

UTSA
CREATING
BOLD
FUTURES[®]

A **BOLD** New
Knowledge Enterprise
DISCOVERIES THAT CHANGE LIVES

2021 ANNUAL REPORT



UTSA Office of the Vice President for Research,
Economic Development, and Knowledge Enterprise

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Annual Report of Sponsored Program Activities
for the fiscal year ending August 31, 2021.

Report Data Finalized December 31, 2021.

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

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Founding Executive Director,
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Revised 2022. Data sources include: Sponsored Projects Administration, Research Support, Strategic Research Initiatives, Commercialization and Innovation, Research Integrity, Research Finance and Operations, and the Institute for Economic Development. All financial data has been rounded to the nearest dollar.

RESEARCH EXPENDITURES

\$140 MILLION



AWARDS

386

As we entered this calendar year, and closed the books on the FY21 fiscal year, it finally happened. UTSA attained the highly coveted R1 status from the Carnegie Classification of Institutions of Higher Education, effective January 2022.

Occurring every three years, an independent organization created a framework for classifying education institutions including higher ed research activity across the nation since 1970. It is an achievement for any educational institution to be recognized, and even more so to achieve the R1 designation, “very high research activity”, which is measured by research expenditures, number of research-dedicated faculty, number of doctorates awarded, and data culled from various sources including NSF HERD.

PATENTS

47

For this, I want to thank the many folks who contributed to this momentous event: first, the faculty, for their dedication to furthering their disciplines by undertaking complex challenges to resolve and adding to the body of knowledge; to the staff, who work tirelessly to support the project grant cycle from beginning to end; to the students, who are learning the fundamentals of research and will become the next generation of scientists to address our future needs; and, to our research partners and collaborators, the knowledge, and skills you bring helps accelerate innovation and discovery for all.

ECONOMIC IMPACT

\$3 BILLION

This annual report is a testament to the knowledge enterprise established at The University of Texas at San Antonio. Being firmly planted in a unique city has helped us grow specific area of research excellence while addressing the needs of our various and complex communities. As we navigate through the endemic phase of COVID, our office is here to serve the needs of our research community.

A handwritten signature in black ink, appearing to read 'B. Arulanandam'.

Bernard Arulanandam, Ph.D, MBA

Vice President for Research, Economic Development, and Knowledge Enterprise

EXPENDITURE SUMMARY

TOTAL RESEARCH EXPENDITURES

\$140,065,363

RESTRICTED

\$68,072,109

UNRESTRICTED

\$71,993,253

FEDERAL

\$42,951,982

NON-FEDERAL

\$25,120,126

GENERAL

\$50,611,819

DESIGNATED

\$21,381,434

UTSA
» IS NOW «
TIER
ONE

WITH A PRESTIGIOUS
CARNEGIE R1
CLASSIFICATION

A BOLD
MILESTONE FOR
RESEARCH
EXCELLENCE

TOP
4%
ONLY 146 UNIVERSITIES
IN THE NATION

AND
ONE OF
20
TIER ONE
HISPANIC
SERVING
INSTITUTIONS

TOP 12

LARGEST AWARDS

- 1** Howard Grimes
VP for Research, Economic Development and Knowledge Enterprise
Cybersecurity and Manufacturing Innovation Institute (CyManII)
US Department of Energy
\$70,000,000
- 2** Brian Hermann, Jenny Hsieh
John McCarrey, Christopher Navara
COS Neuroscience, Developmental and Regenerative Biology
Advancing brain health research through male germline editing in marmosets
National Institutes of Health
\$12,498,656
- 3** Teresa Cuevas, Claudia Elenes, Kirsten Gardner, Lilliana Saldana, Rhonda Gonzales, Karla Broadus, John Santos
Honor Colleges, COEHD Race, Ethnicity, Gender, and Sexuality Studies
COLFA History Democratizing Racial Justice
The Andrew W Mellon Foundation
\$5,000,000
- 4** Qian Chen
KCEID Electrical Engineering
AI in Cybersecurity Education Partnership (ACEP)
US Department of Energy - 270
\$ 4,949,001
- 5** Albert Salgado
IED Small Business Development Center
VP Research, Economic Development, and Knowledge Enterprise
South West TX SBDC Program Renewal FY20-21 - San Antonio
United States Small Business Administration - LOC
\$3,063,798
- 6** Tracie Burt
VPAA Education Outreach & Retention
TRiO Educational Talent Search (ETS-South) Eagle Pass and Brackett
US Department of Education
\$2,302,215
- 7** Ender Finol, Victor De Oliveira
KCEID Mechanical Engineering, ACOB Management Science & Statistics
A Nonlinear Membrane Based Analysis for Estimating the Rupture Potential of Abdominal Aortic Aneurysms
National Institutes of Health
\$1,961,656
- 8** Thomas Forsthuber
COS Molecular Microbiology and Immunology
The role of TNFR2 in ameliorating progressive encephalomyelitis
National Institutes of Health
\$1,888,690
- 9** Megan Augustyn
HCAP Criminology & Criminal Justice
Life-course and intergenerational effects of criminal justice involvement: Identifying risks, the search for resilience, and the impact of the rise in opioid misuse and the Covid-19 pandemic.
US DOJ National Institute of Justice
\$1,881,736
- 10** Janakiram Seshu, Kelly Nash, Chiung-Yu Hung
COS Molecular Microbiology and Immunology, COS Physics & Astronomy
Efficacy of novel reservoir-host targeted bait formulations against a tick-borne pathogen
NIH National Institute of Allergy/Infectious Diseases
\$1,875,000
- 11** Erica Sosa, Rogelio Saenz, Jeffrey Howard, Meizi He
HCaP Public Health, HCaP Demography
Advancing Health Literacy to Enhance Equitable Community Responses to COVID-19
City of San Antonio
\$1,678,762
- 12** Gregory White, Rajendra Boppana
COS Center for Infrastructure Assurance and Security (CIAS), COS Computer Science
Cybersecurity Community Development: Initiatives to Contribute to a Culture of Cybersecurity
US National Security Agency
\$1,678,112

