OFFICE OF
Technology Commercialization
THE UNIVERSITY OF TEXAS AT AUSTIN

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Eric Anslyn

University Distinguished Teaching Professor, Faculty
Norman Hackerman Professorship in Chemistry
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Education:
Postdoctorate, Columbia University, 1987-89
Ph.D., California Institute of Technology, 1987
B.S., California State University - Northridge, 1982

Research:
My research group is interested in the physical and bioorganic chemistry of synthetic and natural receptors and catalysts. Using a combination of synthesis, NMR, slow and fast kinetics, and computer modeling, we design and implement studies oriented at the development of compounds which perform certain functions and tasks. In specific, we focus upon catalysts of phosphoryl and glycosyl transfers, receptors for carbohydrates and enolates, and single and multi-analyte sensors. In addition, we seek to form polymeric molecules that exhibit unique abiotic secondary structure and are useful in novel combinatorial library applications.

Adela Ben-Yakar

Assistant Professor
Department of Mechanical Engineering
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Education:
Ph.D., Stanford University, 2000
M.Sc., Israel Institute of Technology, 1995
B.Sc., Israel Institute of Technology, 1992

Research:
Dr. Ben-Yakar specializes on advanced applications of femtosecond lasers in life sciences, nonlinear microscopy, plasmonic nanoengineering, and nanotechnology. She investigates the fundamentals of femtosecond laser interaction with biological tissues and nanomaterials to develop novel techniques such as laser nanosurgery and 3-D micro-/nano-fabrication techniques. Current projects include the development of miniaturized fiber endoscopes that combine femtosecond laser microsurgery (FLMS) with two-photon imaging for early cancer detection and treatment (utilizing optical MEMS scanners and photonic band-gap fibers), femtosecond laser nano-axotomy to study nerve regeneration in C. elegans, and the design, micro-fabrication, and characterization of 3-D microfluidic devices in glass and polymeric substrates.

Paul Barbara

Director, Center for Nano- and Molecular Science and Technology
Richard J. V. Johnson-Welch Regents Chair

Department of Chemistry and Biochemistry
512-471-2053
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Education

Ph.D., Brown University, 1978
B.A., Hofstra University, 1974

Research

The primary focus in our research is the use of single molecule spectroscopy to investigate the chemical and photophysical dynamics of important chemical and biological systems that are too complex to adequately investigate by non-single molecule spectroscopy methods. The complex chemical and physical processes of heterogeneous systems are often obscured in ordinary ensemble measurements. These processes, however, have become accessible in recent years through the development and application of single-molecule (single-particle) experimental tools for materials and biological research.

Andrew Ellington

Professor, Wilson and Kathryn Fraser Research Professorship in Biochemistry
Department of Biomedical Engineering
Institute for Cellular & Molecular Biology
(512) 232-3424
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Education:
Ph.D., Harvard University, 1988
B.S., Michigan State University, 1981

Research:
Current research interests include directed evolution; ribozymes; biotechnology; chemical and biological warfare detection. The Ellington lab is primarily interesting in the evolutionary engineering of molecules, pathways, and organisms, and the application of these efforts to real world problems. In particular, we evolve functional RNA molecules that can function as diagnostic and therapeutic reagents, including RNA molecules that inhibit the replication of HIV-1 and tumor cells. We combine functional RNAs and other components into synthetic genetic circuits that can be used to control gene expression during gene therapy. We are also involved in the development of novel chimeras between biology and chemistry, including minimal replicators that can evolve outside of cells, light-dependent signal transduction pathways, and organisms that utilize unnatural amino acids in their proteomes.

Stanislav Emelianov

Assistant Professor
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Research:
Medical imaging for therapeutics and diagnostic applications, ultrasound microscopy, elasticity imaging, opto-acoustical imaging, acousto-mechanical imaging, radiation pressure imaging. The research at Panscopic Imaging Laboratory is focused on developing macro- and microscopic (i.e., panscopic) imaging methods for fundamental biomedical research, biomedical applications, and clinical practice. Among many ambitious research areas in biomedical imaging ranging from full body or organ visualization to molecular and nanoscale imaging.

George Georgiou

Professor, Cockrell Family Regent's Chair in Engineering #9
Department of Biomedical Engineering
Institute for Cellular and Molecular Biology
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Education:

Ph. D., Cornell University, 1987
M.S., Cornell University, 1983
B.Sc., University of Manchester Institute of Science and Technology (UMIST), England, 1981

Research:

Our group employs molecular biology and genetic approaches for the design and production of proteins with improved function and for the engineering of cellular physiology. Current research projects include: Development of new technologies to aid protein engineering and drug discovery; Engineering of therapeutic and diagnostic antibodies; Engineering of novel enzymes; The mechanism of oxidative protein folding in bacteria; Protein secretion pathways in bacteria; Regulation of RNA turnover; Biologically templated nanomaterials

Jack Hart

Assistant Chairman, Department of Biomedical Engineering

Department of Biomedical Engineering
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Dr. Hart manages the Department of Biomedical Engineering's Industry Affiliate Program which seeks to build long-term relationships with visionary industry leaders and companies through departmental, college, and university-wide programs. In addition, he interfaces with private industry and the Engineering Career Assistance Center to identify internships, Co-op and fulltime positions for students. He also works with the Office of Technology Commercialization to foster commercialization opportunities for BME technologies.

