STANFORD ENGINEERING

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AERONAUTICS AND ASTRONAUTICS

The course offerings and research activities in the Department of Aeronautics and Astronautics cover most aspects of aircraft and spacecraft design, structures, fluid mechanics, dynamics and control, and navigation, with strong emphasis on fundamental principles as well as on systems engineering.

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Juan Alonso

Associate Professor; Director, Aeronautics & Astronautics Industrial Affiliates Program

AERONAUTICS AND ASTRONAUTICS

Alonso's work is focused on research and development of new high-fidelity, multidisciplinary methods and techniques for the analysis and design of complex aerospace systems. He is interested in the development of these methods and their use in realistic test cases. Past and current research includes transonic, supersonic, and hypersonic vehicles, rotorcraft, turbomachinery, and launch vehicles. Specific current interests include advanced methods for design, multi-fidelity optimization, environmentally friendly aircraft, uncertainty quantification and robust design, and system-level challenges for NextGen. PhD 1997 Princeton

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Brian Cantwell

Professor; Edward C. Wells Professor in the School of Engineering

AERONAUTICS AND ASTRONAUTICS, MECHANICAL ENGINEERING

Cantwell's research focuses in the area of turbulent flow, especially the direct numerical simulation of turbulent shear flows, theoretical studies of the fine-scale structure of turbulence, and experimental measurements of turbulent structure in flames. Experimental studies include the development of particle-tracking methods for measuring velocity fields in unsteady flames and variable density jets. Research in turbulence simulation includes the development of spectral methods for simulating vortex rings, the development of topological methods for interpreting complex fields of data, and simulations of high Reynolds number compressible and incompressible wakes. Theoretical studies include predictions of the asymptotic behavior of drifting vortex pairs and vortex rings and use of group theoretical methods to study the nonlinear dynamics of turbulent fine-scale motions. Current projects include studies of fast-burning fuels for hybrid propulsion and decomposition of nitrous oxide for space propulsion. PhD 1976 Caltech

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Fu-Kuo Chang

Professor; Director, Structures and Composites Laboratory

AERONAUTICS AND ASTRONAUTICS, MECHANICAL ENGINEERING BY COURTESY

Chang's research focuses in the areas of multi-functional materials and intelligent structures with particular emphases on structural health monitoring, intelligent self-sensing

diagnostics, and integrated health management for space and aircraft structures as well safety-critical assets and medical devices. His specialties include sensors and sensor network development, built-in self-diagnostics, integrated diagnostics and prognostics, damage tolerance and failure analysis for composite materials, and advanced multi-physics computational methods for multi-functional structures. Most of his work involves system integration and multi-disciplinary engineering in structural mechanics, electrical engineering, signal processing, and multi-scale fabrication of materials. His recent research topics include: integrated health management for aircraft structures, bio-inspired intelligent sensory materials for fly-by-feel autonomous vehicles, active sensing diagnostics for composite structures, and self-diagnostics for high-temperature materials. PhD 1983 Michigan

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Sigrid Close

Assistant Professor

AERONAUTICS AND ASTRONAUTICS, ELECTRICAL ENGINEERING BY COURTESY

Close's research involves space weather detection and modeling for improved spacecraft designs, and advanced signal processing and electromagnetic wave interactions with plasma for ground-to-satellite communication systems. These topics fall under the Space Situational Awareness (SSA) umbrella, which includes environmental remote sensing using satellite systems and ground-based radar. Her current efforts are the MEDUSSA (Meteoroid, Energetics, and Debris Understanding for Space Situational Awareness) program, TALIS (Tomographic Array for Lightning and Ionospheric Studies) using ground-based and space-based RF sensors, and using ground-based radar data to characterize the meteoroid population and its threat to spacecraft. Future work includes using CubeSats for asteroid detection and characterization.

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Per Enge

Professor; Vance D. and Arlene C. Coffman Professorship in the School of Engineering; Director, Stanford Center for Position Navigation and Time

AERONAUTICS AND ASTRONAUTICS, ELECTRICAL ENGINEERING BY COURTESY

Enge's research focuses on the design of navigation systems that satisfy stringent requirements with respect to accuracy, integrity (truthfulness), time availability, and continuity. To provide high integrity, these navigation systems must detect and flag any faults (or natural conditions) that may cause large position errors. To simultaneously provide high time availability, the system must automatically compensate for any such faults. These days, such navigation systems are usually based on the Global Positioning System (GPS) with substantive augmentation. Applications of current interest include the landing of airplanes and harbor navigation. PhD 1983 Illinois

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Charbel Farhat

Professor and Chair, Aeronautics and Astronautics; Vivian Church Hoff Professor of Aircraft Structures; Director, Army High-Performance Computing Research Center

AERONAUTICS AND ASTRONAUTICS, MECHANICAL ENGINEERING

Farhat and his research group develop mathematical models, advanced computational algorithms, and high-performance software for the design and analysis of complex systems in aerospace, marine, mechanical, and naval engineering. They contribute major advances to Simulation-Based Engineering Science. Current engineering focus in research is on the aerodynamics of Micro Aerial Vehicles (MAVs) and Formula 1 cars, ballistic fabric for lightweight shields, nonlinear aeroelasticity of fighter jets and High-Altitude Long Endurance (HALE) aircraft, thermal management of hypersonic vehicles, underwater acoustics and imaging, and underwater implosion. Current theoretical and computational emphases in research are on high-performance, multi-scale modeling for the high-fidelity analysis of multi-physics problems, and efficient reduced-order modeling for time-critical applications such as design and active control. PhD 1987 UC Berkeley

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Antony Jameson

Professor (Research); Thomas V. Jones Professor in the School of Engineering

AERONAUTICS AND ASTRONAUTICS

Jameson's research focuses on the numerical solution of partial differential equations with applications to subsonic, transonic, and supersonic flow past complex configurations, as well as aerodynamic shape optimization. PhD 1963 Cambridge

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Ilan Kroo

Professor (Research); Director, Aircraft Aerodynamics and Design Group

AERONAUTICS AND ASTRONAUTICS

Kroo's research involves work in three general areas: multidisciplinary optimization and aircraft synthesis, unconventional aircraft, and low-speed aerodynamics. Current research in the field of aircraft synthesis, sponsored by NASA and industry, includes the development of a new computational architecture for aircraft design, and its integration with numerical optimization. Studies of unconventional configurations employ rapid turnaround analysis methods in the design of efficient subsonic and supersonic commercial aircraft. Recent research has included investigation of configurations such as joined wings, oblique wings, and tailless aircraft. Nonlinear low-speed aerodynamics studies have focused on vortex wake roll-up, refined computation of induced drag, the design of wing tips, and the aerodynamics of maneuvering aircraft. PhD 1983 Stanford

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Sanjay Lall

Associate Professor

ELECTRICAL ENGINEERING, AERONAUTICS AND ASTRONAUTICS

PhD 1995 Cambridge

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Sanjiva Lele

Professor; Director, Unsteady Flow Physics and Aeroacoustics Laboratory

AERONAUTICS AND ASTRONAUTICS, MECHANICAL ENGINEERING

Lele's research combines numerical simulations with analytical modeling to study fundamental unsteady flow phenomena, turbulence, flow instabilities, and flow-generated sound. Recent projects include shock-turbulence interaction, exploitation of flow instabilities for enhanced mixing and for reducing the vortex-wake hazard from an airplane, new approaches for active noise control, and the development of high-fidelity prediction methods for engineering applications. PhD 1985 Cornell

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Marco Pavone

Assistant Professor

AERONAUTICS AND ASTRONAUTICS

Pavone's fields of expertise are control theory, optimization, and (space) robotics. His main research interests lie in the area of design and control of autonomous systems, with a focus on robotic platforms for planetary exploration, distributed coordination of multi-robot networks, formation flying, and transportation networks. He is currently leading a project for the development of robotic platforms for the exploration of small Solar System bodies (including asteroids, comets, Phobos, and Deimos). Also, in collaboration with scientists at MIT, he is investigating new paradigms for future urban mobility systems, which leverage robotics and automation. On the flight project side, he has been working on the Mars sample return mission, focusing on the problem of combined aero-flight and rover mobility analysis. PhD MIT 2010

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Stephen Rock

Professor; Director, Aerospace Robotics Laboratory

AERONAUTICS AND ASTRONAUTICS

Rock's research interests include the application of advanced control and modeling techniques for robotic and vehicle systems (aerospace and underwater). He directs the Aerospace Robotics Laboratory in which students are involved in experimental programs designed to extend the state-of-the-art in robotic control. Areas of emphasis include planning and navigation techniques (GPS and vision-based) for autonomous vehicles; aerodynamic modeling and control for aggressive flight systems; underwater remotely operated vehicle control; precision end-point control of manipulators in the presence of flexibility and uncertainty; and cooperative control of multiple manipulators and multiple robots. PhD 1978 Stanford

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Debbie Senesky

Assistant Professor

AERONAUTICS AND ASTRONAUTICS

Senesky's research is centered on the development of micro- and nano-systems for operation within extreme harsh environments. Her laboratory (EXtreme Environment Microsystems Laboratory, XLab) is researching the synthesis of temperature tolerant, chemically resistant, and radiation-hardened wide bandgap semiconductor thin films and nanostructures. These new material sets serve as a platform for the realization of sensor, actuator, and electronic components that can operate and collect data under the most hostile conditions. More specifically, smart and adaptable structures for extreme environments are enabled through the technology developed in her laboratory. Her research efforts support a variety of applications including deep space systems, hypersonic aircrafts, combustion monitoring, and subsurface monitoring.
PhD 2007 UC Berkeley

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Claire Tomlin

Professor (Research)

AERONAUTICS AND ASTRONAUTICS

Tomlin's research is in the analysis, control, simulation, and prototyping of hybrid systems, with applications to automated air traffic systems. A hybrid system incorporates both continuous-time dynamics (differential equations) with discrete-event dynamics (finite state machines) and allows accurate modeling of such complex systems as a group of aircraft interacting with an automated air traffic control, or the coupling of the continuous dynamics of a Boeing 777 with its on-board avionics. This research emphasizes the computation of controllers that ensure the safety of such systems.
PhD 1998 UC Berkeley

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BIOENGINEERING

The Department of Bioengineering is a fusion of engineering and the life sciences to promote biomedical discovery and the development of new technologies and therapies. Bioengineering at Stanford embraces biology as a new engineering paradigm and applies engineering principles to medical problems and biological systems.

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Russ Altman

Professor; Kenneth Fong Professor in the School of Engineering; Principal Investigator, Simbios

BIOENGINEERING, GENETICS, COMPUTER SCIENCE BY COURTESY, MEDICINE BY COURTESY

Altman's primary interests are in the application of computing technologies to basic molecular biological problems, now referred to as bioinformatics. He is particularly interested in the analysis of protein and RNA structure and function, both in an individual problem-centered manner and on a functional genomic scale. He has an interest in applying systems biology concepts to pharmacology and personalized medicine. His current efforts are in three areas: techniques for representing biological knowledge for automatic scientific computation; analysis of microenvironments within macromolecules; and physics-based simulation of biological structures, particularly RNA and proteins. PhD 1989 Stanford; MD 1990 Stanford

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Annelise Barron

Associate Professor

BIOENGINEERING

Barron researches novel polymeric materials and strategies for capillary and microchip electrophoresis (DNA sequencing and genotyping); polymer-biomolecule conjugates; and sequence-controlled, biomimetic oligomers with folded structure for biomedical and biomaterial applications (mimicry of lung surfactant proteins and antimicrobial peptides).
PhD 1995 UC Berkeley

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Kwabena Boahen

Associate Professor

BIOENGINEERING

Boahen's research interests include mixed-mode multichip VLSI models of biological sensory and perceptual systems, their epigenetic development, and asynchronous digital communication for reconfigurable connectivity.
PhD 1997 Caltech

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Zev Bryant

Assistant Professor

BIOENGINEERING, STRUCTURAL BIOLOGY BY COURTESY

Bryant researches the molecular motors at the heart of biological processes from DNA replication to vesicle transport. His laboratory seeks to understand the physical mechanisms by which these nanoscale machines convert chemical energy into mechanical work. They use single molecule tracking and manipulation techniques to observe and perturb substeps in the mechanochemical cycles of individual motors. Protein engineering helps them to explore relationships between molecular structures and mechanical functions. Broad topics of current interest include torque generation by DNA-associated ATPases and mechanical adaptations of unconventional myosins. PhD 2003 UC Berkeley

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David Camarillo

Assistant Professor

BIOENGINEERING

Camarillo's current projects include cell mechanics for regenerative medicine, in vivo microscopy and computer vision for cancer diagnosis and treatment, and flexible robotics for cardiovascular therapy. He has dozens of other project ideas from smart helmet design to dental surgery augmentation, to brain interface devices for mindfulness. PhD 2008 Stanford

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Dennis Carter

Professor

MECHANICAL ENGINEERING, BIOENGINEERING

Carter studies the influence of mechanical loading on the growth, development, regeneration, and aging of skeletal tissues. Basic information from these studies is used to understand skeletal diseases and treatments. PhD 1976 Stanford

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Jennifer Cochran

Associate Professor

BIOENGINEERING, STANFORD CANCER INSTITUTE

Cochran's research group uses interdisciplinary approaches in chemistry, engineering, and biophysics to study complex biological systems. The main goal is to develop new technologies for basic science and biomedical applications. Clinical applications of the research involve bone and wound healing, biomimetic corneas, neural cell regeneration, and cancer imaging and therapy. Her group is interested in elucidating molecular details of receptor-mediated cell signaling events, and at the same time developing protein and polymer-based tools that will allow manipulation of cellular processes on a molecular level. For biomedical applications, they combine rational design and combinatorial methods to create designer protein therapeutics and diagnostic agents. PhD 2001 MIT

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Markus Covert

Assistant Professor

BIOENGINEERING, CHEMICAL AND SYSTEMS BIOLOGY BY COURTESY

Covert's lab focuses on building computational models of complex biological processes, and using these models to guide an experimental program. Such an approach leads to a relatively rapid identification and validation of previously unknown components and interactions. Biological systems of interest include metabolic, regulatory, and signaling networks as well as cell-cell interactions. Current research involves the dynamic behavior of NF-kappaB, an important family of transcription factors whose aberrant activity has been linked to oncogenesis, tumor progression, and resistance to chemotherapy. PhD 2003 UCSD

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Karl Deisseroth

Professor

BIOENGINEERING, PSYCHIATRY

Deisseroth focuses on developing molecular and cellular tools to observe, perturb, and re-engineer brain circuits. His laboratory employs a range of techniques including neural stem cell and tissue engineering methods, electrophysiology, molecular biology, neural activity imaging, animal behavior, and computational neural network modeling. As a clinician in the psychiatry department, he employs novel electromagnetic brain stimulation techniques in human patients for therapeutic purposes. PhD 1998 Stanford; MD 2000 Stanford

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Scott Delp

Professor; James H. Clark Professor in the School of Engineering; Director, Neuromuscular Biomechanics Lab; Co-Principal Investigator, Simbios

BIOENGINEERING, MECHANICAL ENGINEERING, ORTHOPAEDIC SURGERY BY COURTESY

Delp combines experimental and theoretical approaches to study human movement. He has developed graphics-based biomechanical models from medical images that are used to guide surgery, study movement disorders, and design new medical products. He has a long-standing interest in improving treatments for children with cerebral palsy. PhD 1990 Stanford

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Drew Endy

Assistant Professor

BIOENGINEERING

Endy's immediate research goal is to enable the engineering of genetically encoded memory systems. Modest amounts of programmable memory, if implemented within living organisms, would have profound impacts on the study and treatment of diseases and would broadly enable non-medical applications of biotechnology. He is interested in both the basic and applied aspects of the problem, from considering how to best store information inside cells to practical applications. His

overall long-term goal is to help make biology easy to engineer, an area of research known as synthetic biology. PhD 1998 Dartmouth

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Kerwyn Huang

Assistant Professor

BIOENGINEERING

Huang's lab employs diverse interdisciplinary methods of inquiry to understand the relationships among cell shape detection, determination, and maintenance in bacteria. Cell shape plays a critical role in regulating many physiological functions, yet little is known about how the wide variety of cell shapes are determined and maintained. Inside the cell, many proteins organize and segregate, but how they detect and respond to the cellular morphology to end up at the right place at the right time is also largely mysterious. The group uses a combination of analytical, computational, and experimental approaches to probe physical mechanisms of shape-related self-organization in protein networks, membranes, and the cell wall. Current topics of interest are cell-wall biosynthesis, the regulation and mechanics of cell division, membrane organization, and membrane-mediated protein interactions. Ultimately, the manipulation of cell shape may provide a direct tool for engineering complex cellular behaviors. PhD 2004 MIT

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Michael Lin

Assistant Professor

PEDIATRICS, BIOENGINEERING

Lin's research group applies biochemical and engineering principles to the development of protein-based tools for molecular imaging and gene therapy. Topics of investigation include fluorescent proteins structure and biophysics, fluorescent protein-based biosensors, spatiotemporal analysis of protein translation pathways, chemical control of protein translation, and light-responsive proteins. PhD 2002 Harvard; MD 2004 UCLA

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Norbert Pelc

Professor and Chair, Bioengineering

BIOENGINEERING, RADIOLOGY

Pelc's primary research interests are in the physics, engineering, and mathematics of diagnostic imaging and the development of applications of this imaging technology. His current work focuses on computed tomography, specifically in methods to improve the information content and image quality and to reduce the radiation dose from these examinations. PhD 1979 Harvard

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Manu Prakash

Assistant Professor

BIOENGINEERING

Prakash's group works in the field of physical biology. Their approach brings together experimental and theoretical techniques from soft condensed matter physics, fluid dynamics, theory of computation, and unconventional micro- and nano-fabrication to open problems in biology: from organismal to cellular and molecular scale. They design and build precision instrumentation including droplet microfluidic tools to probe and perturb biological machines and their synthetic analogues. Along the way, they invent novel technologies in global health context with clinical applications in extreme resource-poor settings. PhD 2008 MIT

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Stephen Quake

Professor; Lee Otterson Professor in the School of Engineering

BIOENGINEERING, APPLIED PHYSICS, PHYSICS BY COURTESY

Quake's interests lie at the nexus of physics, biology, and biotechnology. Demonstrating the first integrated microfluidic devices with thousands of mechanical valves, his group pioneered the development of Microfluidic Large Scale Integration (mLSI). This technology is helping to pave the way for large-scale automation of biology at the nanoliter scale, and he and his students have been exploring applications of lab-on-a-chip technology in functional genomics, genetic analysis, and structural biology. He is also active in the field of single molecule biophysics. PhD 1994 Oxford

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Ingmar Riedel-Kruse

Assistant Professor

BIOENGINEERING

The Riedel-Kruse lab combines basic research and engineering approaches by working on the biophysics of development and biotic games. (1) They investigate how genetic networks orchestrate the dynamics and mechanics of developing embryos, with a focus on oscillatory processes and molecular forces; the long-term motivation is to advance understanding on human disease and tissue engineering. (2) Biotic games require biological process to run and could have a similar impact on society as conventional video games based on electronics. The lab designs and engineers biotic games specifically targeted at educational challenges and to support biomedical research. They use theoretical/computational as well as experimental approaches based on molecular, cellular, and developmental biology; zebrafish; imaging; physics; informatics/computer sciences; micro-fluidics; and engineering.
PhD 2005 Max Planck Institute

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Matthew Scott

Professor; Investigator, Howard Hughes Medical Institute; Member, Cancer Center

DEVELOPMENTAL BIOLOGY, BIOENGINEERING, BIOLOGY BY COURTESY

Scott's research is aimed at learning fundamental molecular mechanisms of development, including gene regulation and cell-cell signaling. He also studies the formation and function of brain circuitry. He works with cultured cells, Drosophila, and mice to investigate how normal embryos grow and what goes wrong in birth defects, cancer, and neurodegenerative disease. A major goal is to identify and explore new genes and proteins that control development. His lab investigates the development of the nervous system, especially the cerebellum, using cell and tissue culture, genomics, and transgenic animals. Cells are grown on controlled and patterned surfaces to govern neurite outgrowth. To investigate signal transduction between and within cells, the group studies regulators that control cell morphology and intracellular trafficking. Time-lapse video of engineered proteins is combined with genetic modifications that alter cell-cell signaling and the assembly and transport of organelles. Imaging and image processing are important tools. Collaborative engineering projects include the invention of an embryo sorting instrument and the development of new injection methods applicable to high-throughput screens of gene functions. PhD 1980 MIT

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Christina Smolke

Associate Professor

BIOENGINEERING

Smolke's research program focuses on developing modular genetic platforms for programming information processing and control functions in living systems, resulting in transformative technologies for engineering, manipulating, and probing biological systems. She has pioneered the design and application of a broad class of RNA molecules, called RNA devices, that process and transmit user-specified input signals to targeted protein outputs, thereby linking molecular computation to gene expression. This technology has been extended to efficiently construct multi-input devices exhibiting various higher-order information processing functions, demonstrating combinatorial assembly of many information processing, transduction, and control devices from a smaller number of components. Her laboratory is applying these technologies to addressing key challenges in cellular therapeutics, targeted molecular therapies, and green biosynthesis strategies. PhD 2001 UC Berkeley

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James Swartz

Professor; James H. Clark Professor in the School of Engineering

CHEMICAL ENGINEERING, BIOENGINEERING

Swartz's group balances research in microbial metabolism, protein expression, and protein folding with a strong emphasis on compelling applications. Fundamental research includes: mechanisms and kinetics of ribosomal function, fundamental bioenergetics, basic mechanisms of protein folding, functional genomics, and metabolic pathway analysis motivated by medicine, energy, and environmental needs. In the medical

area, current research addresses the need for patient-specific vaccines to treat cancer. To address pressing needs for a new and cleaner energy source, they are working toward an organism that can efficiently capture solar energy and convert it into hydrogen. To address environmental needs, they are developing an improved water filter using Aquaporin Z, a membrane protein that has the ability to reject all other chemicals and ions except water. They are also working toward the development of a new class of biosensors that brings high sensitivity and selectivity. PhD 1978 MIT

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Fan Yang

Assistant Professor

ORTHOPAEDIC SURGERY, BIOENGINEERING

Yang's group focuses on three areas of stem cell research: Fundamental – understanding how microenvironmental cues regulate stem cell fate. They are interested in understanding the effects of interactive signaling on stem cells in 3D. Results from such studies would help predict stem cell phenotype in vivo and direct rational design of stem cell niche for tissue engineering applications. Technological – developing a controlled release system for sustained delivery of synergistic genetic signals to direct stem cell differentiation in situ. Translational – engineering stem cells for targeting and delivery of therapeutic factors to restore normal vascularization and promote tissue regeneration. PhD 2006 Johns Hopkins

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Paul Yock

Professor; Martha Meier Weiland Professor in the School of Medicine

BIOENGINEERING, MEDICINE, MECHANICAL ENGINEERING BY COURTESY, BUSINESS BY COURTESY

Yock is known for his work in inventing, developing, and testing new devices, including the Rapid Exchange balloon angioplasty system. The main focus of his research is in the field of intravascular ultrasound. Yock directs the Center for Research in Cardiovascular Interventions, a core facility for development and testing of new devices in cardiovascular medicine. Focusing on early-stage concepts for new technologies, the center provides a clearinghouse where these ideas can be refined and tested in animal models and clinical studies. Yock helped launch the Program in Biodesign, a new interschool initiative at Stanford that focuses on the invention and development of new medical technologies.
MD 1979 Harvard

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CHEMICAL ENGINEERING

The Department of Chemical Engineering uses knowledge of mathematics, chemistry, and other natural sciences to develop economical means of using materials and energy to benefit society.