EXPENDITURES

BY UNIT

UNIT	AMOUNT
Carlos Alvarez College of Business (COB)	\$12,242,871.18
College of Education and Human Development (COEHD)	\$8,087,260.54
Margie and Bill Klesse College of Engineering and Integrated Design (KCEID)	\$23,107,219.98
College of Liberal and Fine Arts (COLFA)	\$7,695,965.49
College of Sciences (COS)	\$42,767,888.82
College for Health, Community and Policy (HCAP)	\$9,866,177.30
Honors College	\$14,024.45
University College	\$18,460,216.61
VP Academic Affairs	\$5,210,607.47
VP Research, Economic Development, and Knowledge Enterprise	\$11,958,574.51
Other (VP Business Affairs, VP University Relations, VP Inclusive Excellence, etc.)	\$654,556.67

TOTAL

\$140,065,363

EXPENDITURES

BY RESEARCH CENTERS & INSTITUTES

RESEARCH CENTERS/INSTITUTES	AMOUNT
Academy for Teacher Excellence Research Center	\$684,681.26
Bank of America Child and Adolescent Policy Research Institute (BACAPRI)	\$1,080,007.24
Brain Health Consortium	\$198,837.36
Center for Advanced Measurements in Extreme Environments (CAMEE)	\$699,021.52
Center for Advanced Manufacturing & Lean Systems (CAMLS)	\$473,015.43
Center for Archeological Research (CAR)	\$977,067.67
Center for Community Based and Applied Health Research (CCBAHR)	\$471,595.56
Center for Cultural Sustainability (CCS)	\$240,379.36
Center for Excellence in Engineering Education Research (CE3R)	\$1,132,982.94
Cyber Center for Security and Analytics	\$1,854,757.94
Center for Infrastructure Assurance and Security (CIAS)	\$1,424,970.08
Center for Innovation and Drug Discovery (CIDD)	\$1,223,837.95
Center for Research and Training in the Sciences (CRTS)	\$4,576,634.57
Center for Urban and Regional Planning Research (CURPR)	\$27,475.21
Cybersecurity Manufacturing Innovation Institute (CyManII)	\$5,159,100.70
Institute for Cyber Security (ICS)	\$1,280,601.45
Institute for Demographic and Socioeconomic Research (IDSR)	\$969,830.83
Institute for Health Disparities Research (IHDR)	\$556,389.21
Institute of Regenerative Medicine (IRM)	\$48,986.47
Institute for Water Research, Sustainability and Policy (IWRSP)	\$6,359.97
Matrix AI Consortium for Human Well-Being	\$706,693.39
National Security Collaboration Center	\$1,193,855.80
Open Cloud Institute (OCI)	\$625,296.95
San Antonio Cellular Therapeutics Institute (SACTI)	\$749,665.21
Sustainable Pervasive Urban Resilience (SPUR)	\$306,301.97
South Texas Center for Emerging Infectious Diseases (STCEID)	\$3,841,866.12
Texas Sustainable Energy Research Institute (TSERI)	\$2,445,950.95
Urban Education Institute	\$412,817.83
UTSA Mexico Center	\$171,344.79
UTSA Neurosciences Institute (NI)	\$2,525,049.91
Women's Studies Institute (WSI)	\$360,880.70
Policy Studies Center (PSC)	\$31,211.41

TOTAL

\$25,788,831

AWARDS BY UNIT

NUMBER

UNIT	NUMBER
Carlos Alvarez College of Business	15
College of Education and Human Development	26
Margie and Bill Klesse College of Engineering and Integrated Design	85
College of Liberal and Fine Arts	45
College of Sciences	123
College for Health, Community and Policy	41
Libraries	2
VP Academic Affairs	14
VP Business Affairs	1
VP Inclusive Excellence	1
VP Research, Economic Development, and Knowledge Enterprise	31
University College	2

TOTAL

386

AWARDS BY UNIT

AMOUNT

UNIT	NUMBER
Carlos Alvarez College of Business	\$4,152,938.85
College of Education and Human Development	\$6,117,649.88
Margie and Bill Klesse College of Engineering and Integrated Design	\$19,037,115.65
College of Liberal and Fine Arts	\$3,440,228.25
College of Sciences	\$38,663,678.73
College for Health, Community and Policy	\$9,369,015.62
Libraries	\$1,925.20
VP Academic Affairs	\$103,521,430.42
VP Business Affairs	\$271,301
VP Inclusive Excellence	\$77,875,017.30
VP Research, Economic Development, and Knowledge Enterprise	\$50,000
University College	\$108,578.12

TOTAL

\$262,608,879

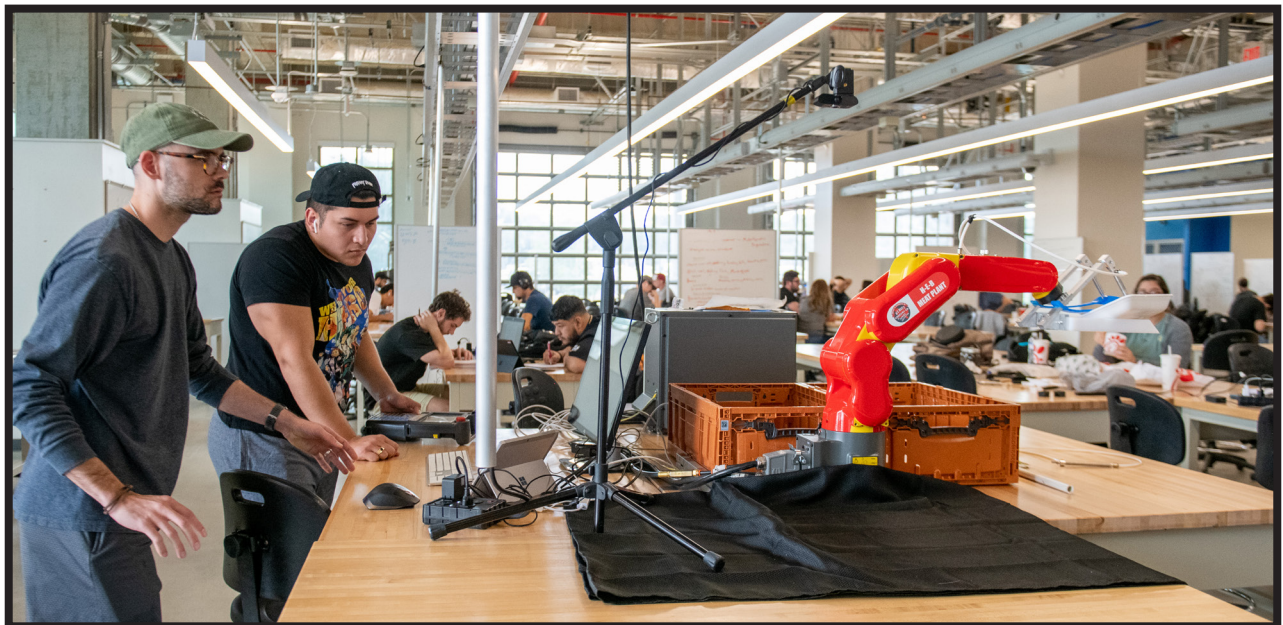
PROPOSALS

BY SOURCE

SOURCE OF FUNDING	NUMBER OF PROPOSALS
Development & Gifts	11
Federal Government	440
Federal Pass Through	210
Private	228
Local Government	67
Other Government	10
State Government	115

