UTSA.

The University of Texas at San Antonio
Office of the Vice President for
Research, Economic Development,
and Knowledge Enterprise

2020
ANNUAL
REPORT

TABLE OF CONTENTS

RESEARCH EXPENDITURES
$134 M

AWARDS
370

PATENTS
55

ECONOMIC IMPACT
$2.4 B

In what turned out to be a year like no other, the UTSA Office for Research, Economic Development, and Knowledge Enterprise found new ways to develop and support the campus research community and to be recognized as the great public research university we are.

The UTSA community rallied when the world shut down. Not only did the research enterprise pivot to continue life-changing and innovative research under new safety measures, researchers continued to engage their students, often digitally and remotely, in the discovery process.

This fortitude led us to reaching the highest research expenditures in the history of the institution. Our on-campus research is ever expanding, particularly in critical disciplines such as biomedicine, all things cyber, national security, education, arts, social justice, and more. Our division also completed rigorous submission applications for NRUF and Carnegie consideration. FY21 will be a critical counting year for us to propel UTSA in being recognized officially as a Tier One research intensive institution.

In tandem, at the Downtown Campus, the Institute for Economic Development helped small businesses connect to vital resources, which allowed them to survive and thrive during a pandemic. The economic impact of 2020's crisis demonstrated how essential their work is to our Texas economy.

The new year brings promise: a better understanding of the virus, new treatment modalities and vaccine distribution. As our university is an exemplar of innovative excellence for all, our mandate is to grow and support our researchers, our scholars, our innovators and our entrepreneurs, bringing even more assistance and resources for all to achieve their dreams.

UTSA is uniquely positioned to serve our communities which reflect the demographic future of our country. Our doors are always open.

Regards,

Bernard Arulanandam, Ph.D., MBA
Vice President for Research, Economic Development, and Knowledge Enterprise

$133,904,616

TOTAL RESEARCH EXPENDITURES

$64,112,215
Restricted

$69,792,401
Unrestricted

$34,334,601
Federal

$29,777,614
Non-Federal

$46,565,436
General

$23,226,964
Designated

TOP 10
LARGEST AWARDS

1 CV19: UTSA COVID-19 Business Recovery Accelerator FY20-21
United States Small Business Administration - LOC

Albert Salgado, Terri Williams
UTSA Small Business Development Center
$4,308,815

2 CONNECT- the Consortium on Nuclear Security Technologies
US Department of Energy

Kelly Nash, Elizabeth Wood, Harry Milwater, Miltiadis Alamaniotis, Amanda Fernandez
COS Physics & Astronomy, COE Mechanical Engineering, COE Electrical Engineering, COS Computer Science
$2,999,995

3 Role of cortical long-range GABAergic inhibition in emotional learning
National Institutes of Health

Alfonso Apicella, Isabel Muzzio
COS Neurosciences Institute
$2,911,061

4 FY19 State and Community Coordinated Cybersecurity Training
US Dept of Homeland Security

Natalie Sjelin and Gregory White
COS Center for Infrastructure Assurance and Security (CIAS), Computer Science
$2,547,585

5 South West TX SBDC Program Renewal FY19-20 - San Antonio
United States Small Business Administration - LOC

Albert Salgado
UTSA Small Business Development Center
$2,282,529

6 Mimetic Peptides-Mediated Protection Against Coxiella burnetii Infection
NIH National Institutes of Allergy/Infectious Diseases

Guoquan Zhang
COS Biology
$1,559,870

7 Identification of Regulatory Loci of Stx2a Cytotoxin Production in Enterohemorrhagic Escherichia coli O157:H7
National Institutes of Health

Mark Eppinger
COS Biology
$1,499,584

8 Sex differences in cardiometabolic health of offspring born from obese mothers with and without exercise
National Institute of General Medical Sciences

Eunhee Chung
HCaP Public Health
$1,419,790

9 Student Support Services Program
US Department of Education

Tammy Wyatt, Angelica Barrera
VPSS University College
$1,309,440

10 SWTAAC Renewal FY19-20 (YR4)
US Department of Commerce

Robert Velasquez
UTSA Institute for Economic Development
$1,211,784

EXPENDITURES

UNIT	AMOUNT
Architecture, Construction, and Planning (CACP)	$964,887
Business (COB)	$11,675,550
Education & Human Development (COEHD)	$9,018,310
Engineering (COE)	$23,095,725
Liberal & Fine Arts (COLFA)	$7,058,681
Health, Community and Policy (HCaP)	$9,216,047
Sciences (COS)	$39,835,481
Honors College	$15,151
VP Academic Affairs (VPAA)	$2,707,900
VP Research, Economic Development, and Knowledge Enterprise (VPREDKE)	$4,899,532
Other (VPAA,VPBA, VPDAR, VPEA, VPIE, VPIMT, VPSA, VPSE, VPSS, VPUR)	$3,257,972
Institutional Research Infrastructure	$22,159,373
TOTAL	**$133,904,616**

EXPENDITURES
BY RESEARCH CENTERS & INSTITUTES

RESEARCH CENTERS/INSTITUTES	AMOUNT
Child and Adolescent Policy Research Institute (CAPRI)	$387,124
Cyber Center for Security and Analytics	$1,740,849
Center for Excellence in Engineering Education (CE3)	$412,211
Center for Advanced Manufacturing Lean Systems (CAMLS)	$426,621
Sustainable Pervasive Urban Resilience (SPUR)	$369,988
Texas Sustainable Energy Research Institute (TSERI)	$1,735,888
Center for Archeological Research (CAR)	$899,009
Center for Urban and Regional Planning Research (CURPR)	$ 9,882
Center for Cultural Sustainability (CCS)	$182,566
Institute for Demographic and Socioeconomic Research (IDSER)	$948,205
Center for Infrastructure Assurance and Security (CIAS)	$1,300,288
South Texas Center for Emerging Infectious Diseases (STCEID)	$2,757,392
Institute for Water Research, Sustainability and Policy (IWRSP)	$488,191
San Antonio Cellular Therapeutics Institute (SACTII)	$ 523,743
Institute for Cyber Security (ICS)	$940,741
Center for Research and Training in the Sciences (CRTS)	$4,451,976
Neurosciences Institute (NI)	$2,395,330
UTSA Mexico Center	$135,949
Center for Research and Policy in Education (CRPE)	$208,688
Academy for Teacher Excellence Research Center	$759,070
Center for Innovation and Drug Discovery (CIDD)	$1,134,340
Open Cloud Institute (OCI)	$792,070
Center for the Inquiry of Transformative Literacies (CITL)	$154,189
Institute for Health Disparities Research (IHDR)	$563,688
Team Autism Research Center (ARC)	$4,126
Center for Community-Based and Applied Health Research (CCBAHR)	$381,260
National Security Collaboration Center (NSCC)	$940,761
Urban Education Institute (UEI)	$649,111
Cybersecurity Manufacturing Innovation Institute (CyManII)	$ 95,560

TOTAL $25,788,831

AWARDS BY UNIT

UNIT	NUMBER
Architecture, Construction, and Planning (CACP)	7
Business (COB)	17
Education & Human Development (COEHD)	19
Engineering (COE)	55
Liberal & Fine Arts (COLFA)	76
Health, Community and Policy (HCaP)	36
Sciences (COS)	118
Library	5
Contex Office	2
VP Academic Affairs (VPAA)	4
VP Research, Economic Development, and Knowledge Enterprise (VPREDKE)	23
Other (VPBA and VPIMT)	4
VPSE	2
VPSS	2
TOTAL	**370**

AWARDS BY UNIT

UNIT	AMOUNT
Architecture, Construction, and Planning (CACP)	$554,821
Business (COB)	$2,231,651
Education & Human Development (COEHD)	$4,719,263
Engineering (COE)	$11,050,071
Liberal & Fine Arts (COLFA)	$2,073,994
Health, Community and Policy (HCaP)	$6,170,809
Sciences (COS)	$25,995,771
Library	$163,526
Contex Office	$750,000
VP Academic Affairs (VPAA)	$6,170,809
VP Research, Economic Development, and Knowledge Enterprise (VPREDKE)	$12,241,075
Other (VPBA and VPIMT)	$539,539
VPSE	$14,883,329
VPSS	$1,319,440
TOTAL	**$99,711,311**

