



Governor's University Research Initiative

2021 Legislative Report
Reporting Period: January 2019 - December 2020

Office of the Governor | Economic Development & Tourism

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OVERVIEW OF THE GOVERNOR'S UNIVERSITY RESEARCH INITIATIVE GRANT PROGRAM

"We are beginning the process of elevating higher education in Texas to greater heights than it's ever been before. Through our Governor's University Research Initiative, Texas is making a strategic investment to vault the standings of our public colleges and universities into the top-ranked nationally. Our investment into GURI will help our universities recruit even more Nobel Laureates and National Academy members to the Lone Star State, and will serve as a catalyst for further economic development."
-Governor Greg Abbott

The Governor's University Research Initiative grant program ("GURI") was enacted in 2015 by the 84th Legislature with a goal to bring the best and brightest researchers in the world to Texas colleges and universities. Through the GURI program, Texas welcomes transformative researchers who will in turn serve as economic catalysts to the Texas economy for years to come. Administration of the GURI program is the responsibility of the Texas Economic Development & Tourism (EDT) office, in the Office of the Governor.

GURI is a matching grant program to assist eligible Texas institutions of higher education in recruiting distinguished researchers, such as Nobel Laureates and members of national honorific societies, from around the world. The program is codified in Chapter 62 of the Texas Education Code, Subchapter H and the program's administrative rules may be found in Title 10, Part 5, Chapter 190 of the Texas Administrative Code.

The GURI Advisory Board was established to assist the Economic Development Finance division of EDT in the Office of the Governor ("OOG") with the review and evaluation of applications for funding of grant proposals under this chapter. The first application was received February 25, 2016. As of December 31, 2020, there have been 20 GURI Advisory Board meetings.

REPORTING REQUIREMENTS

The contents of the GURI legislative report are outlined in Section 62.168 of the Texas Government Code:

Sec. 62.168. REPORTING REQUIREMENT. (a) Before the beginning of each regular session of the legislature the governor shall submit to the lieutenant governor, the speaker of the house of representatives, and the standing committees of each house of the legislature with primary jurisdiction over economic development and higher education matters and post on the office of the governor's Internet website a report on matching grants made to eligible institutions from the fund that states:

- (1) the total amount of matching funds granted by the office;
 - (2) the total amount of matching funds granted to each recipient institution;
 - (3) a brief description of each distinguished researcher recruited by each recipient institution, including any amount of external research funding that followed the distinguished researcher to the institution;
 - (4) a brief description of the expenditures made from the matching grant funds for each distinguished researcher; and
 - (5) when available, a brief description of each distinguished researcher's contribution to the state's economic competitiveness, including:
 - (A) any patents issued to the distinguished researcher after accepting employment by the recipient institution; and
 - (B) any external research funding, public or private, obtained by the distinguished researcher after accepting employment by the recipient institution.
- (a-1) The report may not include information that is made confidential by law.
- (b) The governor may require an eligible institution that receives a matching grant under this subchapter to submit, on a form the governor provides, information required to complete the report.

PROGRAM ACTIVITY

As of December 31, 2020, the OOG has approved \$62,239,216.50 in GURI matching funds to five Texas universities:

- \$43,680,000 of matching funds, in 12 awards, granted to Texas A&M University
- \$9,794,216.50 of matching funds, in four awards, granted to the University of Houston
- \$1,800,000 of matching funds, in one award, granted to The University of Texas at Austin
- \$5,000,000 of matching funds, in one award, granted to Texas Tech University
- \$1,965,000 of matching funds, in one award, granted to The University of Texas at Arlington

Universities receiving GURI matching grant awards are required to submit quarterly status reports and reimbursement requests with supporting documentation. To date, grantee universities have submitted 202 quarterly reports. OOG staff reviews reimbursement requests to ensure compliance prior to disbursing funds.

DISTINGUISHED RESEARCHERS AND EXPENDITURES

The following contains a brief description of each distinguished researcher recruited by each recipient institution, in addition to a brief description of expenditures made from the matching grant funds for each researcher. All of the distinguished researchers enhance the faculty at each university, and their research and discoveries have the potential to catalyze job creation and commercialization efforts in Texas.