TOTAL

1081



PROPOSALS

BY UNIT

UNIT	SUBMITTED	AMOUNT REQUESTED
Carlos Alvarez College of Business	53	\$22,916,936.46
College of Education and Human Development	71	\$37,121,085.04
Margie and Bill Klesse College of Engineering and Integrated Design	305	\$178,907,005.82
College of Liberal and Fine Arts	90	\$13,065,870.83
College of Sciences	358	\$196,853,275.70
College for Health, Community and Policy	116	\$45,033,329.81
Honors College	1	\$51,000
Libraries	1	\$1,353.30
University College	3	\$2,896,255.62
VP Academic Affairs	19	\$111,428,191.37
VP Business Affairs	1	\$2,569,529
VP Inclusive Excellence	3	\$1,599,455.2
VP Information Management and Technology	6	\$6,949,176
VP Research, Economic Development, and Knowledge Enterprise	53	\$60,596,695.95
VP Student Affairs	1	\$2,367,575

TOTAL

1081

\$682,356,735

RESEARCH SUPPORT

Research Support helps faculty navigate the research development and partnership process to secure funding for research activities.

FACULTY DEVELOPMENT

This team organizes and facilitates professional development workshops, trainings, and networking opportunities, bringing leading researchers and outside experts to engage with the UTSA community.

- » Developed more than 20 training events in 2020
- » Provided peer-mentoring programs, including the NSF CAREER program that served 41 faculty, 24 of whom submitted proposals, a record year
- » Educated 132 individuals via our professional development trainings, with over 268 registrants.
- » Inspired over 30 individuals to attend more than one of our professional development sessions.

PROPOSAL DEVELOPMENT

This team, working with the UTSA Research Service Centers, provides additional support services for investigators as they develop applications to grants and prestigious awards. Working to increase the number of UTSA faculty awards which contribute to our NRUF and CMUP goals, they promote award opportunities and provide strategic consultations to support proposal development efforts.

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

- » Six National Science Foundation CAREER awardees
- » Three Fulbright US Scholars
- » One National Endowment for the Humanities Fellowships
- » One American Association for the Advancement of Science Fellows



CONFERENCES

The team organized and supported conferences, including the annual San Antonio Military Health System (SAMHS) and Universities Research Forum (SURF). The SURF conference, held annually in June, brings together the latest research and discoveries of trainees, faculty, staff, and students working to improve health outcomes and readiness. Presenters and attendees come from around the country, but primarily from the San Antonio Military Health System (SAMHS), UT San Antonio, and the UT Health Science Center at San Antonio.

- » Hosted the first virtual SURF conference with a record 814 attendees in 2020
- » Supported several UTSA research conferences including:
 - Vaccine Development Center of San Antonio Conference
 - Center for Innovative Drug Discovery Texas Drug Discovery Symposium
 - San Antonio Conference on Stem Cell Research and Regenerative Medicine
 - UTSA Graduate School Conference

COMMERCIALIZATION & INNOVATION

The Office of Commercialization and Innovation (OCI) maintains a portfolio of over 300 active technologies, and has had more than 130 patents issued, 90 just in the last five years.

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. 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).

YEAR IN REVIEW

The UTSA Office of Commercialization and Innovation (OCI) continued supporting the on-campus innovation ecosystem, managing 25 new technology disclosures, 47 patent filings and 24 patents issued in FY21. UTSA technologies newly licensed or optioned in FY21 included an implantable drug delivery system for pain management, an emergency medical suction device for obstructed airways, and antigens potentially useful for diagnosis and immunization against Valley fever infection.

Recent highlights of companies developing UTSA technologies include EmergenceMed receiving an investment from the inaugural round of the San Antonio Military Medical Innovation fund, Safebiosense and Vitanova Biomedical both being awarded National Science Foundation small business grants (SBIR Phase I).

The Venture Mentor Service San Antonio (VMS-SA) continued its growth. At the end of FY21, VMS-SA had nine companies participating.

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 17	FY 18	FY 19	FY 20	FY 21
Commercial Agreements (Contract, SRA, MOU, NDA, & MTA)	109	102	92	101	95
New Invention Disclosures	62	51	53	56	25
Patents Filed	53	67	69	57	47
Copyrights & Trademarks	1	3	0	8	0
New License/Options Signed	8	6	9	2	5
Technologies Licensed/Optioned	10	7	8	3	25
Companies Incubated (New Venture Incubator)	7	7	8	6	4

INNOVATION DISCLOSURES

An application of laser light to measure and monitor oxygenation at the capillary level and End-tidal carbon dioxide via an endotracheal tube or supraglottic airway device

Forhad Akhter, Julio F. Perez

KCEID Mechanical Engineering

A parking monitor that is designed to identify the amount of parking spaces available

Patrick Cavanagh, William Sanchez, Gisselle Contreras-Velarde

KCEID Electrical & Computer Engineering

New materials for highly selective ethane/ethylene separation

Banglin Chen

Non-UTSA Inventor: **Bin Li**

COS Chemistry

New materials for highly selective ethylene and proylene separation

Banglin Chen, Hui Cui

Non-UTSA Inventor: **Rasika Dias, Anurag**

Noonikara Poyil

COS Chemistry

A technique targeting cancerous cells through coated nanoparticles

Yusheng Feng, Robert Lyle Hood, Forhad Akhter, Kathryn Maureen Mayer

Non-UTSA Inventor: **Santiago Manrique Bedoya, Chris Moreau**

KCEID Mechanical Engineering and COS Physics & Astronomy

An Expandable and Contractible Stent Controlled by Extracorporeal, Temperature-Modifying or External Magnetic Field Actuation Devices