Chair: Eric Shaqfeh
Information: 650-725-3132

Zhenan Bao

Professor

CHEMICAL ENGINEERING, MATERIALS SCIENCE AND ENGINEERING BY COURTESY

Bao's group researches areas including synthesis of functional organic and polymer materials, organic electronic device design and fabrication, and applications development for organic electronics. Their approach is multidisciplinary, involving concepts and expertise from chemistry, chemical engineering, biomedical engineering, materials science and engineering, physics, and electrical engineering. The devices of current interest are organic and carbon nanotube thin film transistors, organic photovoltaic cells, chemical/biological sensors, and molecular switches. These devices are used as characterization tools for fundamental charge transport and photophysics studies. They are also of practical interest for nano-scale electronics, alternative energy sources, low cost and large area flexible plastic circuits, displays, and disposable sensors. PhD 1995 University of Chicago

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Stacey Bent

Professor; Jagdeep and Roshni Singh Professor in the School of Engineering; Co-Director, Center on Nanostructuring for Efficient Energy Conversion; Director, TomKat Center for Sustainable Energy

CHEMICAL ENGINEERING, PRECOURT INSTITUTE FOR ENERGY (SENIOR FELLOW), MATERIALS SCIENCE AND ENGINEERING BY COURTESY, CHEMISTRY BY COURTESY

Bent's lab focuses on understanding and controlling surface and interfacial chemistry and applying this knowledge to a range of problems in semiconductor processing, micro- and nano-electronics, nanotechnology, and sustainable and renewable energy. Much of the research aims to develop a molecular-level understanding in these systems, and hence the group uses a variety of molecular probes. Systems currently under study in the group include functionalization of semiconductor surfaces, mechanisms and control of atomic layer deposition, molecular layer deposition, nanoscale materials for light absorption, interface engineering in photovoltaics, and catalyst and electrocatalyst deposition. PhD 1992 Stanford

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Alexander Dunn

Assistant Professor

CHEMICAL ENGINEERING

Dunn's lab group researches the generation of force and motion inside living cells. Almost all the work in understanding how

motor proteins work has been done under highly artificial conditions, abstracted from the cellular milieu in which the proteins actually work. Recent results demonstrate that the internal structure of the cell is pre-tensioned, and that generating, releasing, and sensing this tension is a key element in controlling how the cell reacts to its environment. They observe single motors at work inside living cells to understand how the cell generates, detects, and manages tension at the molecular level. The results from this project will be highly relevant to many aspects of human health, including heart disease, cancer metastasis, and the development of stem cell therapies. PhD 2003 Caltech

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Curtis Frank

Professor; W.M. Keck Professor in Engineering; Senior Associate Dean, Faculty & Academic Affairs

CHEMICAL ENGINEERING, MATERIALS SCIENCE AND ENGINEERING BY COURTESY, CHEMISTRY BY COURTESY

Frank's group studies the properties of ultrathin polymer films. His lab uses spin casting, Langmuir-Blodgett deposition, and surface grafting to fabricate ultrathin films in the range of 100 to 1000 Angstroms thick. His group also explores highly simplified analogues of the cell membrane for possible applications in bioanalytical devices. Vesicles or liposomes of phospholipids are prepared by sonication or membrane extrusion and characterized by dynamic light scattering. In collaboration with the Department of Ophthalmology in the Stanford School of Medicine, they have designed and synthesized a fully interpenetrating network of two different hydrogel materials that have properties consistent with application as a substitute for the human cornea. They have developed a technique for surface modification with adhesion peptides that allows binding of collagen and subsequent growth of epithelial cells, and are pursuing broad questions on the relationships among molecular structure, processing protocol, and biomedical device application.
PhD 1972 University of Illinois

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Gerald Fuller

Professor; Fletcher Jones Chair in the School of Engineering

CHEMICAL ENGINEERING

The Fuller group is primarily interested in investigating the behavior of complex (non-Newtonian) fluids. The processing of polymeric, biological, and other complex liquids alters their microstructure through orientation and deformation of their constitutive elements, causing the fluids to exhibit interesting mechanical properties, orientation dynamics, and interfacial behaviors. The Fuller group uses a variety of rheological and visual tools to explore the behavior of these fluids both in the bulk and at the interface. Understanding the underlying physics that governs the behavior of complex liquids helps us to learn how to effectively utilize them in a variety of applications. Current projects include applications in development of biomaterials, semiconductor processing, and solar cell fabrications. PhD 1980 Caltech

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Tom Jaramillo

Assistant Professor

CHEMICAL ENGINEERING

The Jaramillo laboratory focuses on fundamental catalytic processes occurring on solid-state surfaces in both the production and consumption of energy. Chemical-to-electrical and electrical-to-chemical energy conversion are at the core of the research. Nanoparticles, metals, alloys, sulfides, nitrides, carbides, phosphides, oxides, and biomimetic organo-metallic complexes compose the toolkit of materials that can help change the energy landscape. Tailoring catalyst surfaces to fit the chemistry is their primary challenge. Their research aims to develop new electrocatalytic materials by studying fundamental electrochemical surface phenomena, with the ultimate aim of overcoming the technological challenges in fuel cell catalysis.
PhD 2004 UC Santa Barbara

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Chaitan Khosla

Professor; Wells H. Rauser and Harold M. Petiprin Professor in the School of Engineering

CHEMICAL ENGINEERING, CHEMISTRY, BIOCHEMISTRY BY COURTESY

Khosla's lab group researches the interface of enzyme chemistry and medicine. They have investigated the catalytic mechanisms of modular megasynthases such as polyketide synthases, with the concomitant goal of harnessing their programmable chemistry for preparing pharmaceutically relevant natural products. Recent accomplishments include methods for heterologous production of polyketides; genetically reprogrammed biosynthesis of anthraquinones and polypropionates; and chemo-biosynthesis of new polyketides not readily affordable by synthetic or biological methods alone. More recently, they have investigated the pathogenesis of celiac sprue, an inflammatory disease of the small intestine that is induced by exposure to gluten. Within the next decade, they see safe and effective drugs having measurable impact on the health of celiac sprue patients. PhD 1990 Caltech

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Jens Nørskov

Professor; Leland T. Edwards Professor in the School of Engineering; Director, SUNCAT Center for Interface Science and Catalysis

CHEMICAL ENGINEERING, PHOTON SCIENCE (SLAC)

The Nørskov group focuses on the development of electronic structure methods to describe interface phenomena including adsorption, surface chemical reactions, heterogeneous catalysis, electro-catalysis, and photo-catalysis. The aim is to develop concepts to understand which surface properties, electronic and geometrical, determine their chemical activity. An additional aim is to use the insight in combination with large-scale computations to design new catalytic surfaces and nano-structures. Applications are primarily in energy transformations including (photo-)electrochemical water splitting, CO_2 reduction, N_2 reduction, and syngas reactions.
PhD 1979 Aarhus University

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Elizabeth Sattely

Assistant Professor

CHEMICAL ENGINEERING

Sattely's group studies the extraordinary capacity of plants to harvest atmospheric CO_2 and sunlight for the production of energy-rich biopolymers, clinically used drugs, and other biologically active small molecules. The metabolic pathways that produce these compounds are key to developing sustainable biofuel feedstocks, protecting crops from pathogens, and discovering new natural-product based therapeutics for human disease. These applications motivate them to find new ways to elucidate and engineer plant metabolism. They use a multidisciplinary approach combining chemistry, enzymology, genetics, and metabolomics to tackle problems that include new methods for delignification of lignocellulosic biomass and the engineering of plant antibiotic biosynthesis. PhD 2007 Boston College

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Eric Shaqfeh

Professor and Chair, Chemical Engineering; Lester Levi Carter Professor

CHEMICAL ENGINEERING, MECHANICAL ENGINEERING

Shaqfeh's research program includes the study of different areas associated with transport in complex fluids, including the occurrence of purely elastic instabilities in polymer flows; the micro-dynamics of polymer molecules, including DNA, in nonequilibrium transport; the flow behavior of fiber suspensions; the general microfluidic flow behavior of complex fluids; and the stability of compressible boundary layer flows. His group's approach in these areas includes developing large-scale simulations (including both Brownian dynamics and continuum simulation) of poorly understood phenomena and then coupling these to detailed experiments to elucidate the important physics in a variety of processes. PhD 1986 Stanford

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Andrew Spakowitz

Assistant Professor

CHEMICAL ENGINEERING

Spakowitz's research group uses a combination of analytical theory and computational techniques to understand the underlying physical phenomena in biological systems and complex fluids. Research projects within their lab fall within three broad themes: DNA biophysics, charge transport in conjugated polymers, and protein self-assembly. Theoretical tools include: analytical theory of semiflexible polymer behavior; polymer field theory; continuum elasticity of filaments; Brownian dynamics simulation; equilibrium and dynamic Monte Carlo simulations; and analytical theory and numerical simulations of reaction-diffusion phenomena. PhD 2004 Caltech

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Alfred Spormann

Professor

CIVIL AND ENVIRONMENTAL ENGINEERING, CHEMICAL ENGINEERING, BIOLOGY BY COURTESY, GEOLOGICAL AND ENVIRONMENTAL SCIENCES BY COURTESY

The Spormann group's overall research is directed to understand, on a fundamental level, molecular processes in microbes that are important for environmental as well as medical processes. These include: molecular interactions of microbes in complex environments; cellular level of c-di-GMP signaling; molecular evolution of new genetic traits in microbes; microbial reductive dehalogenation for large-scale remediation of contaminated aquifers using a group of unusual microbes (Dehalococcoides sp.).
PhD 1989 Philipps-University, Marburg

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James Swartz

Professor; James H. Clark Professor in the School of Engineering

CHEMICAL ENGINEERING, BIOENGINEERING

Swartz's group balances research in microbial metabolism, protein expression, and protein folding with a strong emphasis on compelling applications. Fundamental research includes: mechanisms and kinetics of ribosomal function, fundamental bioenergetics, basic mechanisms of protein folding, functional genomics, and metabolic pathway analysis motivated by medicine, energy, and environmental needs. In the medical area, current research addresses the need for patient-specific vaccines to treat cancer. To address pressing needs for a new and cleaner energy source, they are working toward an organism that can efficiently capture solar energy and convert it into hydrogen. To address environmental needs, they are developing an improved water filter using Aquaporin Z, a membrane protein that has the ability to reject all other chemicals and ions except water. They are also working toward the development of a new class of biosensors that brings high sensitivity and selectivity. PhD 1978 MIT

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Cliff Wang

Assistant Professor

CHEMICAL ENGINEERING

Wang's research aspires to understand and quantify genetic principles involved in cancer, aging, and cell culture engineering. Specifically, he studies how co-expression of multiple genes over a range of expression levels determines cell proliferation, survival, and other phenotypic outcomes. His lab plots genetic "phase diagrams" that describe cell fates determined by combinatorial gene expression. To achieve these objectives, he develops genetic tools that allow him to control gene expression and quantify phenotypic outcome.
PhD 2000 UC Berkeley

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CIVIL AND ENVIRONMENTAL ENGINEERING

The Department of Civil and Environmental Engineering comprises seven programs: Construction Engineering and Management, Structural Engineering and Geomechanics, Environmental Engineering and Science, Environmental Fluid Mechanics and Hydrology, Atmosphere and Energy, Design and Construction Integration, and Architectural Design. The department also offers a degree specialization in Design-Construction Integration.

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Jack Baker

Assistant Professor

CIVIL AND ENVIRONMENTAL ENGINEERING

Baker's research focuses on the use of probabilistic and statistical tools for modeling of extreme loads on structures. He has investigated probabilistic modeling of seismic hazards, improved characterization of earthquake ground motions, dynamic analysis of structures, prediction of the spatial extent of soil failures from earthquakes, and tools for modeling loads on spatially distributed infrastructure systems.
PhD 2005 Stanford

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Sarah Billington

Associate Professor; Associate Chair, Civil and Environmental Engineering

CIVIL AND ENVIRONMENTAL ENGINEERING

Billington researches the behavior of unbonded post-tensioned bridge piers for seismic resistance; the behavior and application of high-performance fiber-reinforced cementitious composite materials to structural systems; and advanced nonlinear simulation of structural concrete systems. New research directions include the investigation of bio-degradable (resource-rich) composites for the building industry; life-cycle 4D modeling for construction, operation, and maintenance of the built environment; performance-based earthquake engineering to support implementation of advanced materials in practice; and health-monitoring of post-tensioned infrastructure with embedded sensors. PhD 1997 University of Texas, Austin

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Alexandria Boehm

Associate Professor

CIVIL AND ENVIRONMENTAL ENGINEERING

Boehm's primary research area is coastal water quality, including activities on sanitation more broadly. The work on coastal water quality is focused on understanding the sources, transformation, transport, and ecology of biocolloids – specifically, fecal indicator organisms, pathogens, and phytoplankton, as well as sources and fate of nitrogen and phosphorus. This knowledge is crucial to directing new policies and management and engineering practices that protect human and ecosystem health along the coastal margin. The work on sanitation aims to develop microbial risk assessment models to

gain a better understanding of how pathogens are transmitted to humans through their contact with water, feces, and contaminated surfaces. Research is focused on key problems in developed and developing countries. The goal is to design and test effective interventions and technologies for reducing the burden of infectious disease. PhD 2000 UC Irvine

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Ronaldo Borja

Professor

CIVIL AND ENVIRONMENTAL ENGINEERING, GEOLOGICAL AND ENVIRONMENTAL SCIENCES BY COURTESY

Borja works in computational mechanics, geomechanics, and geosciences. His research includes developing strain localization and failure models for soils and rocks, modeling coupled solid deformation/fluid flow phenomena in porous materials, and finite element modeling of faulting, cracking, and fracturing in quasi-brittle materials. PhD 1984 Stanford

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Craig Criddle

Professor

CIVIL AND ENVIRONMENTAL ENGINEERING, STANFORD WOODS INSTITUTE FOR THE ENVIRONMENT (SENIOR FELLOW)

Criddle's research focuses on biotechnology and microbial ecology for clean water, clean energy, and healthy ecosystems. PhD 1990 Stanford

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Jennifer Davis

Associate Professor

CIVIL AND ENVIRONMENTAL ENGINEERING, STANFORD WOODS INSTITUTE FOR THE ENVIRONMENT (SENIOR FELLOW)

Davis studies the intersection of economic development and environmental management with particular emphasis on the water and sanitation sector in developing countries. Current research projects focus on characterizing environmental contamination in resource constrained environments; sustainable sanitation solutions for middle- and low-income urban areas; linking domestic and productive uses in water infrastructure planning; and informational interventions to trigger health behavior change. PhD 1998 UNC-Chapel Hill

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Gregory Deierlein

Professor; John A. Blume Professor in the School of Engineering; Director, Blume Center: Earthquake Engineering Affiliates; Director, John A. Blume Earthquake Engineering Center

CIVIL AND ENVIRONMENTAL ENGINEERING

Deierlein's research focuses on improving limit state design of constructed facilities through the development and application of nonlinear structural analysis methods and performance-based design criteria. Recent projects include the development and application of strength and stiffness degrading models to simulate steel and reinforced concrete structures, seismic design and behavior of composite steel-concrete buildings, analysis of inelastic torsional-flexural instability of steel members, and a fracture mechanics investigation of seismically designed welded steel connections. PhD 1988 University of Texas, Austin

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Martin Fischer

Professor; Director, Center for Integrated Facility Engineering

CIVIL AND ENVIRONMENTAL ENGINEERING, PRECOURT INSTITUTE FOR ENERGY (SENIOR FELLOW), COMPUTER SCIENCE BY COURTESY

Fischer's research goals are to improve the productivity of project teams involved in designing, building, and operating facilities and to enhance the sustainability of the built environment. His work develops the theoretical foundations and applications for virtual design and construction (VDC). VDC methods support the design of a facility and its delivery process and help reduce the costs and maximize the value over its lifecycle. His research has been used by many small and large industrial government organizations around the world. PhD 1991 Stanford

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David Freyberg

Associate Professor

CIVIL AND ENVIRONMENTAL ENGINEERING, STANFORD WOODS INSTITUTE FOR THE ENVIRONMENT BY COURTESY

Freyberg studies reservoir sedimentation and hydrology, hydrologic ecosystem services, tropical rainfall and throughfall, surface water-ground water interactions, especially in reservoir/sediment systems, and learning under distance-learning formats and during undergraduate laboratory research experiences. PhD 1981 Stanford

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Oliver Fringer

Associate Professor

CIVIL AND ENVIRONMENTAL ENGINEERING

Fringer's research focuses on the development and application of numerical models and high-performance computational techniques to the study of fundamental processes that influence the dynamics of the coastal ocean, rivers, lakes, and estuaries. PhD 2003 Stanford

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Lynn Hildemann

Professor

CIVIL AND ENVIRONMENTAL ENGINEERING

Hildemann specializes in the study of air pollutants. Her research interests include organic aerosols, indoor air pollutants, and source emissions characteristics. Current projects include the sources of indoor bioaerosols (molds and bacteria), measurement of near-proximity exposure to secondhand smoke, emissions from "green" construction adhesives, and characterization of thermodynamic properties for organic aerosols. PhD 1989 Caltech

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Mark Jacobson

Professor

CIVIL AND ENVIRONMENTAL ENGINEERING

Jacobson researches physical, chemical, and dynamical processes in the atmosphere in order to solve atmospheric problems, such as global warming and urban air pollution, with improved scientific insight and more accurate predictive tools. He also evaluates the atmospheric and health effects of proposed energy and transportation solutions to global warming and air pollution, maps renewable energy resources, and studies optimal methods of integrating renewable electricity into the grid. PhD 1994 UCLA

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Anne Kiremidjian

Professor

CIVIL AND ENVIRONMENTAL ENGINEERING

Kiremidjian's research focuses on the design and implementation of wireless sensor networks for structural damage and health monitoring and the development of robust algorithms for structural damage diagnosis that can be embedded in wireless sensing units. She works on structural component and systems reliability methods; structural damage evaluation models; and regional damage, loss, and casualty estimation methods utilizing geographic information and database management systems for portfolios of buildings or spatially distributed lifeline systems assessment with ground motion and structure correlations. PhD 1977 Stanford

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Peter Kitanidis

Professor

CIVIL AND ENVIRONMENTAL ENGINEERING, GEOLOGICAL AND ENVIRONMENTAL SCIENCES BY COURTESY

Kitanidis develops methods for the solution of interpolation and inverse problems utilizing observations and mathematical models of flow and transport. He studies dilution and mixing of soluble substances in heterogeneous geologic formations, issues of scale in mass transport in heterogeneous porous media, and techniques to speed up the decay of pollutants in

situ. He also develops methods for hydrologic forecasting and the optimization of sampling and control strategies. PhD 1978 MIT

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Jeffrey Koseff

Professor; William Alden Campbell and Martha Campbell Professor of Civil and Environmental Engineering; Perry L. McCarty Director of the Stanford Woods Institute for the Environment

CIVIL AND ENVIRONMENTAL ENGINEERING, STANFORD WOODS INSTITUTE FOR THE ENVIRONMENT (SENIOR FELLOW)

Koseff's research falls in the emerging interdisciplinary domain of environmental fluid mechanics and focuses on the interaction between physical and biological systems in natural aquatic environments, and in particular on turbulence and internal wave dynamics; transport, mixing, and phytoplankton dynamics in estuarine systems; and coral reef, kelp forest, and sea-grass hydrodynamics. Long-term research projects include understanding the transport of mass and energy in estuarine systems such as San Francisco Bay, and understanding how water flow affects the functioning of California kelp forests and coral reef systems of the Great Barrier Reef, the Red Sea, and Hawaii. PhD 1983 Stanford

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Kincho Law

Professor

CIVIL AND ENVIRONMENTAL ENGINEERING

Law researches the application of advanced computing principles and techniques for structural engineering analysis and design. His research interests include computational mechanics, numerical methods, and analysis and simulation of large-scale systems using distributed workstations and high-performance parallel computers. His work has also dealt with sensing, monitoring, and control of structures as well as various aspects of computer-aided design, including application of information technology to facilitate regulatory compliance assistance, to facilitate analysis and design of building structures, and to coordinate concurrent engineering design activities. PhD 1981 Carnegie Mellon

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James Leckie

Professor; C.L. Peck, Class of 1906 Professor of Engineering; Director, Center for Sustainable Development and Global Competitiveness

CIVIL AND ENVIRONMENTAL ENGINEERING, GEOLOGICAL AND ENVIRONMENTAL SCIENCES BY COURTESY

Leckie investigates chemical pollutant behavior in natural aquatic systems and engineered processes, specifically the environmental aspects of surface and colloid chemistry and the geochemistry of trace elements. New research efforts are focused on the development of techniques and models for assessment of exposure of humans to toxic chemicals. Specific attention has been paid to the evaluation of exposure of young

children to toxic chemicals. Other interests include technology transfer and the development of environmental science programs in developing nations. PhD 1970 Harvard

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Michael Lepech

Assistant Professor

CIVIL AND ENVIRONMENTAL ENGINEERING

Lepech's research focuses on the integration of sustainability indicators into engineering design, ranging from materials design, structural design, and system design to operations management. Such sustainability indicators include a comprehensive set of environmental, economic, and social costs. Recently his research has focused on the design of sustainable high-performance fiber-reinforced cementitious composites (HPFRCCs) and fiber-reinforced polymers (FRPs), the impacts of sustainable materials on building and infrastructure design and operation, and the development of new life cycle assessment (LCA) applications for building systems, transportation systems, water systems, and consumer products. He is also studying the effects that slowly diffusing sustainable civil engineering innovations, and the social networks they diffuse through, can have on achieving long-term sustainability goals. PhD 2006 Michigan

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Raymond Levitt

Professor; Kumagai Professor in the School of Engineering; Director, Stanford Construction Institute; Director, Collaboratory for Research on Global Projects

CIVIL AND ENVIRONMENTAL ENGINEERING

Levitt's research program develops theory, methods, and tools to design organization structures and governance regimes for project and matrix organization structures in construction and other project-based industries. His current research is aimed at developing new financing, governance, and organizational approaches to enhance the long-term financial, environmental, and social sustainability of these critically needed, but institutionally challenging, projects. PhD 1975 Stanford

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Richard Luthy

Professor; Silas H. Palmer Professor in Civil Engineering; Academic Director, Re-inventing the Nation's Urban Water Infrastructure

CIVIL AND ENVIRONMENTAL ENGINEERING, STANFORD WOODS INSTITUTE FOR THE ENVIRONMENT (SENIOR FELLOW)

Luthy's research focuses on environmental engineering and water quality with application to water reuse and management of contaminated sediments. He is the director of the National Science Foundation's Engineering Research Center for Re-inventing the Nation's Urban Water Infrastructure (ReNUWIt). The center is a collaboration among four universities that promotes new strategies for urban water systems, enabled by technological developments and informed

by a deeper understanding of institutional frameworks, to achieve more sustainable solutions to urban water challenges.
PhD 1976 UC Berkeley

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Eduardo Miranda

Associate Professor

CIVIL AND ENVIRONMENTAL ENGINEERING

Miranda's research involves development of knowledge and tools to integrate structural engineering with construction and management engineering in order to design projects that perform better, are faster to build, and are more economical to design, build, and maintain. Other areas of research include performance-based engineering and earthquake engineering.
PhD 1991 UC Berkeley

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Stephen Monismith

Professor and Chair, Civil and Environmental Engineering; Obayashi Professor in the School of Engineering; Director, Environmental Fluid Mechanics Laboratory

CIVIL AND ENVIRONMENTAL ENGINEERING, STANFORD WOODS INSTITUTE FOR THE ENVIRONMENT (SENIOR FELLOW)

Monismith's research in environmental and geophysical fluid dynamics is focused on the application of fluid mechanics principles to the analysis of flow processes operating in rivers, lakes, estuaries, and the oceans. Flows that involve physical-biological interactions are of particular interest.
PhD 1983 UC Berkeley

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Leonard Ortolano

Professor; UPS Foundation Professor of Civil Engineering in Urban and Regional Planning

CIVIL AND ENVIRONMENTAL ENGINEERING

Ortolano is concerned with environmental and water resources policy and planning. His research stresses environmental policy implementation in developing countries, technology transfer, and the role of non-governmental organizations in environmental management. Several current projects concern air and water pollution control regulations in China.
PhD 1969 Harvard

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Ram Rajagopal

Assistant Professor

CIVIL AND ENVIRONMENTAL ENGINEERING, ELECTRICAL ENGINEERING BY COURTESY

Rajagopal works on renewable energy, the smart grid, algorithms for load forecasting, dynamic response, and energy policy.

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Alfred Spormann
Professor

CIVIL AND ENVIRONMENTAL ENGINEERING, CHEMICAL ENGINEERING, BIOLOGY BY COURTESY, GEOLOGICAL AND ENVIRONMENTAL SCIENCES BY COURTESY

The Spormann group's overall research is directed to understand, on a fundamental level, molecular processes in microbes that are important for environmental as well as medical processes. These include: molecular interactions of microbes in complex environments; cellular level of c-di-GMP signaling; molecular evolution of new genetic traits in microbes; microbial reductive dehalogenation for large-scale remediation of contaminated aquifers using a group of unusual microbes (Dehalococcoides sp.).
PhD 1989 Philipps-University, Marburg

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COMPUTER SCIENCE

Strong research exists in the areas of systems, software, networking, databases, security, graphics, foundations of computer science, artificial intelligence, robotics, and scientific computing. In addition to basic research, interdisciplinary work on applications that stimulate basic research has been undertaken in fields of genetics, biology, linguistics, physics, medicine, and various branches of engineering.

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Alex Aiken
Professor

COMPUTER SCIENCE

Aiken's research focuses on developing techniques for the construction of reliable software systems. His interests include both static and dynamic methods of analyzing programs, and span both detecting errors and verifying the absence of errors in software. Most of his research combines a theoretical component (for example, proving the soundness of an analysis technique) and a practical component, which often involves the implementation and measurement of advanced program analysis algorithms. Finally, his research also extends to the design of new programming languages and programming techniques in which it is easier to write software that can be checked for a wide variety of errors. PhD 1988 Cornell

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Serafim Batzoglou
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COMPUTER SCIENCE

Batzoglou's research has focused on the development of algorithms and systems for genomics. Some of the topics he is working on include sequence alignment algorithms, hidden Markov models, whole-genome comparison, annotation of biological features in genomes, microarray analysis, gene regulation, and DNA sequencing. PhD 2000 MIT

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Gill Bejerano
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DEVELOPMENTAL BIOLOGY, COMPUTER SCIENCE

The overarching goal of Bejerano's lab is to bring vertebrate development and genomics closer together. Their focus is the functional landscape of vertebrate genomes, and in particular that of the human genome. Their computational approaches rely heavily on machine learning and probabilistic and statistical reasoning, and aim to glean novel biological insights. Accordingly, projects range from the pursuit of novel biological knowledge to the design and implementation of the tools that facilitate these studies.
PhD 2004 Hebrew University of Jerusalem, Israel

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Dan Boneh

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Boneh's main research area is applied cryptography and network security. His focus is on building security mechanisms that are easy to use and deploy. He has developed new mechanisms for improving web security, file system security, and copyright protection. He contributed to the security and performance of the RSA cryptosystem and contributed to the study of cryptographic watermarking. PhD 1996 Princeton

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David Cheriton

Professor

COMPUTER SCIENCE, ELECTRICAL ENGINEERING BY COURTESY

Cheriton's research includes the areas of high-performance distributed systems and high-speed computer communication with a particular interest in protocol design. He leads the Distributed Systems Group in the TRIAD project, focused on understanding and solving problems with the Internet architecture. He has also been teaching and writing about object-oriented programming, building on his experience with OOP in systems building. PhD 1978 Waterloo

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Stephen Cooper

Associate Professor (Teaching)

COMPUTER SCIENCE, EDUCATION BY COURTESY

Cooper's research areas lie in program visualization and semantics. Current research projects include the creation of a serious game to teach secure coding practices to novice programmers, incorporation of an intelligent tutoring system into Alice, and a new Google-like approach toward digital libraries to make them more usable. He is also working toward creating a series of curricular guidelines for information assurance programs.