Texas A&M University

Girish Saran Agarwal, Ph.D.

Member of the Royal Society – United Kingdom

Dr. Agarwal's research focuses in quantum optics and photonics with a range of applications with publications on slow light, quantum coherence, nonlinear optics, and light scattering. The optical techniques will permit the identification of chemical compounds and will form the basis to detect pathogens and chemicals at a distance. Dr. Agarwal is a full-time employee of the College of Agriculture and Life Science within the Department of Biological and Agricultural Engineering at Texas A&M University. Dr. Agarwal also spearheads activities within the Center for Bio-photonics within the Institute for Quantum Science and Engineering. At Texas A&M, he has been developing laboratories for microscopy and quantum sensing and has produced publications on a range of topics in biophotonics. Dr. Agarwal lectures on the interdisciplinary courses for graduate students.

Dr. Agarwal started at Texas A&M University on August 1, 2016. To date, expenditures have been made from the matching grant funds for equipment, supplies, and direct operating expenses for Dr. Agarwal.

Leif Andersson, Ph.D.

Foreign Associate of the National Academy of Sciences

Dr. Leif Andersson is among the most renowned international leaders in the genomic and molecular studies of domestic animals as models of biomedical genomics. Dr. Andersson conducts research on the genetic changes underlying phenotypic diversity in horses, pigs, dogs, and a variety of other domestic animals. Many of Dr. Andersson's discoveries in domestic animal models can be directly applied to agriculture, as he uses the latest genomic tools to reveal the genetic control of many important production traits in agricultural animals. Dr. Andersson participates in graduate education programs of the College of Veterinary Medicine at Texas A&M University.

Dr. Andersson started at Texas A&M University on October 16, 2016. To date, expenditures have been made from the matching grant funds for travel, construction, equipment, a one-time salary supplement, supplies, and direct operating expenses for Dr. Andersson.

Mark A. Barteau, Ph.D.

Member of the National Academy of Engineering

Dr. Mark A. Barteau brings extensive experience as a researcher, inventor, academic leader, and consultant for organizations around the world. Dr. Barteau's research is focused on selective oxidation catalysts for more efficient chemicals production, electrochemical energy storage, and integrated capture and conversion of carbon

dioxide and other low-value resources to valuable products. Dr. Barteau is the Vice President of Research and Professor of Chemistry and Chemical Engineering at Texas A&M University. Dr. Barteau's research focuses on new technologies related to large-scale batteries as well as impacting the energy and chemical industries.

Dr. Barteau started at Texas A&M University on February 15, 2018. To date, expenditures have been made from the matching grant funds for equipment for Dr. Barteau.

Ali Erdemir, Ph.D.

Member of the National Academy of Engineering

Dr. Erdemir's research group focuses on bridging scientific principles with engineering innovations towards the development of new materials, coatings, and lubricants for a broad range of cross-cutting applications in manufacturing, transportation, and other energy conversion and utilization systems where further increases in efficiency, reliability, and environmental sustainability are of primary objectives. Dr. Erdemir's group specifically strives to unravel key/underlying mechanisms that control friction and wear at the most fundamental levels and develop more advanced surface layers and interface chemistries providing superlubricity and/or super high-hardness as well as extreme resistance to wear, corrosion, fatigue, and other types of degradations under harsh operational and environmental conditions.

Dr. Erdemir started at Texas A&M University on February 1, 2020. To date, no expenditures have been made from the matching grant funds for Dr. Erdemir.

M. Cynthia Hipwell, Ph.D.

Member of the National Academy of Engineering

Dr. M. Cynthia Hipwell has been at the forefront of the creation of new devices, models, and metrology from the fundamental understanding of small nanoscale and surface phenomena and nanotechnology integration. Dr Hipwell's experience in leading interdisciplinary research and technology transfer and commercialization benefits Texas A&M's nanoscale and surface science technology facilities. These efforts are expected to lead to new discoveries and enhance Texas' global economic competitiveness in nano/biotechnology and manufacturing by generating new jobs and start-up companies for commercialization.