Yusheng Feng, Robert Lyle Hood, David Restrepo

Non-UTSA Inventor: **Austin Shinagawa, Ho Young Song, Matthew C. Taon, Michelle Taon, Jorge Lopera**

KCEID Mechanical Engineering

A biomechanical mechanism that regulates human milk transfer from the breast

Jimi Francis

HCaP Health and Kinesiology

A method to operate a water distribution network including a pump and considering variable pump efficiency

Nikolaos Gatsis, Ahmad Taha, Shen Wang, Marcio Giacomoni, Krishna Sandeep Ayyagari

KCEID Electrical & Computer Engineering

A gene that encodes for a chromatin remodeling protein that is a key regulator of embryonic induced pluripotent stem cell fate

Gary Gaufo, Ching Hsun Cheng

COS Biology

A software can measure the movement of any point on a bridge in the field of view

Wassim Ghannoum, Shima Rajae Dehkordi, Graham Hogsett

KCEID Civil and Environmental

A screw device used to drawing fluid in and pushing fluid out

Lyle Hood, Daniel Portillo

KCEID Mechanical Engineering

A deep learning semi-streaming method for interference applications

Eugene Britto John, Nazariy K Shaydyuk

KCEID Electrical & Computer Engineering

A which protects against eavesdroppers by applying security protocols at Layer 1 of the OSI stack

Brian Kelley, Anil Kumar Yerrapragada

KCEID Electrical & Computer

A framework that reduces the burden of access control model engineering, fitting and administration

Ramnarayan Krishnan, Yufei Huang, Mohammad Nur Nobi, Mehrnoosh Shakarami
KCEID Electrical & Computer Engineering

A system for automatic detection of distributed attacks in IOT devices using decentralized deep learning

Peyman Najafirad, Gonzalo De La Torre Parra
KCEID Electrical & Computer Engineering

A system to train, estimate, robustify, and neural network architectures for signal, image and video purification

Peyman Najafirad, Samuel Henrique Silva
KCEID Electrical & Computer Engineering

An application that relates to systems and methods for classifying images/videos which are not exposed to a neural network model

Peyman Najafirad, Nihar Shrikant Bendre, Kevin Desai
KCEID Electrical & Computer Engineering and COS Computer Science

A new endotracheal tube with the integrated capability of providing distal suction and irrigation

Daniel Jordan Portillo, Robert Lyle Hood, David Berard, David Restrepo, Saketh Ram Peri
Non-UTSA inventor: **Robert A DeLorenzo**
KCEID Mechanical Engineering

A process to study sleep and brain activity analogs and to develop brain parts and neural networks from stem cells

Amina Qutub, Byron Long, Zacharie Maloney, Sean Tritley
Non-UTSA Inventor: **Arun Mahadevan, Nicolas Grandel, Chenyue Hu, George Britton**
KCEID Biomedical Engineering

A method for mining activity to predict changes in brain tissue and cognitive health

Amina Qutub, Erin Pollet, Byron Long
Non-UTSA Inventor: **Arun Mahadevan**
KCEID Electrical & Computer Engineering

A terminology to describe cycloadditions between metal-azides and organic alkynes

Kirk Schanze
Non-UTSA inventor: **Adam Viege, Christopher Beto, Yajing Yang**
COS Chemistry

A method for synthesis of biofunctionalized conjugated polymers is disclosed and their application as high brightness flow cytometry labels is demonstrated

Kirk Schanze, Zhiliang Li, Han Sun, Daniel Martinez
COS Chemistry

Universal hybrid quantum computing in trapped ions

Robert Tyler Sutherland
Non-UTSA inventor: **Raghavendra Srinivas**
COS Physics & Astronomy

A custom-made device to extract data in a non-destructive manner

Oren Upton, Robin K Verma, Albert Villarreal
COB Information Systems & Cyber Security

A method to quantify the non-enzymatic conversion of dihydroartemisinic acid to artemisinin.

Francis K Yoshimoto
COS Chemistry

STRATEGIC RESEARCH INITIATIVES

UTSA's Knowledge Enterprise awarded its annual internal funding opportunities to seed research on campus. Over \$490,000 was awarded to 35 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 30 grants given for FY21.

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 2020 seed grants awards had a 402% return on investment with awardees already securing \$2.5 million in follow-up funding. Prior year programs continue to yield success.

FY2021 AWARD TOTALS

CACP	•••	2 awards	•••	\$25,000
COB	•••	6 awards	•••	\$75,000
COE	•••	1 award	•••	\$50,000
COEHD	•••	1 award	•••	\$5,000
COLFA	•••	9 awards	•••	\$60,000
HCaP	•••	5 awards	•••	\$25,000
COS	•••	6 awards	•••	\$170,000

TOTAL 30 awards \$410,000

RETURN ON INVESTMENT

REDKE awarded \$490,000 to 35 faculty led projects, engaging 26 departments and 6 colleges

22 Extramural Grant Submissions

10 Awards

50 Submitted Publications

421 Undergraduate Students

90 Graduate Students

3 Postdoctoral Students

20 Doctoral Students

2 Visiting Scientists

18 Other Scholarly Works

RESULTED IN A RETURN ON INVESTMENT TOTALING:

\$2,462,346

ROI = 402.52%

INTERNAL RESEARCH AWARDS (INTRA)

10.01.2021 - 07.31.2022

\$95,000 awarded: \$5,000 per researcher x 19 new projects

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, Planning and Construction (CACP)

Ibukun Awolusi

Construction Science
Privacy and Security in the Application of IoT-Based Wearable Sensing Devices for Safety and Health Monitoring in Construction

Jiannan Cai

Construction Science
Understanding and Predicting Worker Behavior in Human-Robot Co-Construction

Jae Yong Suk

Architecture
Investigation of Nighttime Lighting Environment of UTSA Main Campus for Student and Public Safety

Alvarez College of Business (COB)

Hu Harrison Liu

Accounting
Short Selling and Executive Stock Option Exercises

Juan Mao

Accounting
The Impact of COVID-19 on Remote Audits and Group Audits

Krishnamurthy 'K.K.' Raman

Accounting
The Effect of Clawback Adoptions on Institutional Investment Decisions

Jennifer Yin

Accounting
Family Firms and Penalized Firm Misconduct

College of Education and Human Development (COEHD)

