Inquiry

Up Close

UTA researchers are focusing their work on racial disparities in health care.

THE UNIVERSITY OF TEXAS AT ARLINGTON

RESEARCH 2022

White plague disease is ravaging coral in the Caribbean. A group of UT Arlington researchers hopes its investigation can provide insight into which species may prove to be most resistant. Read more on page 9.

PHOTOGRAPH BY ANDRZEJ BOCHENSKI

Inquiry

2022

ON THE COVER: Crystals of hemoglobin, an oxygen-carrying protein found in red blood cells. A new device developed at UTA could help detect hemoglobins better in people of color. Read more on p. 22.
Michael W. Davidson/Science Source

VP Dispatch

A Point of Transition

After achieving Texas Tier One, UTA focuses on new goals

THIS IS THE year that the University of Texas at Arlington was recognized by the state of Texas as a research university of national stature, a status often referred to as "Tier One." The story of our path to this distinction is told in this issue beginning on page 28. Although the final notice of this achievement came in the past year, it was no surprise to the many people who worked hard to accomplish it.

Though much of the past year was spent waiting for our report of the qualifying data to receive certification by state audit, we were not idle. UTA's researchers have been more productive than ever. Research expenditures supported by the federal government and by all sponsors continued their impressive rise. These numbers demonstrate the growing strength of our research enterprise, and they are the payoff of over a decade of hard work and investment.

We now stand at a point of transition. For many years, we strove to attain Tier One recognition in Texas; that work is done. We must turn our labors toward the national stage. Our research accomplishments must continue, but we must also commit to maintaining our important role as an accessible, diverse, urban-serving university that creates social mobility and better lives for our students and their families.

We should strive to be a university that truly emphasizes opportunity alongside excellence. We should strive to provide the insights and innovations that help a diverse society achieve wellness, security, and prosperity in a complex, challenging world. As reported on the opposite page, this year we welcome our 10th president, and the first woman to lead our University. We will begin a new era, one in which we define a new model for a great research university of national importance.

Go Mavericks,

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Interim Vice President for Research

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Leading Edge

New President Named

In early 2022, the University of Texas System chancellor announced the appointment of Jennifer Cowley as the next president of UT Arlington. Dr. Cowley is the 10th president in the University's history and the first who is female. In addition, she serves as a member of the UTA faculty as a professor of public affairs and planning. Cowley brings a strong track record of advancing urban-serving research universities, previously serving as provost and vice president for academic affairs at the University of North Texas. She joined UTA at the end of April.

UTA Co-Founds New Initiative

In the summer of 2021, UTA joined eight leading U.S. schools and colleges of architecture, planning, and design in co-founding the Deans' Equity and Inclusion Initiative, a partnership to nurture a diverse population of emerging scholars focused on teaching and researching the built environment to advance socio-ecological and spatial justice, equity, and inclusion.

The initiative is built around a cohort-based fellowship program that supports early career faculty in their academic and research pursuits.

Supporting a Diverse STEM Workforce

UTA was one of 10 universities to receive a seed grant from the National Science Foundation's (NSF) Partnerships for Research and Education in Materials program. Each grant provides $800,000 to support materials research partnerships between minority-serving institutions and large-scale, NSF-supported research centers. UTA's partner is Northwestern University's Materials Research Science and Engineering Center.

"Our goal is to double the number of underrepresented graduate students in materials science and engineering (MSE) in three years," says MSE Department Chair Stathis Meletis. "Involving undergrads in research, mentorship, and educational opportunities will help in that recruitment."

ILLUSTRATION BY LARA TOMLIN

Health and the Human Condition

A century ago, the average American lived about 55 years. Today, we are likely to make 80. Unrelenting scientific curiosity and exploration have made this dramatic increase possible and led to life-saving breakthroughs in the diagnosis and treatment of diseases and other ailments. But progress that improves our quality of life extends beyond the physical realm. Examination of the arts and humanities helps us understand the nature of the human condition and the cultural and social fabric that characterizes our existence and contributes to our well-being.

QUICK HITS

Bioengineering Chair **Michael Cho** is investigating whether a combination of nanoparticles and light therapy can better treat traumatic brain injuries on the battlefield. Professor **Hanli Liu** is collaborating on the project.

Kytai Nguyen, professor of bioengineering, received a three-year National Institutes of Health grant to design a nanoparticle delivery system that will take needed plasmids to arteries in patients suffering from peripheral artery disease in their arms and legs.

In a study published in *Cancer*, kinesiology Assistant Professor **Yue Liao** found that cancer survivors improved their quality of life, physical activity level, and physical functioning after completing a 12-week group-based exercise program.

ASSISTANT PROFESSOR PIYA GHOSE

KILLER GENES

Unlocking complex cell death

By studying how roundworm cells die, Piya Ghose hopes to help patients with cancer and other disorders live.

The assistant professor of biology received a National Institutes of Health grant to study which genes contribute to the death of complex cells. Presently, scientists do not entirely understand how this type of cell dies.

During her postdoctoral work, Dr. Ghose discovered a cell-killing phenomenon in *C. elegans* nematodes, a type of roundworm, that had never been described before. She named it Compartmentalized Cell Elimination (CCE).

"Since we see CCE in two different cell types in the worm and because many of the genes we've identified as important for CCE have human counterparts, there is a high probability that CCE occurs in humans as well," Ghose explains. She and her team hope to unravel how these genes play a role in CCE and how CCE takes place.

"The long-term hope is to develop targeted therapies for neurodevelopmental and neurodegenerative disorders and injuries as well as cancer."

HEAD START

Understanding brain injury

Professor Ashfaq Adnan is working with the Office of Naval Research on four projects totaling $4 million to investigate how head trauma damages the brain and develop better protection to prevent it in the future.

In the first study, he is using ultra-high-speed cameras to capture motion within a simulated brain and determine what level of head movement leads to neuronal or brain injury at the cellular level. In the second—a collaboration with the research consortium PANTHER—he is studying how neuronal injury affects neuronal communication.

"Through these two studies, we will advance our understanding of cellular-level brain injury mechanisms and apply our findings to prevention and treatment against brain injury," Dr. Adnan says.

This application can be seen in his other two projects: The first focuses on developing advanced sensor technologies that can be embedded on protective "smart" helmets to sense head and brain injuries and allow soldiers to receive medical treatment more rapidly, while the second investigates the use of 3D-printing technology to build a new type of material for these helmets.

MEMORY MAKERS

The project pairs UTA students with homebound older adults experiencing early-stage dementia

Combining reminiscence and digital storytelling

A multidisciplinary team at UTA is studying the impact of telephone-based reminiscence by engaging social work students and Meals on Wheels clients in a digital storytelling study.

Funded by the RRF Foundation for Aging, the project pairs UTA students with homebound older adults experiencing early-stage dementia or memory impairment to engage in a semi-structured dialogue about their childhoods. The students then create a digital storytelling product to document these memories in various ways, such as audiovisual clips combining text, music, photographs, and voiceover narration.

Noelle Fields and Ling Xu, both social work associate professors, are principal investigators on the project, which involves a community partnership with Meals on Wheels of Tarrant County.

They hope the use of reminiscence combined with an intergeneration approach and digital storytelling will help promote improved social and emotional well-being in older adults. The project is expected to be completed by the end of 2022.

ILLUSTRATION BY BRIAN STAUFFER

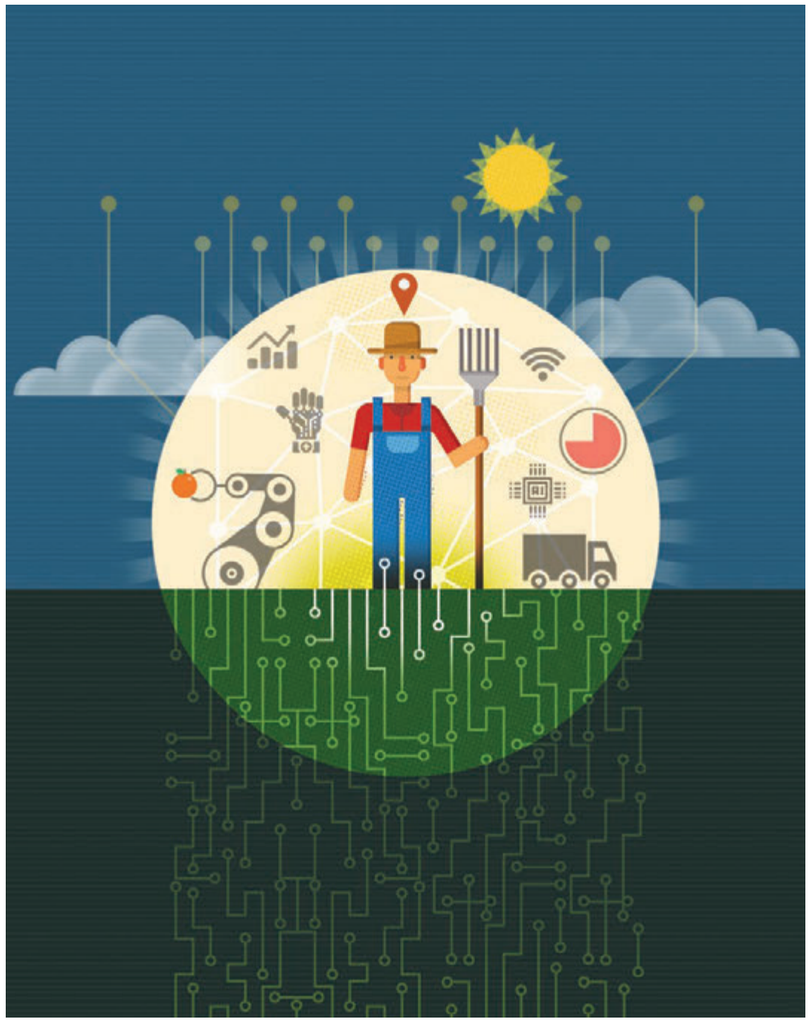
GAS GAUGE

Monitoring emissions on farms

Electrical engineering Professor Sungyong Jung is teaming up with UT Dallas Professor JB Lee on a U.S. Department of Agriculture project to develop a sensing system that can be used on farms to detect greenhouse gas emissions, a major factor in climate change.

"Farm fields emit carbon dioxide, methane, and nitrous oxide from fertilizers, cultivation of soils, animal waste, and rotting crops," Dr. Jung says. "If we are successful, farmers will be able to accurately monitor gas emissions and reduce the factors that lead to them, allowing them to save money while increasing their productivity."

To measure greenhouse gas emissions, farmers must place hundreds of sensors in their fields, making data collection difficult, time-consuming, and expensive. To mitigate that, Dr. Lee is developing a nanosensor that detects carbon dioxide, methane, ammonia, and nitrous oxide, while Jung is creating an embedded readout system with long-range transmission so information can be sent to a centralized data center. There, an individual can view results without having to go out and check multiple sensors in the field.



PEBBLE PROJECT

"It's important to take it a step further and learn about where the products come from"

The sustainability of green industry products

Is there a hidden cost to "sustainable" products? A social scientist at UT Arlington is exploring that question by studying whether sustainable products really improve sustainability in the communities from which they originate.

Anthropology Professor Christian Zlolniski received a National Science Foundation grant to study the labor and environmental implications of natural resources being marketed as sustainably sourced products. His focus is Mexican beach pebbles, which are sold in the U.S. as a substitute for mulch in landscaping, landscape architecture, and outdoor beautification projects.

