UNT Materials Science and Engineering

www.mtsc.unt.edu

Graduate Student Opportunities

The newly established Department of Materials Science and Engineering at the University of North Texas (UNT) is currently undergoing substantial expansion and growth, and is inviting self-motivated graduate students to participate in this exciting building process. With a student enrollment of 31,000, UNT is the fourth largest university in Texas. Individuals with technical or/and scientific backgrounds of all disciplines are encouraged to apply.

In addition to state-of-the-art research facilities and competitive assistantships, we offer opportunities for internships and co-ops with the large variety of high-tech companies located in the Dallas/Forth-Worth metroplex including Texas Instruments, Raytheon, Lockheed Martin Missiles and Fire Control, Bell Helicopter, GM, Halliburton, POCO Graphite and others. Our characterization capabilities include but are not limited to transmission and scanning electron microscopy (TEM and SEM), environmental SEM, atomic force microscopy (AFM), local electron atom probe (LEAP), X-ray diffraction, scattering, and reflectometry, X-ray and ultra-violet photoelectron spectroscopy (XPS and UPS), Auger, frequency dependent I-V and C-V, optical spectroscopy with a full visible to infrared capability and variable angle spectroscopic (UV-VIS-NIR) ellipsometry. Like our characterization facilities, our materials and device fabrication capabilities rival the best in the nation. Examples include deposition and fabrication by focused ion beam (FIB), radio-frequency magnetron and DC sputtering, thermal evaporation, pulsed laser ablation, laser engineering net shape (LENS system), atomic layer deposition, molecular beam epitaxy (MBE) and maskless mesoscale materials deposition (M^3D). The department conducts research in metals, polymers, ceramics, semiconductors and composites. Our basic and applied research is supported by a range of Federal agencies and industrial consortia such as NASA, National Science Foundation, US Army, NIST, Semiconductor Research Corporation and Sematech. Additional experimental facilities are available to us through our collaborations with the physics, chemistry and other engineering departments as well as through our partnership with the US Army Research Laboratory. For more details about our department, our online brochure, and faculty profiles, visit www.mtsc.unt.edu.

Denton, the home of UNT, is roughly 35 minutes from either Dallas or Fort-Worth and strategically located at the apex of the triangle that constitutes the vibrant Dallas/Fort-Worth Metroplex. Essentially a college town (Denton is also home to Texas Women's University), the cost of living is low, housing is affordable and the culture is rich. To request an application packet contact Alberta Caswell at 940-565-3260 (caswell@unt.edu)

UNT-MSE: Driven by the power of ideas.

Current Faculty and Interests

Metals: Advanced Metallics Laboratory

Michael Kaufman – Chair
Strain measurements using convergent beam electron diffraction, high temperature shape memory alloys, interstitial effects in bulk metallic glasses, Mn effects in cast Al alloys**,** metal and intermetallic matrix composites, advanced characterization

Rajarshi Banerjee
Sputttering of multilayer thin films, laser engineering net shape manufacturing of structural materials (Ti-B composites) and prosthetics

Thomas Scharf
Physical & chemical vapor deposition of ceramic & metallic thin films, micro- & nano-tribology of solid lubricants, MEMS materials and tribology

Polymers and composites
Witold Brostow
Development of materials with improved mechanical, tribological and thermophysical properties, including thermoplastics, thermosets, polymer-based composites and coatings. Materials Science education

Rajarshi Banerjee
Metal-matrix nanotube reinforced composites

Nandika D'Souza
Packaging films and substrates, mechanical behavior and life prediction in polymers and composites, hybrid organic-inorganic polymer nanocomposites using nanotubes and nanoclays. Polymer matrix nanotube/nanoclay/long fiber composites. Mechanical interrelationships between strain rate, temperature and deformation.

Thomas Scharf
Atomic Layer Deposition of nanocomposites and nanolaminates

Electronic and Optical Materials

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Mohamed El Bouanani
Electronic thin film materials, advanced ion beam analysis methods, hydrogen and impurity defects in high-k dielectrics, advanced electrode materials and workfunction tuning, metallization and diffusion barriers

Brian Gorman
Photonic structures in wide-gap semiconductors processed with FIB, low temperature processing of inorganic thin films on polymeric substrates for photovoltaics & flexible displays, nanostructural characterization of semiconductors using combined FIB, HRSTEM, and LEAP

Richard Reidy
Supercritical processing of semiconductor materials**, synthesis and characterization of porous** low k dielectrics

Nigel Shepherd
Physical electronics, electroluminescent materials and devices, interface phenomena in multilayered heterostructures, thin-film and nanoparticle processing by physical and chemical vapor deposition, applications of photonic band-gap structures to sensor technology and opto-electronic integrated circuitry, infrared materials, UV-VIS and IR spectroscopy

Ceramics
Brian Gorman
Low temperature thin film ceramic processing, thin film metallic interconnect supported solid oxide fuel cells, utilization of biofuels in fuel cells for power generation

Richard Reidy
Aerogels, xerogels, and other novel ceramics for sensor applications. anti-ballistic body armor, controlled release of antibactrials from porous substrates, synthesis of oxide and metal nanoparticles