COLLEGE on the MOVE

THE UNIVERSITY OF TEXAS AT ARLINGTON
COLLEGE OF ENGINEERING
When I joined the College of Engineering at The University of Texas at Arlington I was excited about the possibilities from this college on the move.

I am proud to lead this collection of outstanding faculty, staff and students. We are the most comprehensive engineering school in North Texas and the third-largest in the state, with more than 7,000 students and nearly 30,000 alumni. We offer bachelor’s, master’s and doctoral programs in seven departments and awarded nearly 1,800 degrees last year to outstanding students who are now members of the local, regional, and national workforce.

Our location in the midst of the Dallas-Fort Worth Metroplex connects us to the world, and our student population reflects the diversity associated with a global economy.

Our research expenditures are the highest they have ever been, and we are collaborating more than ever with university and industry partners alike.

We are ready to put our people to work with you, whether it be a top student to fill an internship, a transformative research collaboration, or one of many opportunities for partnerships throughout the College.

I look forward to speaking with you further about opportunities that will further cement the College’s role as the region’s leader in engineering education.

Peter Crouch, Ph.D.
Dean
Bioengineering

Strengths
Biomaterials and Tissue Engineering
Bioinstrumentation

Department Highlights
Bioengineering has had a dual degree program with UT Southwestern, one of the top medical schools in the nation, for more than 40 years. The combined faculty, staff and facilities of the two campuses provide tremendous resources and opportunities for biomedical engineering students.

The department celebrated its first undergraduate graduating class in 2016. The undergraduate program was added in 2012.

Faculty are engaged in research into the causes of brain damage from shockwaves and how light can ease the symptoms of post-traumatic stress syndrome, as well as trapping cancer cells and creating better materials for tissue engineering.

Other Key Research Areas
Human Performance
Biomechanics and Orthopedics
Medical Imaging
Nanomedicine
Nanotechnology

Notable Faculty Accomplishments
Professor Kytaí Nguyen earned the inaugural Embracing Challenge Award from Materials Today magazine and the Elsevier Materials Science Council.

Hands-On
Undergraduate students have an opportunity to take advantage of a “clinical immersion” program at THR Arlington Hospital. After being screened and selected, the students are brought into the clinics and surgeries at the hospital, where they observe actual surgeries and interact with the surgeons while exploring ways to improve surgical procedures and instruments.
Strengths
Infrastructure
Invented synthetic fiber concrete pipes and developed the ASTM C1818 design specification, one of the world’s leaders in earthquake engineering research and damage mitigation for steel and concrete buildings, implemented the use of plastic pins and geofoam blocks to battle settling and heaving on Texas’ bridges and highways, the Solid Waste Institute for Sustainability is a global leader in education and research in converting landfill solid waste to energy, a world leader in research in smart cities and underground transportation systems, including multiple U.S. Transportation Centers.

Water
Invented a mobile app for reducing flooding and early warning systems for storms to prevent catastrophic damage, a world leader in the area of hydrology and water resources with major impacts on water and health.

Department Highlights
UTA student teams took first and second places, respectively, in American Society of Civil Engineers’ GeoInstitute’s national competitions that predicted soil impact on foundation loads and showed strength and stability in geo-wall design and construction.

Other Key Research Areas
Construction Engineering
Environmental Engineering
Structural Engineering and Mechanics
Water Resources Engineering

Construction Management
Geotechnical Engineering
Transportation Engineering

Notable Faculty Accomplishments
Simon Chao is a recipient of The University of Texas System Regents’ Outstanding Teaching Award, the Chester Paul Siess American Concrete Institute Excellence in Structural Research Award, and the American Institute of Steel Construction (AISC) Milek Fellowship Award.

DJ Seo was named the Robert S. Gooch Endowed Professor in 2016.

Sahadat Hossain was selected as a technical advisor for the United Nations Sub-Saharan African Network for Solid Waste Management.

Sustainable World
UTA’s Structures Lab and centers and institutes such as the Organized Research Center of Excellence on Sustainable and Resilient Civil Infrastructure and the Solid Waste Institute for Sustainability collaborate with colleagues in architecture, science and urban and public affairs, and community leaders, to ensure that civil infrastructure is safe and long-lasting for future generations.
Computer Science and Engineering

Strengths
Big Data Analytics
Theoretical and computational models for Big Data, parallel and distributed big data analytics algorithms, multimedia data analytics, big data visual analytics, big multi-modal data integration, big data analytics for precision medicine, computational neuroscience, and computational journalism, deep web and social media analytics.