"When people see products that are part of the 'green' industry or that are 'environmentally friendly,' it means they are looking for products and resources that aren't impacting the environment," says Dr. Zlolniski, who is also director of the Center for Mexican American Studies. "It's important to take it a step further and learn about where the products come from, the labor conditions of the workers who gather them, and how the extraction of these natural resources impacts their communities."

ASSISTANT PROFESSOR MICHELLE HUMMEL

COASTAL COLLABORATION

Tracking climate change

Civil engineering Assistant Professor Michelle Hummel is helping residents of Ingleside on the Bay, Texas, monitor the effects of climate change on their coastal town.

Ingleside on the Bay has seen environmental impacts on its exposed shoreline due to rising tides and increased air and water pollution from recent growth in the oil industry.

Dr. Hummel and her team are working with the community to develop a low-cost sensor network that will monitor air and water quality and flooding potential, then transfer the data to an online dashboard.

"By working directly with local residents to co-design our research approach, we can better address the complex challenges facing the town and work toward more sustainable, community-driven solutions," Hummel says.

Co-principal investigators from UTA are Associate Professor Yonghe Liu, Associate Professor of Planning Karabi Bezboruah, and Assistant Professor Oswald Jenewein.

Sustainable Communities

Developing more sustainable communities is vital to strengthening our economy, enhancing everyday life, and providing a foundation for lasting prosperity. Opportunities abound to make urban regions more livable, including reducing pollution, preserving ecosystems, and offering a variety of transportation and housing choices. Today's communities demand better building design, land-use planning, and improved infrastructure. They also broaden horizons and enlighten minds through cultural, recreational, and educational programs.

QUICK HITS

The National Science Foundation Early Career Development program awarded **Caroline Krejci**, engineering assistant professor, a grant for her research designing a way for farmers to move crops and livestock to market through crowd-sourced transportation products.

The U.S. Endowment for Forestry and Communities awarded **Warda Ashraf**, civil engineering assistant professor, a grant to make concrete and cement more sustainable.

Professor and Interim Provost **Pranesh Aswath** is collaborating with Canadian Light Source, a research facility at the University of Saskatchewan, to develop a new additive for automotive engine oil that reduces harmful emissions and increases fuel efficiency.

ILLUSTRATION BY GORDON STUDER

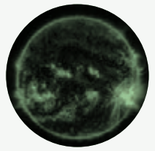
Global Environmental Impact

As concerned citizens of the global community, we must recognize and live within environmental limits. Future generations will survive only if we maintain the delicate balance of our planet through thoughtful stewardship of its natural resources. With the world's population exceeding 7.8 billion, the need to conserve these essential elements is increasingly critical. Becoming more environmentally efficient helps us better manage our shrinking water supply, clean the air we breathe, reduce our carbon footprint, and protect our biodiversity.

QUICK HITS

Sen Xu, assistant professor of biology, received a NSF Faculty Early Career Development award to investigate how the process of recombination in sexual organisms is modified by genetic variants and through interaction with environmental changes.

The National Science Foundation awarded **Luke Frishkoff**, assistant professor of biology, a $1.1 million grant to study the ecological niches of anole lizard species in the Caribbean islands.



Physics Distinguished Professor **Yue Deng**, Assistant Professor **Daniel Welling**, and Research Engineer Scientist **Cheng Sheng** are using a NASA grant to look at the impact of solar-induced phenomena on our electrical power grids.

ASSOCIATE PROFESSOR ROBIN MACALUSO

CHARGED UP

Improving alternative energy sources

Chemistry Associate Professor Robin Macaluso believes that by creating new synthetic materials, she can help make alternative energy sources more efficient and cost-effective.

Funded by a two-year grant from the National Science Foundation's Division of Materials Research, she is establishing a method to create synthetic versions of sulfide and oxysulfide perovskites, a class of materials that share a unique crystalline structure and chemical formula. This would act as a semiconductor that generates electricity when exposed to light.

"The advantage here is to try to make new semiconducting materials that are also stable," Dr. Macaluso says. "So, if we use these materials in energy applications, they must be able to withstand all these environmental factors like rain, humidity, and oxygen. By combining these elements together and making these mixed anion semiconductors, we can have more durable semiconductors to support energy consumption."

CORAL CONCERNS

Disease susceptibility in coral

Coral species have suffered severe declines due to disease outbreaks

Biology Professor Laura Mydlarz and doctoral candidate Nicholas MacKnight published a study in the *Nature* online journal *Communications Biology* demonstrating that a coral reef's tolerance of microbial imbalance when faced with white plague disease reflects its overall disease resistance.

Coral species have suffered severe declines due to disease outbreaks. The research improves our understanding of susceptibility among coral species and could help predict future disease impacts. It also gives researchers a way to quantify community-level change, something that will be increasingly relevant in environments affected by climate change.

For its study, the team—which includes alumni Bradford Dimos ('21 PhD), Lauren Fuess ('18 PhD), Contessa Ricci ('19 PhD), and Caleb Butler ('20 BS)—transmitted white plague disease to seven diverse Caribbean coral species in a controlled setting. This disease is one of the most destructive in the Caribbean and has been devastating coral species there since the 1970s.

BUGGING THE BUGS

Tracking insects to fight infestation

To combat infestations on farms and increase production, researchers at UT Arlington are building tiny sensors that can track insect movement.

In collaboration with the U.S. Department of Agriculture, computer science Professor Gautam Das and electrical engineering Professor Wei-Jen Lee are developing a sensor that can be attached to bugs and relay information about their coordinates and movements to a base station.

"Insects can positively or negatively affect agricultural quality and production," Dr. Lee says. "Understanding their behavior is an important step to taking advantage of their benefits and mitigating damages. Applying advanced sensor technologies and artificial intelligence will have an impact on the future development of agriculture."

Dr. Das is building the sensor, while Lee is creating a data acquisition system for the insects that uses multiple readers to pinpoint their locations. Once they gather the data, Das and Jianzhong Su, mathematics professor and chair, will analyze it to uncover any patterns. The team is also collaborating with Wendy Shen from the University of Central Florida on the project.

PHOTOGRAPH BY MILLENNIUM IMAGES

BAD BOT

Understanding machine-learning systems

When it comes to artificial intelligence, the wrong answers can be as important as the right ones. That's why computer science and engineering Professor Jeff Lei is using a National Institute of Standards and Technology grant to analyze both how machine-learning systems make decisions and what happens when they make the wrong ones.

What leads to a bad decision can be identified by exploring the data points that most influenced the system while it was making that decision. Machine learning uses a large set of data points in that process, with those closer to a decision point exerting more influence.

Dr. Lei will engage in "neighborhood exploration" by looking at data points in the vicinity of the decision point instead of the entire training set, something that can significantly reduce computational complexity.

"We must provide good explanations for why decisions are made, pinpoint the root cause of any incorrect decisions, and suggest changes to correct them to maintain public trust and ensure that the systems are working as intended," Lei says.

AIR CONTROL

The pair is studying how to safely operate both UAVs and piloted aerial vehicles in urban settings

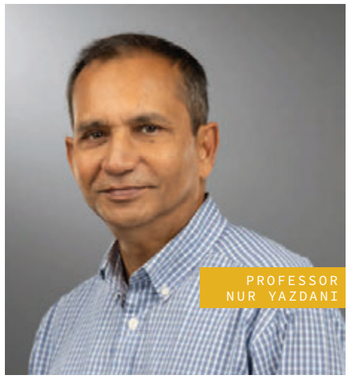
Making the skies safer

As the use of unmanned aerial vehicles (UAVs) increases, so does the need for traffic control of the skies. Engineering Professor Kamesh Subbarao and Associate Professor Animesh Chakravarthy are tackling this important issue by examining how multiple factors impact air traffic in a dynamic environment like the crowded airspace over the United States.

With a grant from NASA, the pair is studying how to safely operate both UAVs and piloted aerial vehicles in urban settings, what to do when a UAV has an emergency, and how UAVs should be equipped to react to each other and piloted aircraft.

They will run their information through an algorithm to simulate and test their theories, using NASA data for validation. Dr. Subbarao will provide the algorithm and simulation results to NASA for further testing and research.

"There are legacy systems that don't take into account future technology that will have to share airspace in busy urban settings," Subbarao says. "Ultimately, this could help create routes that will give input ahead of time for the people who will design those routes for all types of aircraft."



PROFESSOR NUR YAZDANI

ROAD REFERENCE

A database of Texas bridges

Keeping track of the 50,000-plus bridges in Texas can be a challenge, especially since there currently is not a complete, updated record of their exact locations and features. To help rectify that, the Texas Department of Transportation's (TxDOT) Fort Worth District turned to civil engineering Professor Nur Yazdani to develop a database and mobile app that will catalog their GPS coordinates and features.

"At the moment, crews are typically expected to go to a bridge site and collect all of the necessary information every time they need to work on it," Dr. Yazdani says. "That information may not be saved for future reference, so the process is not efficient in terms of personnel and cost."

He and his team will fill in the gaps in TxDOT's incomplete Geospatial Roadway Inventory Database and ensure that all its information is accurate and comprehensive. For some bridges, they will go to the location and get the coordinates; for others, they will use Google Earth, ArcGIS, and similar resources to map locations.

Data-Driven Discovery

Data fuels important decisions at every level of society. The exponential growth and availability of big data presents numerous challenges and opportunities. It is voluminous, fast, increasingly complex, and comes in a range of formats.

But if managed effectively, big data can deliver powerful benefits. It can result in more accurate analyses in fields ranging from health care to genomics to business informatics to physics. More accurate analyses lead to more confident decision-making. And better decisions can mean greater operational efficiencies, cost reductions, and decreased risk.

QUICK HITS

Nevin Weinberg, associate professor of physics, is studying the phenomena of X-ray bursts to better understand neutron stars. His work is funded by a grant from the National Science Foundation's Division of Astronomical Sciences.

NASA named physics Assistant Professor **Frederick Wilder** one of five supervising scientists for the Scientist in the Loop program under its Magnetospheric Multiscale Mission.

Computer science Assistant Professor **VP Nguyen** is developing technology that would allow virtual reality users to see the facial expressions of the person they are interacting with online. It could also have applications for speech enhancement in stroke patients.

ILLUSTRATION BY STEPHAN SCHMITZ

Culture and Societal Transformations

UTA encourages the open-ended exploration of the complex interactions that constitute the diversity of human experience: cultural and artistic expressions, the social environment, and the physical world. Our projects explore topics related to advancing interdisciplinary research and creative works in areas such as community development and engagement, diversity of communication, diversity of creative expression and experience, advocacy and civic engagement, and finding solutions to inequities in our world.

QUICK HITS

David Arditi, associate professor of sociology, published a new book, *Streaming Culture: Subscription Platforms and the Unending Consumption of Culture*, which outlines the extensive impact of streaming services.

Public policy Assistant Professor **Evan Mistur** published a study in the *Journal of Chinese Political Science* arguing that nationalistic governments are more likely to copy other nationalistic governments in responding to the COVID-19 pandemic.

Assistant Professor of architecture **Dennis Chiessa** received the Associate of the Year award from the Texas Society of Architects, recognizing his achievements in support of architecture and the built environment.

