Official Newsletter of the *UTSA Brain Health Consortium*

BRAIN WAVES

August *2023*

Message From BHC Director:

This year marks my 5-year anniversary at UTSA. Since my arrival, UTSA has achieved Carnegie R1 status, in part because of the incredible research that you and your teams are doing. To continue to expand transdisciplinary research, I'm delighted to announce that this year we've merged with the UTSA Neurosciences Institute and the Bank of America Child and Adolescent Policy and Research Institute (BOA-CAPRI). Under the directorship of Dr. Charles Wilson, the UTSA Neuroscience community expanded the scope of its activities to include a strong component of faculty and student career development training through its Annual Neuroscience Symposium, Public Lecture Series, and 'Neuroscientists Talk Shop' Podcast, amongst other activities. With our steady focus on science and engineering, coupled with the desire to develop community-based research; by partnering with BOA-CAPRI, directed by Dr. Leslie Neely, we are adding capabilities in the social determinants of brain health, neurodevelopmental disorders, and mental and behavioral health. I've already had multiple brainstorming meetings (no pun intended!) with Dr. Neely and Dr. Wilson on how to support and promote collaborative research across UTSA. Stay tuned for exciting events ahead. Thank you for your continued support and contributions.

Dr. Jenny Hsieh

What's Inside:

Merging Minds

The BHC has grown our collaborative community in 2023 by welcoming the addition of the UTSA Neurosciences Institute (now UTSA Neurosciences found at neuroscience.UTSA.edu) and the Bank of America - Child and Adolescent Policy Research Institute (BOA-CAPRI found at: education.utsa.edu/research-service-centers/capri/). In combining forces, the BHC gains the insight and innovation of our new Associate Directors, Dr. Leslie Neely and Dr. Charles Wilson, and the various research faculty associated with their respective units.

Dr. Wilson will continue to mentor and guide our students and faculty thru the rigors of scientific and professional development, produce the podcast hit “Neuroscientists Talk Shop” on iTunes, and oversee the well-established Neuroscience Symposia and annual Distinguished Public Lecture that encourages hot topic conversations in the UTSA and local scientific communities.

Dr. Neely will continue to lead the charge forward on developing external research and communal partnerships to grow extramural funding as well as collaborative research opportunities to advance overall BHC goals. A recent event of note in this regard is the signing of a memorandum of understanding between UTSA and the Multi-Assistance Center (The MAC) at Morgan’s Wonderland.

This partnership aims to set The MAC as a comprehensive service for providing both medical and non-medical support for families and individuals with special needs of all ages across the greater San Antonio area.

Dr. Jenny Hsieh, BHC Director, sums up our growth spurt best "With our steady focus on science and engineering coupled with the strengthened community-based partnerships which BOA-CAPRI brings, we hope to create and broaden research projects with non-STEM disciplines. This includes advancing the understanding of non-medical drivers of brain health such as health care equity and educational equity, development of interventions to advance brain health interventions for mental and behavioral health, interventions to increase brain health literacy in under-served populations, and research to increase inclusion of diverse populations in brain health research, especially from underrepresented communities. We want to encourage further collaboration across all fields, to address complex brain health challenges with new methodologies and approaches from a multi-faceted transdisciplinary approach".

For more information see: https://www.utsa.edu/today/2023/02/story/brain-health-consortium-research-institute-merger.html

EVENTS AT A GLANCE...

UT System Brain Health Summit

During November 7-8, the BHC was provided the opportunity to represent UTSA at a System wide gathering of top scientists, researchers and health care experts from across health and academic institutions to collaborate on the latest neuroscience research and care related to various brain diseases, from Alzheimer's and dementia to substance use, pain, depression, schizophrenia, traumatic brain injury and stroke, and more.
For more info see:
https://www.utsa.edu/today/2022/10/story/researchers-lend-expertise-at-brain-health-summit.html

BHC/IRM Capabilities Day

The BHC and the UTSA Institute of Regenerative Medicine (IRM) jointly presented a day long workshop on February 3rd to discuss "Synergizing Research Capabilities at UTSA" to highlight multiple departments and colleges and their unique research approaches, resources and methodologies relevant to studies of regenerative medicine and brain health. Faculty presented short summaries of specialized research capabilities they routinely utilize in their own labs in a format that exemplifies how others might adapt those approaches for use in their own endeavors, either on their own or as part of new collaborative efforts to potentially advance goals or provide new avenues of exploration.