Claudia Interiano-Shiverdecker

Counseling
Recruitment and Retention of Students in a Bilingual Counseling Certificate Program

College of Liberal and Fine Arts (COLFA)

Paul Ardoin

Philosophy and Classics
Monstrous Becketts

Sue Hum

English
Visualizing the Yellow Peril: Racializing the Chinese, 1834-1941

Ritu Mathur

Political Science and Geography
Security Archives and the Problem of Cyber Arms Control

Pablo Requena

Modern Languages and Literatures
Dialectal variation in the acquisition of Spanish early verb morphology

Omar Valerio-Jimenez

History
Challenging Exclusion in Education: Mexican Americans and School Reform

Oswaldo Zapata

Music
Latin American Music Recording

College for Health, Community and Policy (HCaP)

Ying Huang

Demography
Income Loss and Mental Health Outcomes During the COVID-19 Pandemic in the United States—Investigating the Moderating Role of Metropolitan Racial Residential Segregation

Kara Joyner

Demography
The Effects of Partisanship on Mate Choices

Se-Woong Park

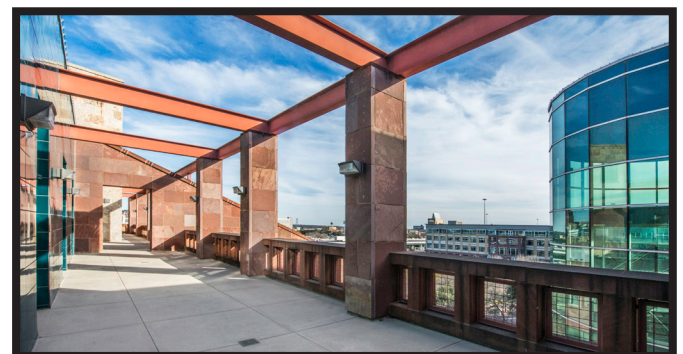
Kinesiology
Characterizing predictive gaze patterns and brain activity in children with autism spectrum disorder

Jelena Todic

Social Work
Perceptions of Current and Former Social Work Students on Anti-Racist Praxis

Tianou Zhang

Kinesiology
The Effects of Nicotinamide Riboside Supplementation and Exercise Training on Body Composition and Physical Performance in Older Adults with Sarcopenic Obesity



GRANTS FOR RESEARCH ADVANCEMENT AND TRANSFORMATION (GREAT)

Ao Du

COE Civil and Environmental Engineering
Regional Natural Hazard Risk Assessment Methodology toward Resilient 5G Telecommunication Infrastructure Deployment

Murtuza Jadhwal

COS Computer Science
Addressing Security and Privacy Challenges in Visual Augmented Reality (VAR) applications

Angela Lombardi

CACP Architecture
Toward Cultural Heritage Scientific Conservation: Characterization of Spanish Colonial Stones and Lime Mortars in the San Antonio Missions, Texas

Leslie Neely

COEHD Educational Psychology
A step towards smart and connected health in behavior analysis

10.01.2021 - 07.31.2022

Four new research projects were awarded \$20,000 for a total of \$80,000 through the GREAT program.

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.



CONNECTING THROUGH RESEARCH PARTNERSHIPS (CONNECT)

10.01.2021 - 07.31.2022

Two teams consisting of one principal investigator from UTSA and one from Southwest Research Institute were each awarded \$125,000, for a total of \$250,000, with the UTSA PI receiving \$50,000 and the SwRI PI receiving \$75,000 through the Connect program.

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.

Hai-Cho Han, COE Mechanical Engineering

Keith Bartels, Southwest Research Institute

Modeling the trabecular structure in human heart and its change in heart failure patients

Gary Jacobs, COE Biomedical and Chemical Engineering

Grant Seuser, Southwest Research Institute

CO₂ to Fuel: Combining Reverse Water Gas Shift and Fischer Tropsch Synthesis into a Single Reactor

TRANSDISCIPLINARY TEAMS PROGRAM (T2)

10.01.2021 - 07.31.2022

Five research projects and its lead investigator were each awarded \$20,000 for a total of \$100,000 through the T2 program.

The Transdisciplinary Teams (T2) program rewards cross-disciplines teams working together to create new conceptual, theoretical, methodological, and translational innovations that move beyond discipline-specific approaches to address a common problem, ultimately advancing UTSA's institutional research excellence goals and establish a foundation for extramural funding.

TEAM

Rebecca Bria (lead) | COLFA Anthropology
Hongjie Xie | COS Geological Sciences
Kristen Brown | COE Civil and Environmental Engineering
Changing Environment in the Glacial Watershed of the Cordillera Blanca, Peru under the Warming Climate: Understanding the shifting local dynamics of water availability, agriculture, and energy production

TEAM

Sue Hum (lead) | COLFA English
Rebecca Weston | HCaP Psychology
Aaron Cassill | COS Biology
Greg Elliott | COLFA Art and Art History
Investigating STEM Students' Approaches to Innovative Thinking Through Focus Groups

TEAM

Allison Veach (lead) | COS Environmental Science and Ecology
Saugata Datta | COS Geology
Corey Sparks | HCaP Demography
Linking the urban microbiome to lawncare choices: How does xeriscaping impact the microbiome?

TEAM

Teja Guda (lead) | COE Biomedical Engineering and Chemical Engineering
Janakiram Seshu | COS Biology
Mario Flores | COE Electrical and Computer Engineering
Microphysiological models of the upper airway to evaluate pathogen resistance agriculture, and energy production

TEAM

Angela Lombardi (lead) | CACP Architecture
Lorenzo Brancaleon | COS Physics and Astronomy
Arturo Ponce Pedrasa | COS Physics and Astronomy
Paul LeBlanc | COLFA Communication
Cultural Heritage and Climate Change: The biological colonization in the San Antonio Missions — biodeterioration vs. bioprotection debate

BRAIN HEALTH CONSORTIUM COLLABORATIVE SEED GRANT PROGRAM

10.01.2021 - 06.30.2022

Two research projects were each awarded \$15,000 for a total of \$30,000.

The Brain Health Consortium Collaborative Seed Grant program supports a broad range of trans-disciplinary research that may yield fundamental insights into the mechanisms underlying brain disorders.