ASSOCIATE PROFESSOR DANIEL SLEDGE

DISASTER ZONE

Learning from recent crises

Texas was hit with a double dose of disaster in early 2021, when the COVID-19 pandemic and a historic winter freeze tested the state's ability to cope with crises. Daniel Sledge believes that by analyzing the response to these events, we can learn a great deal about the intersection of public health and politics on our daily lives.

The political science associate professor is studying how the state and organizations like food banks and homeless shelters reacted to both crises in hopes of bringing much-needed insights that could inform planning and preparation for future disasters.

"The COVID-19 pandemic has represented a massive shock to the American public health system and to our routines," Dr. Sledge says. "How do these service-providing entities respond when there are already significant public health protocols in place from the COVID-19 pandemic—and now there's no electricity and multiple bad things are happening at the same time?"

He plans to share his findings with public officials and practitioners.

HOSTAGE CRISIS

The greatest obstacle law enforcement faces often isn't the criminal, but the victim

Responding to ransomware attacks

When a ransomware attack occurs, the greatest obstacle law enforcement faces often isn't the criminal, but the victim.

A ransomware attack is like a cyber hijacking, with criminals seizing an organization's data or computer systems and demanding a payment to restore access. In their new *Management Science* study, business Professors Kay-Yut Chen and Jingguo Wang, along with doctoral candidate Yan Lang, explain that companies often find that it makes more sense to negotiate directly with their attackers to drive down the cost of the ransom. But such behavior incentivizes attackers to continue their illegal activities and runs counter to FBI guidance.

The study investigates in part how to nudge companies toward adopting strategies that decrease the risk of digital extortion.

"We must convince companies that just because the bad actors come down on the ransom, it doesn't make it right to pay them—and you'll probably continue to have problems," Dr. Chen says.

FOCUSED

Strategies for sustaining attention

Need to stay focused on a task? Your best bet may be to solicit feedback, according to a new study by psychology Assistant Professor Matthew Robison.

In a paper published in the *Journal of Experimental Psychology: Human Perception and Performance*, Dr. Robison explains how he and his team measured the effectiveness of goal-setting, feedback, and incentive manipulations on participants' ability to keep their attention on a task.

The resulting data showed that setting a specific goal improved sustained attention but produced no effect on task engagement, while combining a goal with feedback improved both. Feedback on its own was an impressive regulator of task-unrelated thoughts, but incentives showed little evidence of increasing task engagement or performance compared to the effects of the other strategies.

"Sustaining one's attention is notoriously difficult," says Robison. "If you want to encourage people to maintain focus on a task, giving feedback about their performance is a very powerful motivator."

ILLUSTRATION BY HARRY CAMPBELL

The Way *Forward*

UT Arlington is taking an interdisciplinary, collaborative approach to making public transportation more accessible and equitable for all. *BY DANA JENNINGS*

IN 2019, AMERICANS took 9.9 billion trips using public transportation, a helpful indication of the size and scope of these systems in the United States.

Yet nearly half of all Americans have zero access to public transportation.

With expansive public transit networks growing bigger and faster around the globe, the U.S. is falling behind, leading to persistent economic, social, and cultural disadvantages for large swaths of the population. In a nation rooted in forward movement, why are we standing still? How can we do better?

A diverse collection of researchers from The University of Texas at Arlington is investigating just that, utilizing innovative, data-driven approaches to rethink and reframe public transportation development so it supports equitable systems that serve all of us, not just some.

Filling in the Data Gaps

"The United States' transportation infrastructure is not competitive," says Ali Abolmaali, chair of UTA's Civil Engineering Department. He points to the country's historically low grade (a C-) on the American Society of Civil Engineers' (ASCE) 2021 Infrastructure Report Card. The state of Texas didn't fare much better, earning a C.

"Bringing technology into transportation is the future; it's necessary for our longevity," he says.

With the rising prevalence and availability of autonomous vehicles, it can feel as though the future of technology in transportation is already here. But the reality is that the data collection we rely on to inform our transportation systems is stuck in the past.

Sensor networks are available in transportation infrastructure but come with a variety of drawbacks. Capturing a more complete picture of what's happening on our roads is key to making the future of transportation planning a truly data-driven practice.

"Public agencies are continually collecting data, but traffic sensors cannot cover all roads, only the major ones. This means that potential problems in local residential communities are not being well-reflected in the data, possibly causing an equity issue," says Taylor Li, assistant professor of civil engineering. "Transportation management is driven by data, but only communities where data is rich can be represented in scientific conclusions. Without data, transportation agencies may end up relying on conjectural, sometimes biased, judgment."

Dr. Li is using seed funding from UTA's Center for Transportation Equity, Decisions, and Dollars

ILLUSTRATION BY STUART BRADFORD

Civil engineering Assistant Professor Taylor Li

(CTEDD) to study an emerging data source that may fill the gaps in public agencies' sensor networks.

Auto manufacturers are increasingly equipping vehicles with cellular service for integrated roadside assistance, like GMC's OnStar. These cellular modems continually deliver robust data like location, speed, and braking intensity back to the manufacturer.

Previously, this connective vehicle data (CVD) was used exclusively by car makers to identify performance improvements. Once it became available in an anonymized form, however, Li saw potential for it to be combined with public data to improve our picture of transportation systems.

"The accuracy of this data is unprecedentedly high, so I knew it was going to be a game-changer," he says. "With CVD, we can directly measure things we were having to guess in the past."

Bridging the Transportation Divide

In its solutions for improving the nation's infrastructure grade, the ASCE notes the importance of making use of public-private partnerships to close the urban and underserved community resource divide. UT Arlington is taking on this challenge by using autonomous vehicles to fill in gaps and increase access to public transportation in Arlington, a city that has historically avoided traditional public transit systems.

In partnership with the city of Arlington, a UTA team led by Sharareh "Sherri" Kermanshachi launched a new public transportation pilot program downtown and on campus that features autonomous vehicles.

The goal of Arlington RAPID (Ride-share, Automation, and Payment Integration Demonstration) is to provide a blueprint for combining autonomous vehicles and mobility-on-demand technologies to develop more effective, efficient, safe, and accessible transit networks in low-density settings where traditional fixed-route transit is impractical. To that end, RAPID is integrating fully autonomous vehicles into Arlington's existing Via on-demand ride-share service.

"So many students and Arlington citizens use Via because they do not have a personal vehicle, which makes this program extremely important to them," Dr. Kermanshachi says.

Removing Access Barriers

Stephen Mattingly, Noelle Fields, and Kate Hyun have teamed up on two concurrent projects funded by the U.S. Department of Transportation (USDOT) aimed at increasing equity in transportation planning practice by better accounting for disadvantaged communities—in this case, environmental justice (EJ) populations, which in Texas are defined as low-income and/or minority groups.

Like Li, the researchers have found that part of the problem with transportation inequity is the lack of complete, representative data.

"The people who need public transportation the most aren't captured in the data used for modeling; their voices aren't heard," says Dr. Hyun, an assistant professor of civil engineering. "We're often so focused on making systems faster and safer that we fail to consider inclusivity."

As fellow civil engineer Dr. Mattingly notes, the challenges of insufficient data are compounded by transportation engineers' and planners' "major privilege bias"—from which he was not exempt. After discussing the issue with Dr. Fields, a social work associate professor, "I got hit upside the head with a thunderbolt realizing all the ways we've come up short," he says.

"Large problems require an interdisciplinary strategy," Fields explains. "In social work, we understand the impacts of deficient public transportation. By joining with engineering, we can better work toward a solution."

The researchers started by collecting data from EJ communities and stakeholders on their first- and last-mile transit needs. They also identified the consequences transportation gaps have on the population's well-being in terms of health and access to opportunities. Next, they created performance measures to assess these gaps and disparities, which they're now applying to Dallas County. Additionally, they've conducted a case study of Dallas Area Rapid Transit that includes an equity analysis of the impact of innovative first- and last-mile alternatives, such as hybrid ride-sharing models, bike-share programs, flexible routing, and smaller transit vehicles.

As Hyun puts it, effective transportation doesn't start at the bus or train stop; it starts at home. How people get to and from public transportation should thus be factored into infrastructure planning.

"Older adults, for example, have to consider whether the walking path to the transit stop is safe or if it's been maintained to accommodate their walkers and wheelchairs," she says. "It's important we understand the diverse needs, challenges, and barriers of all populations."

Additionally, while different groups may be considered "transportation disadvantaged," that doesn't mean they're disadvantaged in the same ways or have the same needs.

"Well-designed interventions can be crosscutting," Fields says. "Livable communities are for everybody, and solving a problem for one group can solve the problem for others, too. In joining social work and engineering together, we have the ability to directly apply the research to the real world even while the research continues to progress."

Improving Public Opinion

In just over five years, UTA has received more than $51 million from USDOT and the Texas Department of Transportation for nearly 150 research projects. CTEDD, a USDOT Tier-1 University Transportation Center, is a driving force behind public transportation research, emphasizing the intersection of technology and policy for real-world applications.

Li, Hyun, and Fields all agree that UTA is distinguished in transportation research because of its interdisciplinary, untraditionally collaborative approach. The University's location in North Texas, where it's surrounded by booming construction and transit industries, offers a leg up, too.

This far-reaching, diverse response to public transportation is necessary to confront such a large issue. Maria Martinez-Cosio, interim dean of the College of Architecture, Planning, and Public Affairs, argues that transportation is an equity problem with serious repercussions for individuals and communities.

"Access to jobs, health care, and civic opportunities is necessary for economic advancement, and public transportation is a critical piece of that access," she says. "The location of available jobs may not be near the potential pool of personnel to fill them; this spatial divide is particularly evident for low-income individuals, who can't always afford to get to those job opportunities."

According to the American Public Transportation Association, every $1 invested in public transportation generates $5 in economic returns; 87% of trips on public transit have a direct impact on the local economy; and home values are up to 24% higher near public transportation than in other areas.

While the value of public transit is clear, the stigma against it—such as fears of increased noise and crime—often stymies any meaningful implementation.

"Public transit is not a detriment; it's an asset," says Dr. Martinez-Cosio. She emphasizes the importance of policy to increase buy-in from all communities affected by the establishment of new transportation systems.

It all comes down to the fact that public transportation is about more than just making sure a person can get from place to place.

"We need to consider whether someone can access opportunities to thrive, not just survive, within economic and temporal constraints," Mattingly says. "This is a battle worth trying to fight, because if we never try, things never change." i

From left: Assistant Professor Kate Hyun, Associate Professor Noelle Fields, and Professor Steven Mattingly

Agents of Change

Whether they're creating films that impart empathy, finding ancient tools that clarify history, or assessing educational practices that may do harm, researchers at UT Arlington are helping shape a better future. **BY AMBER SCOTT**

SEVERAL YEARS AGO, in a small fishing village in Peru, Daniel Garcia was scouting locations for a film. One afternoon, he came across an old woman selling ice cream. As he struck up a conversation, he did what he does best: listened. The ensuing chat—about how as a young girl, she wanted to fish like the men in her village but wasn't allowed after she reached a certain age—inspired his film *Pescadora*, which would go on to win several awards, including Best Short Film at the HBO New York International Latino Film Festival.

For Garcia, an assistant professor at The University of Texas at Arlington, that initial act of openness, of really *listening* to someone's story, is the basis of what he does as a filmmaker. He believes that when we give someone our time and approach their stories with love, we develop empathy—and this is how transformational change happens.