Dr. Hipwell started at Texas A&M University on September 1, 2017. To date, expenditures have been made from the matching grant funds for travel, equipment, supplies, construction, direct operating expenses, and professional and consulting services for Dr. Hipwell.

James Edward Hubbard, Jr., Ph.D.

Member of the National Academy of Engineering

Dr. James Edward Hubbard, Jr. began his career as an engineering officer in the U.S. Merchant Marine Serving in Vietnam. Dr. Hubbard, Jr. has established a national and international reputation in smart, adaptive vehicles and sensors. Dr. Hubbard, Jr. is considered to be an expert in smart structures and has made significant contributions in this field. At Texas A&M, Dr. Hubbard, Jr. leads the establishment of a facility focused on advancing research and knowledge for safety technologies as well as methods and processes that support connected and autonomous vehicle development in conjunction with the newly established Center for Infrastructure and transportation industries.

Dr. Hubbard, Jr. started at Texas A&M University on February 1, 2018. To date, expenditures have been made from the matching grant funds for equipment, supplies, renovations, travel, and direct operating expenses for Dr. Hubbard, Jr.

Richard B. Miles, Ph.D.

Member of the National Academy of Engineering

Dr. Richard B. Miles came to Texas A&M University from Princeton University, and his research focuses on the use of lasers, electron beams, low temperature plasmas, microwaves, and magnetic devices to observe, control, accelerate, extract power, and precondition gas flows for subsonic, supersonic, and hypersonic fluid dynamics, combustion, propulsion, and homeland defense applications. One such application of his research is the development of state-of-the-art remote detection that will identify hazardous gases and dangerous contaminants such as anthrax or the Ebola virus, hidden explosives such as IEDs and/or greenhouse gases and pollutants. Dr. Miles is working to establish a Center of Excellence in Interdisciplinary Optical and Laser Detection Systems for National Security and Safety at Texas A&M University.

Dr. Miles started at Texas A&M University on February 15, 2017. To date, expenditures have been made from the matching grant funds for supplies, direct operating expenses, construction and equipment for Dr. Miles.

Elaine Surick Oran, Ph.D.

Member of the National Academy of Engineering

Dr. Elaine Surick Oran is considered a world authority on numerical methods for large-scale simulation of physical systems by utilizing computer modeling. Dr. Oran has pioneered computational technology for the solution of complex reactive flow problems, unifying concepts from science, mathematics, engineering, and computer science in a new methodology. Dr. Oran leads an Interdisciplinary Center of Excellence in Simulation and Control of Non-Equilibrium Reacting Systems at Texas A&M University. Her research and collaboration efforts will lead to new technologies that can be utilized by the aerospace and defense industries.

Dr. Oran started at Texas A&M University on March 1, 2019. To date, expenditures have been made from the matching grant funds for equipment, supplies, construction and direct operating expenses for Dr. Oran

Thomas Overbye, Ph.D.

Member of the National Academy of Engineering

Dr. Thomas Overbye maintains a robust research portfolio that includes very large, multi-investigator energy projects. Some of the projects include a \$22.5 million cyber security project with the department of Energy, an ARPA-E project on synthetic data for power grid analysis, and a National Science Foundation project on the impact of geomagnetically-induced currents on power networks. In joining the work already ongoing at Texas A&M University to make the state's electric power grids operate smarter, thus called "Smart Grids," Dr. Overbye leads in the areas of improved power system operations, real-time smart grid visualization, and cybersecurity. These improvements will save money for the public utility companies and the state, making the state's power system more reliable and secure. Dr. Overbye serves as a professor in the Department of Electrical and Computer Engineering and teaches on topics related to power distribution and generation.

Dr. Overbye started at Texas A&M University on January 1, 2017. To date, expenditures have been made from the matching grant funds for construction, equipment, supplies, professional and consulting services, travel, and direct operating expenses for Dr. Overbye.

Roderic Ivan Pettigrew, Ph.D., M.D.