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Bill Dally

Professor (Research)

COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Dally investigates methods for applying VLSI technology to solve information processing problems. Current projects include network architecture, multicomputer architecture, media-processor architecture, and high-speed (4Gb/s) CMOS signaling. His research involves demonstrating novel concepts with working systems. Previous systems include the MARS Hardware Accelerator, the Torus Routing Chip, the J-Machine, M-Machine, and the Reliable Router. His group has pioneered techniques including fast capability-based addressing, processor coupling, virtual channel flow control, wormhole routing, link-level retry, message-driven processing, and deadlock-free routing. PhD 1986 Caltech

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David Dill

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Dill has interests in computational systems biology as well as the theory and application of formal verification techniques to system designs, which encompass hardware, protocols, and software. He has also done research in asynchronous circuit verification and synthesis, and in verification methods for hard real-time systems. PhD 1987 Carnegie Mellon

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Associate Professor

COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Engler's research focuses both on building interesting software systems and on discovering and exploring the underlying principles of all systems. PhD 1998 MIT

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Fedkiw's research is focused on the design of new computational algorithms for a variety of applications including computational fluid dynamics, computer graphics, and biomechanics. PhD 1996 UCLA

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Hector Garcia-Molina

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Garcia-Molina's research interests include distributed computing systems, database systems, and digital libraries. PhD 1979 Stanford

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Michael Genesereth

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COMPUTER SCIENCE, LAW BY COURTESY

Genesereth works on computational logic and applications of that work in enterprise management and electronic commerce. Basic research interests include knowledge representation, automated reasoning, and rational action. Current projects include logical spreadsheets, data, and service integration on the World Wide Web, and computational law. PhD 1978 Harvard

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Leonidas Guibas

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING BY COURTESY

Guibas works on algorithms for sensing, modeling, reasoning, rendering, and acting on the physical world. His interests span computational geometry, geometric modeling, computer graphics, computer vision, sensor networks, robotics, and discrete algorithms. Current foci of interest include geometric modeling with point cloud data, deformations and contacts, organizing and searching libraries of 3D shapes and images, sensor networks for lightweight distributed estimation/reasoning, analysis of GPS traces and other mobility data, and modeling the shape and motion biological macromolecules and other biological structures. More theoretical work is aimed at investigating fundamental computational issues and limits in geometric computing and modeling. PhD 1976 Stanford

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Hanrahan's current research involves rendering algorithms, high-performance graphics architectures, and systems support for graphical interaction. He has also worked on raster graphics systems, computer animation, and modeling and scientific visualization, in particular, volume rendering.
PhD 1986 Wisconsin

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John L. Hennessy

Professor; President of Stanford University; Bing Presidential Professor

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

President Hennessy's research is in the area of computer architecture. His early research was centered on the development of MIPS, one of the first RISC microprocessors. His recent research involves the architecture and effective use of large-scale parallel machines. His group developed DASH, the first scalable cache-coherent multiprocessor, which is now the base for a number of commercial developments. In addition to his research activities, Hennessy is a coauthor of leading graduate and undergraduate texts in computer architecture.
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Mark Horowitz

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ELECTRICAL ENGINEERING, COMPUTER SCIENCE

Horowitz's research interests are quite broad and span using EE and CS analysis methods, problems in molecular biology, and creating new design methodologies for analog and digital VLSI circuits. His current research includes updating both analog and digital design methods, low-energy multiprocessor designs, computational photography, and applying engineering to biology. PhD 1984 Stanford

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Katti's research focuses on designing and building next-generation high-capacity wireless networks using techniques from information and coding theory. His research interests are in networks, wireless communications, applied coding theory, and security. PhD 2009 MIT

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Oussama Khatib

Professor

COMPUTER SCIENCE, MECHANICAL ENGINEERING BY COURTESY

Khatib's research is in autonomous robots, human-centered robotics, human-friendly robot design, dynamic simulations, and haptic interactions. His exploration in this research ranges from the autonomous ability of a robot to cooperate with a human to the haptic interaction of a user with an animated character, virtual prototype, or surgical instrument. PhD 1980 Sup-Aero, France

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Scott Klemmer

Associate Professor

COMPUTER SCIENCE

Klemmer's group researches tools to harvest and synthesize examples that empower more users to design interactive systems, learners to acquire new skills, experts to be more creative, and programmers to engage in more design thinking. In tandem with creating new tools, they study the psychological and social ingredients of design excellence, focusing on the role of alternatives and prototyping. PhD 2004 UC Berkeley

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Daphne Koller

Professor

COMPUTER SCIENCE, PATHOLOGY BY COURTESY

Koller's interests span artificial intelligence, economics, and algorithms. Her main research interest focuses on probabilistic models for complex systems, covering representation, reasoning, decision-making, and learning. Her current projects include: learning statistical patterns from structured data, with emphasis on biological and medical data; using probabilistic models for making decisions under uncertainty; learning and inference in Bayesian networks; and extraction of semantically meaningful information from images and related modalities. PhD 1994 Stanford

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COMPUTER SCIENCE

Koltun works in visual computing. Current interests include modeling the structure and semantics of complex shapes, high-fidelity simulation of human motion, and a number of topics in computer vision. PhD 2002 Tel Aviv University

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Christos Kozyrakis

Associate Professor

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

Kozyrakis' research focuses on making computer systems of any size faster, cheaper, and greener. His current work focuses on the hardware architecture, runtime environment, programming models, and security infrastructure for warehouse-scale data centers and many-core chips with thousands of general-purpose cores and fixed functions accelerators. PhD 2002 UC Berkeley

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Monica Lam

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING BY COURTESY

Lam is the faculty director of the Stanford MobiSocial Laboratory, whose goal is to create disruptive mobile and social computing technology that serves consumers' interests and benefits the economy in the long term. Her current focus is to let everyone interact socially with each other, without having to join the same proprietary social network.
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Jure Leskovec

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COMPUTER SCIENCE

Leskovec's research focuses on the analyzing and modeling of large social and information networks as the study of phenomena across the social, technological, and natural worlds.

He focuses on statistical modeling of network structure, network evolution, and spread of information, influence, and viruses over networks. Problems he investigates are motivated by large-scale data, the Web, and other online media. He also does work on text mining and applications of machine learning. PhD 2008 Carnegie Mellon

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Philip Levis

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Levis' research focuses on the design and implementation of efficient software systems for embedded wireless sensor networks; embedded network sensor architecture and design; and systems programming and software engineering. PhD 2005 UC Berkeley

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Marc Levoy

Professor

COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Levoy's current interests include light field sensing and display, computational imaging, digital photography, and applications of computer graphics in microscopy and biology. PhD 1989 University of North Carolina

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Fei-Fei Li

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COMPUTER SCIENCE

Research in Li's lab focuses on two intimately connected branches of vision research: computer vision and human vision. In both fields, she is intrigued by visual functionalities that give rise to semantically meaningful interpretations of the visual world. In computer vision, she aspires to build intelligent visual algorithms that perform important visual perception tasks such as object categorization, scene recognition, scene understanding, human motion analysis, action and event recognition, material recognition, etc. In human vision, her curiosity leads to studying the underlying neural mechanisms that enable the human visual system to perform high-level visual tasks with amazing speed and efficiency. PhD 2005 Caltech

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Percy Liang

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COMPUTER SCIENCE

Liang works in the fields of machine learning and natural language processing. Research topics included unsupervised learning, structured prediction, statistical learning theory, grounded language acquisition, compositional semantics, and program induction. PhD 2011 UC Berkeley

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Christopher Manning

Professor

LINGUISTICS, COMPUTER SCIENCE

Manning works on systems that can intelligently process and produce human languages. Particular research interests include probabilistic models of language, statistical natural language processing, information extraction, text mining, robust textual inference, statistical parsing, grammar induction, constraint-based theories of grammar, and computational lexicography. PhD 1994 Stanford

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David Mazières

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COMPUTER SCIENCE

Mazières investigates ways to improve the security of operating systems, file systems, and distributed systems. In addition, he has worked on large-scale peer-to-peer systems and e-mail privacy. PhD 2000 MIT

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Nick McKeown

Professor; Faculty Director, Open Networking Research Center

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

McKeown researches techniques to improve the Internet. Most of this work has focused on the architecture, design, analysis, and implementation of high-performance Internet switches and routers. More recently, his interests have broadened to include network architecture, backbone network design, congestion control, and how the Internet might be redesigned if we were to start with a clean slate. PhD 1995 UC Berkeley

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Teresa Meng

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Meng's current research activities include neural signal processing, bio-implant technology, and non-invasive stimulation. PhD 1988 UC Berkeley

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John Mitchell

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING BY COURTESY

Mitchell's research focuses on computer security, including access control, network protocols, and software system security; programming languages, type systems, object systems, and formal methods; and applications of mathematical logic to computer science. PhD 1984 MIT

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Subhasish Mitra

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Mitra's research focuses on ways to design robust computer systems and information appliances, and covers various aspects of very-large-scale integration design and testing, computer-aided design, computer architecture, and design in future nanotechnologies. PhD 2000 Stanford

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Andrew Ng

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Ng's research is in the areas of machine learning and artificial intelligence. He leads the STAIR (STanford Artificial Intelligence Robot) project, whose goal is to develop a home assistant robot that can perform tasks such as tidying up a room, loading/unloading a dishwasher, fetching and delivering items, and preparing meals using a kitchen. Ng also works on machine learning algorithms for robotic control, in which rather than relying on months of human hand-engineering to design a controller, a robot instead learns automatically how best to control itself. Using this approach, Ng's group has developed by far the most advanced autonomous helicopter controller that is capable of flying spectacular aerobatic maneuvers that even experienced human pilots often find extremely difficult to execute. As part of this work, Ng's group also developed algorithms that can take a single image and turn the picture into a 3D model that one can fly through and see from different angles. PhD 2002 UC Berkeley

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Oyekunle Olukotun

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Olukotun's research interests are in the design, performance analysis, and verification of computers. He is currently leading the Hydra single chip multiprocessor project and is developing novel simulation, estimation, and verification techniques for system-level design. PhD 1991 Michigan

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John Ousterhout

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COMPUTER SCIENCE

Ousterhout's research ranges across a variety of topics in system software, development tools, and user interfaces. His current focus is on large-scale datacenter storage systems. His past research projects include the Tcl scripting language and its companion GUI toolkit Tk, log-structured file systems, the Sprite network operating system, and integrated circuit design tools such as Magic and Crystal. PhD 1980 Carnegie Mellon

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Serge Plotkin

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Plotkin's focus is on optimization problems that are encountered in the context of design, management, and maintenance of broadband communication networks. Currently his main effort in this area is concentrated on development of algorithms for network topology design, routing, capacity sizing, server placement, and fair resource allocation. His goal is to develop offline strategies that can be used during network design stage, as well as online strategies that can be applied to optimize existing network infrastructure. PhD 1988 MIT

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Balaji Prabhakar

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Prabhakar's research focuses on the design, analysis, and implementation of data networks, both wireline and wireless. He has been interested in designing network algorithms, problems in ad hoc wireless networks, and designing incentive mechanisms. He has a long-standing interest in stochastic network theory, information theory, algorithms, and probability theory. PhD 1994 UCLA

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Roberts' areas of interest include computer science education and the social implications of technology. PhD 1980 Harvard

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Mendel Rosenblum

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Rosenblum's research focus is on system software and simulation systems for high-performance computing architectures. As part of the Stanford FLASH project, he is leading an effort to build a new operating system targeted for large-scale shared memory multiprocessors. He is also building a high-performance machine simulation system for detailed simulations of current and new computer architectures. PhD 1991 UC Berkeley

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Tim Roughgarden

Associate Professor

COMPUTER SCIENCE, MANAGEMENT SCIENCE AND ENGINEERING BY COURTESY

Roughgarden's research interests lie at the interface of computer science and game theory, and he is currently investigating a wide range of game-theoretic issues in networks and auctions. PhD 2002 Cornell

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Mehran Sahami

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COMPUTER SCIENCE

Sahami is interested in computer science curriculum development, aimed at highlighting the wide variety of options available in computing. PhD 1999 Stanford

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Kenneth Salisbury

Professor (Research)

COMPUTER SCIENCE, SURGERY, MECHANICAL ENGINEERING BY COURTESY

Salisbury worked on the development of the Stanford-JPL Robot Hand, the JPL Force Reflecting Hand Controller, the MIT-WAM arm, and the Black Falcon Surgical Robot. His work with haptic interface technology led to the founding of SensAble Technology, producers of the PHANToM haptic interface and software. He also worked on the development of telerobotic systems for dexterity enhancement in the operating room. His current research focuses on human-machine interaction, cooperative haptics, medical robotics, and surgical simulation. PhD 1982 Stanford

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Yoav Shoham

Professor

COMPUTER SCIENCE

Shoham's artificial intelligence work includes formalizing common-sense (including notions such as time, causation, and mental state) and multi-agent systems (including agent-oriented programming and coordination mechanisms). His current interests concern game theory pragmatics and formal models of intention. PhD 1986 Yale

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Sebastian Thrun

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Thrun pursues research on artificial intelligence, robotics, and machine learning. He also works on distributed systems, human-robot interaction, and programming language design. Within the area of probabilistic robotics, which concerns itself with applying statistical techniques to problems in real-world perception, planning, and control, he has focused on mobile robot exploration, mapping, and multi-robot coordination. On the basic research level, he has pursued research on robust statistical programming techniques that scale to complex environments and to large decentralized robot systems. PhD 1995 University of Bonn, Germany

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Luca Trevisan

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COMPUTER SCIENCE

Trevisan's research is focused on theoretical computer science. PhD 1997 Sapienza University, Rome

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Jennifer Widom

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Widom's research spans all aspects of nontraditional data management. PhD 1987 Cornell

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Ryan Williams

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COMPUTER SCIENCE

Williams works in algorithm design and computational complexity theory. One of his current interests is to understand how the art of finding good algorithms relates to the art of finding lower bounds, which are limitations on solving problems via good algorithms. For example, mildly efficient algorithms for certain problems in circuit analysis can be applied to prove limitations on what circuits can do. PhD 2007 Carnegie Mellon

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ELECTRICAL ENGINEERING

The Department of Electrical Engineering incorporates mathematics and science in the study of signals and systems, solid-state and photonic devices, complex information processing and communications systems, digital and analog electronics, electromagnetics, and materials across a broad spectrum of applications.

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Amin Arbabian

Assistant Professor

ELECTRICAL ENGINEERING

Arbabian's research is broadly in the area of integrated circuits and systems and electromagnetic interfaces. He is interested in design of "end-to-end" electronic systems/devices. Exploratory study and physical design of systems for biomedical applications is an important part of his research. Topics include biomedical applications, electromagnetic interfaces, and RF/mm-wave integrated circuits and systems.
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Nicholas Bambos

Professor

MANAGEMENT SCIENCE AND ENGINEERING, ELECTRICAL ENGINEERING

Bambos' research interests include high-performance networking, autonomic computing, and service engineering. His methodological interests are in network control, online task scheduling, queuing systems, and stochastic processing networks. PhD 1989 UC Berkeley

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Dan Boneh

Professor; Director, Security Lab

COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Boneh's main research area is applied cryptography and network security. His focus is on building security mechanisms that are easy to use and deploy. He has developed new mechanisms for improving web security, file system security, and copyright protection. He contributed to the security and performance of the RSA cryptosystem and contributed to the study of cryptographic watermarking. PhD 1996 Princeton

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Stephen Boyd

Professor; Samsung Professor in the School of Engineering; Director, Information Systems Laboratory

ELECTRICAL ENGINEERING, MANAGEMENT SCIENCE AND ENGINEERING BY COURTESY, COMPUTER SCIENCE BY COURTESY

Boyd researches convex optimization, especially applications to engineering problems. PhD 1985 UC Berkeley

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Bill Dally

Professor (Research)

COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Dally investigates methods for applying VLSI technology to solve information processing problems. Current projects include network architecture, multicomputer architecture, media-processor architecture, and high-speed (4Gb/s) CMOS signaling. His research involves demonstrating novel concepts with working systems. Previous systems include the MARS Hardware Accelerator, the Torus Routing Chip, the J-Machine, M-Machine, and the Reliable Router. His group has pioneered techniques including fast capability-based addressing, processor coupling, virtual channel flow control, wormhole routing, link-level retry, message-driven processing, and deadlock-free routing. PhD 1986 Caltech

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Robert Dutton

Professor; Robert and Barbara Kleist Professor in the School of Engineering

ELECTRICAL ENGINEERING

Dutton's group develops and applies computer aids to process modeling and device analysis. His circuit design activities emphasize layout-related issues of parameter extraction and electrical behavior for devices that affect system performance. Activities include primarily silicon technology modeling for both digital and analog circuits, including OE/RF applications. New emerging area now includes bio-sensors and the development of computer-aided bio-sensor design. PhD 1970 UC Berkeley

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Abbas El Gamal

Professor and Chair, Electrical Engineering; Hitachi America Professor in the School of Engineering

ELECTRICAL ENGINEERING

El Gamal applies statistical tools, signal processing, and system-on-chip design techniques to problems in imaging and configurable circuits. He also investigates theoretical problems arising in communications and networks. PhD 1978 Stanford

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Audrey Ellerbee

Assistant Professor

ELECTRICAL ENGINEERING

Ellerbee's lab seeks to develop and deploy novel tools for optical imaging and sensing at the microscale and nanoscale. Their work finds applications both in the clinic and for basic science research. The lab also has particular interest in the development of low-cost, portable technologies suited for use in poorly resourced environments. PhD Duke 2007

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Dawson Engler

Associate Professor

COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Engler's research focuses both on building interesting software systems and on discovering and exploring the underlying principles of all systems. PhD 1998 MIT

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Shanhui Fan

Professor

ELECTRICAL ENGINEERING

Fan's research involves the theory and simulations of photonic and solid-state materials and devices; photonic crystals; nano-scale photonic devices and plasmonics; quantum optics; computational electromagnetics; and parallel scientific computing. PhD 1997 MIT

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Hector Garcia-Molina

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Garcia-Molina's research interests include distributed computing systems, database systems, and digital libraries. PhD 1979 Stanford

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James Gibbons

Professor (Research)

ELECTRICAL ENGINEERING

A pioneer in the use of ion implantation and rapid thermal process techniques for solid-state physics, Gibbons also conducts research into semiconductor device analysis, fabrication, and process physics. Current research is focused on the growth and processing of thin semiconductor films and nanostructures that offer potential for advanced semiconductor and optical device development. PhD 1956 Stanford

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John Gill

Associate Professor

ELECTRICAL ENGINEERING

Gill's research interests are in the areas of computational complexity theory and information theory, including probabilistic computation, lossless data compression, and error correcting codes. PhD 1972 UC Berkeley

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Bernd Girod

Professor; Senior Associate Dean for Online Learning and Professional Development; Faculty Director, Stanford Center for Image Systems Engineering; Director, Brown Institute for Media Innovation; Faculty Director, Max Planck Center for Visual Computing and Communication

ELECTRICAL ENGINEERING

Girod's research focuses on algorithms and systems for multimedia analysis and communication. Applications range from wireless media delivery to interactive video streaming to mobile visual search and augmented reality. Engineering Doctorate 1987 University of Hannover, Germany

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Andrea Goldsmith

Professor; Stephen Harris Professor in the School of Engineering

ELECTRICAL ENGINEERING

Goldsmith's research develops novel techniques, protocols, and designs for future wireless systems and networks. Her specific research areas include the design and capacity analysis of wireless systems and networks, multiple-antenna wireless networks, cognitive radios, sensor and "green" networks, cross-layer wireless network design, and applications of communications and signal processing to health and neuroscience. PhD 1994 UC Berkeley

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Patrick Hanrahan

Professor; Canon Professor in the School of Engineering

COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Hanrahan's current research involves rendering algorithms, high-performance graphics architectures, and systems support for graphical interaction. He has also worked on raster graphics systems, computer animation, and modeling and scientific visualization, in particular, volume rendering.
PhD 1986 Wisconsin

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James Harris

Professor; James and Ellenor Chesebrough Professor in the School of Engineering

ELECTRICAL ENGINEERING, MATERIALS SCIENCE AND ENGINEERING BY COURTESY, APPLIED PHYSICS BY COURTESY

Harris utilizes molecular beam epitaxy (MBE) of III-V compound semiconductor materials to investigate new materials for electronic and optoelectronic devices. He utilizes heterojunctions, superlattices, quantum wells, and three-dimensional self-assembled quantum dots to create metastable "engineered materials" with novel or improved properties for electronic and optoelectronic devices. He has recently focused on integration of photonic devices and micro optics for creation of new minimally invasive bio and medical systems for micro-array and neural imaging. PhD 1969 Stanford

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John L. Hennessy

Professor; President of Stanford University; Bing Presidential Professor

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

President Hennessy's research is in the area of computer architecture. His early research was centered on the development of MIPS, one of the first RISC microprocessors. His recent research involves the architecture and effective use of large-scale parallel machines. His group developed DASH, the first scalable cache-coherent multiprocessor, which is now the base for a number of commercial developments. In addition to his research activities, Hennessy is a coauthor of leading graduate and undergraduate texts in computer architecture. PhD 1977 SUNY-Stony Brook

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Lambertus Hesselink

Professor; Director, Nano-Photonics Laboratory

ELECTRICAL ENGINEERING, AERONAUTICS AND ASTRONAUTICS BY COURTESY, APPLIED PHYSICS BY COURTESY

Hesselink's research encompasses nano-photonics, ultra-high-density optical data storage, nonlinear optics, optical super-resolution, materials science, three-dimensional image processing and graphics, and Internet technologies. PhD 1977 Caltech

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Mark Horowitz

Professor; Yahoo! Founders Professor in the School of Engineering

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

Horowitz's research interests are quite broad and span using EE and CS analysis methods, problems in molecular biology, and creating new design methodologies for analog and digital VLSI circuits. His current research includes updating both analog and digital design methods, low-energy multiprocessor designs, computational photography, and applying engineering to biology. PhD 1984 Stanford

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Roger Howe

Professor; William E. Ayer Professor in Electrical Engineering; Director, Stanford Nanofabrication Facility

ELECTRICAL ENGINEERING

Howe's research involves the design and fabrication of sensors and actuators using micro- and nanotechnologies, with applications to information processing and energy conversion. PhD 1984 UC Berkeley

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Joseph Kahn
Professor

ELECTRICAL ENGINEERING

Kahn's research focuses on optical fiber communications, free-space optical communications, optical microscopy and sensing, and associated devices and subsystems. PhD 1986 UC Berkeley

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Sachin Katti
Assistant Professor

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

Katti's research focuses on designing and building next-generation high-capacity wireless networks using techniques from information and coding theory. His research interests are in networks, wireless communications, applied coding theory, and security. PhD 2009 MIT

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Leonid Kazovsky
Professor (Research)

ELECTRICAL ENGINEERING

Kazovsky and his research group are investigating green energy-efficient networks. Areas of interest include: access and in-building networks; hybrid optical/wireless networks; next-generation Internet architectures; and novel zero-energy photonic components. PhD 1972 St. Petersburg, Russia

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Butrus (Pierre) Khuri-Yakub
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ELECTRICAL ENGINEERING

Khuri-Yakub develops micromachined silicon sensors and actuators such as airborne and water immersion ultrasonic transducers and arrays, medical ultrasound imaging systems, sensors in bio-fluidic channels, micromachined microphones, fluid ejectors, and chemical/biological sensors. He is also active in developing in-situ sensors (temperature, film thickness, resist cure) for process monitoring and process control of integrated circuits manufacturing processes. PhD 1975 Stanford

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Gregory Kovacs
Professor

ELECTRICAL ENGINEERING, MEDICINE BY COURTESY

Kovacs' research areas include instruments for biomedical and biological applications (including space flight), solid-state sensors and actuators, cell-based sensors for toxin detection and pharmaceutical screening, microfluidics, electronic interfaces to tissue, and biotechnology, all with an emphasis on solving practical problems. He teaches a hands-on undergraduate course in analog circuit design and a graduate course in micromachined transducers. He is currently in charge of

developing the Bioengineering graduate core curriculum sequence. PhD 1990 Stanford

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Christos Kozyrakis

Associate Professor

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

Kozyrakis' research focuses on making computer systems of any size faster, cheaper, and greener. His current work focuses on the hardware architecture, runtime environment, programming models, and security infrastructure for warehouse-scale data centers and many-core chips with thousands of general-purpose cores and fixed functions accelerators. PhD 2002 UC Berkeley

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Sanjay Lall

Associate Professor

ELECTRICAL ENGINEERING, AERONAUTICS AND ASTRONAUTICS

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Thomas Lee

Professor

ELECTRICAL ENGINEERING

Lee's principal areas of professional interest include analog circuitry of all types, ranging from low-level DC instrumentation to high-speed RF communications systems. His present research focus is CMOS RF integrated circuit design and extending operation into the terahertz realm. ScD 1990 MIT