Garcia's art is one example of how creators and researchers alike at UTA are exploring the human experience from every angle, interrogating what makes us who we are and bringing those things to life—through art, community outreach, education, and more. It's work that crosses disciplines, transcends boundaries, and, ultimately, uplifts us all.

When the University updated its Strategic Plan 2025, it codified the importance of this work by adding a fifth pillar to its research portfolio: Culture and Societal Transformations. As Pranesh Aswath, interim provost and vice president for academic affairs, notes, the addition of the research theme doesn't mean it's a new area for the University; instead, it affirms the work that's already being done.

"It crystallizes the importance of this particular theme in the broader University context," says Dr. Aswath, who served as an ex officio member of the planning committee that developed the new theme. "As an institution embedded in a large metropolitan area, we're uniquely positioned to address all the challenges that come with that, which include social justice, equity, health disparities, and more. We as a university can be a neutral player and help people and communities heal."

Helping Our Neighbors

For some UTA researchers, helping communities means starting in their own backyards. When the city of Arlington expressed a need to bring its citizens together in the wake of nationwide civic unrest following the murder of George Floyd, the City Council tapped Jason Shelton, associate professor in the Department of Sociology and Anthropology, to lead its efforts. As chair of the Arlington Unity Council, he oversaw a 30-member group charged with examining racial and ethnic disparities within the city and making recommendations to address them.

The council ultimately received input from over 300 residents and community leaders through interviews, focus groups, and town hall meetings.

"We let the data speak for itself—the good, the bad, and the ugly," Dr. Shelton says. "It allows people to see problems and a need for change. Reasonable people are still going to disagree, but the data helps us find a middle ground."

The city has already implemented several of the recommendations from the council's final report, which won a 2021 Cultural Diversity Award from the National League of Cities.

Given the extraordinary diversity of both the city and the University, Shelton points out that "in a lot of ways, we have the ability to be a blueprint for how America, as it becomes increasingly racially and ethnically diverse, can maintain equality. That's really the challenge before all of us."

Changing the Status Quo

A pair of researchers in the College of Education is tackling what's known as the preschool-to-prison pipeline, a phenomenon where students of color, and particularly Black children, are exposed to higher rates of suspension and expulsion, overrepresented in subjective disability categories, and referred to law enforcement at higher rates.

Associate Professor Ambra Green and Assistant Professor Amanda Olsen are looking at disability and race in the education system to identify how to disrupt that pipeline. Much of their research involves collaboration with pre-K-12 schools to identify practices that lead to harmful student disciplinary decisions. By replacing these with proactive, positive alternatives based on empirical evidence, they hope to increase students' academic achievements and reduce undesired behaviors.

Drs. Green and Olsen's findings often demonstrate that students of color who have or are at risk for disabilities have significantly less access to positive practices and receive more harmful disciplinary ones from their teachers when compared to their white peers without disabilities.

"It is important to critically study the intersection of disability, disability risk, and race in the field of special education," Green says. "By doing so, we can ask challenging questions about the status quo and the policies and procedures that play a role in transforming our society and culture."

The researchers are putting their expertise to work by partnering with Head Start of Greater Dallas to provide coaching to preschool teachers on using evidence-based practices. The Meadows Foundation, a private philanthropic institution, is providing funding.

Diving Into the Past

Ashley Lemke, assistant professor of anthropology, is also interested in societal transformations, but she's approaching the subject from a unique vantage point: deep under the waters of the Great Lakes. By examining relics of the past to gain insight into human behavior, her work can tell us a lot about patterns of human connection that still persist today.

In her interdisciplinary, multi-institutional study, Dr. Lemke and her colleagues explored an underwater archaeological site at Lake Huron. She and the team found something incredible: stone tool artifacts dating from 9,000 years ago that originated from an obsidian quarry in central Oregon, more than 2,000 miles away. These flakes represent the oldest and farthest east that confirmed specimens of western obsidian have ever been found in the continental United States.

"These very small pieces have very large stories to tell," says Lemke. "No one person walked all the way from Oregon to the Great Lakes, so these little flakes tell us something about social connections. Humans would have traded these pieces or passed them on, which is evidence that they were hanging out and making connections with people from far away."

Lemke says finding these links between the past and present are what continue to drive her work.

"When we study culture and societal transformations of the past, we often discover that people back then were not so different from people now," she says. "Even though the things I study are pre-history, it's all really relevant to human behavior today."

Empowering Communities

For Diane Jones Allen, a professor in the College of Architecture, Planning, and Public Affairs, studying historical patterns is essential to enacting societal change. As a landscape architect, her work centers on place and the way built environments shape our lives.

Because of that, her research often focuses on Black communities. Historically, the places where Black people live have tended to become more desirable to others over time, which results in the Black populations being shifted out—and shifted, and shifted again. It's a phenomenon that we can currently see playing out today in Dallas and Fort Worth Freedmen's towns—historic Black communities founded by freed slaves after the Civil War.

In 2021, Dr. Allen and co-investigators Austin Allen, associate professor of practice, and Kathryn Holliday, director of the David Dillon Center for Texas Architecture and professor of architectural history, began creating a "design playbook" for historic Black settlements in North Texas, including Joppa/Joppee, The Garden of Eden, The Bottom, Mosier Valley, Bear Creek, and Bonton. The aim of the project is to provide guidance to these and similar towns on how to preserve their history while also adapting for the future.

For the better part of the year, the team spent time in the communities, talking to residents and gathering data. But Allen notes that the biggest impact came when she and her co-researchers organized roundtables that allowed locals to share their stories, discuss their shared challenges, and find solutions.

"It's ultimately about empowerment," she says. "When we bring these communities together and get them talking, they find this collective power that allows them to make real change happen."

Lifting the Vulnerable

As Diane Mitschke will tell you, a key part of empowerment for any community—and particularly for the more vulnerable among us—is access.

"We know that access to resources like health care, schools, jobs, and social support is a key indicator of a community's well-being," says Dr. Mitschke, associate professor and associate dean in the School of Social Work.

Through her work with immigrant and refugee communities, she has seen firsthand the impact a lack of access can have. She's addressing the challenge by looking at which factors are most important to new Americans when it comes to deciding where to live.

"By understanding the value that new immigrants and recently resettled refugees place on specific community resources, we can guide city planning efforts to support their health and wellness," she says.

As a researcher, Mitschke seeks to make a direct and positive impact on the people she works with.

"Ultimately, community empowerment must be led by the community itself," she says. "Recognizing and appreciating the unique constellation of diverse cultures and communities is essential to the work that we do as a university to engage and empower individuals to thrive in society."

WITH THE ADDITION of Culture and Societal Transformations as a major research pillar for UT Arlington, work in this arena only stands to grow and deepen.

"What all great universities do, and especially great public research universities like UT Arlington, is connect what they do to society," says Dan Cavanagh, College of Liberal Arts interim dean. "The work that happens at a university, whether it's through the educational process or through research and creative activity, is crucial to the advancement of us all." i


Daniel Garcia


Jason Shelton


Ashley Lemke

Eradicating ~~Inequities~~ in Health Care

Researchers at UTA are addressing decades-long racial gaps in the U.S. medical industry.

BY SARAH BAHARI

ILLUSTRATION BY DAN BEJAR

The COVID-19 pandemic has revealed many things about the character of the United States and its people: the instability of the supply chain, the capability of scientists, the transmutability of misinformation, the flexibility of workers—and the inequality of the health care system.

The latter is not a new revelation; in fact, disparities in the way racial and ethnic groups are treated is a recurring theme over the history of epidemiology and medical intervention. Just over a century ago, for example, a global influenza epidemic shot through the U.S., killing some 675,000 people.

While a lack of data means that we can't know precisely how many of that number were Black Americans, we do know that they were less likely to be infected than their white counterparts, possibly because housing segregation provided them a sort of natural quarantine. Yet Black patients who did contract the virus were far more likely to die than white patients because they received inadequate treatment—if they received any at all. Hospitals turned them away or sent them to basements for inadequate care.

Despite the advancements in health care and civil rights that have ensued over the past century, the COVID-19 pandemic has followed a similar pattern, with Black and Latino people in the U.S. three times more likely to become infected than their white neighbors and nearly twice as likely to die from the virus. Overall, Black and Latino men faced the most significant drop in life expectancy in 2020 compared to all other groups.

Simply put, COVID-19 revealed the deep racial and ethnic inequities in U.S. health care that have persisted for, essentially, its entire existence. At nearly every age group, Black Americans die at higher rates than white Americans. They have higher rates of diabetes, hypertension, heart disease, and many types of cancer. Even Black children have a 500% higher death rate from asthma compared to white children.

In 2021, Rochelle P. Walensky, M.D., director for the U.S. Centers for Disease Control and Prevention , put it plainly: "Racism is a serious public health threat that directly affects the well-being of millions of Americans. As a result, it affects the health of our entire nation."

The University of Texas at Arlington is committed to addressing this critical issue head-on. Researchers from a variety of fields are engaging in projects aimed at improving the health outcomes of marginalized groups, including strengthening communication tools for people of color, developing noninvasive blood tests for Black patients, evaluating the link between segregation and heart disease, and more.

Communication and the Pandemic

The emails arrived in Gabriela Wilson's inbox one after another: notifications from her son's school about classroom changes due to COVID-19, potential exposures, and new cases. Because they were all written in English, the multilingual professor of kinesiology started to wonder how Spanish-speaking families were staying informed during the pandemic.

> "To reach marginalized communities, we cannot simply send in government health workers to promote vaccines. The younger generation has so much potential and power. If we can tap into that power, we can improve health outcomes."
>
> – GABRIELA WILSON

That became the spark for a multidisciplinary UTA team to develop a COVID-19 navigator that presents educational health information to pre-K-12 students and their families. This curated content comes in both English and Spanish and covers public health practices, resources to support students' mental health, and information on cases, strains, and vaccinations.

For this work, the Coalition of Urban-Serving Universities in 2021 named UTA its inaugural Racial Justice and Equity Program Award Winner.

"Misinformation spreads like wildfire," Dr. Wilson says. "The best way to fight it is to ensure that people have access to fact-based, up-to-date information."

She and her team are now preparing to address the question of how such information should be delivered to maximize effectiveness. They are developing a community outreach model in which Latino teenagers are trained as health ambassadors to present information to their classmates and communities. Such ambassadors could help reduce vaccine hesitancy, which is higher among young Latinos in the U.S. than their older counterparts, according to a study by the Kaiser Family Foundation. Roughly 74% of Latino adults over the age of 50 said they were confident the vaccine was tested for safety and effectiveness; only 56% of those under the age of 50 had the same confidence.

Initially, UTA's team will recruit and train 10 ambassadors at two schools located in at-risk neighborhoods in the Dallas-Fort Worth Metroplex. It will then host focus groups to identify and better understand sources of misinformation. The researchers include Peggy Semingson, associate professor of linguistics; Denise Hernandez, adjunct assistant professor of kinesiology; and Chyng-Yang Jang, associate professor of communication.

"To reach marginalized communities, we cannot simply send in government health workers to promote vaccines," Wilson says. "The younger generation has so much potential and power. If we can tap into that power, we can improve health outcomes."

No Needle Needed

For patients who require hemoglobin monitoring, the process is arduous and time-consuming, typically requiring frequent needle sticks and blood samples. Moreover, while noninvasive methods do exist, they are often inaccurate when monitoring people of color due to differences in skin melanin.