Viva Science! 2023

Once again the BHC had the opportunity to spend a day at the Witte Museum's May's Family Center on April 1st to talk to one and all about the many great things we have going on at UTSA! This year was exceptional in that the turn out of future STEM pioneers was fantastic, just going to show the future looks bright with these inquisitive minds set to guide the way.

TRANSDISCIPLINARY Research at UTSA

Stem Cells and Precision Medicine

Carolina Vivas-Valencia, Biomedical Engineering Dept., CEID

Dr. Vivas-Valencia seeks to advance precision population health using data analytics, with the aim of tailoring proven interventions for populations of heterogenous risks and from socioeconomically disadvantaged communities. By leveraging biomedical and electronic health records to develop semi-mechanistic models on the health risks of vulnerable populations she can study the impact of social and genetic determinants on care access and health outcomes.

Website: https://heallaboratory.com/

Neuroscience

Nicole Wicha, NDRB Dept. COS

Dr. Wicha focuses on understanding how the human brain processes language in real time using both behavioral and brain imaging techniques. In particular event-related brain potentials, which is a non-invasive direct measure of electrical brain activity with excellent precision in the time domain are used to investigate the neural time course of language.

Website: https://www.utsa.edu/sciences/labs/NicoleWicha/

Neuroengineering

Morteza Seidi, Biomedical Engineering Dept., CEID

Dr. Seidi's research interests are in impact biomechanics, traumatic brain injury (TBI), and injury protection devices. His team searches for ways to develop clinically translatable diagnostic and prognostic metrics of TBI to advance evaluation and therapeutics for impacted patients and preventative measures.

Website: https://ceid.utsa.edu/team/morteza-seidi-ph-d-p-e/

Psychology and Behavior

Denver Brown, Psychology Dept., HCAP

Dr. Brown's overarching goals are to improve the health and wellbeing of children and youth through the promotion, adoption and maintenance of healthy active lifestyles. Currently he focuses on understanding why the majority of children and youth do not engage in recommended amounts of physical activity - in particular, those with chronic health conditions and disabilities - and as a result, establishing the downstream consequences of physical inactivity for their mental health and wellbeing.

Website: https://hcap.utsa.edu/faculty/profiles/brown-denver.html

SEED Grant Winners

October 1, 2023 through July 31, 2024

$60,000 awarded: $30,000 split between two projects

PI: Emily Bonner, Co-PI's: Nicole Wicha, Priscilla Prasath

Emily Bonner
Assoc. Prof.
ILT Dept.
COEHD

Priscilla Prasath
Asst. Prof.
Dept. of Counseling
COEHD

Nicole Wicha
Prof.
NDRB Dept.
COS

The Brain Health Institute for Teachers (BRITE)

Scientific research is not always translated into practical outcomes that benefit the public. The Brain Health Institute for Teachers (Project BRITE) aims to address this complex issue or "science-practice" gap by exploring the translational space between scientific research on brain health and teacher classroom practice. Project BRITE will focus on piloting workshops that bring a brain health scientist together with classroom teachers. The goals of these workshops are (1) to allow scientists to share their scientific research and outcomes with classroom teachers, (2) engage the two groups in a collaborative discussion about the ways these findings might be translated into classroom practice, (3) investigate the ways (if any) teachers adjust their practice based on these discussions, and (4) use these teacher data to inform translational best practice among scientists.

The Brain Health Consortium Collaborative Seed Grant program, sponsored by the Office of the Vice President for Research, Economic Development, and Knowledge Enterprise at The University of Texas at San Antonio, 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

SEED Grant Winners (cont)

October 1, 2023 through July 31, 2024

$60,000 awarded: $30,000 split between two projects

PI: Soo Chan Lee, Co-PI: Hyoung-Gon Lee

Soo Chan Lee
Asst. Prof.
MMI Dept.
COS

Hyoung-Gon Lee
Assoc. Prof.
NDRB Dept.
COS

Investigation of the Association of the Commensal Fungus Candida Albicans in Alzheimer's Disease

One line of thought suggests that Alzheimer's Disease may have a microbial origin, which relies on the model of the gut-brain axis. However, among the microbial residents in the gut, the fungal mycobiome is largely ignored. We now seek to understand the infectious consequences and the mechanism by which Candida contributes to AD etiology. Our data for both in vivo mouse and in vitro cell line models suggest that a toxin secreted by C. albicans, called candidalysin, increases gut permeability of the epithelial barrier permitting the fungus to migrate from the gut to the brain. The overall hypothesis of this proposal is that candidalysin is required for the migration of C. albicans from the gut to the brain and contributes to onset and or the progression of AD pathology.