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Philip Levis

Associate Professor

COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Levis' research focuses on the design and implementation of efficient software systems for embedded wireless sensor networks; embedded network sensor architecture and design; and systems programming and software engineering. PhD 2005 UC Berkeley

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Marc Levoy

Professor

COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Levoy's current interests include light field sensing and display, computational imaging, digital photography, and applications of computer graphics in microscopy and biology. PhD 1989 University of North Carolina

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Nick McKeown

Professor; Faculty Director, Open Networking Research Center

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

McKeown researches techniques to improve the Internet. Most of this work has focused on the architecture, design, analysis, and implementation of high-performance Internet switches and routers. More recently, his interests have broadened to include network architecture, backbone network design, congestion control, and how the Internet might be redesigned if we were to start with a clean slate. PhD 1995 UC Berkeley

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Teresa Meng

Professor; Reid Weaver Dennis Professor of Electrical Engineering

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

Meng's current research activities include neural signal processing, bio-implant technology, and non-invasive stimulation. PhD 1988 UC Berkeley

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David Miller

Professor; W.M. Keck Foundation Professor in Engineering; Co-Director, Stanford Photonics Research Center

ELECTRICAL ENGINEERING, APPLIED PHYSICS BY COURTESY

Miller studies optical and optoelectronic devices including quantum wells and photonic nanostructures, especially for information sensing, communication, switching, and processing. He also investigates more generally the fundamentals of optics in these applications, with current research including dense optical interconnection to silicon electronics, quantum well optical physics and devices, nanometallic photonics, and fundamental limits in optics. PhD 1979 Heriot-Watt University

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Subhasish Mitra

Associate Professor

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

Mitra's research focuses on ways to design robust computer systems and information appliances, and covers various aspects of very-large-scale integration design and testing, computer-aided design, computer architecture, and design in future nanotechnologies. PhD 2000 Stanford

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Andrea Montanari

Associate Professor

ELECTRICAL ENGINEERING, STATISTICS

Montanari's main research focus is to understand the collective behavior of large assemblies of elementary components, each one interacting with a few neighbors. This is a central problem

in many disciplines, from probability to statistical mechanics and system biology, and is becoming increasingly important in engineering (e.g., in modern coding systems). Montanari's objective is to obtain a precise quantitative description in regimes in which the elementary components cannot be regarded as "roughly" independent.
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Boris Murmann

Associate Professor

ELECTRICAL ENGINEERING

Murmann's research is concerned with mixed-signal integrated circuit design, including system- and device-level modeling. A recurring theme in most projects is the attempt to capitalize on the immense digital signal processing capabilities of modern integrated circuit technologies. The vision of his group is to create a new class of digitally assisted data converters and sensor front-ends that are based on minimalistic, low complexity analog blocks that leverage digital processing for performance enhancement. His work spans various applications from communication systems to biomedical instrumentation and sensing, and incorporates technologies including fine-line CMOS, MEMS, and organic thin-film devices.
PhD 2003 UC Berkeley

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Yoshio Nishi

Professor (Research); Research Director, Center for Integrated Systems; Director, Initiative for Nanoscale Materials and Processes; Director, Nonvolatile Memory Technology Research Initiative

ELECTRICAL ENGINEERING, MATERIALS SCIENCE AND ENGINEERING BY COURTESY

Nishi's research interest has been in silicon- and germanium-based CMOS devices, processes, and materials. He is currently interested in research for new device structures with new materials in the nanoelectronics era, resistive switching memory, metal gate work function engineering, flexible electronics, and graphene band engineering.
PhD 1973 University of Tokyo

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Dwight Nishimura

Professor; Director, Magnetic Resonance Systems Research Laboratory

ELECTRICAL ENGINEERING, RADIOLOGY BY COURTESY

Nishimura develops new acquisition and processing techniques for improved medical imaging. PhD 1984 Stanford

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Oyekunle Olukotun
Professor

ELECTRICAL ENGINEERING, COMPUTER SCIENCE

Olukotun's research interests are in the design, performance analysis, and verification of computers. He is currently leading the Hydra single chip multiprocessor project and is developing novel simulation, estimation, and verification techniques for system-level design. PhD 1991 Michigan

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Brad Osgood
Professor; Senior Associate Dean, Student Affairs

ELECTRICAL ENGINEERING, EDUCATION BY COURTESY

Osgood is a mathematician by training and applies techniques from analysis and geometry to various engineering problems. He is interested in problems in imaging, pattern recognition, and signal processing. PhD 1980 Michigan

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Ayfer Özgür
Assistant Professor

ELECTRICAL ENGINEERING

Özgür's research focuses on understanding the fundamental limits of communication in wireless networks and designing strategies that can approach these limits in practice. Her research combines tools and ideas from disciplines including information and coding theory, wireless communication, random matrix theory, graph theory, and combinatorial and convex optimization.
PhD 2009 École Polytechnique Fédérale de Lausanne

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John Pauly
Professor; Director, Magnetic Resonance Systems Research Laboratory

ELECTRICAL ENGINEERING

Pauly's interests include medical imaging in general, and magnetic resonance imaging (MRI) in particular. Current efforts are focused on medical applications of MRI where real-time interactive imaging is important. Two examples are cardiac imaging and the interactive guidance of interventional procedures. Specific interests include rapid methods for the excitation and acquisition of the MR signal, and the reconstruction of images from the data acquired using these approaches. PhD 1990 Stanford

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Piero Pianetta

Professor (Research); Deputy Director, Stanford Synchrotron Radiation Lightsource

PHOTON SCIENCE (SLAC), ELECTRICAL ENGINEERING

Pianetta's research is directed toward understanding how the atomic and electronic structure of semiconductor interfaces impacts device technology. His research includes the development of new analytical tools for these studies based on the use of synchrotron radiation. Recent projects include the development of ultrasensitive methods to analyze trace impurities on the surface of silicon wafers at levels as low as 1e-6 monolayer. PhD 1976 Stanford

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James D. Plummer

Professor; Frederick Emmons Terman Dean of the School of Engineering; John M. Fluke Professor of Electrical Engineering

ELECTRICAL ENGINEERING, MATERIALS SCIENCE AND ENGINEERING BY COURTESY

Plummer studies both the physics which governs device operation in silicon integrated circuits and the technology used to fabricate these circuits. Recent work is aimed at extending silicon device structures into nanoscale dimensions. New device concepts are explored through computer simulation and promising ideas are fabricated in the Stanford Nanofabrication Facility to verify ideas experimentally. His research also explores the scaling limits of silicon technology and the application of this technology outside traditional integrated circuits. PhD 1971 Stanford

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Ada Poon

Assistant Professor

ELECTRICAL ENGINEERING

Poon enjoys solving problems that require an interdisciplinary system view, from theoretical studies to efficient implementation. Currently, she is researching the wireless delivery of power and data to medical implants, the limits of utilizing polarization in communication systems, and applying mathematical concepts to RF/analog circuit architectures. PhD 2004 UC Berkeley

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Balaji Prabhakar

Professor; Director, Stanford Center for Societal Networks

ELECTRICAL ENGINEERING, COMPUTER SCIENCE, MANAGEMENT SCIENCE AND ENGINEERING BY COURTESY

Prabhakar's research focuses on the design, analysis, and implementation of data networks, both wireline and wireless. He has been interested in designing network algorithms, problems in ad hoc wireless networks, and designing incentive mechanisms. He has a long-standing interest in stochastic network theory, information theory, algorithms, and probability theory. PhD 1994 UCLA

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Mendel Rosenblum

Associate Professor; Faculty Director, Stanford Computer Forum Affiliates Program; Faculty Director, Stanford Experimental Data Center Lab Affiliates Program; Director, Computer Systems Laboratory

COMPUTER SCIENCE, ELECTRICAL ENGINEERING

Rosenblum's research focus is on system software and simulation systems for high-performance computing architectures. As part of the Stanford FLASH project, he is leading an effort to build a new operating system targeted for large-scale shared memory multiprocessors. He is also building a high-performance machine simulation system for detailed simulations of current and new computer architectures. PhD 1991 UC Berkeley

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Krishna Saraswat

Professor; Rickey/Nielsen Professor in the School of Engineering

ELECTRICAL ENGINEERING, MATERIALS SCIENCE AND ENGINEERING BY COURTESY

Saraswat is working on a variety of problems related to new and innovative materials, structures, and process technology of silicon, germanium, and III-V devices and interconnects for VLSI and nanoelectronics. Areas of current interest are new device structures to continue scaling MOS transistors, DRAMs and flash memories to nanometer regime, 3-dimensional ICs with multiple layers of heterogeneous devices, metal and optical interconnections, and high-efficiency and low-cost solar cells. PhD 1974 Stanford

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Krishna Shenoy

Professor

ELECTRICAL ENGINEERING, NEUROBIOLOGY BY COURTESY

Shenoy conducts basic and applied research on neural prosthetic systems. Basic studies include investigating sensory-motor and cognitive functions in the primate cortex using a combination of behavioral, electrophysiological, and computational techniques to discover how populations of neurons represent movement plans. Applied studies include designing algorithms to read out these representations and developing prosthetic systems controlled by the neural activity. The ultimate goal of these neural prosthetic systems, or brain-computer interfaces, is to assist disabled patients. PhD 1995 MIT

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Olav Solgaard

Professor; Director, Edward L. Ginzton Laboratory

ELECTRICAL ENGINEERING

The Solgaard group focuses on design and fabrication of nano-photonics and micro-optical systems. They combine photonic crystals, optical meta-materials, silicon photonics, and MEMS to create efficient and reliable systems for communication, sensing, imaging, and optical manipulation.
PhD 1992 Stanford

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Professor

ELECTRICAL ENGINEERING, COMPUTER SCIENCE BY COURTESY

Tobagi works on network control mechanisms for handling multimedia traffic (voice, video, and TCP- based applications) and the performance assessment of networked multimedia applications using user-perceived quality measures. He also investigates the design of wireless networks, including QoS-based media access control and network resource management, as well as network architectures and infrastructures for the support of mobile users, all of which meet the requirements of multimedia traffic. He also investigates the design of metropolitan and wide area networks combining optical and electronic networking technologies, including topological design, capacity provisioning, and adaptive routing.
PhD 1974 UCLA

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Professor

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Van Roy is broadly interested in the formulation and analysis of mathematical models that address problems in information technology, business, and public policy. PhD 1998 MIT

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ELECTRICAL ENGINEERING

Vuckovic conducts experimental and theoretical research in nanophotonics and quantum photonics. Topics include: quantum optics, cavity QED, and quantum information processing with quantum dots in photonic crystals; single quantum dot switches and modulators; electrically injected active III-V lasers and modulators; silicon germanium photonics; inverse photonic crystal design; nonlinear optics in photonic crystals; and atoms and photonic crystal cavities.
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MATERIALS SCIENCE AND ENGINEERING, ELECTRICAL ENGINEERING, RADIOLOGY BY COURTESY

Wang is engaged in the research of magnetic nanotechnology, biosensors, spintronics, integrated inductors, and information storage. He uses modern thin-film growth techniques and lithography to engineer new electromagnetic materials and devices and to study their behavior at nanoscale and at very high frequencies. His group is investigating magnetic nanoparticles, high-saturation soft magnetic materials, giant magnetoresistance spin valves, magnetic tunnel junctions, and spin electronic materials, with applications in cancer nanotechnology, in vitro diagnostics, rapid radiation triage, spin-based information processing, efficient energy conversion and storage, and extremely high-density magnetic recording. Research interests include: magnetic nanotechnology, including bio-magnetic sensors, cancer nanotechnology, in vitro diagnostics, radiation triage, and DNA forensics; magnetic inductive heads, RF magnetic inductors, and soft magnetic materials; magnetoresistive materials and spin electronics; and magnetic recording physics and information storage.
PhD 1993 Carnegie Mellon

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ELECTRICAL ENGINEERING

Weissman's research interests span information theory and its applications to data compression and communications, and statistical signal processing. PhD 2001 Technion

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Jennifer Widom

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COMPUTER SCIENCE, ELECTRICAL ENGINEERING

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ELECTRICAL ENGINEERING

Wong's research focuses on nanoscale science and technology, semiconductor technology, solid-state devices, and electronic imaging. He is interested in exploring new materials, novel fabrication techniques, and novel device concepts for future nanoelectronics systems. Novel devices often require new concepts in circuit and system designs. His research also includes explorations into circuits and systems that are device-driven. PhD 1988 Lehigh

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S. Simon Wong

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ELECTRICAL ENGINEERING

Wong studies the fabrication and design of high-performance integrated circuits. His work focuses on understanding and overcoming the limitations of circuit performance imposed by device, interconnect, and on-chip components.
PhD 1983 UC Berkeley

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Yoshihisa Yamamoto

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ELECTRICAL ENGINEERING, APPLIED PHYSICS

Yamamoto's current research interests are in the areas of quantum information, quantum optics, and mesoscopic physics such as squeezed states, quantum nondemolition measurements, cavity quantum electrodynamics, quantum computers, and mesoscopic electron transport and tunneling.
PhD 1978 Tokyo

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ELECTRICAL ENGINEERING, GEOPHYSICS

Zebker's research program consists of developing spaceborne radar systems and applying remote sensing data to problems in geophysics. His current emphasis is on interferometric radar for topographic and surface deformation studies of earthquakes, volcanoes, and global environmental problems.
PhD 1984 Stanford

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MANAGEMENT SCIENCE AND ENGINEERING

The Department of Management Science and Engineering aims to promote research and education related to the information-intensive, technology-based economy. The department has great breadth, covering the knowledge, tools, and methods required to make decisions and shape policies, configure organizational structures, design engineering systems, and solve operational problems. It covers eight areas: systems modeling and optimization; probability and stochastic systems; information science and technology; economics and finance; decision analysis and risk analysis; production operations and management; organization, technology, and entrepreneurship; and policy and strategy.

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Nicholas Bambos

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MANAGEMENT SCIENCE AND ENGINEERING, ELECTRICAL ENGINEERING

Bambos' research interests include high-performance networking, autonomic computing, and service engineering. His methodological interests are in network control, online task scheduling, queuing systems, and stochastic processing networks. PhD 1989 UC Berkeley

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Stephen Barley

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MANAGEMENT SCIENCE AND ENGINEERING, EDUCATION BY COURTESY

Barley is currently researching corporate power in the United States, the rhetorical history of telecommuting, and how sophisticated mathematical modeling tools are altering the work of engineers who design automobiles.
PhD 1984 MIT Sloan School of Management

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Margaret Brandeau

Professor; Coleman F. Fung Professor in the School of Engineering

MANAGEMENT SCIENCE AND ENGINEERING

Brandeau is an operations researcher and policy analyst with extensive background in the development of applied mathematical and economic models, and a distinguished investigator in HIV. Her HIV research focuses on using mathematical and economic models to assess the value of different HIV and drug abuse interventions, both in the U.S. and abroad. She has also studied policies for control of hepatitis B, and preparedness planning for potential bioterror attacks.
PhD 1985 Stanford

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MANAGEMENT SCIENCE AND ENGINEERING

Byers focuses on innovation and entrepreneurship education. He is a founder and faculty co-director of the Stanford Technology Ventures Program (STVP), which serves as the entrepreneurship center for the engineering school. PhD 1982 UC Berkeley

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Samuel Chiu

Associate Professor

MANAGEMENT SCIENCE AND ENGINEERING

Chiu's research focuses on probabilistic analysis: structuring, processing, and presentation of probabilistic information. PhD 1981 MIT

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Chuck Eesley

Assistant Professor

MANAGEMENT SCIENCE AND ENGINEERING

Eesley's research interests focus on strategy and technology entrepreneurship. In the broadest sense, he is interested in the "ideas sector" of the economy. His research seeks to uncover which individual attributes, strategies, and institutional arrangements optimally drive high-growth, high-tech entrepreneurship. He examines how entrepreneurs in developed and developing economy contexts commercialize R&D-intensive products, with a particular interest in who successfully innovates in new markets and the challenges of technology-based entrepreneurship. PhD 2009 MIT

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Kathleen Eisenhardt

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MANAGEMENT SCIENCE AND ENGINEERING

Eisenhardt's research focus is on strategy and organization in uncertain, high-velocity markets with emphasis on complexity and power theories. She is currently studying the use of heuristics in strategies, creation of synergies in multi-business corporations, building alliance portfolios by entrepreneurial firms, and strategic interaction. PhD 1982 Stanford

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Erhun's research interests include Internet-enabled supply chains, supply chain management and logistics, and just-

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PhD 2002 Carnegie Mellon

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Kay Giesecke

Associate Professor

MANAGEMENT SCIENCE AND ENGINEERING

Giesecke's research addresses the quantification and management of financial risks, especially the risk of default (credit risk). He is particularly interested in stochastic modeling, valuation and hedging of credit risks, development of statistical tools to estimate and predict these risks, and the methods for solving the significant computational problems that arise in this context. His research contributions enable more effective hedging of credit risks, better risk management at financial institutions, and more accurate measurement of systemic risk in financial markets.
PhD 2001 Humboldt University, Berlin, Germany

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Peter Glynn

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MANAGEMENT SCIENCE AND ENGINEERING, ELECTRICAL ENGINEERING BY COURTESY

Glynn's interests include discrete-event simulation, computational probability, queuing, and general theory for stochastic systems. Current application areas include performance engineering for communications networks, control algorithms for wireless networks, and computational finance.
PhD 1982 Stanford

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Associate Professor

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Goel's research interests lie in the design, analysis, and applications of algorithms. PhD 1999 Stanford

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Warren Hausman

Professor

MANAGEMENT SCIENCE AND ENGINEERING; OPERATIONS RESEARCH IN THE GRADUATE SCHOOL OF BUSINESS BY COURTESY

Hausman performs research in operations planning and control, with specific interests in production and distribution planning, inventory control, multi-echelon inventory systems, and supply

chain management. Most of his contributions are based upon quantitative modeling techniques and emphasize relevance and real-world applicability. PhD 1966 MIT

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Siegfried Hecker

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MANAGEMENT SCIENCE AND ENGINEERING

Hecker's research interests include plutonium science, nuclear weapon policy and international security, nuclear security (including nonproliferation and counterterrorism), and cooperative nuclear threat reduction. Over the past 15 years, he has fostered cooperation with the Russian nuclear laboratories to secure and safeguard the vast stockpile of ex-Soviet fissile materials. His current interests include the challenges of nuclear India, Pakistan, and North Korea, and the nuclear aspirations of Iran. PhD 1968 Case Western Reserve

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MANAGEMENT SCIENCE AND ENGINEERING

Hinds studies the effect of technology on groups. She has conducted extensive research on the dynamics of geographically distributed work teams, particularly those spanning national boundaries. She explores issues of culture, language, identity, conflict, and the role of site visits in promoting knowledge sharing and collaboration. Most recently, she has been exploring the relationship between national culture and work practices, particularly the work practices of designers. She has also been exploring the relationship between national culture and technology use and is especially interested in the design of collaborative technologies for use across national boundaries. PhD 1997 Carnegie Mellon

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Ronald Howard

Professor

MANAGEMENT SCIENCE AND ENGINEERING, MANAGEMENT SCIENCE IN THE GRADUATE SCHOOL OF BUSINESS BY COURTESY

Howard's current research interests are centered on improving the quality of decisions, life-and-death decision making, and the creation of a coercion-free society. ScD 1958 MIT

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Ramesh Johari

Professor

MANAGEMENT SCIENCE AND ENGINEERING, COMPUTER SCIENCE BY COURTESY, ELECTRICAL ENGINEERING BY COURTESY

Johari is interested in the design and management of large-scale complex networks, such as the Internet. Using tools

from operations research, engineering, and economics, he has developed models to analyze efficient market mechanisms for resource allocation in networks. PhD 2004 MIT

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Riitta Katila

Associate Professor

MANAGEMENT SCIENCE AND ENGINEERING

Katila's research focuses on technology strategy, organizational innovation, and learning. She is an expert on innovation, competitive dynamics, technology entrepreneurship, inter-organizational relationships, and corporate venture capital. In her most recent work, she examines how firms create new products successfully. Focusing on the robotics industry, she investigates how different search approaches, such as the exploitation of existing knowledge and the exploration for new knowledge, influence the kinds of new products that technology-intensive firms introduce.
PhD 2000 University of Texas, Austin

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David Luenberger

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MANAGEMENT SCIENCE AND ENGINEERING, ELECTRICAL ENGINEERING BY COURTESY

Luenberger's long-term interest is the role of mathematics in the solution of important problems of planning, decision, operations, and strategy. A general theme of his interest is "Better Living Through Mathematics." He has worked on numerous practical problems, but his main objective has been the development of theory. PhD 1963 Stanford

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Robert McGinn

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MANAGEMENT SCIENCE AND ENGINEERING

McGinn's general research is on technology and society, a field devoted to study of social, cultural, ethical, and policy issues raised by contemporary developments in science and technology. His specific research area is on ethics, science, and technology, a specialty within applied ethics that is devoted to the study of both ethical issues that arise in the practice of contemporary science, technology, and engineering, and ethical issues raised by the diffusion of technical innovations into society. PhD 1970 Stanford

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MANAGEMENT SCIENCE AND ENGINEERING

Murray's research interests include numerical optimization, numerical linear algebra, sparse matrix methods, optimization software, and applications of optimization. He has authored

two books – *Practical Optimization* and *Optimization and Numerical Linear Algebra* – and more than 80 papers. In addition to his university work he has extensive consulting experience with industry, government, and commerce. PhD 1969 London

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M. Elisabeth Paté-Cornell

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MANAGEMENT SCIENCE AND ENGINEERING

Paté-Cornell's specialty is engineering risk analysis with application to complex systems (space, medical, etc.). Her research has focused on explicit inclusion of human and organizational factors in the analysis of systems' failure risks. Her recent work is on the use of game theory in risk analysis with applications that have included counterterrorism and nuclear counterproliferation problems. PhD 1978 Stanford

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Amin Saberi

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MANAGEMENT SCIENCE AND ENGINEERING

Saberi's research interests include algorithms, approximation algorithms, and algorithmic aspects of games, markets, and networks. PhD 2004 Georgia Institute of Technology

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Michael Saunders

Professor (Research)

MANAGEMENT SCIENCE AND ENGINEERING

Saunders develops mathematical methods for solving large-scale constrained optimization problems and large systems of equations. He also implements such methods as general-purpose software to allow its use in many areas of engineering, science, and business. He is co-developer of the large-scale optimizers MINOS, SNOPT, SQOPT, PDCO and the linear equation solvers SYMMLQ, MINRES, MINRES-QLP, LSQR, LSMR, LUSOL. PhD 1972 Stanford

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MANAGEMENT SCIENCE AND ENGINEERING, MEDICAL INFORMATICS BY COURTESY

Shachter's interests include: influence diagram knowledge representation and solution; intelligent decision systems; medical decision analysis; medical technology assessment; decision analysis fundamentals; and planning under uncertainty. PhD 1982 UC Berkeley

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Robert Sutton

Professor

MANAGEMENT SCIENCE AND ENGINEERING, ORGANIZATIONAL BEHAVIOR (GSB) BY COURTESY

Sutton's research focuses on the links (and gaps) between managerial knowledge and organizational action, organizational creativity and innovation, organizational performance, and evidence-based management. PhD 1984 Michigan

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James Sweeney

Professor; Senior Fellow, Stanford Institute for Economic Policy Research; Senior Fellow, Hoover Institution by courtesy

MANAGEMENT SCIENCE AND ENGINEERING

Sweeney's research includes depletable and renewable resource use, electricity market analysis, environmental economics, global climate change policy, gasoline market dynamics, energy demand, energy price dynamics, automobile market analysis, and housing market dynamics. PhD 1971 Stanford

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Edison Tse

Associate Professor

MANAGEMENT SCIENCE AND ENGINEERING

Tse is currently conducting research on building core competence within an enterprise to gain competitive advantage. His recent interests are in extending the theory to analyzing the dynamic competition in network economy, regional technology center development, and applying the theory of dynamic strategies to the wireless, airport, real estate, and financial industries in China. PhD 1970 MIT

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John Weyant

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MANAGEMENT SCIENCE AND ENGINEERING

Weyant's research focuses on global climate change, energy security analysis, Japanese energy policy, and methods for strategic planning. PhD 1976 UC Berkeley

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Yinyu Ye

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MANAGEMENT SCIENCE AND ENGINEERING, ELECTRICAL ENGINEERING BY COURTESY

Ye's research interests lie in the areas of optimization, complexity theory, algorithm design and analysis, and applications of mathematical programming, operations research, and system engineering. He is also interested in developing optimization software for various real-world applications. Current research topics include linear programming algorithms, Markov decision processes, computational game/market equilibrium, metric distance geometry, dynamic resource allocation, and stochastic and robust decision making. PhD 1988 Stanford

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MATERIALS SCIENCE AND ENGINEERING

The Department of Materials Science and Engineering is concerned with the relation between processing, structure, and properties of materials, with the goal of developing new materials and processes through fundamental understanding. It brings together in a unified discipline materials-related developments in physical metallurgy, polymer science, ceramics, biology, and the physics and chemistry of solids.