Recently, a team at UTA sought to address these challenges. Working with an Austin-based biotechnology firm, the researchers developed a new, noninvasive technology that can essentially monitor the concentration of hemoglobin through the skin. The device works particularly well in patients of color.

"This has the potential to both reduce health disparities and give people a great deal of freedom in monitoring their own health," says Georgios Alexandrakis, associate professor of bioengineering, who led the project.

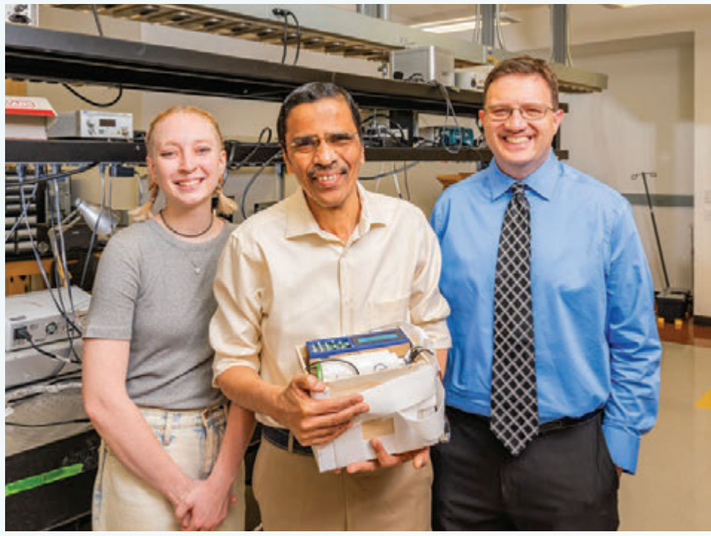
Hemoglobin is a protein in red blood cells that carries oxygen from the lungs to rest of the body. It is of particular importance because low levels are associated with severe cases of COVID-19 and numerous other conditions, including anemia and lead poisoning.

Available devices monitor hemoglobin by using properties in the red-infrared spectra. Dr. Alexandrakis' team at UTA developed an alternative that uses properties in the blue-green light spectra, which allows it to better measure hemoglobin in people with more melanin. A small probe is placed on the skin, measuring reflected light. The technology can be embedded in a wearable device, such as watch or a monitor.

So far, the team has evaluated the device in more than 30 participants. They compared the hemoglobin values measured by the device to those produced by currently available devices and by standard blood tests. Preliminary results suggest the new technology can estimate hemoglobin with better accuracy and consistency than other comparable methods.

The team plans to conduct follow-up studies at Arlington hospitals. Members include Sanjay Gokhale, a medical scientist whose research focuses on spectroscopic properties of adult and fetal hemoglobin, and Michael Nelson, an associate professor of kinesiology.

"The technology has massive potential in health care settings, remote monitoring, and embodiment into wearables," says Vinoop Daggubati, M.D., CEO of Shani Biotechnologies, which sponsored the project. "We are committed to closing the racial disparity ... to provide better care for African Americans, Hispanics, and people of color."



From left: Bioengineering student Alexandra Hansard, medical scientist Sanjay Gokhale, and Associate Professor Georgios Alexandrakis

> If we change neighborhoods, we could reduce an entire population's risk. The magnitude of that impact would be great.
> –YEONWOO KIM

Segregation's Pernicious Effects

Cardiovascular disease kills more Americans every year than anything else. But its impact varies widely by race and socioeconomic status.

On average, Black Americans develop the disease at a younger age and are 30% more likely to die from it than white Americans. The reasons why are complex, but the population tends to have greater rates of obesity, diabetes, high blood pressure, and high cholesterol—four major risks factors of heart disease.

But Yeonwoo Kim thinks there's another important contributor: segregation.

The assistant professor of kinesiology is studying the extent to which poverty and neighborhood segregation contribute to cardiovascular disease by examining data from the Health and Retirement Study, which features comprehensive information on the health, health behaviors, and socioeconomic status of more than 26,000 Americans over the age of 50. The National Institute on Aging-supported study collected the data every two years between 2004 and 2014. Crucially for Dr. Kim, it deliberately oversampled people of color, thus providing a wealth of information about the communities at greatest risk of developing cardiovascular disease.

"If this research does find that neighborhood factors like racial segregation and income impact cardiovascular disease in minority and low-income people, then we can begin to approach those issues from a local-policies perspective and hopefully reduce cardiovascular disease for the entire community," Kim says.

In a separate investigation, she is using the survey data to examine the effects of built and social environments—such as health care resources, food accessibility, socioeconomic status, crime prevention, and recreational activities—on health disparities found in people with cardiovascular disease.

"Essentially, we are able to look at where someone lived, whether they developed cardiovascular disease, and when they developed it," she explains. "That allows us to delve into data on a neighborhood-by-neighborhood level."

Examining the role geography plays in cardiovascular disease has the potential to help policymakers reduce incidents of it and improve public health overall. This is a relatively new way to approach racial and socioeconomic health disparities.

"If we change neighborhoods, we could reduce an entire population's risk," Kim says. "The magnitude of that impact would be great."

Cardiovascular Disease in Women

Cardiovascular disease kills some 50,000 African American women every year. Yet they are among the most understudied group in the world on this topic.

A team of researchers in UTA's Integrative Vascular Physiology Laboratory is working to address this knowledge gap. Led by Matthew Brothers, associate professor of kinesiology, the group is studying the neural and vascular mechanisms of elevated blood pressure and cardiovascular disease among this demographic.

"The lack of research on African American women and cardiovascular disease is alarming," Dr. Brothers says. "We know that African American women have the highest rates of this disease, but the vast majority of historic research focuses on men."

Using Doppler ultrasound, the team will capture images of volunteers' blood vessels to evaluate how well they dilate and relax. Healthy blood vessels are soft and pliable to allow blood to flow easily. As arteries thicken and harden with age, they become narrow and stiff, increasing the risk for a heart attack.

The team is currently recruiting participants, including healthy, college-aged women. That will allow scientists to determine whether decreased blood vessel function is already present in otherwise healthy women. They will also study how antioxidants and other interventions, such as a vegan diet and acute thermal therapy, affect the blood vessels.

"We are trying to better understand cardiovascular disease and the genetic risk factors that we know contribute to hypertension," Brothers says. "If we can learn more about the scientific reasons blood vessel health may be impaired, interventions can be developed and tailored to specific populations."

He is working with Department of Kinesiology colleagues Paul Fadel, associate dean for research, and David Keller, associate dean and chair. Their project is funded by the National Institutes of Health.

Eventually, the group will collaborate with other researchers to study social determinants, environmental and socioeconomic factors, and their effect on cardiovascular disease risk.

"For now, we are looking at the physiology of the blood vessels," Brothers says. "But we recognize there could be a host of factors that contribute to cardiovascular disease."

The Stress of Prostate Cancer

Cancer places extraordinary stress on both patients and caregivers. Finding ways to cope is critical to maintaining quality of life during and after treatment, says Yue Liao, an assistant professor of public health in the Department of Kinesiology.

She is working with the MD Anderson Cancer Center to study the stress that Black prostate cancer patients and their partners face, how they cope, and how that affects their health behaviors.

"We want to better understand our African American cancer patients and their partners' daily stressors," Dr. Liao says. "That will enable us to develop culturally tailored interventions that could help couples cope with stress and adopt healthier lifestyles."

Improving our understanding is important, Liao believes, because Black men in the U.S. are more likely to get prostate cancer than other men and twice as likely to die of the disease. Despite this gloomy picture, however, survival rates remain quite high.

"That means it is critical for these men to adopt healthy behaviors—such as healthy diet and being physically active—so they can go on to have the highest quality of life possible once treatment has ended," Liao says.

Study participants will provide a snapshot into the lives of cancer patients and their partners by answering brief surveys throughout their days. In total, 240 patients and their partners will be asked about various stressors, including any related to financial worries, work-related problems, or relationship challenges.

> We want to better understand our African American cancer patients and their partners' daily stressors. That will enable us develop culturally tailored interventions that could help couples cope with stress due to cancer and adopt a healthier lifestyle.
> –YUE LIAO

The surveys will be administered through smartphones. Patients and caregivers will also wear activity trackers to show how active or sedentary they are so researchers can see how that might contribute to their stress.

"Smartphone technology allows us to seamlessly ask participants how they are feeling throughout the day," Liao says. "This gives us a window into their lives that we did not have years ago."

Funded by the National Institutes of Health, the project is led by Dalnim Cho, M.D., of MD Anderson's Department of Health Disparities Research, Division of Cancer Prevention and Population Sciences.

Rethinking Health Messaging

How are people motivated to exercise? That question is at the heart of a multidisciplinary project at UT Arlington that is developing culturally appropriate, effective messaging for women of color at risk for heart disease, diabetes, and other complications due to obesity.

The University is providing funding for the project, which is led by Liao; Grace Ellen Brannon, assistant professor of communication; VP Nguyen, assistant professor of computer science and engineering; Halel Aghajani, research scientist at the UTA Research Institute; and Kyrah Brown, assistant professor of public health.

Obesity is a complex health issue resulting from a combination of causes and factors, including genetics and behaviors like physical activity and diet patterns. The team is investigating effective ways to promote active living in women of color with obesity.

To do so, the researchers will use health communication, data science, and health promotion techniques to develop personalized feedback for women of color who are at risk of heart disease, diabetes, and other complications due to obesity. The feedback will be based on individuals' behavioral patters and personal backgrounds, similar to messages sent by activity trackers like Fitbit or exercise platforms like Peloton.

Study participants will evaluate sample messaging in English and Spanish and offer feedback about motivation and cultural appropriateness through a series of focus groups later this year.

Dr. Brannon, who is designing and assessing the communications, notes that fitness messaging has long neglected people of color.

"The importance of regular physical activity cannot be overstated. It offers both physical and mental health benefits," she says. "But cultural beliefs and motivators vary by population, and we need to recognize and address these differences so that we can reach all women." i

TOP TIER

In its quest to qualify for the Texas National Research University Fund, UT Arlington revamped its research portfolio and charted a new course for the future.

BY LINSEY RETCOFSKY

A FEW MINUTES BEFORE 5 p.m. on Aug. 10, 2021, James Grover heard the familiar chime of an incoming email. It was news from state officials. The next day, The University of Texas at Arlington would become just the fourth institution in the state to qualify for the National Research University Fund (NRUF), a mark of excellence in research and academics.

UTA's interim vice president for research was thrilled. The distinction, often called "Texas Tier One" status, was hard-earned, and the promise of its announcement had kept the University's research administrators holding their breath for weeks.

To become a Texas Tier One university, UTA had to reach or exceed a series of rigorous benchmarks established by the Texas Higher Education Coordinating Board for at least two consecutive years. These included surpassing $45 million in restricted research expenditures, awarding more than 200 doctoral degrees each year, having high-quality faculty, and other key institutional metrics.

For universities that receive the designation, the state of Texas provides dedicated support from the NRUF to enable their continued research expansion, advancement of high-caliber educational programs, and recruitment of world-class faculty.

Awarded to the state's highest-quality research universities, Texas Tier One status stands as recognition of UTA's commitment to improve the world through inquiry and innovation, securing its position as a preeminent institution for education, research, and discovery.

SPOTLIGHT *Urban Sustainability*

Solid waste management is one of the fastest-growing sustainability challenges to emerge alongside global urbanization. For one professor of civil engineering, the world's garbage problem is personal.