PROPOSALS

SOURCE OF FUNDING	NUMBER OF PROPOSALS
Development & Gifts	8
Development & Gifts for Endowments	14
Federal	378
Federal Pass Through	194
Local Government	26
Other Government	7
Private	238
State	173
TOTAL	**1038**
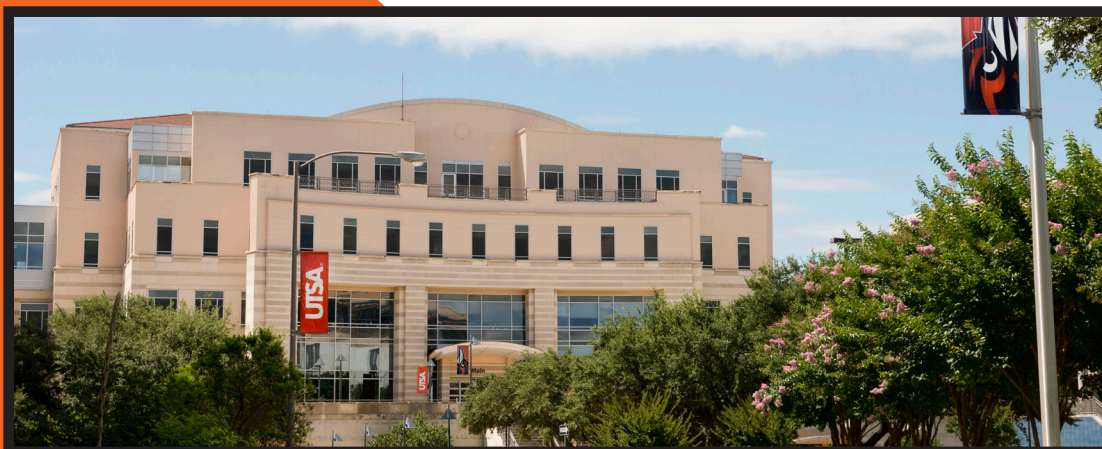
PROPOSALS

UNIT	SUBMITTED	AMOUNT REQUESTED
Architecture, Construction, and Planning (CACP)	37	$3,935,322
Business (COB)	66	$23,863,607
Education & Human Development (COEHD)	49	$21,456,192
Engineering (COE)	224	$127,015,027
Honors	1	$51,000
Liberal & Fine Arts (COLFA)	142	$6,466,801
Health, Community and Policy (HCaP)	92	$28,622,467
Sciences (COS)	361	$ 175,605,170
Library	9	$ 872,774
Contex Office	3	$1,000,000
VP Academic Affairs (VPAA)	6	$ 19,227,999
VPREDKE	40	$41,824,036
Other (VPBA, VPIE, VPIMT)	4	$689,541
VPSE	2	$ 14,945,327W
VPSS	2	$ 1,275,160
TOTAL	**1038**	**$465,931,856**

COMMERCIALIZATION & INNOVATION

The Office of Commercialization and Innovation (OCI) maintains a portfolio of over 300 active technologies, and has had more than 130 patents issue, 90 just in the last five years. The number of active startups is growing and increasingly succeeding at getting SBIR small business funding, including most recently Vitanova Biomedical and SAFEbiosense (for a total of $449,246).

UTSA startups also reflect the collaborative nature of San Antonio, with Leaptran developing technologies jointly-owned with CPS Energy, and MedCognition commercializing technologies from a UTSA/UT Health SA collaboration.

RENA BIZIOS INDUCTED INTO NATIONAL ACADEMY OF INVENTORS AND RECEIVED 2020 BIOMEDSA AWARD FOR INNOVATION IN HEALTHCARE AND BIOSCIENCE

Rena Bizios, Lutcher Brown Chair and professor of biomedical engineering at UTSA, was elected a fellow of the National Academy of Inventors. The honor recognizes Bizios for demonstrating a prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development and the welfare of society.

Dr. Bizios was also recognized in the same year by BioMedSA, a nonprofit corporation promoting and growing San Antonio's health care and bioscience, was presented with its 2020 BioMedSA Award for Innovation in Healthcare and Bioscience.

Bizios, a chemical/biomedical engineer by training and a pioneer in the field of biomedical engineering, joined the faculty at UTSA in 2006. Her research interests include cellular and tissue engineering, tissue regeneration, biomaterials (including nanostructured biomaterials) and biocompatibility. Her research endeavors made seminal contributions to cellular engineering, the understanding of cell-material interactions, protein/cell interactions with materials (including nanostructured ones), and in elucidating the effects of pressure and electric current stimulation on cell functions pertinent to new tissue formation. Her research has applications in the tissue engineering and tissue regeneration fields.

Bizios is fellow of five professional societies: American Institute for Medical and Biological Engineering, International Union of the Societies for Biomaterials Sciences and Engineering, Biomedical Engineering Society, American Institute of Chemical Engineers, and American Association for the Advancement of Science.

She is member of the National Academy of Medicine, the Academy of Medicine, Engineering and Science of Texas, International Academy of Medical and Biological Engineering, and now, the National Academy of Inventors.

VENTURE MENTOR SERVICE SAN ANTONIO

To strengthen UTSA startups and increase their odds of success, the Office of Commercialization and Innovation stood up the Venture Mentor Service San Antonio (VMS-SA) jointly with UT Health's Office of Technology Commercialization and support from UT System. Twelve business mentors were recruited and trained, and three VMS-SA companies were introduced and then matched with mentors in FY20.

As part of an encompassing mentoring program that stretches across The University of Texas System, this program differs from others, since it is team-based and includes a strong statement of principles to which all participants adhere. It is designed for the ventures to be focused on action and accountability and to create a community for the mentors.

Based on the model developed by MIT that has been running for over 20 years, the program has been facilitated by UT System, which provided both best practice and networking support for this chapter, and backend support for all the chapters.

The UTSA and UT Health SA collaboration follows programs established at MD Anderson, Austin Technology Incubator at UT Austin, and North Texas, a combined effort between UT Dallas, UT Southwestern and UT Arlington.

COMMERCIALIZATION ACTIVITY SUMMARY

Technology innovation and commercialization are major focuses of the UT System and other Tier One universities throughout the state and nation. The office establishes UTSA procedures and policies for technology transfer and commercialization, and provides training to faculty, staff, and students. It also spearheads a commercialization council that connects UTSA with regional technology commercialization partners.

Activity	FY 16	FY 17	FY 18	FY 19	FY 20
Commercial Agreements (Contract, SRA, MOU, NDA, & MTA)	143	109	102	92	101
New Invention Disclosures	53	62	51	53	56
Patents Filed	71	53	67	69	57
Copyrights & Trademarks	4	1	3	0	8
New License/Options Signed	3	8	6	9	2
Technologies Licensed/Optioned	3	10	7	8	3
Companies Incubated (New Venture Incubator)	15	7	7	8	6

5 YEAR TECHNOLOGY DISCLOSURES
BY COLLEGE

152   96   39
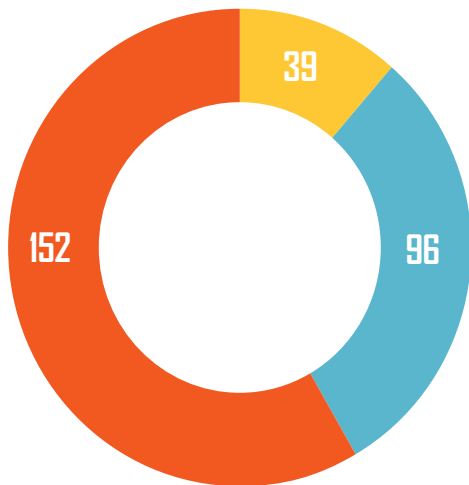
2020 TECHNOLOGY DISCLOSURES
BY COLLEGE

27   25   8
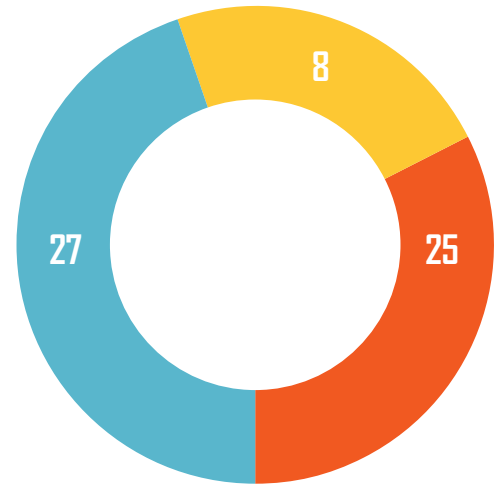
● College of Engineering   ● College of Sciences   ● Other (All other UTSA college units)