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David Barnett
Professor

MATERIALS SCIENCE AND ENGINEERING, MECHANICAL ENGINEERING

Barnett's research involves dislocations in elastic solids; bulk, surface, and interfacial waves in anisotropic elastic media; mechanics of piezoelectric and piezomagnetic materials; and modeling of transport in fuel cell materials and of AFM usage to characterize charge distributions and impedance of fuel cell media. PhD 1967 Stanford

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Mark Brongersma
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MATERIALS SCIENCE AND ENGINEERING

Brongersma's research focuses on the fabrication and characterization of nanometer-size electronic and optical devices. The ability to engineer materials at the atomic level has opened myriad possibilities for the advancement of technologies that impact the areas of semiconductors, telecommunications, chemistry, and pharmaceuticals. His current research is aimed at the development of Si-based microphotonic functionality and plasmonic devices that can manipulate the flow of light at the nanoscale. Specific research interests include: nanoscale electronic and photonic materials and devices; guiding and manipulation of light in metal-optic structures; optical properties of semiconductor nanocrystals and nanowires; fundamentals of ion beam modification of materials; and nanoscale thermal engineering with light. PhD 1998 FOM Institute for Atomic and Molecular Physics, Amsterdam, Netherlands

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William Chueh
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MATERIALS SCIENCE AND ENGINEERING

The Chueh group explores efficient electrochemical routes for converting solar energy to chemical fuels and subsequently to electricity. The group also develops next-generation electrochemical energy storage materials. They take a rational approach toward materials discovery and optimization. Using powerful electron, X-ray, and optical microscopy and spectroscopy techniques, they visualize electrochemical reactions as they take place on length scales ranging from tens of microns down to sub-nm. These fundamental observations, combined with atomistic- and continuum-level models, lead to new insights into the design of functional materials

with novel compositions and structures. They utilize a wide range of solution, vapor, and solid-state routes to create high-performance electrochemical devices, such as photo-electrochemical cells, fuel cells, electrolyzers, and metal-air batteries. PhD 2010 Caltech

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Bruce Clemens

Professor

MATERIALS SCIENCE AND ENGINEERING, PHOTON SCIENCE (SLAC), APPLIED PHYSICS BY COURTESY

Clemens studies the growth, structure, magnetic properties, and mechanical properties of thin films and nanostructured materials. By controlling growth and atomic scale structure, he is able to tune and optimize properties. He is currently investigating materials for metallization, magnetic recording, electronic device, and hydrogen storage applications. PhD 1983 Caltech

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Yi Cui

Associate Professor

MATERIALS SCIENCE AND ENGINEERING, PHOTON SCIENCE (SLAC), CHEMISTRY BY COURTESY

Cui studies nanoscale phenomena and their applications broadly defined. His research interests include: nanocrystal and nanowire synthesis and self-assembly; electron transfer and transport in nanomaterials and at the nanointerface; nanoscale electronic and photonic devices, batteries, solar cells, microbial fuel cells, water filters, and chemical and biological sensors. PhD 2002 Harvard

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Reinhold Dauskardt

Professor; Deputy Director, Center for Advanced Molecular Photovoltaics

MATERIALS SCIENCE AND ENGINEERING, MECHANICAL ENGINEERING BY COURTESY, SURGERY BY COURTESY

Dauskardt and his group have worked extensively on integrating new materials into emerging technologies, including thin-film structures for nanoscience and energy technologies, high-performance composite and laminates for aerospace, and biomaterials and soft tissues in bioengineering. His group has pioneered methods for characterizing adhesion and cohesion of thin films used extensively in device technologies. His research on wound healing has concentrated on establishing a biomechanics framework to quantify the mechanical stresses and biologic responses in healing wounds and define how the mechanical environment affects scar formation. Experimental studies are complemented with a range of multiscale computational capabilities. His research includes interaction with researchers nationally and internationally in academia, industry, and clinical practice. PhD 1988 UC Berkeley/Witwatersrand

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Assistant Professor

MATERIALS SCIENCE AND ENGINEERING

Dionne's research investigates metamaterials – engineered materials with optical and electrical properties not found in nature. She is especially interested in plasmonic and colloidal nanocrystal-based metamaterials, including their fundamental electrodynamic properties and applications to solar energy and bioimaging. Active research areas in her group include visible-frequency metamaterials for subwavelength light manipulation, enhanced photovoltaics and photocatalysis, and active neuronal imaging. PhD 2009 Caltech

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Sarah Heilshorn

Assistant Professor

MATERIALS SCIENCE AND ENGINEERING, BIOENGINEERING BY COURTESY, CHEMICAL ENGINEERING BY COURTESY

Heilshorn's interests include biomaterials in regenerative medicine, engineered proteins with novel assembly properties, microfluidics and photolithography of proteins, and synthesis of materials to influence stem cell differentiation. Current projects include creating in vitro circuits of neurons, tissue engineering for spinal cord regeneration, and designing scaffolds for cell transplantation in the treatment of Parkinson's disease and stroke. PhD 2004 Caltech

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Aaron Lindenberg

Assistant Professor

MATERIALS SCIENCE AND ENGINEERING, PHOTON SCIENCE (SLAC)

Lindenberg's research is focused on probing the ultrafast dynamics and atomic-scale structure of materials on femtosecond and picosecond time-scales. X-ray techniques are combined with ultrafast laser techniques to provide a new way of taking snapshots of materials in motion. Current research is focused on the dynamics of phase transitions, ultrafast properties of nanoscale materials, photoelectrochemical charge transfer dynamics, and THz nonlinear spectroscopy.
PhD 2001 UC Berkeley

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Michael McGehee

Associate Professor; Director, Center for Advanced Molecular Photovoltaics

MATERIALS SCIENCE AND ENGINEERING

McGehee's research group studies organic semiconductors, nanostructured materials, and solar cells.
PhD 1999 UC Santa Barbara

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Paul McIntyre

Professor; Director, Geballe Laboratory for Advanced Materials

MATERIALS SCIENCE AND ENGINEERING

McIntyre's group performs research on nanostructured inorganic materials for applications in electronics, energy technologies, and sensors. He is best known for his work on metal oxide/semiconductor interfaces, ultrathin dielectrics, defects in complex metal oxide thin films, and nanostructured Si-Ge single crystals. His research team synthesizes materials, characterizes their structures and compositions with a variety of advanced microscopies and spectroscopies, studies the passivation of their interfaces, and measures functional properties of devices. ScD 1993 MIT

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Nicholas Melosh

Associate Professor

MATERIALS SCIENCE AND ENGINEERING, PHOTON SCIENCE (SLAC)

Melosh's research is focused on developing methods to detect and control chemical processes on the nanoscale, to create materials that are responsive to their local environment. The research goal incorporates many of the hallmarks of biological adaptability, based on feedback control between cellular receptors and protein expression. Similar artificial networks may be achieved by fabricating arrays of nanoscale (<100 nm) devices that can detect and influence their local surroundings through ionic potential, temperature, mechanical motion, capacitance, or electrochemistry. These devices are particularly suited as "smart" biomaterials, where multiple surface-cell interactions must be monitored and adjusted simultaneously for optimal cell adhesion and growth. Other interests include precise control over self-assembled materials, and potential methods to monitor the diagnostics of complicated chemical systems, such as the effect of drug treatments within patients. Additional research interests: molecular materials at interfaces; directed dynamic self-assembly; controlling molecular or biomolecular assembly and behavior; and influence of local electronic, optical, or thermal stimuli.
PhD 2001 UC Santa Barbara

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Friedrich Prinz

Professor; Finmeccanica Professor and Robert Bosch Chair of Mechanical Engineering; Co-Director, Center on Nanostructuring for Efficient Energy Conversion; Director, Nanoscale Prototyping Laboratory

MECHANICAL ENGINEERING, MATERIALS SCIENCE AND ENGINEERING

Prinz's group models and prototypes nanoscale structures to understand the physics of electrical energy conversion and storage. They are exploring the relation between size, composition, and the kinetics of charge transfer. They are also interested in learning from nature, in particular by studying the electron transport chain in plant cells. The Prinz team employs a wide range of nano-fabrication technologies to build and evaluate prototype structures. Such technologies include atomic layer deposition, scanning probe microscopy, and impedance spectroscopy. In addition, the group uses molecular scale modeling to gain insights into the nature of charge separation and recombination processes. PhD 1975 University of Vienna

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Evan Reed

Assistant Professor

MATERIALS SCIENCE AND ENGINEERING

Reed's group is engaged in theory and modeling for energy-related materials, ultrafast science and photonics, and materials under extreme conditions. Recent research topics include shock and other forms of dynamic compression, ultrafast phase transformations, THz radiation, THz frequency acoustics, piezoelectric materials, energetic materials, detonation, and photonic crystals. New directions include energy-related materials and nanomaterials. They develop and utilize computational and theoretical tools (molecular dynamics, electronic structure, etc.) and interact closely with experimentalists. PhD 2003 MIT

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Alberto Salleo

Assistant Professor

MATERIALS SCIENCE AND ENGINEERING

Salleo's research includes novel materials and processing techniques for large-area and flexible electronic/photonic devices; ultra-fast laser processing for electronics, photonics, and biotechnology; and defects and structure/property studies of polymeric semiconductors, nano-structured, and amorphous materials in thin films. PhD 2001 UC Berkeley

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Robert Sinclair

Professor and Chair, Materials Science and Engineering; Charles M. Pigott Professor in the School of Engineering; Director, Stanford Nanocharacterization Laboratory

MATERIALS SCIENCE AND ENGINEERING

Using high-resolution transmission electron microscopy, Sinclair studies microelectronic and magnetic thin film microstructure. PhD 1972 Cambridge

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Shan Wang

Professor; Director, Center for Magnetic Nanotechnology

MATERIALS SCIENCE AND ENGINEERING, ELECTRICAL ENGINEERING, RADIOLOGY BY COURTESY

Wang is engaged in the research of magnetic nanotechnology, biosensors, spintronics, integrated inductors, and information storage. He uses modern thin-film growth techniques and lithography to engineer new electromagnetic materials and devices and to study their behavior at nanoscale and at very high frequencies. His group is investigating magnetic nanoparticles, high-saturation soft magnetic materials, giant magnetoresistance spin valves, magnetic tunnel junctions, and spin electronic materials, with applications in cancer nanotechnology, in vitro diagnostics, rapid radiation triage, spin-based information processing, efficient energy conversion and storage, and extremely high-density magnetic recording. Research interests include: magnetic nanotechnology, including bio-magnetic sensors, cancer nanotechnology, in vitro diagnostics, radiation triage, and DNA forensics; magnetic inductive heads, RF magnetic inductors, and soft magnetic materials; magnetoresistive materials and spin electronics; and magnetic recording physics and information storage. PhD 1993 Carnegie Mellon

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MECHANICAL ENGINEERING

The programs in the Department of Mechanical Engineering are designed to provide background for a variety of careers. The discipline is very broad, but it is generally understood to include energy and thermal sciences; propulsion; solid mechanics, fluid mechanics and biomechanics; design and manufacturing; sensing, control, and robotics; and computational and simulation-based engineering.

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Thomas Andriacchi

Professor; Director, Biomotion Research Group

MECHANICAL ENGINEERING, ORTHOPAEDIC SURGERY

Andriacchi's research focuses on the biomechanics of human locomotion and its biomedical applications to artificial joints, sports injury, osteoarthritis, and neuromuscular disorders. PhD 1974 University of Illinois, Chicago

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Banny Banerjee

Associate Professor (Teaching)

MECHANICAL ENGINEERING

MS 2000 Stanford

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David Barnett

Professor

MATERIALS SCIENCE AND ENGINEERING, MECHANICAL ENGINEERING

Barnett's research involves dislocations in elastic solids; bulk, surface, and interfacial waves in anisotropic elastic media; mechanics of piezoelectric and piezomagnetic materials; and modeling of transport in fuel cell materials and of AFM usage to characterize charge distributions and impedance of fuel cell media. PhD 1967 Stanford

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David Beach

Professor (Teaching); Co-Director, Product Realization Laboratory

MECHANICAL ENGINEERING

Beach teaches courses in the areas of design and manufacturing. He co-directs the Product Realization Laboratory, which provides 800 students annually with hands-on experiences in product definition, conceptual design, detail design, and prototype creation. Pedagogically, Beach believes that creation of experience from which students (and teams of students) can interpret and internalize their own conclusions provides an excellent complement to content-based teaching. His goal is to add strength in tacit knowledge, which derives from the hands-on synthesis of design, prototype building, presentation, and criticism. MS 1972 Stanford

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Tom Bowman

Professor

MECHANICAL ENGINEERING

Bowman studies reacting flows, primarily through experimental means, and the processes by which pollutants are formed and destroyed in flames. In addition, he is interested in the environmental impact of energy use, specifically greenhouse gas emissions from use of fossil fuels. PhD 1966 Princeton

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Wei Cai

Associate Professor

MECHANICAL ENGINEERING, MATERIALS SCIENCE AND ENGINEERING BY COURTESY

Cai's research involves predicting mechanical strength of materials through theory and simulations of defect microstructures across atomic, mesoscopic, and continuum scales. Other areas of interest include the development of new atomistic simulation methods for long-time-scale processes, such as crystal growth and self-assembly, and the introduction of magnetic field in quantum simulations of electronic structure and transport. PhD 2001 MIT

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Mark Cappelli

Professor

MECHANICAL ENGINEERING

Cappelli's research interests include plasma spectroscopy, plasma propulsion, and plasma and combustion synthesis of materials. PhD 1987 University of Toronto

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Brian Cantwell

Professor; Edward C. Wells Professor in the School of Engineering; Director, Aero Fluid Mechanics Laboratory

AERONAUTICS AND ASTRONAUTICS, MECHANICAL ENGINEERING

Cantwell's research focuses in the area of turbulent flow, especially the direct numerical simulation of turbulent shear flows, theoretical studies of the fine-scale structure of turbulence, and experimental measurements of turbulent structure in flames. Experimental studies include the development of particle-tracking methods for measuring velocity fields in unsteady flames and variable density jets. Research in turbulence simulation includes the development of spectral methods for simulating vortex rings, the development of topological methods for interpreting complex fields of data, and simulations of high Reynolds number compressible and incompressible wakes. Theoretical studies include predictions of the asymptotic behavior of drifting vortex pairs and vortex rings and use of group theoretical methods to study the nonlinear dynamics of turbulent fine-scale motions. Current projects include studies of fast-burning fuels for hybrid propulsion and decomposition of nitrous oxide for space propulsion. PhD 1976 Caltech

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Dennis Carter

Professor

MECHANICAL ENGINEERING, BIOENGINEERING

Carter studies the influence of mechanical loading on the growth, development, regeneration, and aging of skeletal tissues. Basic information from these studies is used to understand skeletal diseases and treatments.
PhD 1976 Stanford

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Mark Cutkosky

Professor

MECHANICAL ENGINEERING

Cutkosky applies analyses, simulations, and experiments to the design and control of robotic hands, tactile sensors, and devices for human/computer interaction. In manufacturing, his work focuses on design tools for rapid prototyping.
PhD 1985 Carnegie Mellon

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Eric Darve

Associate Professor

MECHANICAL ENGINEERING

Darve's research is focused on the development of numerical methods for large-scale scientific computing with applications in biomolecular simulations, acoustics, electromagnetics, and microfluidics. In these applications, the computational expense of simulating large and complex systems is very significant and in many instances beyond current computer capabilities. He is developing innovative numerical techniques to reduce this computational expense and enable the simulation of complex systems over realistic time scales. He also uses processors with novel architectures, such as GPUs and the Cell processor, for scientific computing. Applications range from particle simulation to fluid dynamics and solving partial differential equations.

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Scott Delp

Professor; James H. Clark Professor in the School of Engineering; Director, Neuromuscular Biomechanics Lab; Co-Principal Investigator, Simbios

BIOENGINEERING, MECHANICAL ENGINEERING, ORTHOPAEDIC SURGERY BY COURTESY

Delp combines experimental and theoretical approaches to study human movement. He has developed graphics-based biomechanical models from medical images that are used to guide surgery, study movement disorders, and design new medical products. He has a long-standing interest in improving treatments for children with cerebral palsy. PhD 1990 Stanford

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John Eaton

Professor; Charles Lee Powell Professor in the School of Engineering

MECHANICAL ENGINEERING

Eaton uses experiments and computational simulations to study the flow and heat transfer in complex turbulent flows, especially those relevant to turbomachinery, particle-laden flows, and separated flows, and to develop new techniques for precise control of gas and surface temperature during manufacturing processes. PhD 1980 Stanford

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Christopher Edwards

Professor

MECHANICAL ENGINEERING

The Edwards research group is focused on fundamental research for advanced energy technologies. The group performs theoretical and experimental studies of energy transformations such that the conversion process can be made cleaner, more efficient, and more controllable than has been possible with traditional technologies. Applications include advanced transportation engines (piston and turbine) and advanced electric power generation with carbon mitigation.
PhD 1985 UC Berkeley

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Charbel Farhat

Professor and Chair, Aeronautics and Astronautics; Vivian Church Hoff Professor of Aircraft Structures; Director, Army High-Performance Computing Research Center

AERONAUTICS AND ASTRONAUTICS, MECHANICAL ENGINEERING

Farhat and his research group develop mathematical models, advanced computational algorithms, and high-performance software for the design and analysis of complex systems in aerospace, marine, mechanical, and naval engineering. They contribute major advances to Simulation-Based Engineering Science. Current engineering focus in research is on the aerodynamics of Micro Aerial Vehicles (MAVs) and Formula 1 cars, ballistic fabric for lightweight shields, nonlinear aeroelasticity of fighter jets and High-Altitude Long Endurance (HALE) aircraft, thermal management of hypersonic vehicles, underwater acoustics and imaging, and underwater implosion. Current theoretical and computational emphases in research are on high-performance, multi-scale modeling for the high-fidelity analysis of multi-physics problems, and efficient reduced-order modeling for time-critical applications such as design and active control. PhD 1987 UC Berkeley

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J. Christian Gerdes

Associate Professor; Director, Center for Automotive Research at Stanford

MECHANICAL ENGINEERING, AERONAUTICS AND ASTRONAUTICS BY COURTESY

Gerdes' research centers on the application of dynamic modeling to problems in nonlinear control, estimation, and diagnostics. Specific areas of interest include the development

of driver assistance systems for lane keeping and collision avoidance, modeling and control of novel combustion processes for internal combustion engines, and diagnostics for automotive drive-by-wire systems. PhD 1996 UC Berkeley

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Kenneth Goodson

Professor

MECHANICAL ENGINEERING

Goodson's group studies thermal phenomena in electronic nanostructures, energy conversion devices, and microfluidic heat exchangers, with a focus both on fundamental heat transfer physics and on contemporary industrial problems. PhD 1993 MIT

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Ronald Hanson

Professor; Clarence J. and Patricia R. Woodard Professor in Mechanical Engineering

MECHANICAL ENGINEERING, AERONAUTICS AND ASTRONAUTICS BY COURTESY

Hanson's research is in the field of laser diagnostics and sensors, shock wave physics and chemistry, laser spectroscopy, chemical kinetics and combustion, and propulsion science. PhD 1968 Stanford

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Gianluca Iaccarino

Assistant Professor; Director, Thermal & Fluid Sciences Affiliates

MECHANICAL ENGINEERING

Iaccarino's research themes include numerical methods for fluid mechanics, physical models for laminar/turbulent flows, and uncertainty quantification in computational science. PhD 2005 Politecnico di Bari, Italy

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David Kelley

Professor; Donald W. Whittier Professor in Mechanical Engineering; Director, Hasso Plattner Institute of Design at Stanford (d.school)

MECHANICAL ENGINEERING

The Product Design program emphasizes the blending of engineering innovation, human values, and manufacturing concerns into a single curriculum. Kelley teaches engineering design methodology, the techniques of quick prototyping to prove feasibility, and design through understanding of user needs. MS 1978 Stanford

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Thomas Kenny

Professor

MECHANICAL ENGINEERING

Kenny's group is researching fundamental issues and applications of micromechanical structures. These devices are usually fabricated from silicon wafers using integrated circuit fabrication tools. Using these techniques, the group builds sensitive accelerometers, infrared detectors, and force-sensing cantilevers. This research has many applications, including integrated packaging, inertial navigation, fundamental force measurements, experiments on bio-molecules, device cooling, bio-analytical instruments, and small robots. Because this research field is multidisciplinary in nature, work in this group is characterized by strong collaborations with other departments, as well as with local industry.
PhD 1989 UC Berkeley

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Ellen Kuhl

Associate Professor

MECHANICAL ENGINEERING, BIOENGINEERING BY COURTESY, CARDIOTHORACIC SURGERY BY COURTESY

Kuhl's area of professional expertise is in computational biomechanics: the creation of theoretical and computational models to predict the acute and chronic response of living biological tissue to environmental changes during development and disease progression. Her specific interest is the multiscale modeling of growth and remodeling, the study of how biological tissues adapt their form and function to changes in mechanical loading, and how this adaptation could be traced back to structural alterations on the cellular or molecular levels. Combining theories of electrophysiology, biophysics, and continuum mechanics, her lab has specialized in predicting the chronic loss of form and function in growing and remodeling cardiac tissue using patient-specific custom-designed finite element models. PhD 2000 University of Stuttgart; PhD 2004 Technical University of Kaiserslautern

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Larry Leifer

Professor; Director, Center for Design Research; Director, Industry Affiliate Program for Teaching Design Thinking

MECHANICAL ENGINEERING

Leifer's design-thinking research is focused on instrumenting, understanding, supporting, and improving design practice through the development of design theory. Specific issues include: design research methodology, global team dynamics, innovation leadership, interactive interaction spaces, design-for-wellbeing, and adaptive mechatronic systems.
PhD 1969 Stanford

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Sanjiva Lele

Professor; Director, Unsteady Flow Physics and Aeroacoustics Laboratory

AERONAUTICS AND ASTRONAUTICS, MECHANICAL ENGINEERING

Lele's research combines numerical simulations with analytical modeling to study fundamental unsteady flow phenomena, turbulence, flow instabilities, and flow-generated sound. Recent projects include shock-turbulence interaction, exploitation of flow instabilities for enhanced mixing and for reducing the vortex-wake hazard from an airplane, new approaches for active noise control, and the development of high-fidelity prediction methods for engineering applications. PhD 1985 Cornell

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David Lentink

Assistant Professor

MECHANICAL ENGINEERING

Lentink's group studies biological flight as an inspiration for engineering design. They focus on key biological questions, which they probe with new engineering methods to find inspiration for innovative flying robots. Their comparative biological flight research ranges from maple seeds and insects to birds such as swifts, lovebirds, and hummingbirds. Their in-depth biomechanics research is focused on bird flight. Their fluid mechanic research of dynamically morphing wings ranges from vortex dynamics to fluid-structure interaction. Their robot designs are centered on flying in complex cluttered environments under realistic atmospheric conditions. PhD 2008 Wageningen University, Netherlands

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Marc Levenston

Associate Professor

MECHANICAL ENGINEERING, BIOENGINEERING BY COURTESY

Levenston's primary research interests relate to the function, degeneration, and repair of articular cartilage and fibrocartilage, with an emphasis on understanding the complex interactions between biophysical and biochemical cues in controlling cell behavior. Current areas include the mechanisms and functional implications of cell mediated tissue degeneration in cartilage and meniscus, novel imaging techniques for nondestructive assessment of cartilage composition, and interactions between mechanical, chemical, and matrix-supplied cues in controlling the development of engineered tissues. PhD 1995 Stanford

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Adrian Lew

Associate Professor

MECHANICAL ENGINEERING

Lew's interests lie in the broad area of computational solid mechanics. He is concerned with the fundamental design and mathematical analysis of material models and numerical algorithms. Currently his group is focused on the design of algorithms to simulate hydraulic fracturing and the effects of improvised explosive devices on crew members in military vehicles. To this end they work on algorithms for time-

integration and embedded or immersed boundary methods.
PhD 2003 Caltech

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Ali Mani

Assistant Professor

MECHANICAL ENGINEERING

The research in Mani's group is broadly defined around multiphysics problems in fluids and transport engineering, commonly involving phenomena such as interfaces, shocks, electrohydrodynamics, turbulence, and micro/nano-scale engineering. Their work contributes to the understanding of these problems primarily through theoretical tools such as large-scale computation and techniques of applied mathematics. Numerical simulations enable quantitative visualization of the detailed physical processes, which can be difficult to detect experimentally. They also provide insight for the development of reduced-order models. The ultimate goal in each problem is to provide a simple representation of the essential physics (ideally ODE-level), which would naturally induce insight into design, optimization, and control. While these efforts at core rely on mathematical techniques such as asymptotic methods or statistical analysis, close interaction with experiments is crucial in identification of practical bottlenecks and validation of the theoretical assumptions.