Databases
Ranked retrieval and top-k querying, keyword search in databases, graph database usability, crowdsourcing and human computation, web data management, data warehousing.

Data Mining
Deep web and social media mining, matrix-based data mining, Convex NMF technology, tri-fractoration technology, similarity based indexing, social networks, spatio-temporal data mining, visualization for data mining, time series similarity and sequential pattern mining, graph mining, secure data mining, IoT data mining, biological and biomedical data mining.

Machine Learning
Matrix-based machine learning, large-scale sparse learning, multi-label multi-instance learning, multi-task learning, multi-view learning, transfer learning, reinforcement learning, deep learning, computational learning theory, statistical learning theory and algorithm, reinforcement learning algorithms for discovering and predicting human performance abilities, learning algorithms for human motion analysis, robotics transfer learning.

Assistive Technologies
Smart rehabilitation systems adapting to human capabilities, new multimodal methods to recognize attention problems in children, technologies for sign language understanding and processing, aging-in-place technologies, adaptive smart home technologies, health monitoring for self-management, treatment adherence technologies, adaptive assistive interfaces.

Department Highlights
The iPerform Center for Assistive Technologies to Enhance Human Performance aims to increase, maintain, or improve the functional capabilities of people with disabilities, and enhance the productivity of able-bodied people.

UTA has more than $7 million in research grants in big-data analysis, with projects in healthcare, data security, and more efficient use of data.

The department is one of four in the college collaborating to offer undergraduate and graduate certificates in unmanned vehicle systems.

Other Key Research Areas

Notable Faculty Accomplishments
Professor Chris Ding is a world-leading expert on matrix-based machine learning who invented the L21 matrix norm that is widely used in machine learning for sparse coding, feature selection and robust data recovery, the widely used mRMR feature selection algorithm, and well-known models and algorithms for sparse coding technology.

Professor Gautam Das won the prestigious IEEE ICDE 10-year “Influential Paper” award in 2012, the highest level of recognition of research impact in the field of data mining in the world.

Creative Solutions
Students at the graduate and undergraduate levels are successfully applying their knowledge in competitions. In recent years, student groups have won the AT&T Coding Challenge twice, the NTx Apps Challenge, and top prizes at the Texas A&M, Verizon, HackTX 2016, MLH Prime Southwest Regional, and SASEHack competitions, among other successes.
The Pulsed Power and Energy Lab performs research in battery power for the Office of Naval Research and other federal agencies. UTA is an affiliate member of the Argonne National Laboratory’s Joint Center for Energy Storage Research, which aims to create batteries that are significantly more powerful and less expensive than current ones.

Collaborative Research

The Pulsed Power and Energy Lab performs research in battery power for the Office of Naval Research and other federal agencies. UTA is an affiliate member of the Argonne National Laboratory’s Joint Center for Energy Storage Research, which aims to create batteries that are significantly more powerful and less expensive than current ones.
Industrial, Manufacturing, and Systems

Strengths
Modeling, Optimization, and Statistics:
A leader in data driven analytics that incorporates stochastic modeling, optimization theory, and statistical analysis for decision-making. Development of custom analytics to address complex real-world problems in logistics, healthcare, energy, and manufacturing via collaborations across UTA and with UT Southwestern Medical Center.

Manufacturing and Logistics Systems:
Research and academic initiatives in automation and robotics, unmanned vehicle systems and advanced simulation modeling. Development of globally-integrated sustainable manufacturing, supply chain, and logistics solutions.

Systems Engineering and Engineering Management:
Design, optimization, and management of complex manmade systems in aerospace, defense and healthcare. Integrating tools from engineering, business, and economics to address the continuously emerging, complex, and multi-faceted challenges and socio-technical problems that are at the frontiers of world needs.

Department Highlights
IMSE is one of the fastest-growing departments on campus, growing from 325 to 760 students over the past two years.

The department is one of four in the college collaborating to offer undergraduate and graduate certificates in unmanned vehicle systems.

Online master’s programs support working professionals, including M.S. degrees in engineering management and systems engineering.

Other research areas
- Data Analytics
- Medical Systems
- RFID
- Human Factors
- Operations Research
- Simulation

Notable Faculty Accomplishments
Jay Rosenberger, Victoria Chen and Aera LeBoulluec are using data analytics techniques to research how physicians can make better, more informed decisions to treat patients’ pain.

Shouyi Wang is working with researchers at the University of Washington to develop a new personalized respiratory-motion system that using mathematical modeling to capture clearer, more precise images of lung tumors.

Bill Corley and Jay Rosenberger have developed a method to solve a broad class of previously unsolvable problems that enable business to optimize complex economic problems.