INNOVATION DISCLOSURES FY20

A medical device designed to clear out the human airway
Robert Lyle Hood, Christopher Carroll, Tomas Bello, Eduardo Garcia, Jacob Sundeep
Non UTSA Inventors: **Robert A DeLorenzo, Darnell Rashard Campbell**
COE Mechanical Engineering

Devices to enhance cone-beam reconstruction
Bruce Douglas Smith
COE Electrical & Computer

A high-resolution quantification screening of biological fluids for infections
Waldemar Gorski, Stanton McHardy, Hua-Yu Wang, Michael Bekhit
COS Chemistry

A method that combines the encryption and decryption processes into the same data path
Robert Lyle Hood, Forhad Akhter
COE Mechanical Engineering

A platform that allows facial recognition while not being constrained to large computing systems or servers
Eugene Britto John, Cory Dean Davis
COE Electrical & Computer

A device utilized for delivering drug and laser energy simultaneously for treating cancer and for local heating of the therapeutics
Eugene Britto John, Michael Stockton
COE Electrical & Computer

A novel approach to overcome the spatial resolution limit of mass spectrometry imaging when performed on biological specimens
Stephan B.H. Bach, Madeline Elise Colley
Non-UTSA Inventors: **Peter Manning LoCoco, Kenneth M. Hargreaves**
COS Chemistry

A device to protect voice systems from attacking modulated laser beams
Eugene Britto John, Ram Krishnan
COE Electrical & Computer Engineering

An energy efficient ECG pattern for arrhythmia classification in cardiac devices
Prianka L Sengupta, Eugene Britto John
COE Electrical & Computer Engineering

An on-site screening approach utilized to monitor the residues of sulfa drugs
Liang Tang, Lijun Wang
Non-UTSA Inventor: **Xiaofei Hu**
COE Biomedical Engineering

A designed scheme and methodology for industry cloud users to better utilize and manage their purchased cloud resources with reduced operation cost
Dakai Zhu, Amanda Fernandez, Hamidreza Moradi, Wei Wang
COS Computer Science

A fluidic oscillator with no-moving-parts (FONMP) that delivers single-pulsed flow and can be tuned systematically to adjust the frequency of pulses
Daniel Jordan Portillo, Robert Lyle Hood, Christopher Combs, Zach Stelle Fallon
Non-UTSA inventor: **Leonid Bunegin**
COE Mechanical Engineering

A weapon detection system designed to detect weapons and contraband using CCTV technology and IR camera sensors
Rembrandt Bukowski, Allen Herrera, Miles Martinez, Justice Montes
COE Electrical & Computer Engineering

An adsorbent that fulfills high sieving cost and energy efficient separation of important chemicals
Banglin Chen
Non UTSA Inventors: **Sheng Chang Xiang, Zhangjing Zhang**
COS Chemistry

A new machine learning technique that can discriminate temperature effect without any additional arrangement
Mehdi Shadaram, Sanjib Sarkar
COE Electrical & Computer Engineering

A new method for highly selective ethylene/ethane separation
Banglin Chen, Ruibiao Lin, Yanshu Shi
COS Chemistry

Machine learning methods and techniques to distinguish between IoT-generated traffic and other traffic
Elias Bou Harb, Morteza Safei Pour
COB Information Systems & Cyber Security, Accounting

Host-based prevention techniques to cease the execution of ransomware on any machine
Elias Bou Harb
COB Information Systems & Cyber Security

A strategy that will provide alternative chemotherapeutic treatment options for certain cancers
Francis Yoshimoto
COS Chemistry

A groundbreaking technology, research and development, in the medical utilization of Muon(μ) imaging and navigation
Miltiadis Alamaniotis
Non-UTSA Inventor: **Dimitrios Miserlis**
COE Electrical & Computer Engineering

An endovascular device for diagnostic or interventional purpose without the need for fluoroscopy or use of ultrasound
Teja Guda, Amir Jafari, Miltiadis Alamaniotis
Non-UTSA inventor: **Dimitrios Miserlis**
COE Biomedical Engineering/Mechanical Engineering/Electrical & Computer

A method that allows detection of materials and organisms measured at the interface without surface recognition elements
Teja Guda, Benjamin G Johnson, Michelle Colleen Cole, Chase Christensen, Mikayla Li Rahman
COE Biomedical Engineering

An invention that can enable analyzing the spread of an outbreak such as COVID-19 in a privacy-preserving manner
Ramnarayan Krishnan, Chunjiang Qian
COE Electrical & Computer Engineering

A self-powered weigh-in-motion system that generates electrical power from the weight exerted by a vehicle on a piezoelectric sensor
Athanassios T. Papagiannakis, Sara Ahmed, Gopal Vishwakarma, Mohamadreza Khalili
COE Civil & Environmental/ Electrical & Computer

An oxygen-driven tissue preservation device to preserve tissue, organs, and limbs.
Daniel Jordan Portillo, Robert Lyle Hood, Gabriela Lizeth Pineda, Sukhwinder Kaur, Stephen Ryan Rivas
Non-UTSA Inventor: **Leonid Bunegin**
COE Mechanical Engineering/ Biomedical Engineering

A wireless device that addresses both barriers to consistent social distancing and goals
Bryant Silbaugh
COEHD Interdisciplinary Learning and Teaching

Dynamic constant control for spin pumping modulation
Janeth Alexandra Garcia-Monge, Arturo Ayon
COS Physics and Astronomy

A method that can specifically bind to SARS-CoV-2 and subsequently be detected through optical visualization techniques
Douglas Frantz, Stanton McHardy, Kirk Schanze, Lynda DeLa Vina
Non-UTSA inventor: **Matthew Hart**
COS Chemistry, COB Economics

An ideal material configuration for use as a drug release carrier for endotracheal tubes
Teja Guda, Solaleh Miar
Non-UTSA inventor: **Gregory Robert Dion**
COE Biomedical Engineering

A chamber model which can be used as a drug assay to predict the tissue response to certain treatments
Rena Bizios, Teja Guda, Solaleh Miar
COE Biomedical Engineering

A tool/simulator that can develop quantum algorithms, transforms, and methods of processing data
Artyom M Grigoryan
Non-UTSA inventor: **Sos Agaian**
COE Electrical & Computer Engineering

A cyber security management procedure triggered by cyber intelligence and shared between defenders
Shouhuai Xu, Songlin He, Eric Ficke, Mir Mehedi, Ahsan Pritom, Huashan Chen, Qian Chen
Non-UTSA inventors: **Qiang Tang, Marcus Pendleton, Laurent Njilla**
COS Computer Science, COE Electrical & Computer Engineering

An implantable intrathecal drug delivery system
Douglas Edward Frantz, Robert Lyle Hood
Non-UTSA inventors: **Ralph Johnston, Paul V Fenton**
COS Chemistry, COE Mechanical Engineering

An oral vaccine against Covid-19
Janakiram Seshu
COS Biology

A novel class of compounds that could be used as a chemotherapy for cancer patients
Douglas Frantz
Non-UTSA inventors: **April Risinger, Nicholas Clanton**
COS Chemistry

A research platform solution for computational research collaboration, reproduction and verification
Jeff Prevost, Divyaansh Dandona, Mevlut Demir
COE Electrical & Computer

Acid derivatives from strain-induced nucleophilic retro-claisen ring-opening reactions
Michael Patrick Doyle, Kostiantyn Oleksandrovich Marichev
Non-UTSA inventor: **Rui Wang**
COS Chemistry

Novel quinolines for the treatment of COVID-19
Douglas Frantz, Fred Meece
Non-UTSA inventors: **Patricia V. Aguilar, Nathen Bopp**
COS Chemistry

A treatment that can eradicate Covid-19 virus particles
Dhiraj Sardar, Ajithkumar Gangadharan
COS Physics & Astronomy

Strain-induced nucleophilic ring opening of donor-acceptor cyclopropenes for synthesis of monosubstituted succinic acid derivatives
Michael Patrick Doyle, Kostiantyn Oleksandrovich Marichev
COS Chemistry