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Reginald Mitchell

Professor; Director, High Temperature Gasdynamics Laboratory

MECHANICAL ENGINEERING

Mitchell's primary area of research is concerned with characterizing the physical and chemical processes that occur during the combustion and gasification of pulverized coal and biomass. Coals of interest range in rank from lignite to bituminous, and biomass materials include yard waste, field and seed crop residues, lumber mill waste, fruit and nut crop residues, and municipal solid waste. Experimental and modeling studies are concerned with char reactivity to oxygen and carbon dioxide, carbon deactivation, char surface area evolution, and the mode of particle burning. Current studies focus on char conversion behavior under elevated pressure conditions and in oxygen-enriched environments.
ScD 1975 MIT

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Parviz Moin

Professor; Franklin P. and Caroline M. Johnson Professor in the School of Engineering; Chair, Flow Physics and Computation Division of Mechanical Engineering; Director, Center for Turbulence Research; Director, Predictive Science Academic Alliance Program

MECHANICAL ENGINEERING

Moin's research has focused on the development of advanced numerical tools and computational frameworks to predict the physics of turbulent flows in engineering systems. Through pioneering use of direct and large eddy simulation in complex geometries on massively parallel computers, he

conducts fundamental research on multiscale and multiphysics turbulence phenomena including shock-turbulence interactions, aerodynamic noise, hydro-acoustics, aero-optics, turbulent combustion, multiphase flows, and optimal control. PhD 1978 Stanford

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Drew Nelson

Professor

MECHANICAL ENGINEERING

Nelson's research involves development of improved methods for predicting the fatigue life of engineering materials, including the effects of manufacturing processes, and investigation of new approaches in the field of experimental mechanics, such as determination of residual stresses using optical methods. PhD 1978 Stanford

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Allison Okamura

Associate Professor; Principal Investigator, Collaborative Haptics and Robotics in Medicine Lab

MECHANICAL ENGINEERING, COMPUTER SCIENCE BY COURTESY

Okamura's research focuses on developing the principles and tools needed to realize advanced robotic and human-machine systems capable of haptic (touch) interaction, particularly for biomedical applications. Haptic systems are designed and studied using both analytical and experimental approaches. Topics of particular interest are: (1) Teleoperation: devices, models, and control systems that allow human operators to manipulate environments that are remote in scale and/or distance; (2) Virtual Environments: models, control systems, and devices that enable compelling touch-based interaction with computers; (3) Robotic Manipulation: robots that physically manipulate their environment or their own shape, incorporating novel designs, sensors, and control systems. Application areas include surgery, simulation and training, rehabilitation, prosthetics, neuromechanics, exploration of hazardous and remote environments, design, and education. PhD 2000 Stanford

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Peter Pinsky

Professor

MECHANICAL ENGINEERING, CIVIL AND ENVIRONMENTAL ENGINEERING BY COURTESY

Pinsky researches the theory and practice of computational mechanics with a particular interest in the finite element method applied to nonlinear, dynamical, and coupled problems in multiphysics. Areas of current interest include: ocular biomechanics; multiscale modeling of mechanics of the corneal stroma; multiphasic continuum models for tissue elasticity including interactions between solid, fluid, and ionic species; predicting biomechanical response to surgical procedures; multiscale mass transport modeling; molecular-to-continuum

computational framework for study of transdermal drug diffusion; theory of homogenization; drug delivery platform design; vitreous kinetics and retinal drug delivery; modeling diffusive glucose transport in the cornea; computational acoustics; space-time finite element method for transient acoustics; accurate methods for time-harmonic acoustics; exterior problems; optimization and inverse problems; and multifrequency solvers. PhD 1981 UC Berkeley

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Heinz Pitsch

Associate Professor (Research)

MECHANICAL ENGINEERING

Pitsch's research interests are in computational energy sciences. This includes combustion theory, modeling of turbulent reacting flows with large-eddy simulations, development and analysis of chemical kinetic reaction mechanisms, modeling of pollutant formation, development of numerical methods, investigation and modeling of combustion instabilities, and model applications to modern aircraft engine combustion, reciprocating engine combustion, fuel cells, and chemical processing. PhD 1998 RWTH (University of Technology), Aachen

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Friedrich Prinz

Professor; Finmeccanica Professor and Robert Bosch Chair of Mechanical Engineering; Co-Director, Center on Nanostructuring for Efficient Energy Conversion; Director, Nanoscale Prototyping Laboratory

MECHANICAL ENGINEERING, MATERIALS SCIENCE AND ENGINEERING

Prinz's group models and prototypes nanoscale structures to understand the physics of electrical energy conversion and storage. They are exploring the relation between size, composition, and the kinetics of charge transfer. They are also interested in learning from nature, in particular by studying the electron transport chain in plant cells. The Prinz team employs a wide range of nano-fabrication technologies to build and evaluate prototype structures. Such technologies include atomic layer deposition, scanning probe microscopy, and impedance spectroscopy. In addition, the group uses molecular scale modeling to gain insights into the nature of charge separation and recombination processes. PhD 1975 University of Vienna

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Beth Pruitt
Associate Professor

MECHANICAL ENGINEERING

The Pruitt lab researches microfabricated sensors and systems as applied to monitoring and modeling of mechanics in small scale systems, development of novel processes and devices for measuring nanoscale mechanical behavior, operation in harsh environments, and the analysis, design, and control of integrated electro-mechanical systems. They are particularly interested in metrology and modeling for the role of mechanics in biology as well as diagnostic tools and analysis systems, and robust manufacture and design methods for force sensors.
PhD 2002 Stanford

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Bernard Roth
Professor

MECHANICAL ENGINEERING

Roth is academic director and co-founder of the Hasso Plattner Institute of Design at Stanford (the d.school). His design interests include organizing and presenting workshops on creativity, group interactions, and the problem-solving process.
PhD 1962 Columbia

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Juan Santiago
Professor

MECHANICAL ENGINEERING

Santiago's research focuses on the study of microscale transport phenomena including electrokinetic flow, electrohydrodynamic instabilities, and general convective-diffusion-electromigration processes. His research includes the optimization and development of novel micro- and nano-devices for pumping liquids, on-chip electrophoresis, sample preconcentration methods, and miniature fuel cells. The applications of this work include microfabricated bioanalytical systems for genetic analysis, drug discovery, bioweapon detection, drug delivery, and power generation.
PhD 1995 University of Illinois, Urbana-Champaign

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Eric Shaqfeh
Professor and Chair, Chemical Engineering; Lester Levi Carter Professor

CHEMICAL ENGINEERING, MECHANICAL ENGINEERING

Shaqfeh's research program includes the study of different areas associated with transport in complex fluids, including the occurrence of purely elastic instabilities in polymer flows; the micro-dynamics of polymer molecules, including DNA, in nonequilibrium transport; the flow behavior of fiber suspensions; the general microfluidic flow behavior of complex fluids; and the stability of compressible boundary layer flows. His group's approach in these areas includes developing large-scale simulations (including both Brownian dynamics and continuum simulation) of poorly understood phenomena and

then coupling these to detailed experiments to elucidate the important physics in a variety of processes. PhD 1986 Stanford

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Sheri Sheppard

Professor; Co-Director, Center for Design Reseach; Principal Investigator, National Center for Engineering Pathways to Innovation

MECHANICAL ENGINEERING

Sheppard conducts research on weld fatigue and impact failures, fracture mechanics, and applied, finite element analysis. She is particularly concerned with the development of effective engineering tools to allow designers to make more informed decisions regarding structural integrity. PhD 1985 Michigan

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Sindy Tang

Assistant Professor

MECHANICAL ENGINEERING

Tang's research directions include microfluidics, optofluidics, nanophotonics, and bioengineering. PhD 2010 Harvard

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Xiaolin Zheng

Assistant Professor

MECHANICAL ENGINEERING

Zheng's research focuses on the synthesis of combustion and propulsion nanomaterials, and nanomaterials for energy conversion and chemical and biological sensing. PhD 2006 Princeton

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AFFILIATES PROGRAMS

Advances in Biomedical Measurement Science Affiliate Program (ABMS)

Director: Thomas Baer; Administrator: Sara Lefort

Location: Spilker 107B
Phone: 650-723-5627; E-mail: saral@stanford.edu

The Advances in Biomedical Measurement Science (ABMS) program supports research to provide significant improvements in the accuracy and comparability of vital data used to make important research, regulatory, clinical, and manufacturing quality control decisions. The program is co-led by Stanford University and the National Institute for Standards and Technology (NIST). The goals of the ABMS program are to greatly reduce the time for translation of new technology and new drugs into clinical practice, increase safety and efficacy of new pharmaceuticals and greatly decrease the regulatory burden of introducing the next generation of innovative instruments, standardized reagents, protocols, and computational tools needed to improve patient outcomes and reduce healthcare costs.

Aeronautics & Astronautics Industrial Affiliates Program (AAAP)

Director: Juan Alonso; Administrator: Carolyn Edwards

Location: Durand 252; Mail Code: 4035; Phone: 650-723-2867
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URL: http://aa.stanford.edu/affiliates/index.php

The Aero & Astro Affiliates Program facilitates interaction between the department and industry members interested in guidance, control, and navigation systems (including GPS and robotics); composite materials and smart structures; fluid mechanics; aircraft and satellite design; and multidisciplinary design optimization.

Bio-X Corporate Forum (Bio-X)

Executive Director: Heideh Fattaey; Corporate Forum Liaison: Hanwei Li

Location: Clark S1.1; Mail Code: 5446; Phone: 650-725-7882
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URL: http://www.stanford.edu/group/biox/forum/index.html

The Bio-X Corporate Forum provides the opportunity for corporations and other organizations to collaborate and interact with Stanford researchers in the life sciences. The main goals for the Forum are to build relevant and sustainable relationships between companies and Stanford researchers, and to promote the interdisciplinary research mission of Bio-X by attracting additional financial support. The Forum enables corporations to establish links between their scientists and engineers and world-class Stanford scientists. Through the Forum, each company will be invited to participate in seminars, meet with a faculty liaison, and build relationships to learn about leading-edge discoveries as they happen. By fostering the union of academic and corporate research in basic, applied, and clinical sciences, Bio-X enables innovation discoveries and technological advances across the life science spectrum, from the molecular level to living organisms.

Blume Center: Earthquake Engineering Affiliates (BCEEA)

Director: Gregory Deierlein; Administrator: Racquel Hagen

Location: Bldg 540, Rm 118; Mail Code: 4020; Phone: 650-723-4150
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The John A. Blume Earthquake Engineering Center is devoted to the advancement of research, education, and practice in the field of earthquake engineering. Affiliates are invited to visit the Blume Center and participate in various activities. They have facilitated access to the Blume Center's faculty and staff and are encouraged to discuss with them critical issues of mutual concern. Affiliates provide a valuable perspective to the research and development conducted at the Blume Center, and their participation in these activities is essential to the program's goals. Affiliates also receive copies of publications and other material that is available from the Blume Center. Corporations, consulting firms, and individual professionals can become members of the Blume Center Professional Affiliate Program by contributing financially.

Center for Advanced Molecular Photovoltaics (CAMP)

Director: Michael McGehee; Executive Director: Alan Sellinger; Deputy Director: Reinhold Dauskardt; Administrator: Jungmee Kim

Location: McCullough 250; Mail Code: 4045; Phone: 650-723-3183
E-mail: camp@stanford.edu; URL: http://camp.stanford.edu/

CAMP, the Center for Advanced Molecular Photovoltaics at Stanford University, is a research center with the goal of revolutionizing the global energy landscape by developing the science and technology for stable, efficient molecular photovoltaic cells that can compete with fossil fuels in cost per kilowatt-hour produced. While today's best molecular solar cells have efficiencies up to 8.5% and last approximately 2 years in sunlight, our vision is to increase the efficiency to at least 15% and make the cells stable for 10 years or more. Furthermore, developing manufacturing technologies and production of cells at very low cost is also a high priority. CAMP's activities span polymer, small molecular, and dye-sensitized molecular solar cells with research activities in molecular design through advanced quantum mechanical calculations, molecular synthesis, nanostructure engineering and characterization, understanding and engineering carrier recombination, light management, transparent contacts, and the engineering of durable molecular solar cells.

Center for Automotive Research at Stanford (CARS)

Executive Director: Sven Beiker; Director: J. Christian Gerdes

Location: Bldg 550, Rm 131; Mail Code: 2203; Phone: 650-736-1504
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CARS is the interdisciplinary automotive affiliates program at Stanford University. The vision of CARS is to create a community of faculty and students from a range of disciplines at Stanford with leading industry researchers to radically re-envision the automobile for unprecedented levels of safety, performance, sustainability, and enjoyment. Our mission is to discover, build, and deploy the critical ideas and innovations for the next generation of cars and drivers.

Center for Design Research (CDR)

Director: Larry Leifer; Co-Director: Mark Cutkosky; Co-Director: Sheri Sheppard; Deputy Director: Martin Steinert; Consultant: George Toye; Administrator: Anneliese Rogers

Location: Bldg 560; Mail Code: 2232; Phone: 650-723-9233
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URL: http://www-cdr.stanford.edu/

CDR's mission is to support engineering design. Field studies of professional product development teams and laboratory studies of advanced graduate student teams lead to innovations in design process management and supporting collaboration technology. New design and prototyping tools are applied to problems in bio-inspired robotics, human-computer interaction, and dynamic vehicle systems. Based on observations, insights, behavior models, and professional design experience, PhD candidates develop design process instrumentation, metrics, and theoretic frameworks to improve performance. Theory and methods are developed incrementally through iterative interaction analysis. Product-Based Learning curricula like ME310: Team-Based Product Design Development with Corporate Partners serve as simulation environments for real-world product innovation. Approximately 30 PhD students are associated with CDR at any given time.

Center for Integrated Facility Engineering (CIFE)

Director: Martin Fischer; Executive Director: John Kunz; Staff: Calvin Kam; Programs & Administration Manager: Teddie Guenzer

Location: Y2E2, Rm 292; Mail Code: 4020; Phone: 650-723-4945
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URL: http://cife.stanford.edu/

CIFE is a collaborative research effort between the Departments of Civil and Environmental Engineering and Computer Science at Stanford, and practitioners who are leaders as facility owners and managers, architects, engineers, builders, software firms, and construction information providers. In partnership with its industrial members, CIFE aims to be the world's premier academic research center for Virtual Design and Construction (VDC) for capital facility projects. VDC is the use of multi-disciplinary performance models of design-construction projects, including the product (i.e., facilities), work processes, and organization of the design-construction-operation team to support business objectives.

Center for Integrated Systems (CIS)

Research Director: Yoshio Nishi; Executive Director: Richard Dasher; Programs & Administration Manager: Corinne Beck

Location: Allen Bldg; Mail Code: 4070; Phone: 650-725-3617
Fax: 650-725-0991; E-mail: rdasher@stanford.edu
URL: http://cis.stanford.edu/

CIS is a partnership between Stanford University and member industrial firms to produce world-class research and PhD graduates in fields related to integrated systems. CIS areas of interest include hardware and software at all levels of structure in highly integrated computer and network systems, and also semiconductor, electronics, and computer systems within the context of real-world applications. CIS research, PhD fellowships, and knowledge-exchange programs draw on the unique strengths of the university and industry to enhance the productivity and competitiveness of both.

Center for Magnetic Nanotechnology (CMN)

Director: Shan Wang; Executive Director: Robert White; Administrator: Nuvia Pacheco

Location: Geballe Lab for Advanced Materials; Mail Code: 4045
Phone: 650-723-8671; Fax: 650-725-1984
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URL: http://www.stanford.edu/group/nanomag_center/

The mission of the Center for Magnetic Nanotechnology is to stimulate research at Stanford in the area of magnetic nanotechnology, magnetic sensing, and information storage materials; to facilitate collaboration between Stanford scientists and their industrial colleagues; to train well-rounded and highly skilled graduate students; and to develop curricular offerings in the relevant subjects. The center also operates a Nanomagnetics Facility, as well as a Magnetics Forum with annual reviews, workshops, short courses, and conferences on magnetics-based technologies including nanotechnology and information storage. The Stanford Center for Magnetic Nanotechnology supersedes the Center for Research on Information Storage Materials (founded in 1991). The change in the center's name and its operational mode are motivated by the rapidly evolving landscape in the industry and the intellectual environment at Stanford. In particular, as the magnetic recording industry prospers and matures, new industries are emerging, most notably in spintronics and biomagnetics.

Center for Sustainable Development and Global Competitiveness (SDGC)

Director: James Leckie; Executive Director: Jie Wang

Location: Y2E2, Rm 251; Mail Code: 4020; Phone: 650-725-6627
Fax: 650-725-3164; E-mail: sdgcprogram@stanford.edu
URL: http://www.stanford.edu/group/sdgc/index.html

Future economic and business development and competition will be conducted in the context of increasing environmental concerns and limited natural and human resources. Building competitive advantage in a global economy will require addressing the needs of smart business development and innovation in a rapidly changing business ecosystem, while fulfilling social and environmental responsibilities and building a long-lasting foundation for sustainable development. SDGC will provide a platform for Stanford's research and educational communities to collaborate with affiliated global business community members to promote sustainable development while maintaining competitiveness.

Center for Work, Technology & Organization (WTO)

Co-Director: Stephen Barley; Co-Director: Pamela Hinds; Program Coordinator: Lorrie Papadakis

Location: Huang 208; Phone: 650-725-0535
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URL: http://wto.stanford.edu/

WTO is a research center located within the Department of Management Science and Engineering. The center's faculty, graduate students, and industrial research partners are committed to basic and applied research on how work is changing and to designing more effective organizations and technologies. WTO sponsors research projects, colloquia, workshops, and conferences that bring together social scientists, engineers, designers, and managers within the context of an engineering school to address crucial social, organizational, and technical problems in an interdisciplinary manner. We often study technical settings and the organizational issues

that arise at the intersection of work and technology. Our bias is toward field-based research and we are experts in using ethnography to understand work practices in situ. In some cases, we use a combination of qualitative and quantitative methods to investigate phenomena of interest. Our research projects actively involve students at all levels (PhD, Master's, and undergraduate) and often include our research partners from industry as investigators. As we engage with new students and partners, our projects evolve in unanticipated and exciting directions.

Collaboratory for Research on Global Projects (CRGP)

Director: Raymond Levitt; Executive Director: Ryan Orr

Location: Y2E2, Rm 242; Mail Code: 4020; Phone: 650-723-6486
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URL: http://crgp.stanford.edu/

CRGP serves as Stanford's primary forum for research on the development and management of global projects – infrastructure, industrial, commercial, telecommunication, IT, and other projects involving sponsors, financiers, and developers from multiple countries. CRGP is a collaborative undertaking between Stanford University, partner universities, private firms, and government affiliates to advance the science and practice of planning and implementing global projects. The aim of CRGP's research program is to enhance understanding of legal, social, political, financial, and institutional processes that interact in complex ways to affect global project outcomes. Membership in CRGP provides public and private sector organizations engaged in sponsoring, financing, regulating, or developing global projects a range of opportunities for interaction with CRGP faculty and students in all phases of defining and conducting its research on global projects. CRGP offers a three-tier membership structure in order to meet the needs of smaller, more focused industry members as well as large organizations.

Energy & Environment Affiliates Program (EEAP)

Executive Director: Steve Eglash

Location: Y2E2, Rm 396; Mail Code: 4240; Phone: 650-721-1637
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URL: http://eeap.stanford.edu/

The Energy & Environment Affiliates Program facilitates interaction of companies and other organizations with Stanford faculty and graduate students across the full range of energy-related and environmental topics. The scope is broad and encompasses basic physics, chemistry, and materials science; natural resources and biological systems; complex engineered systems such as sustainable buildings and the electric power grid; and societal aspects such as human behavior, regulatory aspects, and public policy. In addressing these topics the affiliates program balances broad coverage of interdisciplinary topics with in-depth treatment of specific focus areas. The list of focus areas evolves over time in response to the interests of affiliates program members and Stanford faculty. Current focus areas include solar photovoltaics, advanced materials for energy applications, smart grid, freshwater, oceans, natural capital, and the built environment. The Energy & Environment Affiliates Program works closely with the Precourt Institute for Energy, the Woods Institute for the Environment, the Geballe Laboratory for Advanced Materials, and many other organizations at Stanford. Affiliates program members receive multiple benefits including invitations to symposia and workshops, access to research papers and computer models,

use of a directory of Stanford research activities in energy and the environment, sponsorship of a graduate student fellowship, facilitated graduate student recruiting opportunities, in-depth interactions with faculty and graduate students, company visits by faculty and graduate students, and opportunity to establish a visiting scientist at Stanford. Visiting scientists have special rights and obligations; further information is available on request.

Energy Modeling Forum (EMF)

Director: John Weyant; Executive Director: Hillard Huntington; Administrator: Pamela McCroskey

Location: Huang 261; Phone: 650-723-0645
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URL: http://www.stanford.edu/group/EMF

EMF seeks to improve the use and usefulness of energy and environmental analysis to the public and private sectors by organizing comparative tests of available models and complementary analyses. These studies are designed to enhance the ability of international, federal, state, and local agencies, energy producing and consuming corporations, and households to plan for market shifts in the energy sector and the introduction of new energy and environmental policies. Current studies focus on global climate change and international natural gas markets and trade.

Industry Affiliate Program for Teaching Design Thinking (PTDT)

Director: Larry Leifer; Programs & Administration Manager: Kristin Burns

Location: Bldg 550; Mail Code 4021; Phone: 650-723-4288
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In this program, student teams and/or individuals are involved in the synthesis of design solutions to problems that are supplied by industry. Membership in this program gives industrial representatives the opportunity for close association with the faculty and students in one of the nation's most highly regarded design education programs. Our affiliate companies are preferentially eligible for participation in project courses.

Initiative for Nanoscale Materials and Processes – Phase 4 (INMP)

Director: Yoshio Nishi; Administrator: Sandra Eisensee

Location: CISX 204; Mail Code: 4075; Phone: 650-724-0068
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This research initiative is focused on metal gate/high k dielectrics/high mobility channel MOSFETs research for the ITRS 22nm and beyond. Both theoretical and experimental study for such devices, device physics, materials science, and innovative new processes has been explored. Included are bilayer metal gate for work function engineering and science, high k dielectrics synthesis and structural analysis, Ge and III-V channel with high mobility n-channel and p-channel MOSFETs. Interfaces for metal-high k dielectrics-substrate are being studied comprehensively by both physical and electrical characterizations as well as interfaces with channel and highly doped source and drain regions.

Management Science and Engineering Industrial Affiliates Program (MSEIA)

Director: Yinyu Ye; Program Manager: Lorrie Papadakis

Location: Huang 308; Mail Code: 4026; Phone: 650-725-0535
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URL: http://www.stanford.edu/dept/MSandE/cgi-bin/corporate/index.php

The MS&E Industrial Affiliates Program directly connects corporations with the department's vast resources: renowned faculty, cutting-edge research centers, and a thriving student community. It is a partnership with industry designed to assist organizations in meeting their challenges while expanding educational and employment opportunities for our students.

MobiSocial Computing Laboratory (MobiSocial)

Faculty Director: Monica Lam; Program Manager: Darlene Hadding

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MobiSocial's goal is to create disruptive mobile and social computing technology that serves consumers' interests and benefits the economy in the long term. Our current focus is to let everyone interact socially with each other, without having to join the same proprietary social network. The success of the project lies in making it FUN for the users and EASY for software developers.

National Performance of Dams Project (NPDP)

Director: Martin McCann

Location: Bldg 540, Rm 124; Phone: 650-723-9323
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URL: http://npdp.stanford.edu/

The NPDP is a cooperative effort of engineers and dam safety professionals in the United States to create an information resource on dams and their performance. The objectives of the NPDP are to retrieve, archive, and disseminate information on the performance of dams. The NPDP creates an information track that facilitates the evaluation and use of dam performance data to improve methods of design and rehabilitation, and the development of effective public policy. The NPDP will provide policy makers with information on the performance of dams that is comparable to data available to professionals and the public in other fields involving public health and safety. Information on public health, such as the rise in tuberculosis cases or the increase in the number of HIV-positive individuals, provides lawmakers and administrators with valuable input to public policy decisions. A goal of the NPDP is to develop resources that will elevate dam safety to a similar level.

Nonvolatile Memory Technology Research Initiative – Phase 2 (NMTRI)

Director: Yoshio Nishi; Director: Sandra Eisensee

Location: CISX 204; Mail Code: 4075; Phone: 650-724-0068
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URL: http://nmtri.stanford.edu/

This initiative for nonvolatile memory research aims at dealing with challenges of increasing needs for embedded memory with high density and low cost with power minimization. NMTRI does this by forming an interdisciplinary team of faculty, staff, and students to look into technical feasibility at the device level and circuit/system level, as well as develop a fundamental understanding for a variety of new nonvolatile memory

phenomena, materials, and processes. NMTRI covers many areas of research: how scalable the various resistance switch materials would be, and studying switching mechanisms from macroscopic model to atomistic model; how selection devices can be integrated with resistive switches in crosspoint arrays; how cell and circuit innovations can improve performance; and how bulk and interface effects control switching reliability, data retention, and endurance. The scope of the initiative is for five years, aiming at possible infusion into 15nm ITRS nodes and beyond.

Open Networking Research Center (ONRC)

Faculty Director: Nick McKeown; Executive Director: Guru Parulkar; Administrator: Flora Freitas

Phone: 650-725-3623; E-mail: ffreitas@stanford.edu
URL: http://onrc.stanford.edu/

The mission of ONRC is to create a comprehensive intellectual framework for software-defined networking and to develop, deploy, and support open source SDN tools and platforms to open up the Internet infrastructure for innovations and enable the larger network industry to build networks that offer increasingly sophisticated functionality yet are cheaper and simpler to manage than current networks. In contrast to most areas of technology, the networking industry has been relatively stagnant over the past 20 years and the basic networking paradigm has remained largely unchanged. As a result, networks are still far too expensive, complex, and difficult to manage. This unfortunate state of affairs is about to change because of two revolutionary developments: the emergence of sophisticated, commodity networking hardware from merchant silicon vendors, and the advent of a radically new approach called software-defined networking. SDN promises to make all networks cheaper, simpler, and easier to manage; the effects of SDN will be felt in the data center, the enterprise wiring closet, the WAN, cellular networks, and the home. SDN originated from research at Stanford and Berkeley, and has now been endorsed by over 65 companies through their membership in the Open Networking Foundation (ONF).

Pervasive Parallelism Lab (PPL)

Director: Oyekunle Olukotun; Program Manager: Darlene Hadding

Location: Gates 302; Mail Code: 9030; Phone: 650-723-1430
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URL: http://ppl.stanford.edu/

The PPL pools the efforts of many leading Stanford computer scientists and electrical engineers with support from industry partners. The center will research and develop a top-to-bottom parallel computing system, stretching from fundamental hardware to new user-friendly programming languages that will allow developers to exploit parallelism automatically. In other words, game programmers who already understand artificial intelligence, graphics rendering, and physics would be able to implement their algorithms in accessible "domain-specific" languages. At deeper, more fundamental levels of software – "under the hood," so to speak – the system would do all the work for them to optimize their code for parallel processing.