Lee Lab: https://www.utsa.edu/stceid/labs/SooChanLee/

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

Postdoctoral Researcher

Q&A

Erin Hurley, Ph.D.

Dr. Erin Hurley, who recently completed her Ph.D. in Neuroscience and served a brief term as a Post Doc, will join the Insmed Inc. biopharmaceutical company as a Cell Assay Scientist beginning September 2023.

The focus of her research pertained mainly to the molecular mechanisms underlying familial Alzheimer's Disease and using stem cells via the 'disease-in-a-dish' model with brain organoids. In analyzing organoid data from this method she was able to determine a possible cause which bears more investigation. Her findings can be found in the NIH PubMed database under "Familial Alzheimer's disease-associated PSEN1 mutations affect neurodevelopment through increased Notch signaling" https://pubmed.ncbi.nlm.nih.gov/37352850/

Tell us how you got involved in brain health research?

I began my research career during my undergraduate at the University of Connecticut while studying Cognitive Science. I started research in a linguists lab studying the effects of traumatic brain injury in veteran soldiers on language discourse. I then also began working in a behavioral neuroscience lab studying the effects of antidepressants in rodent behavior models of depression. I quickly discovered I wanted to learn more about the cellular and molecular underpinnings of the behavioral deficits I was finding, which brought me to Dr. Jenny Hsieh's lab at UTSA to pursue my PhD and now my postdoc

What advice would you give a PhD student in their final years?

My advice to PhD students in their final years is to start earlier than you think you should for preparing for your defense and dissertation. The last two semesters fly by and before you know it, it'll be your defense day. I also recommend practicing your defense in front of a wide variety of audiences that are not familiar with your research. And lastly, enjoy the day of your defense. You know that area of your field better than anyone else in that room; use the time to share everything you have accomplished in the last half decade of your life. My defense day was one of my favorite days of my scientific career and I enjoyed it fully.

What advice would you give to other new Postdocs?

To other new postdocs, I would advise to not be scared to change your area of research completely. I have transitioned from studying Alzheimer's disease using stem cells to studying the neurological effects of COVID19 in mice. It is a great time to try something new and use your skill set from your PhD in a new avenue. Choosing a mentor is the biggest part of the PhD/postdoc career, and I cannot thank Dr. Hsieh enough for her mentorship during my PhD and postdoc.

SPOTLIGHT On Student Research

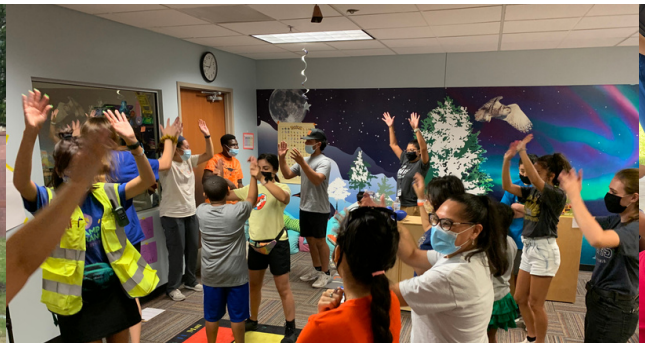
Katie Cantrell, M.Ed., BCBA, LBA

Doctoral Student

Katie Cantrell is a 1st year doctoral student in the Department of Educational Psychology but has been working with CAPRI/BHC for over 5 years as a Special Research Associate. She is a Board-Certified Behavior Analyst (BCBA) and works with individuals with autism to provide assessment and intervention services to address challenging behaviors and improve communication skills. Her research focuses on integrating novel technologies into behavior analytic interventions to improve the access and quality and access of services for individuals and their families. She also conducts qualitative studies evaluating the social validity of treatment models to ensure that families are receiving the supports they need and want.