The use of organic oligo-and polyelectrolytes to inactivate SARS-CoV-2 virus
Kirk Schanze
Non-UTSA inventors: **Eva Chi, Patrick Donabedian, Linnea K. Ista, Allison Kell, Florencia Monge, David G Whitten**
COS Chemistry

A blockchain-based CPPA protocol which facilitates secure communications in networks such as intelligent transportation systems
Kim Kwang, Raymond Choo
Non-UTSA inventor: **Debiao He**
COB Information Systems & Cyber Security

A system that uses a virtual character with artificial intelligence that is a combination of dialog trees and an attention-based transformer model
John Quarles, Samuel Ang, James Bray
COS Computer Science, COLFA Psychology

Small molecule therapeutics for triple-negative breast cancer
Stanton McHardy, Michaels Glassman
Non-UTSA inventors: **Susan L. Mooberry, Petra Elizabeth, Jans Pederson**
COS Chemistry

New chemical composition, synthesis, and use for the treatment of Candida albicans infections
Jose L Lopez-Ribot, Stephen P Saville, Stanton McHardy, Matthew Christopher Valdez, Jesus Antonio Romo
COS Biology/Chemistry

RESEARCH SUPPORT

The office supports research excellence by providing training and workshops, supporting proposal development and nominations to prestigious awards, and facilitating collaboration across all disciplines and with external partners to secure funding for research activities, supporting innovation, discovery and student research.

FACULTY DEVELOPMENT

The team organized and facilitated professional development, trainings, and networking opportunities, bringing leading researchers and outside experts to engage with the UTSA community.

- Offered more than 20 events, including Writing Winning Proposals, Funding Search Tools and Tips, and Competing for Funding in the Humanities and Social Sciences
- Provided peer-mentoring programs, including the NSF CAREER program that served 41 faculty, 24 of whom submitted proposals, a record at UTSA
- Informed and educated a total of 132 individuals via our professional development, with more than 268 registrations

PROPOSAL DEVELOPMENT

Working with the Research Service Centers, the team supported investigators and teams as they developed applications to grants and prestigious awards. We have increased the number faculty awards secured by UTSA, bolstering our national competitiveness by submitting high-quality proposals.

In the past two years, faculty have earned the following highly prestigious awards:

6 NATIONAL SCIENCE FOUNDATION CAREER AWARDEES

3 FULBRIGHT US SCHOLARS

1 NATIONAL ENDOWMENT FOR THE HUMANITIES FELLOWSHIPS

1 AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE FELLOWS

CONFERENCES

The team organized and supported conferences, including the 6th annual San Antonio Military Health System (SAMHS) and Universities Research Forum (SURF), which brought the latest research and discoveries of faculty, staff, trainees and students together, working to improve the health outcomes and readiness of military and civilian populations.

- Collaborated with the SAMHS and the UT Health Science Center at San Antonio to host the first ever virtual SURF conference with a record 814 attendees
- Supported a number of conferences hosted by UTSA, for example:
  - » 8th annual Vaccine Development Center of San Antonio Conference
  - » 6th annual San Antonio Conference on Stem Cell Research and Regenerative Medicine
  - » UTSA Graduate School Conference

STRATEGIC RESEARCH INITIATIVES

UTSA's Knowledge Enterprise awarded its annual internal funding opportunities to seed research on campus. Over $495,000 was awarded to 42 faculty members to kick-start or further current research projects. The funding mechanisms were the long-established seed grants programs -- Connect, INTRA, and GREAT -- with 38 grants given for FY20.

The funds help faculty explore new ideas, support student engagement in research activities, and acquire the necessary data to apply for more complex external funding to propel their research. Seeding internal research also leads to additional funding from federal agencies. For example, the FY 2019 seed grants awards had a 730% return on investment with awardees already securing $4.1 million in follow-up funding. Prior year programs continue to yield success.

FY2020 AWARD TOTALS

CACP	3 awards	$15,000
COB	6 awards	$135,000
COE	9 awards	$208,000
COEHD	6 awards	$30,000
COLFA	9 awards	$60,000
COPP	1 award	$10,000
COS	4 awards	$39,980

TOTAL $497,980

RETURN ON INVESTMENT

AS OF SPRING 2020:

32 Seed Grant Awards Totaling **$495,000**

VPREDKE tracks two years of research output. Return on seeding research for FY 2019 Awardees generated:

28 Grant Submissions

8 Awards

59 Submitted Publications

43 Undergraduate Students

43 Graduate Students

3 Postdoctoral Scholars

1 Visiting Scientists Engaged

10 Other Scholarly Works

RESULTED IN A RETURN ON INVESTMENT TOTALING:

$4,107,082

INTERNAL RESEARCH AWARDS (INTRA)

The Internal Research Awards (INTRA) program is part of the UTSA Vice President for Research, Economic Development, and Knowledge Enterprise's coordinated efforts to promote research and scholarship of the highest quality. This program offers experience in identifying and submitting applications to potential funding sources, provides preliminary data to support applications for extramural funding, and enhances scholarly and creative activities.

College of Architecture

Architecture
Antonio Martinez-Molina
The Impact of Sustainability Education on the Practice and Lifestyle of Architecture Students Around the World

Architecture
Saadeet Toker Beeson
Assessment of Flood Hazards in Coastal Areas Using Satellite Images

Construction Science
Ibukun Gabriel Awolusi
Enhancing the Diffusion of Wearable Sensing Devices for Personalized Safety and Health Monitoring in Construction

College of Business

Economics
Edgar Ghossoub
Economics - Corruption, Income Inequality, and Monetary Policy

Information Systems and Cyber Security
Charles Liu
Information Science & Cyber Security - From Puzzles to Portraits: Enhancing Situation Awareness during Natural Disasters Using a Machine Learning Approach

Marketing
Deepa Wani
Management Science & Statistics - Collaborative Partnerships in Integrated Healthcare Delivery: Evidence from Accountable Care Organizations

College of Education and Human Development

Educational Leadership and Policy Studies
Van Lac
Preparing Equity-Oriented and Community-Based Educational Leaders: A Study of Participatory Action Research as an Approach to Leading Alongside Marginalized Communities

Educational Psychology
Amarie Carnett
Evaluation of infant and toddler sleep problems in children with high risk for autism

Educational Psychology
Guan Saw
Contested Racial Identities among Young Students: Prevalence, Predictors, and Implications

Interdisciplinary Learning and Teaching
Samuel DeJulio
¡Averigüémoslo!: Enhancing Literacy in Colombia through an Innovative Inquiry Curriculum

Kinesiology, Health, and Nutrition
Masataka Umeda
Psychophysiological factors underlying augmented muscle pain during exercise in fibromyalgia

Kinesiology, Health, and Nutrition
Tianou Zhang
Antioxidant and Anti-inflammatory Effects of Oat Avenanthramides (AVA) Supplementation on Young Women and Men after Downhill Running

College of Liberal and Fine Arts

Anthropology
Eva Wikberg
Genetic diversity and differentiation in Costa Rican primates

Art & Art History
Juliet Wiersema
Ancient Tiwanaku Portrait Vessels: Identity, Agency, and Politics in Ancient Bolivia

Communication
James McDonald
Organizing Support for DREAMers on College Campuses: A Multi-Sited Ethnography of Resource Centers for Undocumented Students

English
Mark Bayer
The American Editorial Tradition and the Emergence of Shakespeare Studies

Music
Ethan Wickman
Driftwood Canticles

Philosophy
Jessica Wright
The History of the Brain in Ancient Greek Medicine and Philosophy

Political Science and Geography
Bryan Gervais
The Effects of Candidate Gender on Reactions to Elite Political Incivility

Political Science and Geography
Richard Jones
The Termination of DACA: Impacts on Youthful Careers and the US Economy

GRANTS FOR RESEARCH ADVANCEMENT AND TRANSFORMATION (GREAT)

09.01.2019 - 08.31.2020
$80,000 awarded: $20,000 per researcher x 4 new projects

The GREAT program provides seed grants to support new areas of research for faculty at UTSA, to assemble preliminary data that can be used to seek extramural funding and advance UTSA's goal of reaching Tier One status.

