Virginia Tech's College Of Engineering

Faculty Expertise Guide 2010-2012

Kevin Kochersberger, a Virginia Tech College of Engineering research associate professor and director of the Virginia Tech Unmanned Systems Laboratory, stands by a re-engineered remote-controlled helicopter. Now in the research and development stage, the fully autonomous helicopter one day could — if disaster strikes — fly into an unsafe urban environment to collect data.

The Commonwealth's Leading College of Engineering is at Virginia Tech

VirginiaTech
Invent the Future

Virginia Tech's College of Engineering Faculty Expertise Guide

(Listed alphabetically by area of expertise)

This brochure presents a listing of selected faculty of Virginia Tech's College of Engineering and their areas of expertise. To contact a faculty member:

- use the telephone number listed next to his or her name,
- call the main department or school number (listed below),
- or contact the News Office in the College of Engineering, 540-231-6641.

Main Telephone Numbers

Aerospace and Ocean Engineering.....**540-231-6611**
Biological Systems Engineering **540-231-6615**
Biomedical Engineering.....**540-231-8191**
Chemical Engineering **540-231-6631**
Civil and Environmental Engineering.....**540-231-6635**
Computer Science **540-231-6931**
Electrical and Computer Engineering **540-231-7494**
Engineering Education **540-231-6555**
Engineering Science and Mechanics **540-231-6651**
Industrial and Systems Engineering **540-231-6656**
Materials Science and Engineering **540-231-6640**
Mechanical Engineering **540-231-6661**
Mining and Minerals Engineering **540-231-6671**
Myers-Lawson School of Construction **540-231-3804**
School of Biomedical Engineering
and Sciences **540-231-8191**

Mailing Addresses

You may correspond with a faculty member by using the individual's name, accompanied by the name of the department, College of Engineering, Virginia Tech, Blacksburg, VA 24061.

Internet Address

http://www.eng.vt.edu/

Overview of Virginia Tech's College of Engineering

The College of Engineering honors its Land Grant heritage by providing to the Commonwealth and to the Nation world-class engineering programs through its various research, education, and outreach activities. *The Leading College of Engineering in the Commonwealth* is the home to 13 departments and the Virginia Tech - Wake Forest School of Biomedical Engineering and Science and the Myers Lawson School of Construction.

We have 316 faculty members, about 6,000 undergraduate majors, and almost 2,000 graduate students. Our well-earned reputation for innovation and leadership includes life sciences research, from green engineering to human medicine. The opportunity and responsibility lies before the College to advance engineering curricula that will educate the engineer, researcher, chief executive officer, or other distinguished leaders for the 21st century; that is, to produce "The Engineer of 2020."

Selected Key Accomplishments

- In its most recent survey of total engineering research expenditures at universities and colleges, the National Science Foundation ranked the Virginia Tech College of Engineering 11th.
- In a move recognized by the National Academy of Engineering for its leadership, the college recently transformed its Engineering Fundamentals program into the Department of Engineering Education. In 2007, Virginia's State Council for Higher Education approved a doctoral degree in engineering education at Virginia Tech, the second of its kind in the U.S.
- "America's Best Colleges 2009" survey released by *U.S. News & World Report* in August 2009 ranks the Virginia Tech College of Engineering's undergraduate program 14th in the nation among all accredited engineering schools that offer doctorates, and eighth among those at public universities. The individual college rankings are based on assessments by deans and senior faculty at peer institutions. Seven of the College's undergraduate engineering programs were ranked among the top 20 among their peer programs.
- The magazine's "America's Best Graduate Schools 2010" survey, released in March 2009, ranked the College's graduate program 27th. The College ranks 17th among engineering schools at public universities. The survey ranks four of Virginia Tech's graduate programs — biological systems, civil, environmental, and industrial engineering — among the top ten in their fields.
- The College also has spearheaded a number of new collaborative programs aimed at bolstering the educational and research strengths of Virginia Tech:
- Most recently, the **Institute for Critical Technology and Applied Science** (ICTAS), under the leadership of Roop Mahajan, the James S. Tucker Professor of Engineering, dedicated its first building, the Nanoscale Characterization and Fabrication Laboratory. Located in Virginia Tech's Corporate Research Center, it is a 32,000 square-foot facility on par with the best nanotechnology labs in the world. ICTAS-I opened in 2009 in the College of Engineering corridor, serving as the institute's home base and housing the School of Biomedical Engineering and Sciences as a principal tenant. The Virginia General Assembly has approved construction of ICTAS-II in the university's life sciences corridor to house research labs with a biotechnology focus and it is currently under construction. The three facilities will provide a total of 200,000 square feet of additional space for College of Engineering researchers and colleagues from the Colleges of Science, Natural Resources, and Veterinary Medicine.
- The **Virginia Tech Myers-Lawson School of Construction**, made possible by a shared $10 million pledge from alumni A. Ross Myers (civil engineering) and John R. Lawson, II (geophysics), is a collaborative program of the university, the College of Engineering and the College of Architecture and Urban Studies (CAUS), as well as the Vecillio Construction Engineering and Management Program in the Via Department of Civil and Environmental Engineering and the Building Construction