Brian Hermann
COS Neuroscience, Developmental and Regenerative Biology
Localization of mammalian spermatogonial stem cells and their niche using spatial genomics

Marzieh Hajiaghamemar
COE Biomedical Engineering
Sport-Related Head Exposures in Female Athletes and Discovery of the Sex-Specific Differences

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.

UTSA IED GENERATES \$3 BILLION FOR TEXAS' ECONOMY IN 2021

The UTSA Institute for Economic Development (IED) generated an overall direct economic impact of \$3 billion for the Texas economy in 2021. Among the programs that are part of this multibillion-dollar impact are two initiatives set up by the institute to assist small business owners and entrepreneurs with COVID-19 pandemic relief, including financial assistance via the Small Business Administration Paycheck Protection Program (PPP) and Economic Injury Disaster Loans (EIDL) assistance.

During the 2021 fiscal year, the Institute: Served 40,693 business and community clients; Provided trainings and workshops to 26,020 participants; Delivered 10,329 consulting cases; Helped start up 469 new businesses; Helped scale up 496 existing businesses.

As businesses locally, statewide and around the nation continue to work to gain strength in the midst of the pandemic, the IED is guiding clients and advising constituents on how to rebuild and move forward.

COLLABORATIONS

The IED partnered and engaged with researchers and innovators across UTSA on programs that are key to their mission to small businesses. These projects also represent the collective vision of the IED and the university to develop new programming that improves the quality of life for all San Antonio residents.



The IED worked with the UTSA Westside Community Center to train and advise small businesses and residents. The IED also collaborated with the UTSA Open Cloud Institute on a program that could potentially help the U.S. government address their supply chain issues. They worked with faculty researchers on sponsored research projects to better connect business discovery and technical evaluation.

\$3.0 BILLION

In Direct Economic Impact For 2021

\$3.0 billion is the aggregate amount of new financing & investments | new sales, contracts & exports

SERVICE RESULTS

40,693

Businesses Served

1,355

Training Events & Courses

26,020

Training Participants

10,329

Consulting Cases

4,344

Business Research Tasks

ECONOMIC IMPACT

1,792

Jobs Created

9,203

Jobs Retained

469

New Business Starts

496

Business Expansions

\$2,465,684,491

New Sales, Contracts & Exports

\$500,091,908

New Financing & Investments

\$42,567,000

New Tax Revenue Generated

MATRIX AI Consortium

The MATRIX AI Consortium for Human Well-Being is a transdisciplinary multi-stakeholder research enterprise serving as a central hub for basic and applied AI research at UTSA. MATRIX consists of 65 researchers spanning across four collaborating organizations: UTSA, UT Health San Antonio, Southwest Research Institute, and Texas Biomedical Research Institute.

Dhiresha Kudithipudi, founding director of the MATRIX AI Consortium for Human Well-Being, and the Robert F. McDermott Endowed Chair in Engineering, was awarded \$1,481,697 in combined funding for her research in lifelong learning.

This funding includes a \$472,306 sub-award from Argonne National Laboratory under the Defense Advanced Research Projects Agency's (DARPA) Lifelong Learning Machines (L2M) program, along with a \$1,009,391 award from the Air Force Research Laboratory (AFRL).

These awards will fund her ongoing research developing novel brain-inspired lifelong learning algorithms and systems. Her approaches attempt to close the performance gap between modern artificial intelligence (AI) systems and biological systems, allowing them to learn new tasks while simultaneously improving their energy efficiency.

**

Dr. Kudithipudi was also awarded \$200,000 from the San Antonio Medical Foundation to apply artificial intelligence (AI) models to dementia research serving historically underserved populations, specifically the Hispanic communities in South Texas.

The one-year transdisciplinary project, Disentangling Dementia Patterns Using Artificial Intelligence on Brain Imaging and Electrophysiological Data, focuses on helping the local community through advancements in science. It is a collaboration between UTSA, UT Health SA, and the South Texas Veterans Health Care System focused on data collection and the development and evaluation of methods for dementia classification using magnetic resonance imaging (MRI) and electroencephalograms (EEG).

The inaugural class of Xilinx-MATRIX AI Fellows was announced in Spring 2021. Funded by a generous gift from Xilinx's Women in Technology (WIT) Programs, the award included funding to support stipends for the initial class of fellows, along with state-of-the-art hardware to be used within MATRIX's AI DIY space in the North Paseo Building.

Fellows participated in a variety of programming this spring semester, including the MATRIX AI seminar series and workshops to build collaborative mentorship relationships with female AI scientists. The fellows also completed an

AI-related research immersion experience within a MATRIX core member's lab.

The fellows were:

- » Tomisin Adebayo; advisor: Amina Qutub, biomedical engineering
- » Nour Alharki; advisor: Qutub, biomedical engineering
- » Raquel Britto; advisor: Jiannan Cai, construction science
- » Lilianna Gutierrez; advisor: Debaditya Chakraborty, construction science
- » Jenelle Millison; advisor: Amanda Fernandez, computer science
- » Van Ngo; advisor: Yongcan Cao, electrical and computer engineering
- » Tiffany Tran; advisor: Dhiresha Kudithipudi, electrical and computer engineering

In October, the MATRIX AI Consortium, housed at The University of Texas at San Antonio, BigBear.ai, and the Maryland Innovation & Security Institute (MISI) – research partners representing academia, industry, and nonprofit – hosted a joint symposium this week on the current and future state of artificial intelligence (AI) and quantum computing. The conference's program focused on the current state of AI and quantum computing with discussions about the potential impact of the convergence of these two transformational technologies. More than two dozen panelists and moderators participated in the program, including representatives from the Air Force Research Laboratory, Army Research Laboratory, BigBear.ai, CACI International Inc., Carnegie Mellon University, the Cybersecurity Manufacturing Innovation Institute (CyManII), the Department of Energy, Honeywell Quantum Systems, IT University of Copenhagen, MITRE Corporation, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Rochester Institute of Technology, Sandia National Laboratories, University of Massachusetts Amherst, UT Austin, and UTSA.

Dr. Kudithipudi was a featured panelist on Texas Public Radio's show "Think Science" featuring the latest developments in artificial intelligence.



Cybersecurity Manufacturing Innovation Institute (CyManII)

Led by CEO Dr. **Howard Grimes**, CyManII connects cybersecurity and energy efficiency to create manufacturing solutions that keep America's companies competitive and protected.

To benefit the United States, CyManII will cybersecure U.S. manufacturers and their supply chains against nation-state adversaries and other cybercriminals by completing the following in their five-year agreement.