College of Engineering
Biomedical Engineering
Gabriela Romero Uribe
Wireless magneto-mechanical control of neural activity mediated by magnetic nandiscs

Mechanical Engineering
David Restrepo
Novel Intrinsic Energy Dissipation Materials for Multi-Hazard Resilient Infrastructures

College of Liberal & Fine Arts
Psychology
Ephrem Fernandez
Alleviating Pain and Opioid Dependence through Anger Management: A Pilot Study

College of Sciences
Mathematics
Duy Nguyen Vu Hoang
Relativistic Equations of Motions for Strongly Gravitating Astrophysical Bodies

CONNECTING THROUGH RESEARCH PARTNERSHIPS (CONNECT)

09.01.2019 - 08.31.2020
$250,000 awarded: $125,000 per team ($50,000 UTSA; $75,000 SwRI)

The CONNECT Program is a joint effort between The UTSA and the Southwest Research Institute (SwRI). The program encourages interaction between investigators in support of the acquisitions of established extramural, peer-reviewed research funding. This agreement provides unprecedented opportunities for researchers to work together in addressing issues of mutual interest and need.

Brendy Rincon Troconis | UTSA
W. Fassett Hickey | SwRI
Effect of Additive Manufacturing on the Hydrogen Embrittlement of Alloy 718

Christopher Combs | UTSA
Jacob Delimont | SwRI
Non-Intrusive Measurements and Simulations of Direct-Fired sCO_2 Flows for Low-Emission Renewable Energy Generation

TRANSDISCIPLINARY TEAMS PROGRAM (T2)

09.01.2019 – 08.31.2020
$40,000 awarded: $20,000 per researcher x 2 new projects

The Transdisciplinary Teams (T2) Program provides seed grants to support UTSA faculty members to engage in scholarly research activities that foster transdisciplinary collaborations. The primary goal of these awards is to assemble teams of researchers from different disciplines that will establish a foundation to seek extramural funding.

Team:
Ethan Ahn | College of Engineering
Department of Electrical & Computer Engineering

Wei Gao | College of Engineering
Department of Mechanical Engineering

Arturo Ponce Pedraza | College of Sciences
Department of Physics

Transdisciplinary Investigation of Electromechanical Coupling-driven Properties of New 2D Materials

Team:
Yufei Huang | College of Engineering
Department of Electrical & Computer Engineering

Jenny Hsieh | College of Sciences
Department of Biology

Changfeng Gui | College of Sciences
Department of Mathematics

Identifying Local Field Potential Biomarkers for Epileptic Patient-Derived Organoids Using Machine Learning

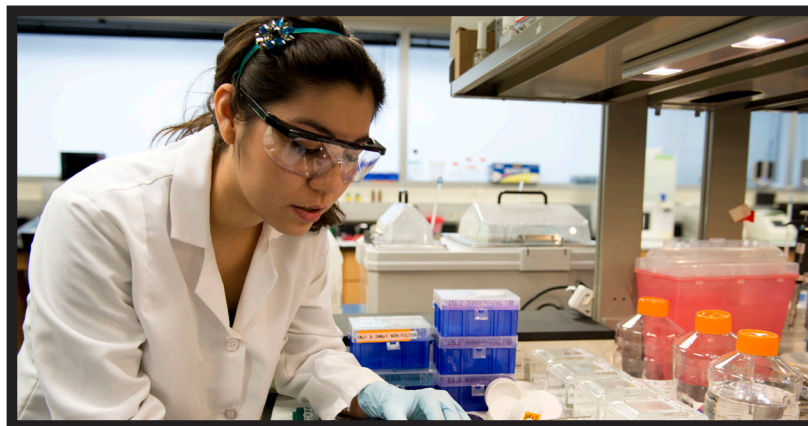# UTSA & ITESM SEED FUNDING PROGRAM

09.01.2019 – 08.31.2020
$240,000 awarded: $80,000 per team ($40,000 UTSA; $40,000 ITESM)

The UTSA & ITESM Seed Funding Program is a joint effort between The UTSA and the Tecnológico de Monterrey (ITESM). The program promotes mutual interests, strengthens connections among the campuses, and catalyzes early-stage research that can lead to external funding.

Raymond Choo | UTSA
Jesús Arturo Pérez Díaz | ITESM
Cyberattack Mitigation in Software Defined Networks

Paul Rad | UTSA
Hugo Terashima-Marín | ITESM
Context-Aware Video Detection and Interpretation of Suspicious Behavior Using Distributed Robust Deep Learning

Rajendra Boppana | UTSA
Luis Angel Trejo Rodríguez | ITESM
Detection and Visualization of DDoS Attacks on Software-Defined Networks

URBAN EDUCATION INSTITUTE SEED FUNDING PROGRAM

09.01.2019 – 08.31.2020
$20,000 awarded: $10,000 per researcher x 2 new projects

The Urban Education Institute (UEI) Seed Funding Program sponsored by the Urban Education Institute and the Vice President for Research, Economic Development, and Knowledge Enterprise (VPREDKE) supports applied research projects aimed at improving the share of San Antonio students pursuing and completing a postsecondary education.

College of Engineering
Mechanical Engineering
Kiran Bhaganaga
Urban Air Quality Detection using In-Situ Sensors and Prediction Model

College of Public Policy
Demography
Ying Huang
Assessing the Association between Neighborhood Disadvantage and Student Mobility in San Antonio

BRIDGE FUND PROGRAM

01.01.2020 – 12.31.2020
$30,000 awarded: $15,000 per researcher x 2 new projects

The Bridge Fund Program (BFP), an initiative of the Brain Health Consortium (BHC), funded by the Office of the Vice President for Research, Economic Development, and Knowledge Enterprise (REDKE), provides funding for limited, interim research support based on the merit of a previously submitted application being revised for resubmission.

College of Engineering
Biomedical Engineering
Jing Yong Ye
Multiplex Biosensing of Neural Organoids Modeling Traumatic Brain Injury

College of Sciences
Biology
Lindsey MacPherson
Vagal Innervation of the Stomach and Duodenum

CIBOLO PRESERVE FUND PROGRAM

09.01.2019 – 08.31.2020
$7,980 awarded: up to $3,000 per researcher x 3 new projects

College of Engineering
Civil and Environmental Engineering
Vikram Kapoor
Monitoring Harmful Algal Blooms in Environmental Waters in Cibolo Preserve

College of Sciences
Environmental Science & Ecology
Brian Laub
Seasonal Dynamics of Hydrology, Water Quality, and Food Resources along a Longitudinal Gradient Cibolo Cree
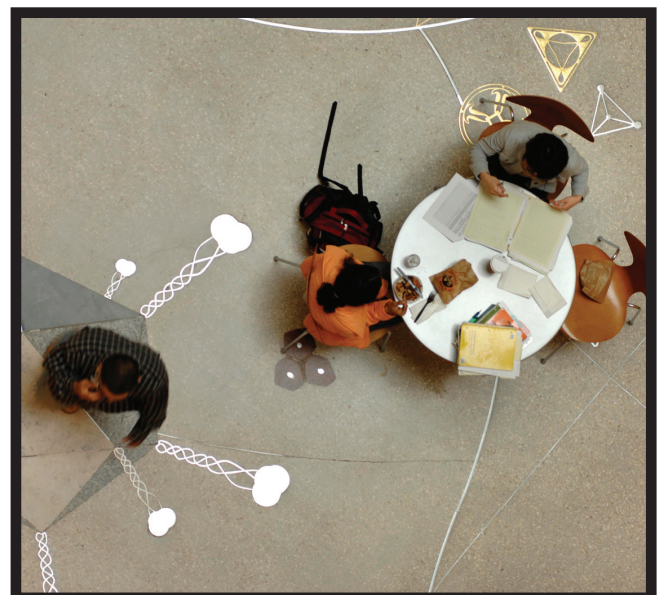
Environmental Science & Ecology
Allison Veach
Microbiome responses to prescribed fire among vegetation mosaics

TRANSDISCIPLINARY RESEARCH PROJECTS

The Office of the Vice President for Research, Economic Development, and Knowledge Enterprise and Academic Affairs awarded the FY21 Transdisciplinary Teams research awarded $50,000 to two teams, representing four colleges and five departments collectively.

The program was launched in 2019 in response to the growing complexity of research and faculty needs. The T2 supports faculty to engage in scholarly research activities that foster transdisciplinary collaboration by assembling teams of researchers from different disciplines. The program also establishes a foundation for faculty to seek extramural funding, ultimately advancing UTSA's research strengths and growing new areas of opportunity.