Department in CAUS. The school will enhance Virginia Tech's strong position of national leadership in construction education and research.

Existing Research Centers, Groups and Initiatives That Involve Engineering Faculty

NAME OF CENTER / LABORATORY	DIRECTOR OR CONTACT
Advanced Vehicle Dynamics Laboratory	**Corina Sandu**
Baker Environmental Hydraulics Laboratory	**Panos Diplas**
Center for Advanced Separation Technology	**Roe-Hon Yoon**
Center for Automotive Fuel Cell Systems	**Doug Nelson**
Center for Bridge Engineering	**Tommy Cousins**
Center for e-Design	**Janis Terpenny**
Center for Embedded Systems for Critical Applications	**Dong S. Ha**
Center for Energy and the Global Environment	**Saifur Rahman**
Center for Excellence in Aviation Operations Research	**Antonio Trani**
Center for Geospatial Information Technology	**Peter Sforza**
Center for Geotechnical Composite Systems	**George Filz**
Center for Geotechnical Practice and Research	**Mike Duncan**
Center for High End Computing Systems	**Srinidhi Varadarajan**
Center for High Performance Manufacturing	**Robert Taylor**
Center for Human Computer Interaction	**Francis Quek**
Center for Injury Biomechanics	**Warren Hardy**
Center for Innovation in Construction Safety and Health	**Brian Kleiner**
Center for Intelligent Material Systems and Structures	**Dan Inman**
Center for Photonics Technology	**Anbo Wang**
Center for Power Electronics Systems	**Fred Lee**
Center for Power Engineering	**Virgilio Centeno**
Center for Space Science and Engineering Research	**Wayne Scales**
Center for Total Maximum Daily Load and Watershed Studies	**Brian L. Benham**
Center for Turbomachinery Propulsion Research	**Walter O'Brien**
Center for Vehicle Systems and Safety	**Mehdi Ahmadian**
Center for Wireless Telecommunications	
Energy Management Institute	**Michael von Spakovsky**
EXTREME Lab	**Brian Lattimer**
Human Factors Engineering and Ergonomics Center	**Tonya Smith-Jackson**
Innovative Particulate Materials Laboratory	**Kathy Lu**
Institute for Critical Technology and Applied Science	**Roop Mahahan**
Lab for Advanced Research in Information Assurance and Security	**Jung-Min Park**
Lab for Advanced Scientific Computing and Applications	**Layne Watson**
Macromolecules and Interfaces Institute	**Richard Turner**
Multidisciplinary Analysis and Design Center for Advanced Vehicles	**Rakesh Kapania**
Performance Engineering Research Lab	**Steve Southward**
Renewable Materials Research Group	**Justin Barone**
RoMeLa: Robotics and Mechanisms Laboratory	**Dennis Hong**
Rotor Dynamics Laboratory	**Gordon Kirk**
Software Technologies Laboratory	**Mark Howard**
Technology, Open Organizing and Learning Sciences Lab (toolsLab)	**Aditya Johri**
Vibrations and Acoustics Laboratories	**Chris Fuller**
VIPER Services	**Steve Southward**
Virginia Active Combustion Control Group	**Uri Vandsburger**
Virginia Center for Autonomous Systems	**Craig Woolsey**
Virginia Tech Advanced Research Institute	**Saifur Rahman**
Virginia Tech Center for Applied Biomechanics	**Maury Nussbaum**
Virginia Center for Coal and Energy Research	**Mike Karmis**
Virginia Tech Center for Engineering Communications	**Marie Paretti**
Virginia Tech Transportation Institute	**Tom Dingus**
Virginia Water Resources Center	**Stephen Schoenholtz**
Wireless @ Virginia Tech	**Jeff Reed**