Adam Heller

Research Professor, Professor Emeritus
Department of Chemical Engineering
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Education:
Ph.D., Hebrew University, Jerusalem, 1961
M.Sc., Hebrew University, Jerusalem, 1957

Research:
Heller co-founded TheraSense acquired in 2004 by Abbott Laboratories, manufacturer of the FreeStyle TM micro-coulometric painless glucose monitor and the FreeStyle NavigatorTM continuous amperometric glucose monitor. Earlier he contributed to the design of photocatalysts for air cleaning, efficient photo-electrochemical solar cells, inorganic lithium batteries and neodymium liquid lasers. Current research interests include bioelectrochemistry, bioelectrocatalysis and electrochemical glucose monitoring for diabetes management. Presently, Heller and his colleagues are designing miniature oxygen-reducing glucose-oxidizing membrane-less biofuel cells that might be used for powering implanted medical sensor-transmitters.

Brent Iverson

University Distinguished Teaching Professor,
Warren J. and Viola Mae Raymer Professorship
Department of Chemistry and Biochemistry
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Education:
Postdoctorate, Scripps Research Institute, 1987-90
Ph.D., California Institute of Technology, 1987
B.S., Stanford University, 1982

Research:
Current research interests include biotechnology, bioorganic chemistry, organic chemistry, and molecular biology, including the production, characterization, and manipulation of large, functional molecules from three different points of view: antibody and enzyme engineering, artificial macromolecules with defined higher order structure and function, and the chemistry of nucleic acid binding, recognition and modification.

Keith Johnston

M. C. (Bud) and Mary Beth Baird Endowed Chair and Professor of Chemical Engineering

Department of Chemical Engineering
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Education

Ph.D., University of Illinois, 1981

Research

Dr. Johnston's research investigates fundamental principles in particle and polymer engineering to produce inorganic and organic nanoparticles of interest in a wide range of applications including drug delivery, production of microelectronic and optoelectronic devices, and CO2 enhanced oil recovery. Johnston's production of nanoscale particles for water-insoluble drugs improves their dissolution rates and bioavailability. Johnston also developed bioerodible polymers with encapsulated peptides and proteins for controlled release drug delivery. His group has synthesized and characterized silicon and germanium nanocrystals of interest in optoelectronic devices such as memory devices, solid state lighting and sensors. The nanocrystals exhibit highly efficient luminescence. In addition, Johnston uses carbon dioxide as an environmentally benign solvent for manipulating the properties of colloids and polymer thin films.

John McDevitt

Professor
Department of Chemistry and Biochemistry
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Education:
Postdoctorate, University of North Carolina - Chapel Hill, 1987-89
Ph.D., Stanford University, 1987
B.S., California Polytechnic University – San Luis Obispo, 1982

Research:
Using nanometer-sized building blocks, the McDevitt laboratory develops extremely tiny sensors – called “Lab-on-a-Chips” – suitable for a variety of applications, such as clinical, environmental, environmental, bioterrorism, humanitarian and saliva-based diagnostic tools. One kind of mini-test system, called “chemical processing units,” is silicon-based and has been adapted to detect pH, electrolytes, metal cations, sugars, toxins, proteins, antibodies and more. A second kind of mini-test, called “cellular processing units,” is membrane-based and shows utility for a variety of cell-based tests. These units have been adapted to test for HIV, have led to the creation of a new Austin company called LabNow, and have shown significant utility in initial testing in US and Africa settings. The McDevitt lab has published over 150 peer-reviewed manuscripts, secured over 95 patents/patent applications thereby establishing one of largest patent portfolios in history of UT, and was recently selected as part of Science Coalition’s Best Scientific Advances for Year.

Jim McGinity

Johnson & Johnson Centennial Chair In Pharmacy

College of Pharmacy
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Education

Ph.D., University of Iowa, 1972

Research

The current use of high speed machinery in the pharmaceutical industry dictates that the pharmaceutical scientist must be cognizant of the physical and chemical properties of drugs and other adjuvants used in pharmaceutical dosage forms. Our research has focused on controlled release technologies and polymeric drug delivery systems. Our current research emphasis is concerned with the microencapsulation of peptides and proteins, aqueous film coating of beads, tablets and soft gelatin capsules, hot-melt extrusion, and compaction properties of tablets and extruded beads. Analytical techniques including HPLC, GPC, DSC and X-ray diffraction are routinely used in our investigations to characterize stability and other important properties of raw materials and the finished dosage form.

Thomas Milner

Professor, Charles Elmer Rowe Fellowship in Engineering
Department of Biomedical Engineering
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Education:
Ph.D., University of Arizona, 1991

Research:
Current research interests include optical-based therapeutics and diagnostic imaging, biomedical fiber sensors, infrared imaging radiometry. Dr. Milner develops optical imaging and laser surgical procedures for diagnosis and treatment of human diseases. His research in optical tomography, or imaging objects by sections, focuses on using laser techniques to image blood vessels and other tissues. For example, Dr. Milner researches polarization and phase sensitive optical coherence tomography. In this work he directs rays of light into the nerve fiber layer in the retina, and can estimate density of fibers in the tissue by measuring the time delay between two light oscillations. The technique can be used for early diagnosis of various neuropathies. Other applications of these technologies track movement of structures in response to various external stimuli.