From a very young age, Sahadat Hossain understood that trash was a danger to the residents in his native country of Bangladesh.

"Not far from where I grew up, there were open dump sites. When rainwater fell onto the trash, it would become contaminated, pass into the ground, and spread into nearby ponds where residents bathed," Dr. Hossain says. "People were getting sick, but they didn't understand why."

As an adult, Hossain devised methods to simultaneously prevent waste pollution and maximize landfills' ability to generate energy that can be utilized by neighboring residents. In a field experiment in Denton, Texas, he put these theories into practice. With colleague Melanie Sattler, professor of civil engineering, he developed and implemented a system called Enhanced Leachate Recirculation in the city's landfill that boosts methane production to produce an alternative energy source. The operation helped Denton accelerate its landfill gas production and generate enough electricity to power 3,000 homes.

In June 2016, UTA named Hossain as the founding director of its Solid Waste Institute for Sustainability. Under his direction, the institute has provided training to waste managers from more than 90 countries, educating international waste experts in managing landfills, reducing the effects of waste on residents, and applying business tactics to address waste management and recycling.

In addition to cities in Texas, Hossain has collaborated with those in Ghana, Nigeria, Tanzania, Kenya, India, Serbia, Colombia, and Brazil. As one example, the solutions he and Dr. Sattler tested in Denton are now being applied in Addis Ababa, Ethiopia, where a landfill slide killed 113 in 2017. The city signed a three-year, $5.9 million agreement with Hossain to help solve waste management issues caused by the exponential increase in its population.

As governments plan for rapid growth, Hossain says city managers should start by taking out the trash: "If a city does not have effective waste management practices, its operations can't thrive. It could have a prosperous economy, affordable housing, and equitable resources, but if trash is everywhere, the population will suffer."


Sahadat Hossain

TOP TIER

Dr. Grover, an ecologist, joined the College of Science in 1993, where he served as assistant, associate, and full professor of biology; associate dean; and interim dean. For the past few years, he has held dual appointments as dean of the Graduate School and as interim vice president for research.

Throughout his tenure, he has witnessed the University's transformation from an emerging research institution to a powerful engine for innovation in the areas of health science, resource management, big data, environmental sustainability, and more.

"The breadth of research activity happening on campus is more than any one of us realizes," Grover says. "The impact of projects led by our world-class investigators ripples across the globe."

As he well knows, the transformation took a village to achieve. "One person did not accomplish this," Grover says. "UTA's research portfolio is the result of a years-long, University-wide effort that required a commitment to academic excellence from our faculty, students, staff, and administrators."

The Road to Tier One Research

Throughout 2014 and 2015, the University planned and launched its inaugural strategic plan, charting an ambitious course to become the "model 21st-century urban research university."

Given its location in the heart of the Dallas-Fort Worth Metroplex—a region on the cusp of becoming the nation's newest megacity—UTA made community partnerships an important part of the strategic plan, with the aim that such collaborations would create local solutions that could be applied to cities across the globe.

Megacities—metropolitan areas with populations of 10 million or more—face challenges of rapid urbanization, including sustainable growth, health care access, and resource equity. As members of a public university, UTA's faculty, staff, and students believe their mission is to meet those challenges with vision and leadership, ensuring that the Dallas-Fort Worth megacity would be one that addressed critical issues before they overwhelmed the area.

After a months-long assessment, the University identified four distinct areas where it could contribute to the Metroplex's growth through organized research: health and the human condition, sustainable urban communities, global environmental impact, and data-driven discovery.

The Strategic Plan 2020 announced an integrated institutional identity defined by innovation, diversity, and excellence. Multidisciplinary health science experts would form comprehensive research teams to address public health challenges and chronic disease. UTA engineers and architects would partner with city, state, and federal entities to solve issues of transportation and infrastructure, while their colleagues would engage with problems of resource management and environmental policy. Scientists at the frontier of information management would innovate systems to harness big data's potential to advance human understanding.

Shortly after launch of the strategic plan, the University learned that it had achieved a major milestone: The Carnegie Classification of Institutions of Higher Education named it to the class of R-1: Doctoral Universities—Highest Research Activity, an elite category that was composed of only 115 institutions from among the nation's best, including Harvard University, the Massachusetts Institute of Technology, and Johns Hopkins University.

As it worked to achieve the strategic plan's outlined goals, the University would substantially increase its research impact through the formation of strategic partnerships, recruitment of world-class talent, diversification of funding sources, and investments into campus infrastructure.

Subtitled "Bold Solutions | Global Impact," the Strategic Plan 2020 emboldened the University to reach its full potential and become an internationally renowned model for higher education.

"The strategic plan organized the University's efforts in an unprecedented manner," Grover says. "It provided the launchpad to thrust us into a new era of discovery."

Setting its course for the future, the University united behind its mission to take on the greatest global challenges and become a leader among Texas research universities.

Moving Forward

For Grover, achieving Texas Tier One illuminated the evolution of UTA's research portfolio.

"Over a brief period, UTA has blossomed from an institution with a limited research portfolio to a catalyst for economic, social, and cultural improvement," he says.

"This milestone is not an end in itself. It is an indicator of an outstanding academic and research environment on the rise," Grover says. "The Maverick nature is to stand apart from the crowd. UTA will continue to distinguish itself as a model for excellence in higher education." i

SPOTLIGHT *Advancing Health Research*


Kayunta Johnson-Winters

Since 2015, UTA's health-related research has grown to encompass developments in disease prevention and management, cancer therapies, rehabilitative care, biomedical technologies, comprehensive gerontological care, and more.

Kayunta Johnson-Winters, enzymologist and associate professor of chemistry and biochemistry, knows that to solve the world's biggest health concerns, you must start small. That's why she's leading a team of student researchers in an investigation of F_{420}-dependent glucose-6-phosphate dehydrogenase (FGD), a tiny enzyme that keeps tuberculosis bacteria intact and makes the infection multidrug-resistant and a leading cause of death worldwide.

"We want to understand on a molecular level how FGD operates, since it is the target for further drug development for multiple drug-resistant forms of tuberculosis," Dr. Johnson-Winters says. "Once we discover the mode of action of FGD, researchers can create treatments that more effectively target the enzyme and cure patients with drug-resistant strains of tuberculosis."

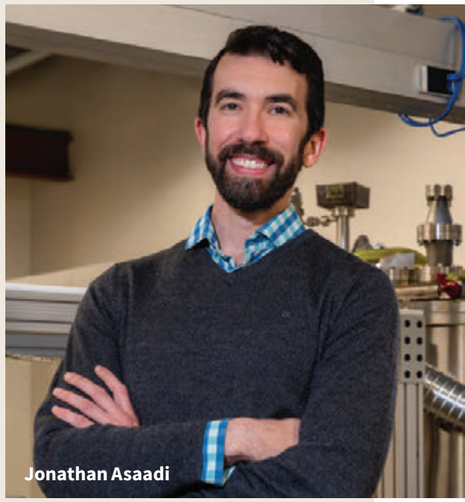
Johnson-Winters' laboratory is housed in the Science & Engineering Innovation & Research (SEIR) building, a collaborative research facility that opened on the south edge of campus in 2018. SEIR, which is divided into research neighborhoods, was designed to bring together teams from a range of disciplines to work in proximity to each other, promoting an open exchange of ideas. The building's interior features glass walls that enable passersby to watch researchers at work in their laboratories, a concept coined as "science on display."

For Johnson-Winters, the freedom for students and campus visitors to view her lab in action creates a powerful opportunity.

"As a scientist from an underrepresented background, I mentor a lot of students who are also underrepresented. My lab's high visibility breaks mental and social barriers to STEM education," she says. "The pool of professors and students who pursue scientific knowledge is increasingly diverse, and our diversity is a strength."

> *"The pool of professors and students who pursue scientific knowledge is increasingly diverse, and our diversity is a strength"*

SPOTLIGHT *The Future of Data*


Jonathan Asaadi

According to the Standard Model of particle physics, the universe should not exist. This impossible problem is what rouses Jonathan Asaadi out of bed every morning.

At the beginning of time, a massive explosion created equal parts matter and antimatter, an equation that should have canceled itself out, leaving behind a dark void. Instead, the universe teems with activity. So what tipped the scales in matter's favor and created life as we know it?

Dr. Asaadi, associate professor of physics, believes the key to unlocking this mystery lies with the neutrino, a fast, nearly massless particle that more closely resembles nothing than something.

To observe the unobservable neutrino, he uses a particular type of time projection chamber, a particle detector that provides a complete, 3D image of large quantities of simultaneous subatomic particle collisions. During experiments, detectors collide particles 40 million times every second, simultaneously recording and producing 60 terabytes of data that must be synthesized and understood. To process the wealth of information, Asaadi and other high-energy physicists must innovate new computational technologies that can quickly identify patterns and make large datasets simple to understand.

"We are after information that is harder to find than a needle in a haystack. We are looking for a needle that is hidden in a pile of needles," Asaadi says. "Our questions require very sophisticated methods for sifting through data to get to the fundamental science that we want to uncover."

Asaadi is one of 10 faculty members comprising UTA's Center for High-Energy Physics, the largest of its kind in Texas. Currently funded by a nearly $4.5 million investment from the Department of Energy, the team works at the leading edge of human knowledge, contributing to the world's understanding of fundamental science and innovating the fields of data science, machine learning, and technological development.

FACULTY NEWS

Highlighting recent faculty awards, appointments, publications, and more

Appointments

Landscape architecture Professor **Diane Jones Allen** was named a 2021-22 fellow with Harvard University's Dumbarton Oaks Research Institute, which supports the pursuit of the humanities, focusing on Byzantine or Pre-Columbian art and on garden and landscape history.

The American Institute of Aeronautics and Astronautics named **Erian Armanios**, Mechanical and Aerospace Engineering Department chair, as a fellow.

Marion J. Ball, the Raj and Indra Nooyi Endowed Distinguished Chair in Bioengineering, was named a distinguished fellow of the American College of Medical Informatics. She was one of four individuals recognized during the 2021 Annual American Medical Informatics Association Symposium.

Marco Brotto, director of the Bone-Muscle Research Center and the Ph.D. in Nursing program, will serve as a U.S. Bone and Joint Ambassador with the American Society of Bone and Mineral Research.

The Association of Computing Machinery (ACM) named **Gautam Das,** associate dean for research in the College of Engineering, as a fellow. He is the first faculty member at UTA to receive the honor and one of only three ACM fellows on the faculty of universities in North Texas.

The International Shock Wave Institute selected **Frank Lu**, an aerospace engineering professor, as a distinguished fellow in its inaugural class. The honor was based on his lifetime professional contributions in the domain of shock wave research.

Visiting Research Scholar **Katie Moylan** was selected as a Marie Curie Global Research Fellow. During her fellowship, she will research tribal radio content and production practices in urban and rural contexts in the U.S.

Kamesh Subbarao, professor in the Mechanical and Aerospace Engineering Department, is the University's first faculty member to be named a fellow of the American Astronautical Society.

The International Society for Optics and Photonics named bioengineering Professor **Baohong Yuan** a fellow in recognition of his outstanding contributions to developing high-resolution fluorescence imaging technologies in deep tissue.

Grants

Ali Abolmaali, chair of the Civil Engineering Department and the Tseng Huang Endowed Professor, is leading a $2.8 million Texas Department of Transportation project that will scan Texas roads to determine their condition and remaining service life.