ACCIDENT INVESTIGATION

see **Human Factors and Ergonomics**, *Lockhart*

ACID MINE DRAINAGE

see **Applied Environmental Microbiology**, *Pruden*

ACOUSTICS

see also **Human Factors Engineering/Ergonomics**, *Casali*

ACOUSTICS

Name: **Michael J. Roan**
Department: Mechanical Engineering
Office Phone: 540-231-5846
FAX: 540-231-9100
E-mail: mroan@vt.edu
Specialty: Acoustical Signal Processing, Underwater Acoustics and Signal Processing, Detection and Estimation Theory, Information Fusion
Applications: Radar; sonar; target detection and classification; intelligence/surveillance/reconnaissance
Expertise: Development, implementation and testing of information theoretic approaches to acoustical and array signal processing
Examples of Funding Sources: Office of Naval Research, DARPA, U.S. Army

ACOUSTICS AND ACTIVE / PASSIVE NOISE AND VIBRATION CONTROL

Noise Control

Name: **Chris R. Fuller**
Department: Mechanical Engineering
Office Phone: 540-231-7273
FAX: 540-231-8836
E-mail: cfuller@vt.edu
URL: www.VAL.me.vt.edu
Specialty: Noise Control, Structural Acoustics, Active Control, Low Frequency Passive Noise and Vibration Control
Applications: Active control of interior noise in aerospace applications, marine hull radiated noise, launch vehicle payload noise, automobile noise; passive control of low frequency sound in construction, industrial and defense applications
Expertise: Analysis and experiments in structural acoustics; development and implementation of adaptive LMS control codes, active noise control systems, and low frequency passive noise and vibration control
Examples of Funding Sources: NASA, Office of Naval Research, National Science Foundation, U.S. Air Force Office of Scientific Research, Boeing, Intel

ACOUSTICS AND HEAT TRANSFER

see **Fluids and Acoustics**, *Ng*

ADHESION SCIENCE

see **Mechanics of Materials**, *Dillard*

ADHESIVE TESTING

see **Mechanical Design**, *Ohanehi*

AERODYNAMICS

see also **Aircraft Design**, *Mason*
Computational Fluid Dynamics, *Roy*
Fluids and Acoustics, *Ng*

AERODYNAMICS

Name: **Demetri P. Telionis**
Department: Engineering Science and Mechanics
Office Phone: 540-231-7492
Home Phone: 540-951-1456
FAX: 540-231-4574
E-mail: telionis@vt.edu
Specialty: Unsteady Aerodynamics, Industrial Fluid Mechanics, Flow-Induced Vibrations
Applications: Airloads on propellers, pump impellers, helicopter blades, wind turbines; heat exchanger designs and nuclear reactor cooling systems; duct systems and ventilation controls; jet heat transfer
Expertise: Experimental methods like hot-wire and laser-Doppler anemometry with applications on unsteady flows; wind tunnel and water tunnel design and testing
Examples of Funding Sources: National Science Foundation, U.S. Air Force Office of Scientific Research, U.S. Army Research Office, U.S. Department of Transportation, U.S. Department of Energy, NASA, Office of Naval Research, Boeing Vertol Company, Fusion Corporation, IIT, DuPont de Nemours, ICI Films