- 1 quad of energy saved
- 1 trillion cyber vulnerability instances mitigated via implementation of E-Pure
- 1 million trained manufacturing workers and employees in cybersecurity
- \$20 billion saved over 5 years

Their diverse technical team is comprised of the most respected and qualified individuals across a multitude of top universities, national laboratories, and industries. Combining their expertise and experience, their team works together to protect U.S. manufactures against cybersecurity threats. CyManII has over 50 members within its network, including recognized leaders in smart manufacturing and cybersecurity from academia, national laboratories, and industries.

CyManII has been featured in over 20 state, national publications and academic journals on their technical efforts and vision commitments to the manufacturing sector this year.

Winning a total over five million dollars in investments from various Texas legislatures, CyManII has begun a contractual agreement with Port San Antonio and The University of Texas System to build a state-of-the-art manufacturing hub in San Antonio to deliver novel, and necessary, cyber security training for U.S. and Texas manufacturers. Housed at Port San Antonio, the Texas Manufacturing x Transformation Hub (TxMx Hub) will begin to provide education and training focused on cyber work force development and assisting TX companies with rigid cyber certifications via cyber-informed, secure by design, architectures that will significantly cyber protect more U.S. manufacturers that are part of the U.S. critical infrastructures and U.S. Department of Defense (DoD) supply chain.

CyManII will deliver work force training to over 25,000 workers, C-suite leaders, government officials, industry experts, and Texas companies by the end of 2021 via their Trustworks -aaS. They have also developed a comprehensive technical Roadmap that outlines a five-year R&D pathway to cyber protect U.S. industry including work to-be completed at the TxMx Hub.

The CyManII FHT Program operates across industry, community colleges, universities, and the military to create cyber-apprentices, cyber-journeys, and cyber-masters. Each level can enter the work force and continue to expand their careers via additional FHT offerings.

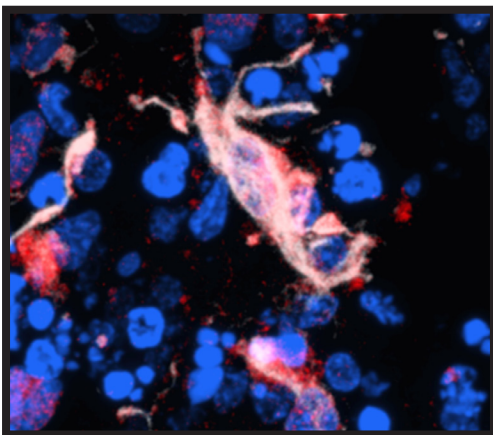
Focused on taking their training and education on the road, the CyManII MTV will provide a one-stop-shop for hands on training sessions and educational workforce development for cybersecurity leaders, technical engineers, and governmental leaders.



Brain Health Consortium (BHC)

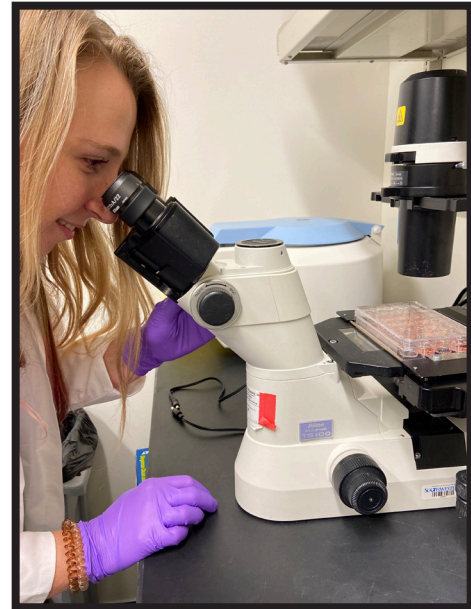
BHC is dedicated to discovering the inner workings of the brain through a collaborative, transdisciplinary team comprised of researchers with expertise in stem cells and precision medicine, neuroscience, biomedical engineering, and psychology and behavior, and is led by Dr. **Jenny Hsieh**. In FY21, the Brain Health Consortium submitted 34 proposals worth \$42 million and was awarded four research grants worth \$13 million.

UTSA brain and stem cell researchers secured \$12.5 million in funding over five years from the National Institutes of Health through the NIH BRAIN Initiative to advance new methods for studying genetic brain disorders. The results of their study could have a significant impact toward one day treating or eliminating neurological diseases such as epilepsy, Alzheimer's disease and more. Brian Hermann, associate professor in the Department of Neuroscience, Developmental and Regenerative Biology, is the lead principal investigator. He'll be working with Jenny Hsieh, professor and department chair, the Semmes Foundation Distinguished Chair in Cell Biology, department chair and director of the Brain Health Consortium; John McCarrey, professor and Kleberg Distinguished University Chair in Cellular and Molecular Biology and co-director of the UTSA Institute of Regenerative Medicine; and Christopher Navara, director of the UTSA Stem Cell Core and associate professor of research. The team will contribute their scientific expertise to different aspects of the study to optimize a new method for producing marmosets that have genetic changes (aka transgenic marmosets) that can be used to study human brain disease.



Lindsey Macpherson, assistant professor of neuroscience and developmental and regenerative biology, recently received a three-year, \$450,000 Voelcker Fund Young Investigator Award from the Max and Minnie Tomerlin Voelcker Fund to pursue novel research in investigating taste rewiring during chemotherapy treatment, Macpherson is an expert in researching the

sense of taste and the molecules, cells and circuits involved in chemosensation, from the tongue and gut to the brain. Dr. Macpherson also received \$225K from the Whitehall Foundation for her related research of synapses in the tongue and gut.



UTSA scientists have discovered it might be possible for SARS-CoV-2, the virus that causes COVID-19, to enter the human brain. The research was led by **Jenny Hsieh**, professor of biology, director of the UTSA Brain Health Consortium and the Semmes Foundation Chair in Cell Biology, in collaboration with Ricardo Carrion's lab at the Texas Biomedical Research Institute. A symptom of COVID-19 is the loss of taste and smell, which contributed to Hsieh investigating if the coronavirus could directly infect the brain. Some patients with COVID-19 develop serious neurological complications, including nerve damage. Hsieh along with **Courtney McMahon**, a UTSA Ph.D. candidate in cell and molecular biology, created a unique laboratory model called brain organoids with different types of brain cells infected with small amounts of SARS-CoV-2. They found that the brain's glial cells were susceptible to COVID-19 infection. Until UTSA's discovery, there hadn't been much scientific reporting on the glial cell and SARS-CoV-2 connection.