Member of the National Academies of Engineering and Medicine

Dr. Roderic Ivan Pettigrew was the founding Director of the National Institute of Biomedical Engineering at the National Institutes of Health. Dr. Pettigrew will build and lead the new research center of excellence on bioimaging and biomedical technology that will place Texas A&M University at the forefront of innovative diagnostic and treatment options for major medical conditions such as atherosclerosis, coronary artery disease, and stroke. The establishment of this center will greatly benefit researchers and patients, and will lead to the creation of new technologies and commercial products. Dr. Pettigrew has split faculty appointments between the College of Medicine and the College of Engineering and is working to establish and lead the Engineering Health (EnMed) Initiative, and was the 2020 recipient of the Vannevar Bush Award given by the National Science Board for lifelong science and technology leadership.

Dr. Pettigrew started at Texas A&M University on November 27, 2017. To date, no expenditures have been made from the matching grant funds for Dr. Pettigrew.

George M. Pharr, Ph.D.

Member of the National Academy of Engineering

Dr. George M. Pharr is the main developer of the materials characterization technique called nano-indentation. Texas A&M University will create an Excellence Cluster in “Nano-Materials Innovation and Characterization for Energy,” focused on nanoscale materials for uses in high strength materials for energy production and storage, electronics, modern medicine, computer hard drives, and everyday products. Dr. Pharr’s nano-indentation technique serves as an instrumental tool in the development and deployment of a variety of new materials for a wide range of applications and industry needs, including national security, transportation infrastructure and vehicle reliability and optimization, and health devices and measurements.

Dr. Pharr started at Texas A&M University on December 16, 2016. To date, expenditures have been made from the matching grant funds for construction and equipment for Dr. Pharr.

Kenneth Ramos, Ph.D.

Member of the National Academy of Medicine

Dr. Kenneth Ramos is a scientific leader in academic medicine, with designations in the National Academies of Medicine and Science. Dr. Ramos has more than 30 years of experience across the tripartite mission areas of education, research, and clinical service, and has received recognition throughout the world for his scientific contributions in the areas of genomics, precision medicine, and toxicology. Dr. Ramos’ research program integrates diverse approaches to understand the genomic basis of human disease and the role of gene-environment interactions in health and disease. Translational research in his laboratory focuses on the study of repetitive genetic elements in the mammalian genome and their role in genome plasticity and disease, while clinical studies focus on the development and characterization of diagnostic and prognostic biomarkers of cancer and pulmonary disease to advance the goals of personalized genomic medicine. Dr. Ramos works closely with colleagues throughout the world to steer the changing landscape of medicine and healthcare and provide academic, executive, administrative, and scientific leadership in several areas.

Dr. Ramos started at Texas A&M University on March 1, 2019. To date, expenditures have been made from the matching grant funds for equipment for Dr. Ramos.

University of Houston

Birol Dindoruk, Ph.D.

Member of the National Academy of Engineering

Dr. Birol Dindoruk leads the CO₂/Gas Storage and Gas Injection & Reservoir Recovery Mechanisms Center of Excellence within the Department of Petroleum Engineering, which is aligned with his citation at National Academy of Engineering “for significant theoretical and practical contributions to enhanced oil recovery and CO₂ sequestration.” Dr. Dindoruk will enhance understanding of reservoir recovery processes, CO₂ sequestration, and behavior of fluids under high pressure and high temperature especially in applications to offshore Gulf of Mexico and Unconventional reservoirs. As a result, this will have significant impact on the State of Texas and Houston. Recently, he also led the digital domain for the Society of Petroleum Engineers as a Technical Director. Dr. Dindoruk is a tenured Professor of Petroleum Engineering and teaches both undergraduate and graduate courses.

Dr. Dindoruk started at the University of Houston as a part-time employee (0.5 FTE) on September 1, 2018, and became a full-time faculty member on September 1, 2020. To date, expenditures have been made from the matching grant funds for supplies for Dr. Dindoruk.

Ganesh Thakur, Ph.D.