AERODYNAMICS AND AEROACOUSTICS

Turbulence and Turbulent Flows

Name: **William J. Devenport**
Department: Aerospace and Ocean Engineering
Office Phone: 540-231-4456
FAX: 540-231-9632
E-mail: devenport@vt.edu
URL: www.aoe.vt.edu/flowdata
Specialty: Experimental Studies of Turbulence and Turbulent Flows with a Particular Emphasis on Revealing and Understanding Mechanisms Responsible for Sound Generation, Related Experimental Methods, Related Theoretical Methods and Analysis Techniques, Aerodynamic and Aeroacoustic Testing, Director of the Virginia Tech Stability Wind Tunnel
Applications: Aircraft engines; marine propulsors; airframe noise; fan noise; hull noise; wind turbine noise
Expertise: Hot-wire techniques for single and multi-point three component turbulence measurement; microphone systems for far-field acoustics; particle image velocimetry; surface microphones for pressure measurement; instrumentation development; multidimensional analysis of random data; dynamic calibration techniques
Examples of Funding Sources: U.S. Office of Naval Research, NASA Glenn Research Center, National Renewable Energy Laboratory

AEROELASTICITY

see **Aircraft***, Kapania*

AERO-HYDRODYNAMICS

see **Fluid Mechanics***, Vlachos*

AERONAUTICS

Name: **Joseph A. Schetz**
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Office Phone: 540-231-9056
FAX: 540-231-9632
E-mail: ptiger@vt.edu
URL: www.aoe.vt.edu/people/faculty.php?fac_id=ptiger
Specialty: Experimental and Computational Studies, High-Speed Flows Including Aerodynamics, Heat Transfer, and Jet Propulsion
Expertise: Aerodynamics; aerospace propulsion; aircraft design; instrumentation

Examples of Funding Sources: NASA, U.S. Air Force

AEROSPACE

see also **Acoustics**, *Fuller*
Nonlinear Dynamics and Control, *Ross*

AEROSPACE

Name: **Christopher D. Hall**
Department: Aerospace and Ocean Engineering
Office Phone: 540-231-2314
FAX: 540-231-9632
E-mail: cdhall@vt.edu
URL: www.aoe.vt.edu/~cdhall
Specialty: Spacecraft Design and Spacecraft Dynamics and Control
Applications: Analysis and design of spacecraft subsystems, especially attitude determination and control subsystem
Expertise: Modeling, analyzing, predicting, and controlling the orbital and attitude motion of space vehicles; attitude determination, dynamics, and control; designing space systems; nonlinear systems analysis; perturbation methods
Examples of Funding Sources: U.S. Air Force, U.S. Department of Energy, NASA, National Science Foundation

AEROSPACE ENGINEERING

Name: **Mayuresh Patil**
Department: Aerospace and Ocean Engineering
Office Phone: 540-231-8722
FAX: 540-231-9632
E-mail: mpatil@vt.edu
Specialty: Structures and Dynamics
Applications: Aircraft structures
Expertise: Adaptive structures; aeroelasticity; dynamics and control; structural dynamics
Examples of Funding Sources: U.S. Air Force Office of Scientific Research, National Science Foundation

AEROSPACE ENGINEERING

Name: **Cornel Sultan**
Department: Aerospace and Ocean Engineering
Office Phone: 540-231-0047
FAX: 540-231-9632
E-mail: csultan@vt.edu
Specialty: Dynamics, Control, Structures
Applications: Fixed and rotary wing aircraft guidance, dynamics and control; formation flying spacecraft; adaptive and deployable structures; cell mechanics
Expertise: Flight dynamics and control; coordinated vehicles structural dynamics
Examples of Funding Sources: NASA, Army Research Office, ICTAS