With San Antonio forecasted to have significant population growth by 2040, the research concentration was smart and connected cities, with a call for proposals that intersected technology and policy in topics areas that merge social mobility, affordable housing, water, utility and waste management, population health and community wellness, digital connectivity, transportation, e-governance and sustainability.

Earlier this year, UTSA became a key collaborative partner in the R&D League, a new research and development program with the City of San Antonio, Southwest Research Institute and USAA to address local civic challenges to enhance our neighborhoods and communities.
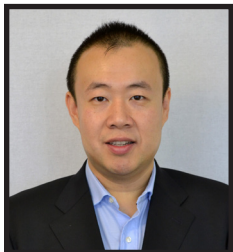
Led principal investigator **Wenbo Wu** (Management Science and Statistics), the first team, collaborating with **Ying Huang** (Demography), **Thankam Sunil** (Public Health), and **Eric Shattuck** (Public Health), is working on "Integration of Mobile Positioning, Sociodemographic factors, and Household Health for Urban Scale Energy Consumption Simulation and Planning", integrating expertise from statistics, engineering, public health, and demography. [Pictured left to right]

The team is developing a novel approach to understand how a set of diverse occupant behaviors impacts energy consumption, tracking time use, mobility, and health status – elements often overlooked in previous energy use models.

Over 400 households in the San Antonio neighborhoods of Elm Creek and Jefferson heights will be surveyed, communities chosen as they are representative of both ends of the socioeconomic spectrum. Data will be aggregated and combined with mobility data derived from cell phone GPS log files to understand how neighborhood population densities vary over time. The team will then be able to model neighborhood-level occupant behavior to better predict energy use and refine sustainable smart community/city models.
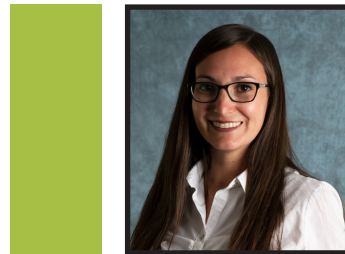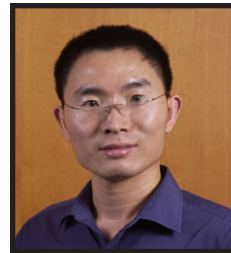
The second project is led by **Dakai Zhu** (Computer Science) working with **Jeff Prevost** (Electrical and Computer Engineering), **Keying Ye** (Management Science), Amanda Fernandez (Computer Science), and **Wei Wang** (Computer Science). [Pictured left to right]

The project, "Towards Statistical and Adaptive Learning in Edges for Smart Health Applications in Connected Communities with Security and Privacy Enforcement," is focused on designing and developing a micro-service based intelligent Edge computing framework.

The team will use digitized sensing data from IoT-enabled devices (e.g. smart thermometers and motion sensors) and smart applications (e.g. assisted living and pandemic flu status) from a large number of mixed-communities to better serve their health needs. The team is also considering the added requirements to ensure the security and privacy of the data and devices while providing flexibility and usage efficiency.

The team is leveraging statistical and learning models, scheduling algorithms and management schemes in Edge devices to support connected communities. These devices can provide effective protection for the privacy of the sensitive health data collected, as well as enable advanced security features for smart health applications. The project will also provide education and research opportunities for underrepresented minority students.

Both these projects also align with UTSA's vision of growing data intelligence across a wide spectrum of fields to address societal challenges and improve our communities.

INSTITUTE FOR ECONOMIC DEVELOPMENT

Since 1979, UTSA's economic development programs have been building the economy, one business at a time. UTSA's Institute for Economic Development hosts a variety of centers and programs that facilitate economic, community and business development at the local, regional and national levels. Programs serve the entrepreneur who is just starting a business to the experienced business owner looking for new markets, to communities seeking to improve their economic health.

COVID BUSINESS RECOVERY ACCELERATOR (COBRA)

Shortly after COVID-19 struck Texas, UTSA's Institute for Economic Development launched the Small Business Development Center COVID Business Recovery Accelerator to help small businesses weather the financial hardships caused by the coronavirus pandemic.

The recovery accelerator is the only one of its kind in Texas designed to help stabilize and rebuild the small business economy. Funded by a $1.2 million grant from the U.S. Small Business Administration, it serves small businesses in Bexar County and 10 surrounding counties by providing counseling and resources to pursue loans from the financial industry and to begin recovering from the economic impact of the pandemic.

COBRA acts as a single access point to help small businesses access relief, recovery, rebooting and resilience resources. To provide businesses with relief, the accelerator helps them navigate federal funding opportunities, such as the SBA's Paycheck Protection Program and its Economic Injury Disaster Loan Emergency Advance. It also assesses the applications of businesses that have been denied emergency funding and help them reapply.

From the funding provided to the SBA through the CARES Act, the South-West Texas Border SBDC Network, a 79-county network that spans the Gulf Coast and Central, West and South Texas, received over $4.3 million. In addition to the $1.2 million allocated to COBRA, the SBDC Network has distributed $3.1 million to its nine field centers outside of the city so they can add staff aligned with COBRA's efforts.

"What we're aiming to do is have an adviser – a real, live person who knows the system. It is a severe and stressful situation so having somebody who is your counselor can be a big change. It's one thing to have someone give you some money. It's another thing to have somebody who can help you figure out how best to use it and prepare for getting out of this situation, getting out of this crisis, and preparing yourself for the next and to rebound."

-Rod McSherry
AVP, Institute for Economic Development

$2.4 BILLION

In Direct Economic Impact For 2020

($2.4 billion is the aggregate amount of new financing & investments | new sales, contracts & exports)

SERVICE RESULTS

37,748
Businesses Served

1,061
Training Events & Courses

25,858
Training Participants

7,690
Consulting Cases

4,200
Business Research Tasks

ECONOMIC IMPACT

3,712
Jobs Created

6,323
Jobs Retained

354
New Business Starts

348
Business Expansions

$1,997,627,969
New Sales, Contracts & Exports

$402,073,788
New Financing & Investments

$27,700,200
New Tax Revenue Generated

MATRIX AI Consortium

MATRIX: The UTSA AI Consortium for Human Well-Being officially launched in July 2020. Artificial Intelligence is a key focus for UTSA, solidifying this cluster of research activity into a collaborative forum and collective.

Comprised of diverse local, national and international AI and machine learning researchers, the consortium is dedicated to conducting transformative research in the design, use and deployment of AI to enhance human life.

Leading this multiorganizational consortium is **Dhireesha Kudithipudi** '06, the Robert F. McDermott Chair in Engineering and a professor of electrical and computer engineering and computer science at UTSA. Her research expertise is in neurally-inspired AI algorithms, AI accelerators, energy-efficient machine learning, and novel computing substrates.

RESEARCH LEADS

Four research thrusts have emerged, each led by two thought leaders in the field.
- Augmenting human capabilities, led by **Amina Qutub** of UTSA biomedical engineering and **Paula K Shireman** of UT Health San Antonio surgery;
- Machine learning and deployment, led by **Christopher Mentzer** of Southwest Research Institute R&D and **Murtuza Jadliwala** of UTSA computer science;
- Neuroinspired AI, led by **Peter Fox** of UT Health San Antonio research imaging and **Fidel Santamaria** of UTSA biology; and
- Trustworthy AI, led by **Ram Krishnan** of UTSA electrical and computer engineering and **Greg Shannon**, Chief Chief Science Officer, Cybersecurity Manufacturing Institute (CyManII)

Matrix has initiated numerous cross-institutional collaborations, including a partnership between UTSA and UT Health San Antonio researchers developing novel AI algorithms for accelerated dementia diagnosis using MRI and EEG data.

FUNDING

The research portfolio of Matrix thrust leads is supported by multiple prestigious federal and private agencies, including the National Science Foundation, the National Institutes of Health, the Air Force Research Laboratory, the U.S. Air Force Office of Scientific Research, the National Aeronautics and Space Administration, and the W.M. Keck Foundation. Already this momentum has resulted in new research awards for Kudithipudi's work in neuromorphic computing. She and her team are designing lifelong learning algorithms and AI accelerators that are inspired by the neural processes in the brain. The research is supported by DARPA's Lifelong Learning Machines project in collaboration with Argonne National Labs, where they are building lightweight AI algorithms that learn, adapt and act continually in new environments.

