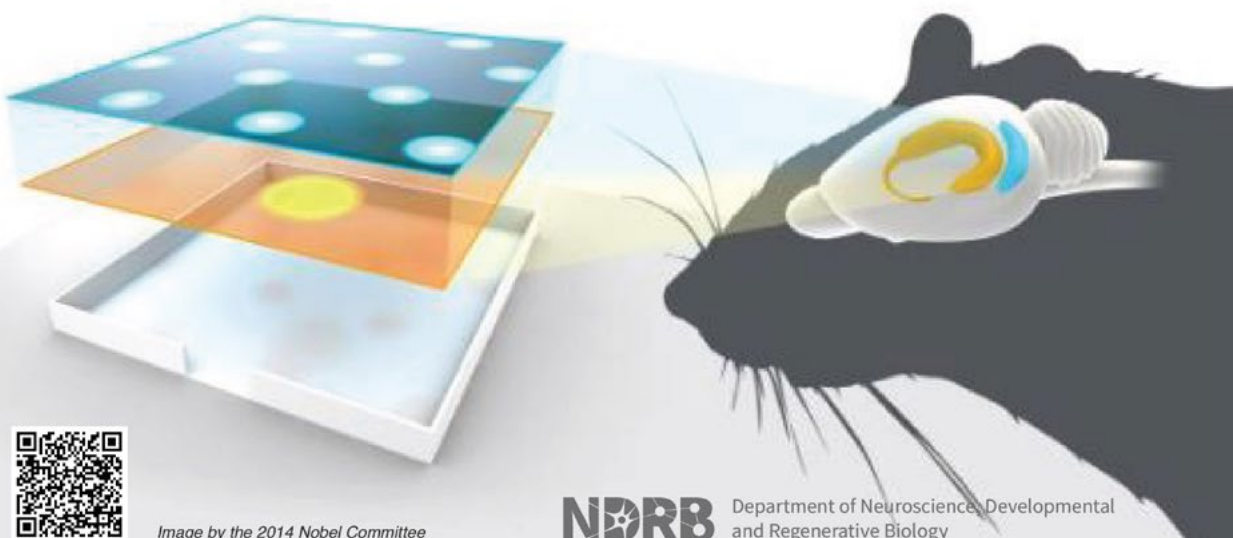


Image by the 2014 Nobel Committee



Department of Neuroscience, Developmental
and Regenerative Biology

FEATURED CORE

Cell Analysis Core - UTSA

The mission of the Cell Analysis Core is to provide centralized services, training, access, and support to researchers in the usage of cutting-edge technology for the study and manipulation of biological samples using flow cytometry and confocal microscopy equipment. We are also striving to establish an active training and consultation program to support the use of cytomics and laser scanning microscopy to impact not only research productivity, but the competitiveness of students and fellows trained on our campus.

<https://www.utsa.edu/crts/rcmi-immunology/>

User Support Services

Our Core Provides The Following Services:

- Access to state-of-the-art instrumentation for flow cytometry, confocal, and 2-photon imaging
- Setting up and maintaining all instruments
- Education and training in the use of core instrumentation
- Assistance in the incorporation of flow cytometry, confocal microscopy, and live-cell imaging applications to researchers' needs
- Technical support for flow cytometry and confocal microscopy applications
- Consultation on projects, data interpretation and analysis for manuscripts/grant proposals

Contacts:

Core Technical Director

Sandra M. Cardona, Ph.D.

(210) 458-4093

Cell.Analysis@utsa.edu

Scientific Advisory Board Chair

Astrid Cardona, Ph.D.

(210) 458-5071

Cell.Analysis@utsa.edu

For more information on this core and others please visit us at:

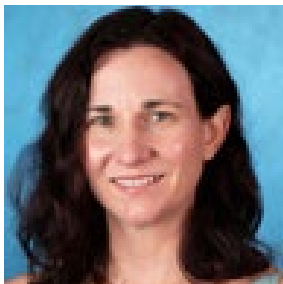
<https://www.utsa.edu/bhc/core/index1.html>

BHC Faculty *In the Press*

Communication is at the heart of scientific advancement and innovation. Between June 1, 2021-August 31, 2022, BHC, members published 78 original manuscripts and reviews, further contributing to our understanding of brain health and disease.

Here, we highlight selected manuscripts by our members.

Melanie Carless



Blood-based miRNA biomarkers as correlates of brain-based miRNA expression, by Mark Z. Kos, Sobha Puppala, Dianne A Cruz, Jennifer L. Neary, Ashish Kumar, Emma Dalan, Cun Li, Peter Nathanielsz, Melanie A. Carless, published in Frontiers in Molecular Neuroscience, section Methods and Model Organisms.

<https://pubmed.ncbi.nlm.nih.gov/35392269/>

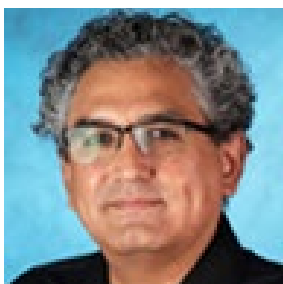
Gabriela Romero Uribe



Claudia Collier, Nicolas Muzzio, Rohini Thevi Guntnur, Amanda Gomez, Carolina Redondo, Raquel Zurbano, Ivan K. Schuller, Carlos Monton, Rafael Morales*, Gabriela Romero*. "Wireless Force-Inducing Neuronal Stimulation Mediated by High Magnetic Moment Microdiscs", Advanced Healthcare Materials, 2021. DOI: 10.1002/adhm.202101826.

<https://pubmed.ncbi.nlm.nih.gov/34890130/>

Fidel Santamaria



The allometric propagation of COVID-19 is explained by human travel
RohishaTuladhar, Paolo Grigolini, FidelSantamaria
Infectious Disease Modelling
Volume 7, Issue 1, March 2022, Pages 122-133

<https://www.sciencedirect.com/science/article/pii/S2468042721000841?via%3Dihub>

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The Max and Minnie Tomerlin Voelcker Fund

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