One of the projects that Katie is most passionate about is Camp Durango, a summer day camp research program hosted at the Downtown UTSA Campus. Katie led the efforts to develop Camp Durango in 2021 in response to the lack of community engagement opportunities available to kids with autism post-Covid 19. The goal of the camp is to provide summer-camp experience for kids, adolescents, and adults who experience social communication delays or engage in challenging behavior – both exclusionary characteristics in other day-camp programs. Campers get to go on scavenger hunts, tie-dye t-shirts, play team sports, and design crazy slime in an environment that is designed specifically for their communication and sensory needs while also participating in research studies! This intersection allows families to participate and engage with innovative research at UTSA, in an approachable and fun environment. This summer, 7 researchers from 3 different UTSA departments participated to conduct over 10 different interdisciplinary studies. The program has served over 500 kids and adults with autism in the San Antonio community across the 3 summers!

To learn more about the Camp Durango program, and similar projects, visit www.abautsa.com/camp



Student Awards Announcements

Congratulations to outstanding students securing individual funding!

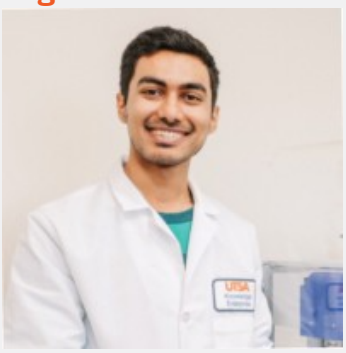
Karina Meyer-Acosta, Neuroscience PhD Student

NIH F31 Grant - Modeling Alzheimer's Disease in Hispanic Latino Populations Using Human Cortical Organoids

Despite Hispanic Latinos having an increased risk for developing Alzheimer's disease (AD) among all ethnic groups in the US, there is decreased or no association of the leading genetic risk factor Apolipoprotein E4 (APOE4) in AD. It is suggested that genetic variation specific to Mexican Ancestry, possibly regulatory, modifies APOE4 expression or function to protect against AD risk association. Understanding the mechanisms by which Mexican genetic ancestry modifies APOE4-mediated AD risk would identify novel therapeutic targets for APOE4 carriers and address a health disparity by studying genetic risk in an underrepresented ethnically diverse population.

Uchit Bhaskar, Developmental & Regenerative Science PhD Student

Diane Kalman - American Federation for Aging Research Scholarship - Age-Associated Signatures of Fibroblast-Derived Induced -Astrocytes



The primary objective of my project is to develop a method for directly reprogramming human fibroblasts into astrocytes to establish an "age-in-a-dish" model. Such models are likely to be broadly applicable in the study of age-related brain disorders including Alzheimer's disease, stroke, and others that are impacted by astrocyte physiology. Our lab will use epigenetic sequencing-based applications to investigate the maintenance of aging biomarkers, as well as cellular assays to assess astrocyte functionality.

Aranis Muniz Perez, BS Biology Graduate

NIH Diversity Supplement - Role of ARX Mutations in Marmoset Brain Organoids

A major hurdle in developing effective neurological treatments has been translation of scientific discoveries from rodent models to humans. To close this critical translational gap, we will use 3D organoid- and marmoset tissue-derived-tools to explore ARX-associated mutations linked to cortical malformation, epilepsy, and intellectual disability. The overarching goals of this project are to develop a marmoset model system to represent the neurobiology of the human brain to advance the utility of the marmoset model to benefit the brain health research community.

New Courses:

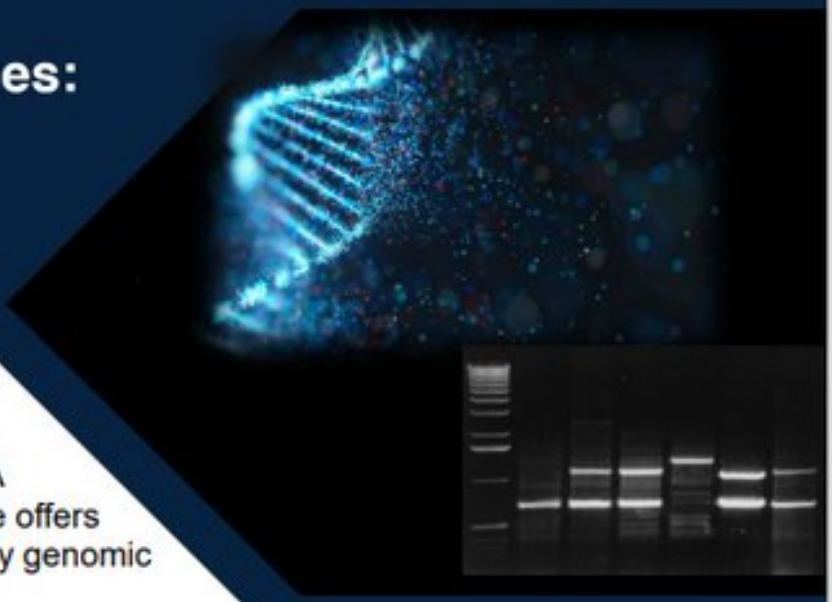
Fall 2023

Advanced Nucleic Acids Laboratory

Register via ASAP: *NDRB 5143*

Class Meeting Times:

T/R
9:00-11:30 AM



Interested in learning advanced techniques in manipulating DNA and RNA? This graduate course offers students the opportunity to purify genomic DNA, cDNA total RNA.

An introduction to advanced techniques of molecular biology dealing with manipulations and analyses of DNA and RNA, including preparation, cloning, polymerase chain reaction (PCR), rtPCR, mRNA isolation, Southern blotting, and much more.

Instructor: Dr. William Ramos
William.ramos@utsa.edu

Prerequisites:
Bio 3913 or equivalent and
Bio 5033 is recommended.

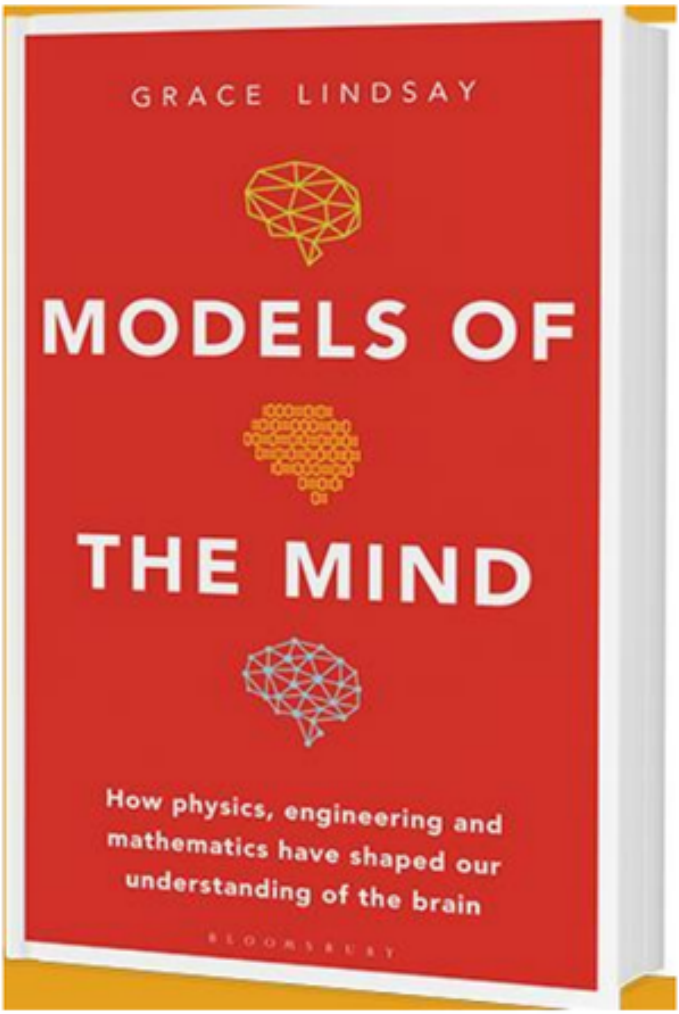
UTSA Neuroscience, Developmental and Regenerative Biology

New Courses:

Fall 2023 - Computational Neuroscience - NDRB 4783/5483

MW 2:30-3:45, Dr. Todd Troyer - todd.troyer@utsa.edu

An introduction to foundational ideas and classical models of how the brain works. Some also serve as the inspiration for algorithms in artificial intelligence and machine learning. Students will get hands on experience with running these models to understand how they relate to the biology of actual brains and what they say about brain function.



Available for both undergraduate (NDRB 4783) and graduate (NDRB 5483) credit.

Prerequisites: Computational Neuroscience is inherently interdisciplinary and the course is flexibly designed. Some math, basic programming, and Neuroscience are strongly recommended **but not absolutely required**. Motivated students with weaknesses in their backgrounds can succeed as long as they are willing to work with the instructor to gain supplemental knowledge.