> "The creation of this consortium will build an ecosystem of stakeholders employing transdisciplinary approaches to advance core AI capabilities, address community-driven research challenges for human well-being, reconceptualize AI training and build a globally inclusive team. The consortium's robust intellectual capital and collaborative spirit will accelerate scientific discovery."
>
> - Dhireesha Kudithipudi , Ph.D.
> Director, MATRIX AI

COVID-19 RESEARCH

Researchers are also actively engaged in supporting the city and local community to address the COVID-19 pandemic through volunteer work; COVID19 modeling work using AI in collaboration with UT Health San Antonio and SwRI, which was awarded DHS funding; digital tools; AI and advanced imaging to noninvasively screen for the coronavirus and detect neurovascular recovery post infection; and mapping tools.

Cybersecurity Manufacturing Innovation Institute (CyManII)

INSTITUTE LAUNCH

UTSA formally launched the Cybersecurity Manufacturing Innovation Institute (CyManII), a $111 million public-private partnership, consisting of $70 million in federal funding, $41 million in cost-sharing funds from its partners, including a commitment of $10 million from UT System, to cybersecure the U.S. manufacturing enterprise.

The university leads the institute, a five-year cooperative agreement with the U.S. Department of Energy which includes a consortium of 59-member institutions. Their goal is to introduce a cybersecure energy-ROI that drives American manufacturers and supply chains to further adopt secure, energy-efficient approaches, ultimately securing and sustaining the nation's leadership in global manufacturing competitiveness.

As part of its national strategy, CyManII focuses on three high-priority areas where collaborative research and development can help U.S. manufacturers: securing automation, securing the supply chain network, and building a national program for education and workforce development.

"As U.S. manufacturers increasingly deploy automation tools in their daily work, those technologies must be embedded with powerful cybersecurity protections. UTSA has assembled a team of best-in-class national laboratories, industry, nonprofit and academic organizations to protect the nation's supply chain, preserve its critical infrastructure and boost its economy."

- Howard Grimes, Ph.D.
  Chief Executive Officer, CyManII

1 Quad	1 Trillion	1 Million	20 Billion
Cumulative U.S. energy savings via use of secure energy efficiency innovations	U.S. cyber vulnerability instance mitigated via use of ε-PURE energy innovations	Trained U.S. manufacturing workers and employees in cybersecurity	Cumulative U.S. energy savings via secure and intelligent energy efficiency

Brain Health Consortium (BHC)

The Brain Health Consortium – led by **Dr. Jenny Hsieh**, Semmes Foundation Chair and Professor in Cell Biology – uses transdisciplinary approaches to advance basic understanding of the brain to prevent and treat the most debilitating brain disorder such as Parkinson, Alzheimer, and epilepsy. Researchers represents expertise in stem cells/precision medicine, neuroscience, biomedical engineering, psychology, and behavior sciences.

The UTSA Brain Health Consortium is a robust network of 39 researchers in science, engineering and psychology who are using multidisciplinary approaches to better understand the nature of brain disorders and translate new discoveries to improve patient lives.

UTSA RESEARCHERS ALFONSO APICELLA AND HIS TEAM DISCOVER NEW PATHWAYS IN BRAIN'S AMYGDALA

UTSA researchers are pioneering an innovative brain study that sheds light on how the amygdala portion of the brain functions and could contribute to a better understanding of post-traumatic stress disorder, anxiety, depression and Alzheimer's disease.

The researchers, **Alfonso Apicella**, an associate professor in the Department of Biology and an affiliate member of the BHC, research associate **Alice Bertero**, postdoctoral fellow **Paul Luc Caroline Feyen**, and graduate student **Hector Zurita**, published their study, "A non-canonical cortico-amygdala inhibitory loop," in The Journal of Neuroscience, the flagship journal of the Society for Neuroscience. Their research was also featured on the Oct. 23, 2019 cover of the journal.

UTSA STUDY: NEWLY DEVELOPED NEURONS CONTRIBUTE TO EPILEPTIC SEIZURES

Epileptic seizures happen in one of every 10 people who have experienced a traumatic brain injury (TBI). However, new research at The University of Texas at San Antonio (UTSA) has uncovered an innovative approach to possibly slow the progression of epilepsy. Researchers at UTSA have successfully removed new neurons that have developed after a brain injury to reduce seizures in mice. They believe that the technique could potentially reduce post-injury epilepsy.

"We already know that new neurons contribute to epilepsy, but we didn't know if we could target them post-injury, after seizures have already started," said Jenny Hsieh, , Director of the UTSA Brain Health Consortium.

Hsieh and her colleagues at The University of Texas at San Antonio systematically removed new neurons that formed during the eight weeks following a seizure in mice. The UTSA team then monitored seizure activity in the mice and observed that the treated mice experienced a 65 percent reduction in seizures compared to untreated mice. This effect required more than four weeks of continuous treatment.

"Now we know we can remove new neurons after the initial seizures," said Hsieh. "While we cannot stop the first seizures, we can try to prevent the secondary seizures. This is very exciting and may lead to new therapeutic strategies."

UTSA PROFESSOR AMINA QUTUB EXPLORES BRAIN HEALTH SCHOLARS SPEAKER SERIES

Amina Qutub, associate professor of biomedical engineering. In her talk, How Daily Habits Can Impact Brain Health, she introduced the latest advances in science and technology to illustrate how daily behaviors influence the ability of brain cells to repair and regenerate, enabling a future that optimizes brain health. Qutub's research aims to understand and improve health by interpreting human cells' communication during process growth and regeneration. Her research team is developing tightly coupled experimental-computational methods to identify fundamental mechanisms of cell communication in the bone marrow and brain. That work has clinical applications to hematological cancers and neurodegenerative disease treatments.

National Security Collaboration Center (NSCC)

AIR FORCE RESEARCH LABORATORY LEVERAGES NSCC FOR INNOVATION

In June 2020, UTSA and the Air Force Research Laboratory, Information Directorate of Rome, New York entered into a Cooperative Research and Development Agreement. This CRADA allows for quick exchanges of research in support of AFRL's mission to lead discovery, development and delivery of warfighting technologies for air, space and cyberspace forces.

Led by **retired Brig. Gen. Guy M. Walsh**, the goal of the collaboration is to further enable research and development in areas ranging from artificial intelligence and machine learning, data sciences and cybersecurity. Additional areas of collaboration include predictive modeling and analysis, training and exercise evaluation, and educational opportunities for students and the broader military community.

The CRADA is a result of growing partnerships between the NSCC and multiple divisions of the Air Force, most notably the 16th Air Force, the Air Force Life Cycle Management Center, the Cyber Proving Ground, and Joint Base San Antonio and their effort to establish 5G capabilities.

"UTSA is building education programs to raise awareness and increase preparedness to enhance the resiliency for major metropolitan areas, like San Antonio. As a top cybersecurity research university, UTSA has a wealth of experience designing education programs for the military, industry, and community. The National Security Collaboration Center's partners from industry, government, and academia are engaged in the design of education programs to address emerging threats."

– ret. Brig. Gen. Guy Walsh, Executive Director, UTSA NSCC

WHITING-TURNER | JACOBS | OVERLAND SELECTED AS DESIGN BUILD TEAM FOR SCHOOL OF DATA SCIENCE AND NATIONAL SECURITY COLLABORATION CENTER

Whiting-Turner | Jacobs | Overland was selected in June 2020 to design and construct the building for its School of Data Science and National Security Collaboration Center, two major initiatives at its Downtown Campus that will serve as the hub for its data intelligence and cybersecurity programs.

The $90 million facility is slated to open in 2022 on a property that abuts the San Pedro Creek project just east of the existing Downtown Campus footprint. Once completed and occupied, the building will house programs anchoring UTSA to San Antonio's burgeoning high-tech corridor.

The School of Data Science and National Security Collaboration Center are part of UTSA's vision to help the university earn national recognition as a research-intensive institution. It is a critical component of UTSA's Campus Master Plan, which charts a course for the university to reach new levels of excellence over the next 10 years.

COVID-19 RESEARCH

Halfway through our academic year, COVID-19 hit the world. UTSA researchers were quick to pivot their existing research or undertake new research to address the issues and complexities this virus unleashed.

Here's a snapshot of some of our researchers in the life, social, and formal sciences.