Member of the National Academy of Engineering

Dr. Ganesh Thakur is a pioneer and world authority in the field of integrated petroleum reservoir management of conventional and unconventional reservoirs and CCUS (carbon capture, utilization, and storage). Dr. Thakur joined the University of Houston (UH) as a Distinguished Professor of Petroleum Engineering in the Cullen College of Engineering. He conducts research and guides Ph.D. students in the field of integrated oil and gas reservoir management, surveillance and monitoring of primary, secondary and EOR (enhanced oil recovery) production, production forecasting using data analytics and physics, waterflooding, EOR of unconventional and heavy oil reservoirs, and CCUS. Dr. Thakur also serves as the Director for Energy Industrial Partnerships at the University of Houston. This center represents efforts in upstream and midstream as it applies to important applications and will have an immense impact on the State of Texas in the field of energy. Dr. Thakur has secured (as a Principal Investigator) external industrial research funding of \$4.868 million (one of the highest at UH) after accepting employment at the University of Houston. In addition, he has filed for two patents after joining UH. Dr. Thakur has been conferred two awards in 2019 and 2020: Legion of Honor (50 years of continuous service) and Honorary Member (the highest-level award made) by the Society of Petroleum Engineers Intl. (SPE). Dr. Thakur serves as the President of SPE Foundation, and on the Board of Texas Academy of Medicine, Engineering, Science and Technology (TAMEST) and will become the Treasurer for the years 2021 through 2022.

Dr. Thakur started at the University of Houston on August 1, 2016. To date, expenditures have been made from the matching grant funds for equipment, supplies, direct operating expenses, and a one-time salary supplement for Dr. Thakur.

Andrea Prosperetti, Ph.D.

Member of the National Academy of Engineering

Dr. Andrea Prosperetti comes to the University of Houston from Johns Hopkins University where he held the title of Charles A. Miller Professor of Mechanical Engineering. Dr. Prosperetti joined the University of Houston as a Distinguished Professor of Mechanical Engineering in the Cullen College of Engineering on July 1, 2016. In the period between 2016 and 2018, he led the multi-disciplinary Center for Advanced Computing and Data Systems promoting education in advanced computing throughout the University of Houston and using most of the GURI award for the purchase of major computing equipment for the University community. He is also the founding director of the University of Houston Hewlett Packard Enterprise Data Science Institute. His research activities at the University of Houston have been primarily directed to the prevention and mitigation of catastrophic blow-outs from oil drilling operations such as the 2010 DeepWater Horizon accident in the Gulf of Mexico.

Dr. Prosperetti started at the University of Houston on July 1, 2016. To date, expenditures have been made from the matching grant funds for a one-time salary supplement, construction, direct operating expenses, and equipment for Dr. Prosperetti.

John Suppe, Ph.D.

Member of the National Academy of Sciences

Dr. John Suppe is a world leader in structural geology and tectonics, and his research focuses on seismic tomography and their multiscale application for fundamental discoveries concerning the deep interior of the Earth, the structure of mountain belts, and fine structure of petroleum basins. Dr. Suppe joined the University of Houston as a Distinguished Professor of Earth & Atmospheric Sciences in the College of Natural Sciences and Mathematics. Dr. Suppe also established and leads the multi-disciplinary Center for Tectonics and Tomography (CTT) at the University of Houston. The center's research agenda has covered many relevant research topics such as sea-level rise, geo-hazards, stratigraphy, and petroleum and resource exploration, all of which are vital to the economy and well-being of Texas. Dr. Suppe's research is focused on new applications of seismic tomography and related data to both fundamental discovery and resource and hazard applications.

Dr. Suppe started at the University of Houston on September 1, 2016. To date, expenditures have been made from the matching grant funds for travel, equipment, supplies, and direct operating expenses for Dr. Suppe.

The University of Texas at Austin

Joan Brennecke, Ph.D.