Dereje Agonafer, Presidential Distinguished Professor, is co-leading a project with Texas A&M's Yassin A. Hassan to conduct experiments and simulations of liquid metal heat pipes for micro nuclear reactors. The Nuclear Regulatory Commission is funding their work.

The National Institutes of Health awarded a five-year, $1.8 million grant to **Joseph Boll**, assistant professor of biology, to identify and inhibit the defense mechanisms of *Acinetobacter baumannii*, a pathogen that thrives in hospitals and clinical settings.

Mechanical engineering Associate Professors **Alan Bowling** and **Hyejin Moon**, along with bioengineering Professor and Chair **Michael Cho**, are developing a technique to better predict how stem cells develop into specific cells, such as bone or skin. They received a two-year, $416,000 grant from the National Institutes of Health for the project.

Associate Professor **Animesh Chakravarthy** and Professor **Kamesh Subbarao**, both from the Mechanical and Aerospace Engineering Department, received $333,000 in funding from Galaxy Unmanned Systems LLC to develop controls that will allow airships to operate autonomously, with an eventual objective of enabling urban air mobility.

An interdisciplinary team of scientists led by physics Assistant Professor **Yujie Chi** is using a grant from the National Institutes of Health's National Cancer Institute to develop a new system designed to make the use of radiation in medical procedures safer for patients. Co-investigators include **Qiming Zhang**, professor of physics, and **Zui Pan**, associate professor in the College of Nursing and Health Innovation.

Computer science and engineering Professor **Gautam Das** and Assistant Professor **Shirin Nilizadeh** received a National Science Foundation grant to explore how to identify and characterize discrimination in web database applications and to enhance fairness through design and transparency.

Nick Fang, associate professor and Robert S. Gooch Endowed Faculty Fellow in Civil Engineering, is using a Texas Water Development Board grant to develop an effective guidance manual for a specific flood early-warning system tailored for communities in Texas.

Sharareh "Sherri" Kermanshachi, associate professor of civil engineering, received $946,000 from the Texas Department of Transportation to address workforce development needs and technologies that could result in safer work-zone environments.

Mechanical engineering Associate Professor **Daejong Kim** received a three-year grant worth nearly $1.5 million from the Office of Naval Research to continue his development of foil bearings for small engines used in aerospace applications.

Computer science Assistant Professor **Jacob Luber** earned a $2 million grant from the Cancer Prevention and Research Institute of Texas to create a database that contains every publicly available cancer dataset from the National Cancer Institute.

The Department of Defense awarded a $1.5 million grant to an Aerodynamics Research Center team to examine how lasers can be utilized to destroy hypersonic threats to the United States. **Luca Maddalena**, professor in the Mechanical and Aerospace Engineering Department and director of the center, is principal investigator.

Karen Jo Matsler, assistant professor in practice and master teacher in the College of Science's UTeach program, is using a $998,448 grant from the National Science Foundation to launch a national training program for high school teachers on how to incorporate quantum physics into their math, science, and engineering curricula. **Ramon Lopez**, UTeach co-director and professor of physics, is co-principal investigator on the project.

Kevin Schug, Shimadzu Distinguished Professor of Analytical Chemistry, received a three-year, $325,702 grant from the National Science Foundation to design an application that will make the Nexera UC, a machine that automates chemical-compound sample preparation and analysis, easier to use.

Cesar Torres, assistant professor in the Computer Science and Engineering Department, received a National Science Foundation grant for his work using machine learning and artificial intelligence

UTA professor named Jefferson Science Fellow

Erick C. Jones was named a 2021-22 Jefferson Science Fellow (JSF) by the National Academies of Science, Engineering, and Medicine. For his fellowship, the College of Engineering associate dean for graduate studies is serving as a senior science adviser in the Office of the Chief Economist at the U.S. State Department. His current research on pandemic supply chains was a main consideration for this assignment, as the office studies how the U.S. can better understand the economics of supply chains and how their disruptions impact global commerce, operations, and quality of life.

"It is a deep honor to be chosen by the academies to serve the State Department," Dr. Jones says. "I look forward to applying my scholarship, previous federal service, and executive industry experience to the economics and engineering of supply chains to diverse, underserved, and impoverished communities domestically and globally."

Once his fellowship ends, Jones will remain available to the State Department for short-term projects over the next five years. He is the second UTA faculty member to serve as a JSF, following business Professor Edmund Prater, who spent 2020-21 at the U.S. State Department's Bureau of Education and Cultural Affairs, Office of American Spaces.

techniques to identify when a person is falling out of "flow."

Electrical engineering Professor **David Wetz** is part of a team working to develop a safer battery to power drones used to inspect mines for hazards. The project is funded by the Alpha Foundation for the Improvement of Mine Safety and Health Inc.

Xinbao Yu, associate professor of civil engineering, received nearly $636,000 from the Texas Department of Transportation to test a geothermal bridge de-icing system that he and his team designed on an in-service bridge to see how it performs under operational conditions.

Awards

Three professors from the Department of Chemistry and Biochemistry were included in *The Analytical Scientist* magazine's list of the top 100 scientists in the world: **Daniel Armstrong**, R.A. Welch Distinguished Professor in Chemistry; **Purnendu "Sandy" Dasgupta**, Hamish Small Chair in Ion Analysis; and **Kevin Schug**, Shimadzu Distinguished Professor of Analytical Chemistry.

Myrtle Bell, associate dean for diversity, racial equity, and inclusion in the College of Business and a professor of management, and **Doug Garner**, coach of the Movin' Mavs wheelchair basketball team and assistant director for adaptive sports and recreation, were named winners of *Dallas Business Journal*'s inaugural Leaders in Diversity Awards for 2021.

The *Dallas Observer* named **Erin Carlson**, associate clinical professor and director of Graduate Public Health programs in the College of Nursing and Health Innovation, the Best Public Health Expert in its 2021 "Best of Dallas" list.

John D. Gonzalez, chair of graduate nursing programs, was selected as a recipient of the DFW Great 100 Nurses distinction.

Sharareh "Sherri" Kermanshachi, associate professor of civil engineering, received the Rosa Parks Leadership Diversity Award from the Women's Transportation Seminar's Greater Dallas/Fort Worth chapter for her research and leadership in the field.

Mark Lamster, associate professor of practice, was honored by the Dorothea and Leo Rabkin Foundation as one of eight recipients of the Rabkin Prize, given to "essential visual art journalists." He is the first recipient who writes principally about architecture.

The Association for Gerontology Education in Social Work awarded its Faculty Achievement Award to social work Assistant Professor **Kathy Lee**.

Kenneth Roemer, a Distinguished Scholar Professor and longtime faculty adviser to the Native American Student Association, won the unpublished book manuscript contest at the Mayborn Literary Nonfiction Conference. His work, "Allies to Indian Country," is a reflection on his lifetime of allyship with the Native American community.

Publications

In a study published in the journal *Ecological Modelling*, a team of researchers led by **Benito Chen-Charpentier**, professor of mathematics, devised a mathematical model to calculate the minimum habitat size for endangered plant species.

In a study for the *Journal of Biological Chemistry*, **Clay Clark**, chair and professor of biology, explored the ancestry of a class of enzymes responsible for killing cells. Known as effector caspases, they provide insight into the process of cell death and how it can be manipulated in disease states.

Piya Ghose, assistant professor of biology, published a collaborative study in the journal *Development* detailing her team's discovery that a gene that represses gene expression and is a master regulator of the fate of cells is important in the process of novel cell death.

Marketing Associate Professor **Fred Miao** published a paper in the *Journal of Marketing* on how digital avatars can replace a sales force and customer service employees at a fraction of the cost.

Katrina Pound, postdoctoral researcher, was lead author on a study showing that if humans continue as they are now regarding climate change, many economically important species could be driven to the brink of extinction within 50 years. Biology Associate Professor **Sophia Passy** and alumnus **Chad Larson** were co-authors on the paper, published in *Global Ecology and Biogeography*.

A multi-institutional team that includes **Ziyad Ben Taleb**, assistant professor of kinesiology, published a paper in *Pediatrics* examining the impact of blunt use on factors such as respiratory function and brain development in adolescents.

Associate Vice President for Research **Jon Weidanz** authored a perspective regarding the development of cancer immunotherapies for the journal *Science*. He argues that emerging protein-based immunotherapies could lead to highly effective "off-the-shelf" cancer treatments.

An international, multidisciplinary team that includes **Kenneth Williford**, associate professor and chair of philosophy and humanities, and **Perry Fuchs**, professor and chair of psychology, published a paper in the journal *Philosophical Psychology* concluding that while fish lack certain regions of the brain typically associated in humans with processing pain, this does not offer definitive proof that they don't experience painful events.

Studying the causes of large storms

Civil engineer **Nick Fang** is charting rainfall data to help Texans prepare for future storms.

The associate professor is leading a $347,000 project with the U.S. Army Corps of Engineers, Fort Worth District, to develop better methods to characterize, predict, and cope with large Texas storms growing more unpredictable due to climate change.

The project will consider weather data from the U.S. Army Corps of Engineers, National Weather Service, and other services and publications. Dr. Fang also will work with state agencies like the Texas Water Development Board to study the causes of large storms and their hydrologic impacts.

"We will look for spatial patterns, trends, and causes of these large storms based on the rainfall data we collect," says Fang, who is also the Robert S. Gooch Endowed Faculty Fellow in Civil Engineering. "We hope to better prepare Texans for these storm events and through that save lives and property."

His team will also build an inventory examining data from all storms that had a duration of longer than six hours, including events with return periods from two years to 1,000 years. Since Texas is a large state with many different environments, ecologies, and meteorological forces, the researchers will need to determine storm probabilities for different areas and establish sound engineering design methods for building a disaster-resilient Texas.

Increasing diversity in archaeology

Ashley Lemke believes diversity and inclusion is critical to her field.

The assistant professor of sociology and anthropology is an expert on submerged ancient sites in the Americas, with experience diving in the Gulf of Mexico, Great Lakes, and Atlantic Ocean. Her latest article, "Getting Your Feet Wet: Barriers to Inclusivity in Underwater Archaeology and How to Break Them," provides her colleagues with specific, practical solutions to increase diversity in underwater archaeology.

"There is a lack of representation in archaeology generally," says Dr. Lemke, who also chairs the national Advisory Council on Underwater Archaeology. "In a specialized field such as underwater archaeology, this issue is only intensified. Whether you are researching shipwrecks or ancient underwater sites, anyone can get involved."

The paper addresses barriers to diversity in underwater archaeology and offers solutions for ways to educate and provide support—both financially and through mentorship programs—to get more people involved in underwater science. Published in the journal *Advances in Archaeological Practice*, it was co-authored with Nicole Bucchino Grinnan from the Florida Public Archaeology Network and Jay V. Haigler from Diving With a Purpose. The team's goal is to get the public more engaged in archaeology.

Early Insight

Supporting research experiences for students

Undergrad research initiative founded

Kinesiology Associate Professors Matthew Brothers and Michael Nelson recently founded a new undergraduate research initiative at UTA. The Summer Research Program in Integrative Physiology allows undergraduate students to gain firsthand laboratory experience, research skills, and opportunities to be mentored while also learning what postgraduate research and education looks like.