Nicholas Peppas

Fletcher Stuckey Pratt Chair in Engineering
Department of Chemical Engineering
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Education:
Sc. D., Massachusetts Institute of Technology, 1973
Dipl. Eng., National Technical University of Athens, Greece, 1971
Doc. Hon. Causa, University of Ghent, Belgium, 1999
Pharm. D. Hon. Causa, University of Parma, Italy, 1999
Doc. Hon. Causa, University of Athens, Greece, 2000

Research:
Polymer physics; Polymerization reaction engineering; Diffusion in polymers; Controlled drug delivery; Biomedical engineering; Biomaterials; Molecular modeling of protein structures in contact with biomaterials and tissues; Modeling of biomedical devices; Bionanotechnology; Molecular recognition processes.

Jonathan Sessler

Professor, Rowland Pettit Centennial Professorship in Chemistry
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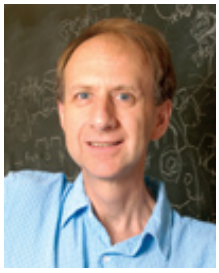

Education:
NSF-NATO and NSF-CNRS Postdoctoral Fellow, Universite Louis Pasteur de Strasbourg (1982-83)
Ph.D., Stanford University, 1982
B.S., University of California - Berkeley, 1977

Research:
My group might be considered to be in the business of "Molecular Engineering" in that our research involves the design and construction of molecules carefully tailored so as to accomplish a specific objective. Often these objectives are medically or biologically inspired in that we seek to understand complex biochemical processes through the study of simple, well-characterized "model" compounds or use our knowledge of chemistry to prepare new compounds that we think could find application in the clinic as novel therapeutic or diagnostic agents. On the other hand, as often as not, we simply set out to prepare molecules or assemblies of architectural elegance with interesting chemical, physical, or biological properties. In both cases, however, we try to accomplish our goals through an appropriate combination of design, synthesis, and testing. As a result, the research projects in the group tend to be highly interdisciplinary in nature, involving at times elements of inorganic chemistry, biochemistry, spectroscopy, and synthetic organic chemistry. This helps keep our research activities fresh, focused, and exciting, as does the fact that much of what we do relates to the "real world" of patents, patients, and biotechnology.

Bill Williams

Johnson & Johnson Centennial Professor in Pharmacy

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Education

Ph.D., University of Texas at Austin, 1986

Research

The research in my laboratory has focused on the formulation development, optimization, and delivery of small organic compounds, peptides, and proteins by a variety of technologies, including depot drug delivery, oral drug delivery and pulmonary/nasal drug delivery. In addition, other current research has focused on aerosol device technology, and novel analytical methods to quantitate and characterize these technologies. Analytical techniques including cascade impaction, HPLC, GC, X-ray diffraction, scanning electron microscopy, atomic force microscopy, Karl Fisher, laser light diffraction and TLC are routinely used to investigate raw materials and formulations. Significant effort is devoted to research to enhance drug solubility through novel particle engineering technologies.

Grant Willson

Professor, Rashid Engineering Regents Chair
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Education:
Ph.D., University of California – Berkeley, 1973
M.S., San Diego State University, 1969
B.S., University of California – Berkeley, 1962

Research:
Several of our current projects are related to photoresist materials and imaging processes. The goal of this work is to develop improved materials and processes for use in the manufacturing of microelectronic devices. Work in this area is highly interdisciplinary and includes among other things, theoretical studies on polymer dissolution mechanisms, sorption and reaction kinetics in thin films. Mesoscale, Mont Carlo simulation of the step and Flash Imprint Lithography process and the conventional lithographic patterning process. This effort includes coll horations with many other faculty both within UT and outside of UT. Experiments in this area involve developing techniques ranging from high speed, variable angle spectroscopic ellipsometry and Fourier transform infrared spectroscopy to radioisotope labeling studies and high resolution electron microscopy. We have collaboration with SEMATECH that provides some of our students with access to the most advanced semiconductor wafer processing tools in the world. We also have a significant effort directed toward Step and Flash Imprint Lithography, a new patterning technique that can be used to produce nanostructures.

Xiaojing Zhang

Assistant Professor
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Education:
Ph.D., Stanford University

Research:
Zhang Laboratory is developing integrated photonic microsystems, semiconductor chips and nanotechnologies for imaging, sensing and regulating cellular processes critical to healthcare, environmental and defense applications. Current research focuses on developing tools and methods to understand and regulate complex biological networks critical to development and disease, and developing nano-micro fabricated photonic sensors for biomaterials characterization, fast pre-cancer detection and diagnosis. Nano-Micro scale science, Information, and Biomedicine are integrative components of Zhang's research that are used with advanced engineering tools to facilitate biomedical studies and develop point-of-care diagnostics for global health initiatives.