Questions?

todd.troyer@utsa.edu

NDRB

New Courses:

Fall 2023

Neurobiology of Animal Behavior

Register via ASAP: *NDRB 6483*

Class Meeting Times:

Mondays
4:00-6:45 PM

Have you ever wondered how our brains control behavior? If so, this is the class for you!

In this course we will examine the neural systems involved with empathy, pain, mating, sneezing, itch, aggression, olfaction, play, social interaction and more.

We will cover current research on the neural systems that control our behavioral responses to stimuli in the environment. This course will teach you how to interpret, analyze, and communicate the findings from primary research journal articles.

Prerequisites:
BIO 3413, NDRB 3433 or instructor consent. Class is open to undergraduates
(requires permission & GPA > 3.0)

Instructor: Dr. Matt Wanat
matthew.wanat@utsa.edu

UTSA Neuroscience, Developmental and Regenerative Biology

FEATURED CORE

Mass Spectrometry & Proteomics Core

The mission of the UTSA Mass Spectrometry & Proteomics Core (MSPC) is to provide routine and custom mass spectrometry-based support to UTSA research programs and the broader research community. Initially called the Protein Biomarkers Core, the MSPC was established with support from the National Institutes of Health through the Research Centers in Minority Institutions (RCMI) program of the National Institute on Minority Health and Health Disparities. The MSPC was renamed in 2020 to better reflect the wide range of services that the core now offers as well as the diversity of research applications that we support.

User Support Services

Our Core Provides The Following Resources:

- High-resolution, high mass accuracy mass analysis (HRMS)
- Liquid chromatography-mass spectrometry (LC-MS)
- Proteomics-based analyses
- maXis quadrupole time-of-flight (QTOF) high-resolution mass spectrometer with electrospray ionization (ESI) and atmospheric pressure chemical ionization (APCI) sources
- Orbitrap Elite high-resolution mass spectrometer with electrospray ionization and nanospray ionization sources
- Acquity LC-MS system with triple quadrupole mass analyzer
- timsTOF Pro II QTOF high-resolution mass spectrometer with trapped ion mobility.

Contacts:

Research Core Director

Wendell P. Griffith, Ph.D.
(210) 458-5180
Mass.Spectrometry@utsa.edu

Note that Working with the MSPC is not limited to just the services listed on our website. We routinely develop new services as well as analytical methods for custom analyses for a number of our users in an endeavor to meet the needs of all UTSA researchers. Investigators interested in working with the UTSA Mass Spectrometry & Proteomics Core or discussing how mass spectrometry can be incorporated to enhance/advance research projects in their laboratories are encouraged to reach out to us.

For more information on this core and others please visit us at: https://research.utsa.edu/cores/mspc/

BHC Faculty In the Press

Here, we highlight selected manuscripts by our members.

Communication is at the heart of scientific advancement and innovation. ***So far in 2023 the merged BHC count for total unique publications stands at 123 and rising.*** *Our goal to further contribute to the understanding of the inner workings of the brain remains strong and we will continue to share discoveries and ask questions.*

Melanie Carless

Differential hydroxymethylation levels in patient-derived neural stem cells implicate altered cortical development in bipolar disorder, by Ashish Kumar, Mark Z. Kos, Donna Roybal, Melanie Carless, published in Frontiers in Psychiatry, section Molecular Psychiatry.

https://doi.org/10.3389/fpsyt.2023.1077415

Leslie Neely

Neely, Leslie & Carnett, Amarie & Quarles, John & Park, Se-Woong & Kelly, Michelle. (2023). Behavior Analytic Technologies Mediated via Augmented Reality for Autism: A Systematic Review. Journal of Developmental and Physical Disabilities. 1-27. 10.1007/s10882-023-09912-w.

https://assets.researchsquare.com/files/rs-1240067/v1/620b11ff-cd59-441b-a259-f3c092f3a7bc.pdf?c=1641848708

George Perry

Synthesize heterogeneous biological knowledge via representation learning for Alzheimer's disease drug repurposing
KL Hsieh, G Plascencia-Villa, KH Lin, G Perry, X Jiang, Y Kim
Iscience 26 (1)

https://www.cell.com/iscience/pdf/S2589-0042(22)01950-2.pdf

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Baptist Health Foundation of San Antonio

CONTACT US!

We want to hear from you if you have general questions or awards, publications, or news to highlight

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