Learning by doing
Industrial Engineering students have completed internships with more than 60 local organizations in the past five years, including DFW International Airport, General Motors, Texas Health Resources, Airbus, Siemens and Triumph. An average of 47% of all UTA engineering students has completed an internship or co-op in the past three years.
Materials Science and Engineering

Strengths
Electronic Materials and Sensors
Invented a new transistor (“cold” electrons) that can increase battery life time by 100 times, nano biosensors for DNA and RNA recognition (homeland security), biochemical sensors for non-invasive breath and skin-based diagnostic tools.

Design and Development of Biomaterials and Devices:
Hollow gold nanoparticles for early detection and therapy of cancer, new materials and coatings for bone implants, bioinks for 3-D printing of tissues and human organs.

Sustainability and Materials for Environmental Engineering and Safety:
Sensors and biosensors for food, water, and soil quality control (fast and onsite detection of harmful viruses/bacteria, such as Zika, Ebola, E-coli, and salmonella), materials for cleanup of produced water from fracking and oil spills; hard and high temperature oxidation resistant coatings for aerospace, corrosion resistant materials and wear and tribology.

Department Highlights
Faculty are using nanotechnology to treat diseases such as diabetes and cancer safely and more efficiently from inside the body, and are also working to develop bioinks that could lead to 3D printing of tissues and organs.

Researchers have made great strides in increasing energy efficiency and storage, including a method for cooling electrons to -228°C using without external means and at room temperature.

Notable Faculty Accomplishments
Perena Gouma has developed a diagnostic breathalyzer that uses nanowires to detect chemical compounds in our breath that can detect and monitor ailments such as the flu, diabetes or kidney disease.

S-J Koh discovered a way to cool electrons to -228°C without external means and at room temperature, an advancement that could enable electronic devices to function with very little energy.

Thinking Small
The Materials Science and Engineering Department initiated a campus-wide certificate program in nanotechnology in 2015. The program focuses on the areas of energy, environment, security and human health, aimed at exploring the potential of nanotechnology in terms of global technological needs while acting as a resource for developing and educating the future workforce.
Mechanical and Aerospace

Strengths
Composite materials
Hypersonics
Fuel Synthesis
Thermal engineering

Department Highlights
Research performed in the Advanced Materials and Structures Lab was featured in the Office of Naval Research’s “Innovation” newsletter in 2013.

A faculty member is building the country’s only university-based, arc-heated, hypersonic-testing facility for thermal protection systems.

Students in MAE’s capstone course are encouraged to follow an entrepreneurial track to learn how to bring an idea to market.

The department is one of four in the college collaborating to offer undergraduate and graduate certificate programs in unmanned vehicle systems.

UTA chemists and engineers have proven that concentrated light, heat and high pressure can drive the one-step conversion of carbon dioxide and water directly into useable liquid hydrocarbon fuels.

Other research areas
Design, Manufacturing, and Multidisciplinary Optimization
Dynamic Systems and Control
Fluid Mechanics, Aerodynamics and Propulsion
Structural Mechanics and Optimization
Thermal Science and Energy Systems

Notable Faculty Accomplishments
Ankur Jain was awarded a 2016 NSF CAREER Award to improve the safety and performance of fuel cells. He joins Hyejin Moon as active CAREER Awardees in the department.

Racing Ahead
UTA’s Formula SAE program is the model program in the U.S., with eight national titles, plus three more overseas. Students design, build and race a car each year from the ground up. The 2014 team was ranked #1 in the U.S. and #5 in the world, and the 2016 team built an electric car with a student-designed, highly-advanced torque vectoring algorithm.
Faculty and Research

FACULTY

138
Tenured/Tenure-track faculty

15
New faculty hired in 2015-16

12
Expected new hires in 2016-17

4
National Science Foundation CAREER Award winners in 2015-16, the most ever in one year at UTA

MASTER'S DEGREE PROGRAMS
Aerospace Engineering
Bioengineering
Civil Engineering
Computer Engineering
Computer Science
Construction Management
Electrical Engineering
Industrial Engineering
Mechanical Engineering
Software Engineering

DOCTORAL DEGREE PROGRAMS
Aerospace Engineering
Bioengineering
Civil Engineering
Computer Engineering
Computer Science
Construction Management
Electrical Engineering
Engineering Management
Industrial Engineering
Logistics
Materials Science and Engineering
Mechanical Engineering
Software Engineering
Systems Engineering

CERTIFICATE PROGRAMS
Automotive Engineering
Electronic Packaging
Manufacturing
Nanotechnology
Unmanned Vehicle Systems