The Brain Health Consortium Collaborative Seed Grant program, launched in collaboration with the UTSA Brain Health Consortium, made its debut this fiscal year by funding two research projects. The first award went to **Matthew Wanat** (Neuroscience, Developmental and Regenerative Biology) for "*The role of VTA astrocyte-neuron interactions in drug addiction*"; the second to **Melanie Carless** (Neuroscience, Developmental and Regenerative Biology) for "*Hydroxymethylation patterns of cortical spheroids across neurodevelopment*".

National Security Collaboration Center (NSCC)

The National Security Collaboration Center (NSCC) is committed to being the nation's premier supplier of a cyber-ready workforce tailored to provide innovative solutions for the national security challenges facing U.S. Government, State of Texas, and industry partners and is led by **Brig. (Ret.) Guy Walsh**. In FY21, the National Security Collaboration Center received seven research awards from the MITRE Corporation, Intrinsic Ventures, CHAaSM Inc, VivSoft, Atakama Inc, Refractr, and Raft Inc.



In January 2021, UTSA marked the groundbreaking of its \$90 million School of Data Science and National Security Collaboration Center, the first new building in a series planned as part of its Downtown Campus expansion, with a virtual celebration in the San Pedro Creek area.

The 167,000-square-foot, six-story structure on 506 Dolorosa St. in downtown San Antonio, sits along San Pedro Creek east of IH-35, anchors UTSA to the city's prospering high-tech corridor and serves as a catalyst for economic and community investment, workforce development, and job creation.

The School of Data Science (SDS) is the first of its kind in Texas and is a key component in UTSA's mission to produce highly skilled professionals in data science and analytics as well as to advance economic development in San Antonio's urban core. The NSCC, co-located with the SDS, will provide more than 81,000 square feet for innovation, laboratories and research. The project advances the university's vision to earn national recognition as a research-intensive institution and bolsters San Antonio's national standing as Cyber City USA.

Construction on the SDS-NSCC building is funded with \$75 million from The University of Texas System Permanent University Fund and a \$15 million gift from San Antonio business leader Graham Weston.

In October 2021, UTSA and the Air Force Research Laboratory (AFRL) have signed a federal research contract worth over \$18 million to accelerate research and development in strategic areas beneficial to both organizations. The contract was negotiated by the Office of the Vice President for Research, Economic Development, and Knowledge Enterprise. UTSA's work will support the AFRL's overarching mission to lead discovery, development and delivery of warfighting technologies for air, space and cyberspace forces. The university will deliver a pipeline of technical innovations and talent to advance cyber resilience and emerging commercial technologies.

This fiscal year, the NSCC hosted many top government, academic, and industry leaders including the U.S. Cyber Command's Joint Force Headquarters-Department of Defense Information Network (JFHQ-DODIN); the Johns Hopkins University Applied Physics Laboratory (JHU APL); 16th Air Force (Air Forces Cyber) commander; the University of Utah; Marshall University; the University of West Virginia; and the West Virginia National Guard.

These ongoing collaborations and discussions add to the ever-growing national security knowledge base at UTSA. These institutions are also looking at the NSCC as a model to guide it in developing similar collaborations similar with partners at its home base to further protect the nation from global security challenges. The NSCC has already become a model for government, industry and academia on how to create an innovation ecosystem.

San Antonio is the second largest global cyber hub in the United States with a growing cyber ecosystem. UTSA is the nation's only Hispanic Serving Institution with three Center of Excellence designations from the National Security Agency and the U.S. Department of Homeland Security.

Open Cloud Institute (OCI)

The Open Cloud Institute (OCI) is a key player in accelerating the ongoing university-wide cloud computing initiative through its primary research areas of cloud computing, big data, artificial intelligence, machine learning, and more. In 2021, OCI helped the university reach new heights, including the noteworthy Carnegie R1 classification.

Research Collaborators:

80/20 Foundation, Cisco Systems, OpenStack, Rackspace, San Antonio City Public Service (CPS), Schlumberger, National Science Foundation (NSF) — Center for Security and Privacy Enhanced Cloud Computing (CSPECC), Texas A&M Southwest Enterprise in Education and Training (SWEET)

In fiscal year 2021, the institute used \$625,000 of research expenditures funded from externally funded research and other sponsored projects, including research endowments and gifts, as well as funds from federal and private sponsors — funding from the 80/20 Foundation, Texas A&M, Schlumberger, and Cisco Systems. Funding supported student research awards, capital equipment, and faculty effort; 33% of these funds were allocated to student research.



UTSA announced **Dr. John "Jeff" Prevost** as the new Interim Executive Director of OCI. Dr. Prevost, who co-founded and has been an Assistant Director and Chief Research Officer of the institute since its launch, brings with him a wealth of knowledge from his over twenty years of experience leading engineering and software development teams.

OCI Co-Founder and Assistant Director Dr. Paul Rad was one of four UTSA professors named to the prestigious Senior Member designation by the National Academy of Inventors (NAI) in 2021.



The institute provides robust student services through the Graduate Cloud Certificate Program and the Catalyst Lab. The Cloud Certificate Program equips technical professionals with the knowledge and skills necessary for a career in an organization that leverages cloud computing. The Catalyst Lab, subsidized in part by the 80/20 Foundation, offers an internship fellowship program that connects top-tier graduate students with local Tech Corridor startups and companies looking to bring on employees who can solve complex problems.

OCI hosts seminars related to research, industry, and more. In 2021, the institute partnered with the newly hired UTSA quantum faculty to develop and host the Quantum Research Seminar Series, wherein faculty from various esteemed institutions of higher education were invited to speak to and share their knowledge and research with the community. Additionally, OCI partnered with Elastic to bring a series of webinars to UTSA to educate faculty and students on how they can leverage Elastic platforms to enhance their research. OCI continues to seek partnerships and collaborations to share with our network and the overall research community.

Looking forward, OCI's goals are to leverage the expertise of the new Cloud Core to engage in research proposals, solicit and recruit current and new faculty seeking active research funding, and continue collaborating with faculty, students, and industry to provide unique and valuable resources to OCI's members and the overall UTSA community.





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