CINDY ERMUS, PH.D.
Assistant Professor, College of Liberal and Fine Arts, History

EXPERTISE: History of disasters and crisis management; epidemics and pandemics; 18th-century Europe and Atlantic World; Age of Revolutions

Dr. Ermus specializes in the history of disaster and disease in 18th-century Europe and the Atlantic World. She is currently completing a book project examining the 1720 Plague of Provence (the "Great Plague of Marseille"), one of the last outbreaks of plague in Western Europe.

> *Here's a final lesson that can be drawn from the Great Plague of Provence and the history of disease: No matter how terrible or how traumatic the pandemic, for the survivors things always go back to normal — or at least a reconfigured version of normal. For better or worse, people forget more quickly than perhaps they should, and the episode becomes a subject only for historians.*
> **- Dr. Ermus**
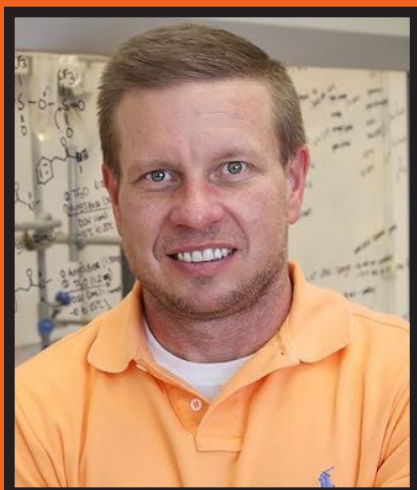
DOUG FRANTZ, PH.D.
Professor, College of Sciences, Chemistry
Max and Minnie Tomerlin Voelcker Distinguished Professorship in Chemistry

EXPERTISE: Drug discovery and development; GMP and GLP large-scale synthesis; medicinal chemistry; IND-enabling studies; formulation development; infectious diseases; cancer; chronic pain

Dr. Frantz research interests include the rational design and efficient synthesis of small molecule pre-clinical candidates in a range of therapeutic areas including infectious diseases, cancer, chronic pain and neurodegeneration. He has over 20 years of industrial and academic experience in the pharmaceutical sciences.

> Doug E. Frantz received an award from the San Antonio Medical Foundation [in 2020] to support his collaborative work with UT Health San Antonio and SwRI on a novel approach for COVID-19 drug discovery. The grant funds collaborative studies that combine virology, high-throughput screening, medicinal chemistry and in-silico drug design expertise.
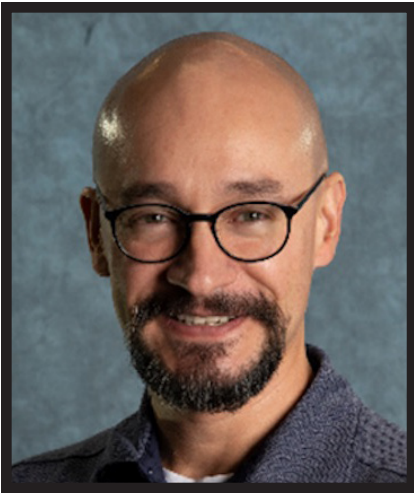
JUAN B. GUTIERREZ, PH.D.
Professor, College of Science, Mathematics

EXPERTISE: Multi-scale modeling of infectious disease, from between-host (epidemiology) to the within host dynamics (bioinformatics) of infectious disease. Harmonization of large and heterogeneous data sets. Foundations and applications of neural networks.

Dr. Gutiérrez conducts transdisciplinary research at the point of convergence of mathematics, computer science, statistics, and biomedical sciences. His lab builds continuous analysis pipelines that integrate data across multiple scales. His work ranges from the theoretical realm to applied research in public health.

> *From a mathematical point of view, there are points that we can control easily in absence of a vaccine. Those are the contact rates between infected people and susceptible people and government interventions, because that changes the behavior of people. The contact rates are decreased when people wear masks, that is the probability that an infected person infects a susceptible person is decreased by decreasing the number of pathogens that are floating in the air.*
>
> **- Dr. Gutierrez**

KARL E. KLOSE, PH.D.
Professor, College of Sciences, Biology
Robert J. Kleberg Jr. and Helen C. Kleberg College of Sciences Professorship

EXPERTISE: Bacterial pathogenesis; Microbiology and Immunology, Francisella tularensis, Vibrio cholera

Dr. Klose is interested in bacterial pathogenesis – how bacteria cause disease. He has worked most extensively with Vibrio cholerae, the bacterium that causes cholera, and is also researching Francisella tularensis, the bacterium that causes tularemia, or rabbit fever. He is the Director of the South Texas Center for Emerging Infectious Diseases (STCEID), and host of microTalk.

> *My specialty, actually, is bacteria that cause disease in humans. We study the agent that causes cholera, and we study the agent that causes the disease tularemia, which is a bioweapon.*
>
> *Truly the key to curing the COVID disease is understanding exactly what viruses need to do in order to replicate themselves. It's basically identifying the Achilles heel in an organism, so that you can then direct appropriate therapeutics or preventions, like vaccines, against these organisms.*
>
> **- Dr. Klose**

DHIREESHA KUDITHIPUDI, PH.D.

Professor, College of Engineering, Electrical and Computer Engineering/ Computer Science

EXPERTISE: AI modeling, machine learning for classification and prediction, neuro-inspired AI for human well-being, domain-specific ML systems.

Dr. Kudithipudi focuses on the development of next generation AI algorithms and systems that are inspired by the neural processes. Her team develops end-to-end stack of AI & ML solutions for a wide range of application domains, in healthcare, defense, prediction, and artificial agents.

The Matrix AI Consortium for Human Well-Being at UTSA developed models based on data from the CDC, WHO and other national and local sources. They also created covid19recoverytexas.org, a website which allowed people to share the location of high-demand consumer goods such as meat, hand sanitizer and toilet paper.

STAN MCHARDY, PH.D.

Associate Professor, College of Sciences, Chemistry
Director, Center for Innovative Drug Discovery

EXPERTISE: Medicinal chemistry; Small molecule drug discovery in cancer, infectious disease, and neuroscience areas; Synthesis of natural products; Synthetic methodology

Dr. McHardy focuses on various small molecule approaches to cancer, psychotherapeutic and neurodegenerative diseases, and infectious disease. He is the director of the Center for Innovative Drug Discovery.

AMINA QUTUB, PH.D.

Associate Professor, College of Engineering, Biomedical Engineering

EXPERTISE: Systems biology human daily behavior brain health neurology biomarkers computational modeling, AI mathematical modeling

Dr. Qutub focuses on the development of new computational methods and experimental analyses to uncover design principles of human cells during growth and regeneration and transform the treatment of hematological cancers and neurovascular diseases.

HONGJIE XIE, PH.D.

Professor and Department Chair, College of Sciences, Geological Sciences

EXPERTISE: GIS mapping, spatial data science, remote sensing, climate change, hydrosphere and cryosphere

Dr. Xie applies his technical expertise to address spatio-temporal patterns and processes through quantitative analysis and modeling in various disciplines, by integrating remote sensing, GIS, field measurements to geology, agriculture, surface hydrology, terrestrial ecosystems, hydrometeorology, urban development, cryosphere, and environmental studies.

BERNARD ARULANANDAM, PH.D., MBA

Professor and Vice President for Research, Economic Development, and Knowledge Enterprise, and the Jane & Roland Blumberg Professorship in Biology

EXPERTISE: Chlamydia; Infectious Diseases; Microbiology and Immunology; STEM Education; Vaccine Development and Commercialization; cellular immunology; microbial pathogenesis; mucosal immunity.

Dr. Arulanandam's lab studies the basic mechanisms of immune defenses at mucosal sites. Mucosal surfaces form the major interface between the host and the environment, and constitute the first line of defense against bacterial pathogens.

LESLIE NEELY, PH.D., BCBA-D, LBA

Assistant Professor, College of Education and Human Development, Educational Psychology

EXPERTISE: Telehealth Applied Behavior Analysis Training others in Telehealth Early Intervention for infants/toddlers at-risk for autism Treatment of Problem Behavior

Dr. Neely researches the use of telehealth to provide continuity of medically necessary applied behavior analytic therapy. She also has expertise in the treatment of severe behavior for individuals with autism and developmental disabilities. She currently is investigating the integration of artificial intelligence into the very early diagnosis and treatment of autism and has recently pivoted to telehealth modality for this project (Project PLAAY www.projectplaay.org).

NOTES

UTSA.
Knowledge Enterprise

UTSA
Knowledge Enterprise