Re-inventing the Nation's Urban Water Infrastructure (ReNUWIt)

Academic Director: Richard Luthy; Administrator: Terri Tippets

Location: Y2E2, Rm 191; Phone: 650-862-6897
E-mail: ttippets@stanford.edu; URL: http://urbanwatererc.org/

The vision of the Engineering Research Center (ERC) on Re-inventing the Nation's Urban Water Infrastructure (ReNUWIt) is to harness new knowledge to facilitate the smooth transition of water systems to a new state in which they consume less energy and fewer resources while continuing to meet the needs of urban users and aquatic ecosystems. Our four overarching goals are to: (1) advance urban water reinvention; (2) develop valued technologies and concepts to support urban water reinvention; (3) obtain recognition as a global leader in the field of urban water reinvention; and (4) prepare students to lead efforts to reinvent urban water infrastructure.

Stanford Center for Image Systems Engineering (SCIEN)

Faculty Director: Bernd Girod; Executive Director: Joyce Farrell

Location: Packard 373; Mail Code: 9510; Phone: 650-725-6345
Fax: 650-725-8286; E-mail: bgirod@stanford.edu
URL: http://scien.stanford.edu/

The Stanford Center for Image Systems Engineering (SCIEN) is a partnership between the Stanford School of Engineering and technology companies developing imaging systems for the enhancement of human communication. SCIEN supports multidisciplinary training, research, and collaboration on the design of imaging systems – including methods for acquiring, processing, analyzing, communicating, rendering, and displaying visual information. SCIEN includes faculty from the Stanford Schools of Engineering, Medicine, and Humanities and Sciences who are working on the mathematical, computational, and experimental aspects of imaging systems. Faculty members jointly advise graduate students and collaborate with industry partners on research projects. SCIEN also organizes seminars and workshops that focus on new developments and applications of imaging technologies.

Stanford Center for Position Navigation and Time (SCPNT)

Director: Per Enge; Executive Director: Tom Langenstein

Location: Durand 260; Mail Code: 4035; Phone: 650-725-4108
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URL: http://scpnt.stanford.edu/

Research at the SCPNT is aimed at vastly extending and expanding the benefits of GPS in society. Researchers are exploring several techniques for supplementing the system's reach, accuracy, and resistance to radio frequency interference to make possible diverse new applications. Technologies include smart antennas, MEMS and atom-based sensors such as accelerometers, gyroscopes and oscillators, and low-power GPS integrated circuits. A related focus is on utilizing signals from other satellite navigation systems including GLONASS, Galileo, Compass and QZSS.

Stanford Center for Societal Networks (SCSN)

Director: Balaji Prabhakar; Program Manager: Jennifer Kuo

Location: Packard 275; Phone: 650-725-1606
E-mail: jpkuo@stanford.edu
URL: http://scsn.stanford.edu/index.php

Many challenges faced by modern society, from overcrowded roads to polluted environments, can be reduced when many individuals make small changes. The stakes for society as

a whole are great, but often the stakes per person are too small for people to change their behavior. How can we encourage individuals to do the right thing? The Stanford Center for Societal Networks has been running a series of research projects to study whether incentives, which induce small changes in user behavior, increase efficiency in societal networks. Researchers are studying how randomization, reward size, payout intervals, user interfaces, and social networking might influence the behavior of users in a particular network. Through this research, they are refining their understanding of some general networking and behavioral economics principles.

Stanford Computer Forum Affiliates Program (SCF)

Faculty Director: Mendel Rosenblum; Executive Director: Connie Chan

Location: Gates 274, Mail Code: 9025; Phone: 650-723-9689
E-mail: forumstaff@cs.stanford.edu; URL: http://forum.stanford.edu/

Stanford Computer Forum is a cooperative venture of the Computer Science and Electrical Engineering Departments and 80+ companies located in Silicon Valley, the rest of the United States, Asia, and Europe. By providing a mechanism for developing interaction with industrial researchers and their academic counterparts, the Forum promotes the exchange of the most advanced technological ideas in fields of computer science and electrical engineering. The Forum offers industry the opportunity to become familiar with the professional abilities and interests of Stanford students through its active recruiting program. As an international leader in innovation and technology, Silicon Valley has become a symbol of vitality, entrepreneurship, and economic growth. Close, productive relationships with Stanford University, through the Computer Forum program, are an integral part of this success story. As the world becomes more closely linked through economic ties, communication, and rapid travel, the need to participate in global forums is essential for keeping pace with new and imminent developments.

Stanford Construction Institute (CEM-CI)

Director: Raymond Levitt; Administrator: Evelyn (Eve) Martinez-Santayana

Location: Y2E2, Rm 242; Mail Code: 4020; Phone: 650-723-4447
Fax: 650-725-6014; E-mail: emarsant@stanford.edu
URL: http://cee.stanford.edu/programs/construction/industry/cInstitute.html

The Stanford Construction Institute was launched in 1960 as one of Stanford's first industrial affiliate programs to support enrichment of our Construction MS educational program by allowing us to engage practicing professionals from industry as consulting professors. Since its inception our Construction MS program has offered a unique blend of cutting-edge insights from the ongoing research of our full-time academic faculty with strong coverage of current and evolving industry best practices presented by a superb group of dedicated lecturers and consulting professors from industry. Examples of current research include new ways to measure and promote sustainability in buildings and infrastructure, and work on sensor and control networks to optimize the operation of interconnected intelligent buildings and infrastructure in a new "smart built environment." Industry faculty round out the degree program by teaching classes ranging from construction law and accounting to real estate development, building energy systems, and labor relations.

Stanford Experimental Data Center Lab Affiliates Program (SEDCL)

Faculty Director: Mendel Rosenblum; Administrator: Denise Murphy

Location: Packard 269; Mail Code: 9510; Phone: 650-723-6579
E-mail: mendel@cs.stanford.edu

The Stanford Experimental Data Center Lab welcomes industry partners interested in developing and deploying networking, computing, and storage technologies. Our group focuses on the architecture of future data center networks, scalable DRAM-based storage, massive server virtualization, and cloud computing.

Stanford Photonics Research Center (SPRC)

Executive Director: Thomas Baer; Co-Director: Martin Fejer; Co-Director: Robert Byer; Co-Director: David Miller

Location: Spilker 107; Mail Code: 4088; Phone: 650-723-5627
Fax: 650-725-1822; E-mail: photonics@stanford.edu
URL: http://stanfordphotonics.stanford.edu/

SPRC is an affiliates program that partners Stanford with companies interested in interacting with the university's photonics students, faculty, research, and teaching. SPRC's goal is to support photonics for the mutual, sustained benefit of both Stanford's teaching and research and SPRC's corporate members. SPRC aims to connect members to the fullest possible range of photonics activities across multiple departments at Stanford, such as electrical engineering, applied physics, materials science and engineering, chemistry, and mechanical engineering. This breadth of connection offers members a broad perspective on current and emerging areas in photonics, including the fields of lasers, optics, optoelectronics, nanophotonics and photonic crystals, integration with electronics, nonlinear optics, optical networks, micro-optomechanics, biophotonic sensing, quantum optics, quantum encryption and computing, and nonlinear optical and optoelectronic materials, including semiconductors and organics.

SUNCAT Center for Interface Science and Catalysis (SUNCAT)

Director: Jens Nørskov

Location: Bldg 40, Rm 147; SLAC National Accelerator Laboratory, 2575 Sand Hill Road, Menlo Park, CA 94025; Phone: 650-926-3668
E-mail: norskov@stanford.edu; URL: http://suncat.slac.stanford.edu/

The SUNCAT (SUstainable eNergy through CATalysis) Center for Interface Science and Catalysis is a partnership between SLAC National Accelerator Laboratory and Stanford's Department of Chemical Engineering. The center explores challenges associated with the atomic-scale design of catalysts for chemical transformations of interest for energy conversion and storage. By combining experimental and theoretical methods the aim is to develop a quantitative description of chemical processes at the solid-gas and solid-liquid interface. The goal is to identify the factors controlling the catalytic properties of solid surfaces and to be able to use theoretical and computational methods to tailor new catalysts.

Thermal & Fluid Sciences Affiliates (TFSA)

Director: Gianluca Iaccarino; Administrator: Marlene Lomuljo-Bautista

Location: Bldg 500, Rm 500A; Mail Code: 3035; Phone: 650-723-5616
Fax: 650-725-3525; E-mail: jops@stanford.edu
URL: http://tfsa.stanford.edu/

TFSA is the industrial liaison program of the Flow Physics & Computational Engineering and Thermosciences Groups of the Department of Mechanical Engineering. The program is administered at the faculty level and emphasizes person-to-person communications between Stanford faculty and the industrial representatives. This is the first point of contact for many companies that develop more extensive research collaborations with the faculty.

LABORATORIES, CENTERS, INSTITUTES

Aero Fluid Mechanics Laboratory (AFML)

Director: Brian Cantwell

Location: Durand 051; Mail Code: 4035; Phone: 650-725-3290
Fax: 650-725-3377; E-mail: cantwell@stanford.edu
URL: http://aa.stanford.edu/research/index.php#afm

For basic studies of fluid flows and combustion, facilities at the Aero Fluid Mechanics Laboratory include a low-speed wind tunnel, a high-pressure shock tube, and a small hybrid rocket motor. Instrumentation includes optics and electronics for velocity- and laser-induced fluorescence measurements and local workstations for data analysis. Current research involves the study of combustion at a liquid-gas interface.

Aerospace Robotics Laboratory (ARL)

Director: Stephen Rock; Founder: Robert Cannon (emeritus); Administrator: Dana Parga

Location: Durand 017; Mail Code: 4035; Phone: 650-723-3601
E-mail: rock@stanford.edu; URL: http://www.stanford.edu/group/arl/

ARL creates experimental facilities for developing very advanced human/robot systems, with the human at the discovery and strategic command level and the (physical) robotic system doing real-time planning and execution of the strategy. Each PhD candidate conceives and builds a new total system for carrying out an object-motion mission: versatile industrial automation, free-flying space robots, free-swimming underwater robots, autonomous purely-GPS-controlled helicopters, or very flexible multi-link space arms. Each new idea is carried through to full experimental proof of concept. Air-cushion-floating two-cooperating-arm free flyers perform (in 2D) exactly as they would in space. High precision and speed of large, very flexible manipulators are achieved via quick minis at their end points. They can handle payload spacecraft having unknown dynamics. The free flyers are controlled also by GPS (alone!), both indoors and out; and they now do formation flying, as will future helicopters. New research will develop control of autonomous planetary rovers using local GPS pseudo-satellites. ARL's deep underwater work is done in close cooperation with the Monterey Bay Aquarium Research Institute.

Aircraft Aerodynamics and Design Group (AADG)

Director: Ilan Kroo

Location: Durand 165; Mail Code: 4035; Phone: 650-723-1640
Fax: 650-725-3314; E-mail: kroo@stanford.edu
URL: http://aero.stanford.edu/ADG.html

The Aircraft Aerodynamics and Design Group is involved with research in applied aerodynamics and aircraft design. The work ranges from the development of computational and experimental methods for aerodynamic analysis to studies of unconventional aircraft concepts and new architectures for multidisciplinary design optimization.

Army High-Performance Computing Research Center (AHPCRC)

Director: Charbel Farhat

Location: Durand 257; Mail Code: 4035; Phone: 650-725-3840
Fax: 650-725-3525; E-mail: cfarhat@stanford.edu
URL: http://www.stanford.edu/group/frg

Led by Stanford University and in partnership with the University of Texas at El Paso, New Mexico State University at Las Cruces, and Morgan State University, the Army High-Performance Computing Research Center focuses on advancing the state of the art of computational-based engineering sciences and high-performance computing, and providing maximum support and impact on the Army's transformation for the 21st century. The center's research program focuses on fundamental problems associated with multi-scale and multi-physics modeling, scalable numerical algorithms, computer architecture, parallel programming tools, and the education of the next generation of scientists and engineers in these areas. Current applications include under body blasts, blood transfusion on the battlefield and inhalation of toxic agents in the lungs, nano-electromechanical devices, scalable computational geometry, and exascale computing.

Biomotion Research Group (BRG)

Director: Thomas Andriacchi; Administrator: Melanie Cole

Location: Durand 061; Mail Code: 4038; Phone: 650-723-8024
Fax: 650-725-1587; E-mail: tandriac@stanford.edu
URL: http://www.stanford.edu/group/biomotion

Researchers in the Biomotion Research Group study normal and pathological function, which can ultimately be applied to the improved evaluation and treatment of musculoskeletal disease and injury. The goals are addressed by studying normal subjects and patients with injury or disease that influences the function of the musculoskeletal system. In addition, the biomotion group is committed to the development of improved methods for the measurement and analysis of human movement. The biomotion laboratory is an important component in the overall biomechanics research within the Department of Mechanical Engineering.

Brown Institute for Media Innovation

Director: Bernd Girod; Program Manager: Kelly Yilmaz

Location: Packard 373; Mail Code: 9510; Phone: 650-723-4539
Fax: 650-724-3648; E-mail: kelly.yilmaz@stanford.edu
URL: http://brown.stanford.edu/

Established in 2012, the David and Helen Gurley Brown Institute is a collaboration between Columbia University and Stanford University, designed to encourage and support new endeavors in media innovation. At Stanford, the primary focus is on media technology, and the Institute is anchored in the School of Engineering. At Columbia, the primary focus is on content, and the Institute is anchored in the Graduate School of Journalism. To achieve its goals, the Brown Institute operates as an academic venture forum. Once per year, we invite the Columbia and Stanford communities to submit proposals for Magic Grants. We look for ideas that are original and have the potential to bring true innovation in the media world. Typically, a Magic Grant supports a small team of graduate or postgraduate students who are expected to demonstrate the relevance and viability of their ideas by implementing a prototype or creating an innovative media product. Successful projects might continue as business ventures outside the

universities. The Institute also awards fellowships; Brown Fellows are postgraduate or graduate students who support the Institute together with their peers and the directors, while working toward engineering prototypes, creating innovative media products, or carrying out related research. Brown Fellows are appointed annually for the academic year; their terms can be renewed.

Center for Turbulence Research (CTR)

Director: Parviz Moin; Administrator: Deborah Michael

Location: Bldg 500, Rm 500A; Mail Code: 3035; Phone: 650-723-5616
Fax: 650-725-3525; E-mail: turbulence@stanford.edu
URL: http://ctr.stanford.edu/

At the Center for Turbulence Research, faculty, postdoctoral fellows, graduate students, and visiting fellows use computer simulation methodology to conduct studies of turbulent flows aimed at improving prediction methods and developing concepts for turbulence control for engineering applications. Specific areas of interest include external and internal aerodynamics, distributed control, reacting flows and combustion, heat transfer, parallel computing, numerical methods for partial differential equations, stochastic differential equations, aeroacoustics and hydroacoustics, plasmas, planetary formation, and molecular dynamics.

Center on Nanostructuring for Efficient Energy Conversion (CNEEC)

Co-Director: Friedrich Prinz; Co-Director: Stacey Bent; Administrator: Elizabeth Mattson

Location: Bldg 530, Rm 226; Mail Code: 3030; Phone: 650-723-6488
Fax: 650-723-5034; E-mail: emattson@stanford.edu
URL: http://cneec.stanford.edu/

The world's growing energy needs will require not one but a collection of extremely efficient energy technologies that will work in concert to produce, store, and use the large amounts of energy that humans will soon demand. To provide a scientific foundation for break-out high-efficiency, cost-effective energy technologies, CNEEC research activities are focused on the following goals: employing nanostructuring to generate high gradients, high surface-to-volume ratios, and low dimensionality leading to improved energy conversion efficiency; manipulating materials at the nanometer scale to increase efficiency of energy conversion devices; and exploiting fundamental advances in charge transport, optical absorption, and equilibrium control to improve performance and efficiency in energy conversion devices.

Collaborative Haptics and Robotics in Medicine Lab (CHARM Lab)

Principal Investigator: Allison Okamura; Administrator: Anneliese Rogers

Location: MERL, Rm 129; Mail Code: 2232; Phone: 650-736-3458
Fax: 650-723-3521; E-mail: aokamura@stanford.edu
URL: http://charm.stanford.edu/

CHARM Lab research focuses on developing the principles and tools needed to realize advanced robotic and human-machine systems capable of haptic (touch) interaction, particularly for biomedical applications. Haptic systems are designed and studied using both analytical and experimental approaches. Topics of particular interest are: Teleoperation – devices, models, and control systems that allow human operators to manipulate environments that are remote in scale and/or

distance; Virtual Environments – models, control systems, and devices that enable compelling touch-based interaction with computers; and Robotic Manipulation – robots that physically manipulate their environment or their own shape, incorporating novel designs, sensors, and control systems. Application areas include surgery, simulation and training, rehabilitation, prosthetics, neuromechanics, exploration of hazardous and remote environments, design, and education.

Computer Systems Laboratory (CSL)

Director: Mendel Rosenblum

Location: Gates 351; Mail Code: 9040; Phone: 650-723-1440
Fax: 650-725-7398; E-mail: mendel@cs.stanford.edu
URL: http://csl.stanford.edu/

CSL is a joint research and teaching laboratory sponsored by the Departments of Electrical Engineering and Computer Science. Research in CSL spans all areas of computer systems, from programming language theory and verification to integrated circuit design and special computer architectures. The systems area encompasses both experimental and theoretical work involving topics in operating systems, computer networking, architecture, compilers, programming languages, information management, database systems, graphics, reliability and fault tolerance, system specification and verification, and user interfaces.

Edward L. Ginzton Laboratory (ELG)

Director: Olav Solgaard; Deputy Director: Butrus (Pierre) Khuri-Yakub

Location: Spilker Bldg; Mail Code: 4088; Phone: 650-723-0111
Fax: 650-725-9355; E-mail: solgaard@stanford.edu
URL: http://www.stanford.edu/group/ginzton/

The Ginzton Laboratory houses research in electrical engineering and applied physics concerned with quantum electronics, lasers, mesoscopic devices, optical interconnects, fiber optics, scanning optical microscopy, acoustics, nondestructive testing, superconductivity, condensed matter, scanning force and tunneling microscopy, and fabrication of nanostructures.

Engineering Risk Research Group (ERRG)

Director: M. Elisabeth Paté-Cornell

Location: Huang 326; Mail Code: 4027; Phone: 650-725-1624
Fax: 650-723-1614; E-mail: scor@stanford.edu
URL: http://www.stanford.edu/group/ERRG

The mission of ERRG is the analysis, mathematical modeling, and management of the safety of engineered systems using probabilistic methods and systems analysis. The objective is to identify the most cost-effective risk reduction measures, including both technical and organizational solutions, in complex systems. Decision analysis is often used to make the final choice among a spectrum of risk mitigation options. Fields of application studied in the ERRG include space systems, medical procedures and devices, offshore oil platforms, counterterrorism and national security, financial problems of the insurance industry, and software risk analysis.

Environmental Fluid Mechanics Laboratory (EFML)

Director: Stephen Monismith; Sr. Research Associate: Derek Fong; Administrator: Yusong Rogers

Location: Y2E2, Rm 126; Mail Code: 4020; Phone: 650-723-4372
Fax: 650-725-9720; E-mail: ysrogers@stanford.edu
URL: http://cee.stanford.edu/programs/efml/index.html

EFML carries out numerical, experimental, and field research focusing on environmental applications of fluid mechanics. The lab contains facilities for studying stratified flows, rotating flows, surface waves, environmental boundary layer flows, and flow-organism interactions. The lab also has available a suite of field instruments, including a REMUS autonomous underwater vehicle for making measurements of currents, salinities, and temperatures in estuaries, lakes, and near-shore waters. Computer facilities, associated with the Peter A. McCuen Environmental Computing Center, which is housed in the EFML, include a number of workstations as well as several Beowulf cluster computers. Undergraduate and graduate fluid mechanics experiments are also conducted in this laboratory as part of the teaching activity.

Geballe Laboratory for Advanced Materials (GLAM)

Director: Paul McIntyre; Director: Zhi-xun Shen; Associate Director: Cynthia Sanchez

Location: McCullough 119; Mail Code: 4045; Phone: 650-723-3183
Fax: 650-723-3044; E-mail: zxshen@stanford.edu
URL: http://www-lam.stanford.edu/

GLAM is an independent laboratory at Stanford under the Dean of Research that supports research programs on advanced materials and fosters research and education for undergraduate, graduate, and postdoctoral students. Its mission is to support interdisciplinary materials research programs and to manage materials characterization facilities for the Stanford materials research community. GLAM consists of about 30 faculty members principally from applied physics, physics, and materials science and engineering, with additional faculty from chemistry, electrical engineering, and mechanical engineering. Current research programs include work on dielectric, magnetic, optical, organic, semiconducting, and superconducting materials. There are strong programs in materials synthesis, materials characterization, physical study, and theory. GLAM is also the home for the Center for Research on Information Storage Materials (CRISM), the NSF-Stanford-IBM NSEC Center for Probing the Nanoscale (CPN), and the IBM/Stanford Center for Spintronics. Located in GLAM is the Stanford Nanocharacterization Laboratory (SNL), which houses state-of-the-art facilities for the characterization of materials. Key instruments include a focused ion beam (FIB), scanning and transmission electron microscopy (SEM and TEM), x-ray diffraction (XRD), x-ray photoemission spectroscopy (XPS), scanning probe microscopy (SPM/AFM), and electron microprobe (EMPA). These facilities are open to the entire Stanford materials research community and are operated by a knowledgeable, professional staff.

Global Climate and Energy Project (GCEP)

Director: Sally Benson; Managing Director: Richard Sassoon

Location: Y2E2, Rm 324; Mail Code: 2205; Phone: 650-735-3230
Fax: 650-725-9190; E-mail: gcep@stanford.edu
URL: http://gcep.stanford.edu/

GCEP was established to perform fundamental, pre-commercial research on technologies that will foster the development of a global energy system with low greenhouse

emissions. GCEP develops and manages a portfolio of innovative research activities, publishes reports, and conducts workshops and seminars related to energy supply, transformation, and use with low emissions of greenhouse gases. The project's energy-related research is currently being conducted by a number of Stanford professors, postdoctoral researchers, and graduate students.

Gravity Probe B Project (GP-B)

Principal Investigator: C.W.F. Everitt; Co-Principal Investigator: Bradford Parkinson; Co-Principal Investigator: John Turneaure; Co-Principal Investigator: Daniel DeBra

Location: Physics & Astrophysics Bldg, Rm 119; Phone: 650-725-4103
Fax: 650-725-8312; E-mail: francis@relgyro.stanford.edu
URL: http://einstein.stanford.edu/

Gravity Probe B was a mission testing Einstein's General Theory of Relativity by means of cryogenic gyroscopes in polar orbit around the Earth. Launched from Vandenberg Air Force Base on April 20, 2004, it went through a 17-month, 9-day on-orbit cryogenic operation followed by a fascinating process of data analysis, culminating in a major NASA HQ Public Announcement on May 4, 2011. GP-B provided accurate measurements of two essentially untested aspects of Einstein's theory, the geodetic effect on a mass moving through curved space-time, and frame-dragging due to the Earth's rotation, both with far-reaching implications. As a test of Einstein, it was almost unique in being a controlled physics experiment, as against more conventional astrophysical observations. The program has produced 86 PhDs at Stanford and 14 elsewhere. During its history, 353 undergraduates from 11 different Stanford departments and 56 high school students have also participated, with a considerable number of undergraduate honors theses and university and national awards. Work is currently in process on a Classical & Quantum Gravity special volume to provide full accounts of the unique technologies that made the mission happen.

Hansen Experimental Physics Laboratory (HEPL)

Director: Peter Michelson; Deputy Director: Mark Kasevich; Managing Director: Nancy Christiansen

Location: Physics & Astrophysics Bldg; Phone: 650-724-7667
E-mail: nchristiansen@stanford.edu
URL: http://www.stanford.edu/group/hepl/

HEPL, an independent laboratory, supports interdisciplinary research programs in fundamental science and engineering. In partnership with departments, HEPL provides unique research and educational opportunities for undergraduate, graduate, and postdoctoral students.

Hasso Plattner Institute of Design at Stanford (d.school)

Director: David Kelley; Executive Director: George Kembel

Location: Bldg 550, Rm 169; Mail Code: 4021; Phone: 650-736-1025
Fax: 650-723-3521; E-mail: info@dschool.stanford.edu
URL: http://dschool.stanford.edu/

The d.school is a place for Stanford students and faculty of many disciplines to learn and engage in design thinking and to work together to solve big problems in a human-centered way. It is a place where people from big companies, startups, schools, nonprofits, government, and anyone else who realizes the power of design thinking can join in multidisciplinary teaching, prototyping, and research. The d.school brings multidisciplinary teams of faculty and students together with public and private organizations to tackle complex problems.

They start by understanding how those problems affect people and then address them by iteratively designing solutions such as products, environments, and services.