"This program was a perfect blend of what you want in an undergraduate research program, with opportunities for both autonomous thinking and collaboration," says Natalia Cardenas, senior biology major. "I not only shadowed the researcher, but I also was able to be immersed in research protocols."

Mathematician wins NSF fellowship

The National Science Foundation selected Talon Johnson for its prestigious Mathematical and Physical Sciences Ascending Postdoctoral Research Fellowship.

The recent mathematics graduate ('21 PhD) will use the three-year, $300,000 award to fund his investigation of mathematical processes used for medical imaging reconstruction.

"There are many barriers to STEM education for people of color," Dr. Johnson says. "I hope to influence students' opinions about their abilities to pursue questions in math and science and apply their knowledge to solve problems."

HONORS STUDENT CHRISTINE ABASI GOT A HEAD START ON RESEARCH AS AN UNDERGRADUATE

Stuttering study

From age 12 to 17, Christine Abasi attended speech therapy to correct a stuttering disorder. Now as an undergraduate researcher at UTA, she is using her experience to help others.

Abasi, an Honors College student double-majoring in psychology and communication studies, is researching the psychological causes of stuttering to gain insight into effective therapies and develop methods to reduce its stigma. In late 2021, her paper on the topic, "The Psychology of Stuttering: Possible Causes and Treatments of Persistent Stuttering Disorder," earned an invitation to Texas Undergraduate Research Day, where she presented her research to an audience of Texas legislators and members of the public.

The State of

RESEARCH

at

THE UNIVERSITY OF TEXAS AT ARLINGTON

THE STATE OF RESEARCH

RECENT RECOGNITION

R-1

Doctoral Universities—Very High Research Activity reaffirmed

(Carnegie Classification of Institutions of Higher Education, 2022)

7th

fastest-growing doctoral public institution in the country

(The Chronicle of Higher Education's Almanac, 2021)

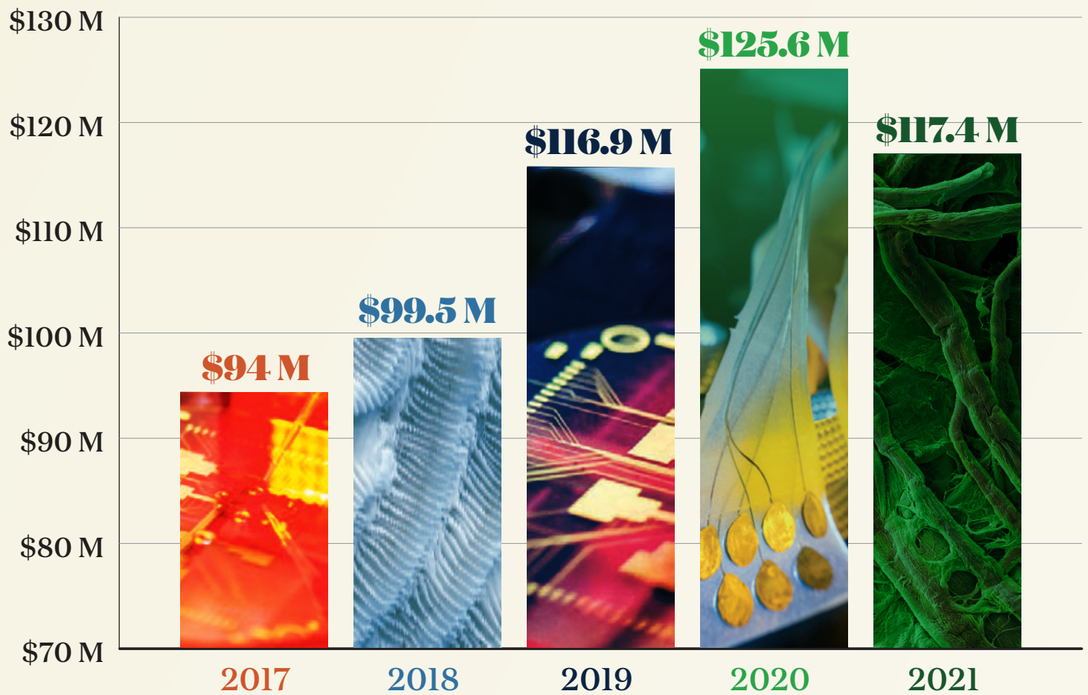
147th

for total research expenditures among all U.S. institutions of higher education

(Higher Education Research & Development Survey, FY 2020)

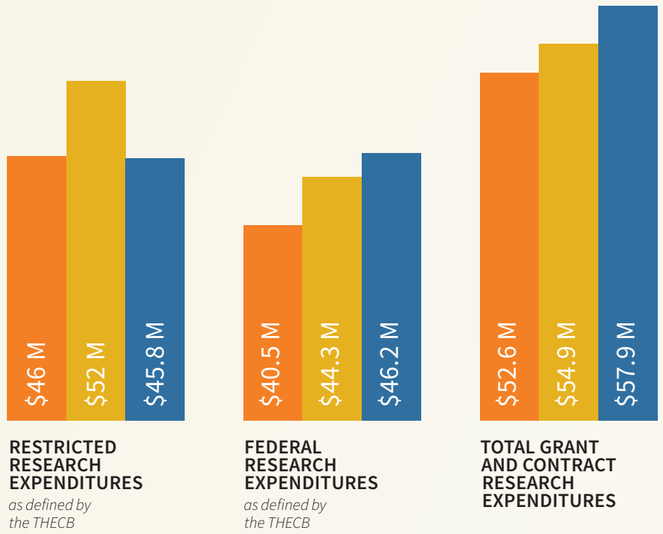
UTA TOTAL RESEARCH EXPENDITURES

by fiscal year, as reported in the THECB RD Expenditure Survey



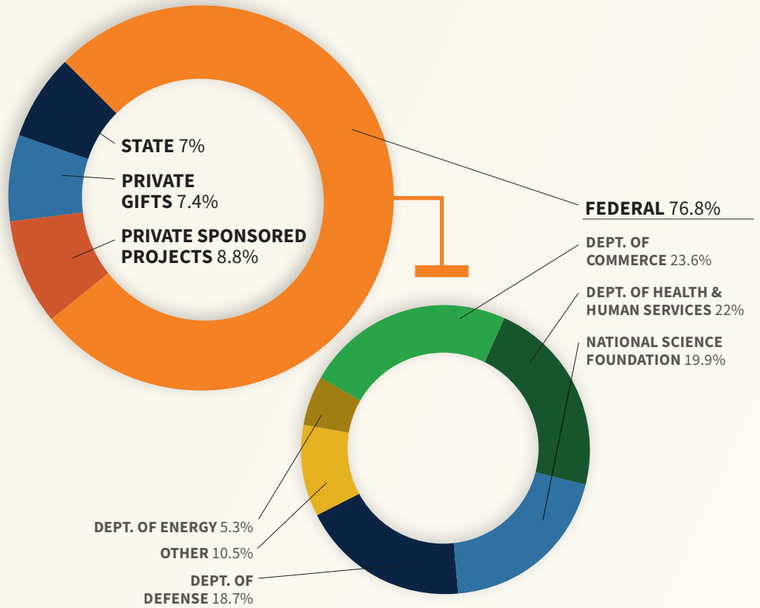
RESTRICTED AND FEDERAL RESEARCH EXPENDITURES

for fiscal years 2019, 2020, and 2021



EXTERNAL RESEARCH EXPENDITURES BY SOURCE

for fiscal year 2021



ENTREPRENEURIALISM BY THE NUMBERS

UTA was granted **23 patents** in 2020, contributing to the University of Texas System's overall No. 4 ranking in the list of Top 100 Worldwide Universities Granted U.S. Utility Patents in 2020.

With the induction of its newest member, UTA now has **19 fellows** in the National Academy of Inventors, the most in Texas.

Six firms founded by **UTA students won $85,000** at the 2021 MavPitch Business Competition grand finale, part of the Maverick Entrepreneur Program and Award Fund. Among the winners were the following:

Pinch Master, a firm that manufactures and sells width-adjustable grip-strength-training equipment for mountain or rock climbers. The strength-training equipment is made from polyurethane using 3D printing technology.

iPark, a firm that is building a centralized parking system that utilizes cost-effective sensors to track the real-time occupancy status of each spot and aggregate this data in the cloud. The company's mobile app allows users to find, book, and navigate to the nearest parking spot at the lowest price. It's a one-stop management system for parking operators to have a bird's-eye view of their parking.

Petal, a company that seeks to change the way consumers shop by reducing the usage of single-use plastic bags. Consumers can purchase reusable bags that they can scan with their smartphones to gain incentives every time they shop.

Showcase

Previewing a new work by UTA faculty

Amplifying Indigenous Voices

In his new book, *The Apache Diaspora: Four Centuries of Displacement and Survival*, history Associate Professor **Paul Conrad** brings to life the stories of displaced Apaches.

Excerpt from *The Apache Diaspora: Four Centuries of Displacement and Survival*, by Paul Conrad

A YOUNG MAN WALKED the grounds of a school counting graves. He had been sent to Carlisle, Pennsylvania, in 1898 for an education, to be trained in welding, construction, and other industrial skills. As he passed through rows of gravestones, counting to 105 before he got "mixed up," he learned other lessons. "Very few came back," he observed.

Sam Kenoi was one who did, however. He slipped away one night on a westbound train and returned to his people. At this time, his Apache Indian relatives were U.S. prisoners of war and had been since the army rounded them up from their Arizona reservation in 1886 and shipped them into exile in Florida, Alabama, and then Oklahoma. Kenoi married and started a family. He settled on the Mescalero reservation in New Mexico after Apache POWs were finally freed in 1913 and given a choice of where to live. After his first wife died of pneumonia, he remarried and had more children. He organized his people in a bold effort to seek reparations for their 27-year internment.

Most lives are full of tragedy and triumph, and Kenoi's was no exception. But his life was also particular, shaped by who he was as an Apache. Kenoi confronted challenges that his ancestors had faced for generations. How does one exist in a world that does not want you to exist as you are? How does one survive that which so many are not surviving? How does one start over in a foreign land or on land made foreign by colonialism? Kenoi responded to these questions creatively, pushed back on those who mistreated him, and lived boldly within the constraints of his circumstances.

Pulling back from Kenoi's particular story, a broader portrait of Apache life and death across North America and the Caribbean comes into view. Apache men and women throw themselves into the Gulf of Mexico, desperate to escape the boat waiting to carry them overseas. A priest pens an entry in a leather-bound ledger near the Pacific coast of Sonora—another Apache girl buried after months of forced labor. Apache boys run errands for the governor of Quebec, and Apache women gather water for their masters at a neighborhood well in Mexico City. Apache men pull a pine tree out of the chimney of an old U.S. fort in Florida and apply mortar to Spanish fortifications in the port of Havana. An Apache servant and a Black slave marry in a church in a Mexican mining town as a crowd of their friends looks on. Their children have children, who have children, their descendants still living across North America today. ...

The history of the Apache diaspora reveals the efforts of outsiders to exploit, subjugate, or eliminate Indigenous people across more than four centuries, and Natives' own determination to resist and survive wherever they have found themselves. ... The ends and means of colonialism have shifted to some extent over time, but colonization and diaspora have not ended. They are ongoing, yet so too is Native resistance.

PHOTOGRAPH BY CHARLES N. PAYNE, "APACHES AT HOME," COURTESY OF THE LIBRARY OF CONGRESS

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