Member of the National Academy of Engineering

Dr. Joan Brennecke is a professor in the McKetta Department of Chemical Engineering and holder of an endowed chair. Dr. Brennecke is an internationally recognized leader in sustainable chemical process technologies and energy storage capabilities. As a member of the faculty at The University of Texas, Dr. Brennecke conducts research on energy and sustainability, including the design of ionic liquid systems for safer, more reliable and longer-lasting batteries. Dr. Brennecke works closely with the university's office of technology commercialization to facilitate technology transfer from her lab to the marketplace thus benefiting not only the university, but also the entire state of Texas.

Dr. Brennecke started at The University of Texas at Austin on August 1, 2017. To date, expenditures have been made from the matching grant funds for travel, equipment, supplies, direct operating expenses, and construction for Dr. Brennecke.

Texas Tech University

Luis Rafael Herrera-Estrella, Ph.D.

Member of the National Academy of Sciences

Dr. Luis Rafael Herrera-Estrella serves as the Director of the Institute for Functional Genomics of Abiotic Stress at Texas Tech University with an overarching goal of understanding the control and regulation of physiological, biochemical, developmental, and growth processes in plants under sub-optimal and semi-arid environments. Dr. Herrera-Estrella's role in grant-supported transformative and translational plant science research will also serve in training the next generation of high-caliber innovators and thinkers in agricultural, industrial and/or pharmaceutical plant biotechnology. To date, Dr. Herrera-Estrella has published 16 papers in high impact scientific journals. Some of his discoveries have been featured in The New York Times and the National Academy of Sciences of the United States of America (PNAS) magazine and has generated two patent applications.

Dr. Herrera-Estrella started at Texas Tech University on October 1, 2018. To date, expenditures have been made from the matching grant funds for a one-time salary supplement, equipment, direct operating expenses, construction, travel, and supplies for Dr. Herrera-Estrella.

The University of Texas at Arlington

Surendra Shah, Ph.D.

Member of the National Academy of Engineering

Dr. Surendra Shah is the Presidential Distinguished Professor of Civil Engineering and Materials Science and Engineering and the founding Director of the Center for Advanced Construction Materials at the University of Texas at Arlington. Distinguished for his seminal research on synthesizing engineering mechanics and materials science, Dr. Shah has made unique, original, and extensive contributions to better understand and define properties of cement-based materials and developing new advanced materials which has become a world standard in these fields. Dr. Shah is responsible for developing high performance concrete, fiber reinforced concrete, self-consolidating concrete, shrinkage reducing admixtures, carbon nano-tube reinforced cement-based composites, and extrusion processing of concrete. These have revolutionized the way modern concretes are used worldwide. Dr. Shah leads the Interdisciplinary Center of Excellence for Advanced Construction Materials, which enables multidisciplinary, materials science, civil engineering, and mechanics research for establishing strong partnerships with research groups and collaborators within the greater scientific and engineering community, industry, and TxDOT.

Dr. Shah started at The University of Texas at Arlington on January 16, 2019. To date, expenditures have been made from the matching grant funds for equipment, construction, supplies, and direct operating expenses for Dr. Shah.

GURI ADVISORY BOARD

The following have been appointed by the Governor to serve as members of the GURI Advisory Board.

Sam L. Susser (Chairman) of Corpus Christi is chairman of BancAffiliated, Inc.

Jacque Baly of Sugar Land is president and chief executive officer for BalyProjects, a former member of the Sugar Land City Council, and former adjunct professor at the University of Houston.

Dr. Antonio Falcon of Rio Grande City is medical director of Family Health Center, L.L.P.

John Goodman of Frisco is founder and executive chairman of Family ER + Urgent Care Centers and is a board member, co-founder, former executive chairman, and former chief executive officer of Goodman Networks.

Wendy Gramm of Helotes is a retired Texas A&M University economist who has held positions on various for-profit, non-profit, academic, and U.S. Government organizations and boards.

Christy McClendon of Lubbock is executive vice president and managing partner for GRACO Real Estate Development, Inc.

Walker N. Moody of Houston is president of Pickering Energy Partners.

Mike Fernandez Shaw of Fredericksburg is owner and operator of Mike Shaw Automotive.

Mica Espinoza Short of El Paso is the vice president of development for the Paso del Norte Community Foundation.



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