High Temperature Gasdynamics Laboratory (HTGL)

Director: Reginald Mitchell; Administrator: Perry Thoorsell

Location: Bldg 520; Mail Code: 3032; Phone: 650-723-1745
Fax: 650-723-1748; E-mail: remitche@stanford.edu
URL: http://thermosciences.stanford.edu/labs/lab_gasdynamic.html

HTGL houses experimental research in the areas of energy science, combustion science, propulsion, pollution science, fluid mechanics, spray dynamics, plasma science, materials synthesis, and laser-based optical diagnostics. Typical topics include fundamental aspects of spray combustion, coal and biomass combustion and gasification, synthetic fuels, plasma-assisted materials processing, plasma propulsion, mixing and reaction of gases at subsonic and supersonic speeds, advanced air-breathing propulsion, pulse detonation engines, chemistry of pollutant formation, reactive gasdynamics, and plasma chemistry. Research activities include determination of spectroscopic parameters in high temperature gases, measurement of reaction rate parameters in combustion gases, development of laser-based diagnostic methods for probing various properties of gaseous flows, and use of diode laser sensors for process monitoring and control.

Information Systems Laboratory (ISL)

Director: Stephen Boyd

Location: Packard Bldg
E-mail: boyd@stanford.edu; URL: http://isl.stanford.edu/

The Information Systems Laboratory (ISL) in the Electrical Engineering Department at Stanford University includes around 30 faculty members, 150 PhD students, and 150 MS students. Research in ISL focuses on algorithms for information processing, their mathematical underpinnings, and a broad range of applications. Core topics include information theory and coding, control and optimization, signal processing, and learning and statistical inference. ISL has active interdisciplinary programs with colleagues in Electrical Engineering, Computer Science, Statistics, Management Science, Aeronautics and Astronautics, Computational and Mathematical Engineering, Biological Sciences, Psychology, Medicine, and Business. ISL research is sponsored by US government agencies including NSF, NIH, and DARPA; by industry; and by university centers such as the Center for Integrated Systems, Precourt, TomKat, the Stanford Center from Image Systems Engineering, and Brown Institute for Media Innovation.

Institute for Computational and Mathematical Engineering (ICME)

Director: Margot Gerritsen; Programs & Administration Manager: Mayita Romero

Location: Huang 060; Mail Code: 4042; Phone: 650-724-3313
Fax: 650-497-8040; E-mail: mayitar@stanford.edu
URL: http://icme.stanford.edu/

ICME leverages the outstanding strengths of Stanford in engineering applications and physical, biological, and Earth sciences to focus and guide the development of modern research and educational enterprise in computational mathematics. ICME's central research mission is the development of sophisticated algorithmic and mathematical tools, which impact many different applied disciplines.

John A. Blume Earthquake Engineering Center (JBEEC)

Director: Gregory Deierlein; Administrator: Racquel Hagen

Location: Bldg 540; Mail Code: 3037; Phone: 650-723-4150
Fax: 650-725-9755; E-mail: jabeec-info@stanford.edu
URL: http://blume.stanford.edu/

The Blume Center was established to promote research and education in earthquake engineering. Through its activities, our understanding of earthquakes and their effects on facilities and structures is continuously improving. Faculty and students at the center conduct research, provide instruction, publish reports and articles, and conduct seminars and conferences. The center also provides financial support for students.

Magnetic Resonance Systems Research Laboratory (MRSRL)

Director: Dwight Nishimura; Director: Albert Macovski; Director: John Pauly

Location: Bldg 565; Mail Code: 9510; Phone: 650-725-5638
Fax: 650-723-8473; E-mail: dwight@mrsrl.stanford.edu
URL: http://www.stanford.edu/group/mrsrl

The MRSRL research group focuses on developing new acquisition and processing methods for improved magnetic resonance imaging (MRI). The MRSRL pursues a wide variety of projects related to new applications and hardware for MRI. A lab housing a fully equipped GE 1.5 T Signa MRI scanner is used for this research.

Manufacturing Modeling Lab (MML)

Director: Kurt Beiter

Location: Thornton 207; Mail Code: 4022; Phone: 650-723-7340
E-mail: kbeiter@stanford.edu

MML serves as a repository of manufacturing models as well as a focus of research on design and manufacturing integration. The laboratory has working relationships with the Stanford Graduate School of Business through the university's Global Supply Chain Management Forum, Center for Design Research (CDR), and Center for Integrated Facilities Engineering (CIFE), Work Systems Collaborative Research Lab (CRL/MS&E). MML's research develops methods and tools for system design and management to improve the life-cycle quality of products and processes. The lab applies structured techniques to support "Design for X" decisions addressing robustness, reliability, serviceability, variety, flexibility, and sustainability. Recent research foci include scenario-based amorphous design and decision analytical scorecarding. MML is also home of Stanford's renowned graduate course ME310: Design for Manufacturability.

Max Planck Center for Visual Computing and Communication (MPC-VCC)

Faculty Director: Bernd Girod; Executive Director: Joyce Farrell

Location: Packard 373; Mail Code: 9510; Phone: 650-725-6345
Fax: 650-725-8286; E-mail: bgirod@stanford.edu
URL: http://www.mpc-vcc.org/

The Max Planck Center for Visual Computing and Communication (MPC-VCC) was established by the Max Planck Society for the Advancement of Science and Stanford University in October 2003. The two institutions recognized the high potential of a mutually beneficial cooperation in the field of visual computing and communication, and the desire of their scientists to conduct joint research. The center supports research collaborations between faculty at Stanford and researchers at the Max Planck Institute for Informatics

by providing graduate and postdoctoral fellowships in the Stanford School of Engineering. MPC-VCC also supports the professional development of a small number of selected, outstanding individuals by providing them with the opportunity to work at Stanford as Visiting Assistant Professors for two years and then return to Germany to continue their research as senior researchers at the Max Planck Institute for Informatics and ultimately as professors or research leaders in industry.

Nano-Photonics Laboratory

Director: Lambertus Hesselink

Location: CIS-X, B104 and B114; Mail Code: 4075; Phone: 650-723-9127
E-mail: bert@kaos.stanford.edu

The Nano-Photonics Lab studies ultra-dense digital optical data storage, optical super-resolution, nonlinear optics, nanostructures, and visualization of scientific data. The lab contains facilities for digital image processing, extensive optical laboratory facilities, crystal growth facilities, and state-of-the-art computing facilities, including graphics machines for efficient visualization of complex 4D scientific data sets. A new effort in nanoscale information processing machines and telecommunications has resulted in new highly efficient nano-scale apertures for ultra-high-resolution microscopy, and optical tweezers for manipulation of single molecules.

Nanoscale Prototyping Laboratory (NPL)

Director: Friedrich Prinz; Administrator: Hong Clark

Location: Bldg 530, Rm 226; Mail Code: 3030; Phone: 650-723-6488
Fax: 650-723-5034; E-mail: hongma@stanford.edu
URL: http://npl-web.stanford.edu/

The Nanoscale Prototyping Laboratory creates, models, and prototypes nanoscale structures to understand the physics of electrical energy conversion and storage. They explore the relation between size, composition, and the kinetics of charge transfer. They are also interested in learning from nature, in particular by studying the electron transport chain in plant cells. The lab employs a wide range of nano-fabrication technologies to build and evaluate prototype structures. Such technologies include atomic layer deposition, scanning probe microscopy, and impedance spectroscopy. In addition, they use molecular scale modeling to gain insights into the nature of charge separation and recombination processes.

National Center for Engineering Pathways to Innovation (The Epicenter)

Principal Investigator: Tom Byers; Principal Investigator: Kathleen Eisenhardt; Principal Investigator: Sheri Sheppard; Director: Tina Seelig; Associate Director: Leticia Britos Cavagnaro

Location: Huang 004; Mail Code: 4026; Phone: 650-725-1627
E-mail: epicenter@stanford.edu
URL: http://epicenter.stanford.edu/

Funded by the National Science Foundation and directed by the Stanford Technology Ventures Program, the Epicenter is an education, research, and outreach hub for the creation and sharing of entrepreneurship and innovation resources among engineering schools in the United States. The Epicenter works to unleash the entrepreneurial potential of undergraduate engineering students across the United States to create bold innovators with the knowledge, skills, and attitudes to contribute to economic and societal prosperity.

Neuromuscular Biomechanics Lab (NMBL)

Director: Scott Delp; Program Coordinator: Carolyn Mazenko

Location: Clark Center; Mail Code: 5444; Phone: 650-725-4009
Fax: 650-736-0801; E-mail: delp@stanford.edu
URL: http://www.stanford.edu/group/nmbl/

The Neuromuscular Biomechanics Lab combines experimental and computational approaches to study human movement. Biomechanical models are developed to analyze muscle function, study movement abnormalities, design new medical products, and guide surgery. New computational models of human movement are tested extensively with medical image data and experimental measurements.

Precourt Institute for Energy (PIE)

Director: Franklin Orr

Location: Y2E2, Rm 324; Mail Code: 4240; Phone: 650-725-3230
E-mail: precourt_institute@stanford.edu
URL: http://pie.stanford.edu/index.html

The Precourt Institute for Energy (PIE) at Stanford engages in a broad-ranging, interdisciplinary program of research and education on energy – applying fundamental research to the problem of supplying energy in environmentally and economically acceptable ways, using it efficiently, and facing the behavioral, social, and policy challenges of creating new energy systems for the United States and the world. PIE serves as the hub of a broad and deep network of experts from various science, technology, behavioral, and policy disciplines who are working independently and collaboratively to solve the world's most pressing energy problems. The institute's mission is to advance the goal of major and rapid energy transformations. PIE provides funding and associated support for cutting-edge energy research, creates and maintains avenues for effective communication and intellectual exchange among scholars and others seeking energy solutions, and develops energy-literate leaders and communities through educational programs and the dissemination of research results.

Predictive Science Academic Alliance Program (PSAAP)

Director: Parviz Moin; Programs & Administrative Manager: Rika Bosmans

Location: Bldg 500, Rm 500X1; Mail Code: 3035; Phone: 650-725-2077
Fax: 650-725-3525; E-mail: rbosmans@stanford.edu
URL: http://psaap.stanford.edu/

Hypersonic flight is intrinsically a multi-physics, multi-scale complex system where elements such as fluid dynamics, gasdynamics, turbulence, transport, chemistry, heat transfer, and their interaction play a significant role. However, taking advantage of the hierarchical nature of this system, PSAAP is able to identify and decompose the full system into its unit components. This enables our scientists to investigate in details, both numerically and experimentally, simpler unit-problem systems, advance their understanding, and construct and validate physics-based models that accurately describe and predict them. All these activities are developed within a UQ framework that enables our researchers to integrate and relate individual efforts. Each of their different topical groups focuses on one such elemental system. They all consist of a modeling activity within our QMU framework with parallel and simultaneous experimental support. The modeling aspects concentrate on developing and refining models to be used in our overall QMU activity, while the experimental activities focus on understanding the physics of the problem and providing opportunities for model validation. They are also

sensitive to quantify the uncertainties in the work, and to identify and resolve sources of possible inconsistency between corresponding experimental and numerical efforts for a more systematic comparison of the results.

Product Realization Laboratory (PRL)

Co-Director: David Beach; Co-Director: Craig Milroy

Location: Bldg 550, Rm 114; Mail Code: 4021; Phone: 650-302-2475
Fax: 650-723-3521; E-mail: milroy@stanford.edu
URL: http://prl.stanford.edu/

The Stanford Product Realization Laboratory offers design and prototyping facilities in support of student product creation. The PRL is a teaching laboratory with emphasis on product innovation.

Project-Based Learning Laboratory (PBL Lab)

Director: Renate Fruchter

Location: Y2E2, Rm 280; Mail Code: 4020; Phone: 650-725-1549
Fax: 650-723-4806; E-mail: fruchter@stanford.edu
URL: http://pbl.stanford.edu/

The PBL Lab is a cutting-edge research and learning facility in the Department of Civil and Environmental Engineering. PBL is about teamwork in a rich information and collaboration technology setting. PBL is a process of teaching and learning that focuses on problem-based, project-centered activities that produce a product for a client. PBL is based on reengineered processes that bring people from multiple disciplines together. Undergraduate students have the opportunity to understand and develop a passion for one of the three professions in the context of Architecture/Engineering/Construction (AEC) teamwork and decide what career to pursue. Since 1993 the PBL Lab has been the home for AEC Global Teamwork, which engages students, faculty, and industry mentors worldwide. The growing global network has engaged partner universities and companies from Europe, Asia, and the United States.

Security Lab (SL)

Director: Dan Boneh

URL: http://crypto.stanford.edu/seclab/

The Security Lab is a part of the Department of Computer Science. Research projects in the lab focus on all aspects of computer security including web security, code analysis, security hardware, virtualization, security of mobile devices, and cryptography. PhD students in the lab work on research projects affecting real-world systems as well as theoretical aspects of computer security. The lab offers computer security courses at all levels, from freshmen undergraduate to advanced graduate. Several online and remote courses in computer security are also available. In addition, the lab runs a bi-weekly security seminar open to the public and an annual one-day security workshop on the latest Stanford research in computer security.

Simbios

Principal Investigator: Russ Altman; Co-Principal Investigator: Scott Delp

Location: Clark Center, S231 & S221; Mail Code: 5448
Phone: 650-724-1575; Fax: 650-723-7461
E-mail: simbios@stanford.edu; URL: http://simbios.stanford.edu/

Simbios is an NIH center based at Stanford for physics-based Simulation of Biological Structures. It is one of seven National Centers for Biomedical Computing. Simbios provides

infrastructure, software, and training to help biomedical researchers understand biological form and function as they create novel drugs, synthetic tissues, medical devices, and surgical interventions.

Smart Products Design Lab (SPDL)

Director: Ed Carryer

Location: Thornton 201; Mail Code: 4021
E-mail: carryer@stanford.edu
URL: http://design.stanford.edu/spdl/

The Smart Products Design Lab is the home for mechatronics education at Stanford. Smart Products, a superset of mechatronics, are those whose functionality is increased by an embedded microprocessor. Courses taught include ME 118 and 218 A, B, C and D.

Space and Systems Development Laboratory (SSDL)

Sr. Research Associate: David Lauben

Location: Durand 271; Mail Code: 4035; Phone: 650-723-8651
Fax: 650-723-1685

The Space and Systems Development Laboratory has a major focus at the master's degree level on building CubeSat picosatellites. The CubeSat picosatellite project provides experience for students in the design, fabrication, testing, and operation of a 4-inch cube, 1 kg picosatellite within a one-year period for a very low cost. The laboratory provides opportunities for quick space experimentation and feasibility demonstrations, and qualifications of space parts. The laboratory also supports doctoral research of special spacecraft components and operational methodologies of satellite constellations. The laboratory has computers for space hardware and software design testing. A student-operated ground control station provides picosatellite operational control and training. The laboratory has cooperative relationships with industry and government laboratories such as Space Systems/Loral, Lockheed Martin, Northrop Grumman, The Aerospace Corporation, JPL, NASA Ames RC, Goddard Space Flight Center, and others.

Space, Telecommunications, and Radioscience Laboratory (STAR Lab)

Director: Umran Inan; Administrator: Shaolan Min

Location: Packard 356; Mail Code: 9515; Phone: 650-723-4994
Fax: 650-723-9251; E-mail: inan@ee.stanford.edu
URL: http://www-star.stanford.edu/

The STAR Lab exploits electromagnetic wave phenomena to probe the physical environment of Earth and other planets, and to develop wireless and optical fiber communication systems.

Stanford Artificial Intelligence Laboratory (SAIL)

Director: Andrew Ng; Lab Administrator: Alex Sandra Pinedo

Location: Gates 1A; Mail Code: 9010; Phone: 650-721-6625
Fax: 650-725-1449; E-mail: asandra@cs.stanford.edu
URL: http://ai.stanford.edu/

The Stanford AI Lab (SAIL) is the intellectual home for researchers in the Department of Computer Science whose primary research focus is artificial intelligence. The lab is located in the Gates Computer Science Building and the Clark Center, where 100+ people share the space with 20+ robots. SAIL's mission is to change the way we understand the world. In the past decade, an abundance of data has become available, such as online data on the Web, scientific data such

as the transcript of the human genome, sensor data acquired by robots or by the buildings we inhabit. The list is endless. Turning data into information pertaining to problems that people care about is the central mission of the lab's research, as is a deeper understanding of human-level cognition, perception, and actuation. In short, SAIL researchers seek to develop the next generations of theory, algorithms, and systems that help them attach meaning to bits and bytes. Members of the lab have contributed to fields as diverse as bio-informatics, cognition, computational geometry, computer vision, decision theory, distributed systems, game theory, image processing, information retrieval, knowledge systems, logic, machine learning, multi-agent systems, natural language, neural networks, planning, probabilistic inference, sensor networks, and robotics.

Stanford Center for Professional Development (SCPD)

Executive Director: Paul Marca

Location: Durand 313; Mail Code: 4036; Phone: 650-204-3984
Fax: 650-725-2868; E-mail: scpd-customerservice@stanford.edu
URL: http://scpd.stanford.edu/tilesPublic/organizations.jsp

The Stanford Center for Professional Development partners with employers to offer access to unique, career-long learning opportunities. For a nominal annual fee, companies will receive access to the part-time Master of Science degree program for qualified employees, tuition discounts on graduate courses, and informational events and resources to help promote the education program.

Stanford Nano Center (SNC)

Director: Kathryn Moler; Association Director: Tobi Beetz

Location: Spilker Bldg; Phone: 650-721-2905
E-mail: tobi@stanford.edu; URL: http://snc.stanford.edu/

The SNC shared facilities include some of the most advanced nanoscale patterning and characterization equipment available, complementing the nearby Stanford Nanocharacterization Lab (SNL) and Stanford Nanofabrication Facility (SNF). The new facilities have been built to meet cutting-edge requirements on the control of vibration, acoustics, electromagnetic interference, light, and cleanliness that are essential for the nanoscale instrumentation.

Stanford Nanocharacterization Laboratory (SNL)

Director: Robert Sinclair; Associate Director: Tobi Beetz

Location: McCullough 114; Mail Code: 4045; Phone: 650-723-0400
Fax: 650-723-3044; E-mail: tobi@stanford.edu
URL: http://snl.stanford.edu

The Stanford Nanocharacterization Laboratory (SNL) provides modern facilities for the characterization of materials. It is a sister facility to the Stanford Nanofabrication Facility (SNF) and the Stanford Nano Center (SNC). The instruments are available for all qualified users in the Stanford community and for Stanford collaborators both locally and globally. SNL's mission is to provide high-quality, useful data and insight for as wide a range of users as possible. The lab has several types of high-resolution microscopes, X-ray diffractometers, and surface science analytical instruments.

Stanford Nanofabrication Facility (SNF)

Faculty Director: Roger Howe

Location: Allen 158; Mail Code: 4070; Phone: 650-725-3664
Fax: 650-725-6278; E-mail: rthowe@stanford.edu
URL: http://snf.stanford.edu/

SNF serves academic, industrial, and governmental researchers across the United State in areas ranging from optics, MEMS, biology, and chemistry to traditional electronics device fabrication and process characterization. The SNF is a 10,000-square-foot Class 100 cleanroom facility that provides researchers with effective and efficient access to advanced nanofabrication equipment and expertise. The SNF is a member of the 13-university National Nanotechnology Infrastructure Network funded by NSF and user fees to provide nanotechnology resources to users across the country. The SNF welcomes researchers from any discipline who wish to explore the uses of nanofabrication technology in their work.

Stanford Synchrotron Radiation Lightsource (SSRL)

Director: Chi-Chang Kao; Deputy Director: Piero Pianetta

Location: 2527 Sand Hill Road, Menlo Park, CA 94025; Mail Code: 210
Phone: 650-926-2079 x4000; Fax: 650-926-3600 x4100;
E-mail: stohr@slac.stanford.edu
URL: http://ssrl.slac.stanford.edu/welcome.html

The Stanford Synchrotron Radiation Lightsource, a division of SLAC National Accelerator Laboratory, is operated by Stanford for the Department of Energy. SSRL is a National User Facility that provides synchrotron radiation, a name given to X-rays produced by electrons circulating in a storage ring at nearly the speed of light. These extremely bright X-rays can be used to investigate various forms of matter ranging from objects of atomic and molecular size to man-made materials with unusual properties. The obtained information and knowledge is of great value to society, with impact in areas such as the environment, future technologies, health, and education. SSRL is primarily supported by the DOE Offices of Basic Energy Sciences and Biological and Environmental Research, with additional support from the National Institutes of Health, National Center for Research Resources, Biomedical Technology Program, and the National Institute of General Medical Sciences.

Stanford Technology Ventures Program (STVP)

Co-Director: Tom Byers; Co-Director: Kathleen Eisenhardt;
Executive Director: Tina Seelig; Associate Director: Forrest Glick

Location: Huang 003; Mail Code: 4026; Phone: 650-723-2164
Fax: 650-723-1614; E-mail: tseelig@stanford.edu
URL: http://stvp.stanford.edu/

Hosted by the Department of Management Science & Engineering, STVP is the entrepreneurship center within the School of Engineering. STVP is dedicated to accelerating technology entrepreneurship education and scholarly research that benefits Stanford students, the larger Silicon Valley ecosystem, and a worldwide audience of engineers, scientists, educators, and entrepreneurs. Through a comprehensive offering of courses, STVP provides undergraduate and graduate students from all majors with the entrepreneurial skills needed to create and leverage innovations to solve problems. Their research efforts tackle the challenges of creating successful ventures and innovative large firms, and then delivering that knowledge to the classroom and through publication. STVP's outreach programs include international conferences on entrepreneurship education, global partnerships with leading

universities, and Stanford's Entrepreneurship Corner, which provides free access to thousands of videos and podcasts from our DFJ Entrepreneurial Thought Leaders Seminar.

Stanford Woods Institute for the Environment (Woods)

Faculty Director: Jeffrey Koseff; Faculty Director: Barton Thompson; Program Coordinator: Brenda Pascual

Location: Y2E2, Rm 221; Mail Code: 4205; Phone: 650-736-8668
Fax: 650-725-3402; E-mail: environment@stanford.edu
URL: http://woods.stanford.edu/

The Stanford Woods Institute for the Environment harnesses the expertise and imagination of leading academics and decision-makers to create practical solutions for people and the planet. In the same spirit that inspired Stanford's role in Silicon Valley's high-tech revolution, the Woods Institute is pioneering innovative approaches to meet the environmental challenges of the 21st century – from climate change to sustainable food supplies to ocean conservation. The Woods Institute carries out its mission by sponsoring research that will lead to new solutions to global environmental sustainability issues; infusing science into policies and practices of the business, government, and NGO communities; developing strong environmental leaders for today and the future; and serving as a catalyst and a hub for the university's interdisciplinary work in environmental research, education, and action.

Structures and Composites Laboratory (SCL)

Director: Fu-Kuo Chang

Location: Durand 054; Mail Code: 4035; Phone: 650-723-3466
Fax: 650-725-3377; E-mail: www@structure.stanford.edu
URL: http://structure.stanford.edu/

Research at the Structures and Composites Laboratory encompasses design, manufacturing, and analysis of structures with new materials and with built-in sensors, actuators, electronics, and processors to enhance structural performance, functionality, durability, reliability, and reparability. Topics include design of multi-functional material systems and structures for self-diagnosis, self-sensing, damage control and repair, damage tolerance and design of composite structures, and modeling and simulation of advanced structures. Target applications range from space and aircraft structures to civil infrastructures, to biomedical structural devices. The laboratory is providing new technologies, design methods, tools, data, and prototypes for making high-efficiency and high-performance multi-functional structures.

Systems Optimization Laboratory (SOL)

Director: Walter Murray; Administrator: Lorrie Papadakis

Location: Huang 310; Mail Code: 4026; Phone: 650-380-2430
Fax: 650-723-1614; E-mail: walter@stanford.edu
URL: http://www.stanford.edu/group/SOL

SOL carries on a synergy program of algorithmic development, model formulation, software production, and theoretical research in the area of large-scale mathematical programming and optimization. SOL software is widely distributed and is also used in many application packages arising in areas such as finance, design, and online control.

TomKat Center for Sustainable Energy (TKC)

Director: Stacey Bent; Administrator: Danica Sarlya

Location: Y2E2, Rm 324; Mail Code: 4240; Phone: 650-724-1524
Fax: 650-725-9190; E-mail: dsarlya@stanford.edu
URL: http://tomkat.stanford.edu/

The mission of the TomKat Center for Sustainable Energy is to develop and promote electricity and transportation technologies and policies for an energy future that is environmentally sustainable, secure, affordable, and abundant.

Unsteady Flow Physics and Aeroacoustics Laboratory (UFPAL)

Director: Sanjiva Lele

Location: Durand 250; Phone: 650-723-7721
E-mail: lele@stanford.edu; URL: http://flowgallery.stanford.edu/index.html

Research areas of current focus in the Unsteady Flow Physics and Aeroacoustics Laboratory include turbulence simulations, compressible shear flows, transition in boundary layers, aeroacoustics, jet noise, turbine blade heat transfer, aircraft vortex wakes and condensation trails, and numerical methods. Computational techniques are developed and used to study the fluid dynamics of a variety of problems.

US-Asia Technology Management Center (US-ATMC)

Director: Richard Dasher

Location: 2470 El Camino Real #200, Palo Alto, CA 94306
Mail Code: 4070; Phone: 650-724-0096; Fax: 650-725-9974
E-mail: rdasher@stanford.edu; URL: http://asia.stanford.edu/

US-ATMC is a project-based education and research center with focus on practical perspectives in international technology management and analysis of international research trends in selected areas of advanced electronics and information technology. Emphasis is on education, research, and outreach about high-tech industries in Asia, including Japan, and their impact on the U.S. science and technology community. Education and outreach programs include seminars and lecture series, videoconferences, and Internet-based dissemination of Asian scientific and technical information. The US-ATMC supports research into topics such as technology transfer, new product development, intellectual property management, global R&D, and the impact of new technologies on industry structure and emerging market growth. Technical areas have included optoelectronics, nanoelectronics, system-on-chip integration, and related software development.

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