AGENT-BASED MODELING

see **Management Systems**, *Rahmandad*

AGING

see **Biomechanics**, *Madigan*
Ergonomics, *Nussbaum*
Human Factors, *Lockhart*

AGRICULTURAL AIR QUALITY

see **Bioresidue Utilization and Management**, *Ogejo*

AGRICULTURAL MACHINERY

Crop Management

Name: **Robert "Bobby" Grisso**
Department: Biological Systems Engineering

Office Phone: 540-231-6538
Home Phone: 540-563-9576
FAX: 540-231-3199
E-mail: rgrisso@vt.edu
URL: http://filebox.vt.edu/users/rgrisso/Grisso_pubs.htm
Specialty: Management of Engineered Systems, Machinery Management, Precision Agriculture, Farm Safety, Conservation Tillage and Performance of Field Machines, Pesticide Application
Applications: Develop machinery systems for precision farming and the use of spatial and temporal data to develop decision support for crop production; geo-referenced data and time sequenced information is used to determine field efficiency for farm machinery; use of electrical conductivity, aerial photos and soils maps to establish management zones from geo-referenced data; from these management zones adjustments of the yield potential and the other agronomic inputs are used to maximize the economic return for each management crop zone. Accurate and uniform placement of pesticides used in crop production; develop educational programs to reduce farm accidents and recovery from injuries
Expertise: Tillage and traction mechanics; soil compaction, accurate placement of pesticides, geo-referenced data, decision support; improving performance of farm equipment; farm safety
Examples of Funding Sources: U.S. Department of Agriculture, Deere and Company, Spraying Systems Company, U.S. Department of Energy, Oak Ridge National Lab

AGRICULTURE

Name: Theo Dillaha
Department: Biological Systems Engineering
Office Phone: 540-231-6813
FAX: 540-231-1402
E-mail: dillaha@vt.edu
URL: www.bse.vt.edu
Specialty: Environmental and Water Resources Engineering, Agricultural Pollution Control, Sustainable Agricultural Development, International Development
Applications: Evaluation of the effectiveness of best management practices for water quality protection; development of watershed management plans; TMDL development; design of appropriate technology water supply and sanitation systems in developing countries; urban and rural stormwater management planning; use of models for best management practice impact assessment; development of sustainable agricultural and natural resource management plans
Expertise: Agricultural pollution control; appropriate technology water supply and sanitation; erosion control; water quality modeling and monitoring; hydrology; soil and water conservation engineering; watershed management; sustainable agriculture; international development
Examples of Funding Sources: National Science Foundation, U.S. Environmental Protection Agency, U.S. Department of Agriculture, U.S. Agency for International Development, Virginia Department of Conservation and Recreation, Virginia Department of Environmental Quality

AIRCRAFT

see also **Fluid Dynamics***, Simpson*

AIRCRAFT

Structural Mechanics

Name: **Rakesh K. Kapania**
Department: Aerospace and Ocean Engineering
Office Phone: 540-231-4881
Home Phone: 540-552-0475
FAX: 540-231-9632

E-mail: rkapania@vt.edu
Specialty: Aerospace Structures, Finite Element Method
Applications: Analysis of aerospace structures flight loads; analysis of structures made of composites
Expertise: Computational structural mechanics with emphasis on finite element method; inverse problems, probabilistic analysis and design; analysis of composite plates and shells under impact, blast, and other short duration loads; aeroelastic tailoring; computational aeroelasticity; random vibrations; multidisciplinary design optimization
Examples of Funding Sources: U.S. Air Force Office of Scientific Research, National Institute of Aerospace, Langely Research Center, Luna Innovations, U.S. Air Force Research Laboratory, Pratt and Whitney, Airbus

AIRCRAFT DESIGN AND AERODYNAMICS

Name: **William H. Mason**
Department: Aerospace and Ocean Engineering
Office Phone: 540-231-6740
Home Phone: 540-392-6412
FAX: 540-231-9632
E-mail: whmason@vt.edu
URL: www.aoe.vt.edu/people/whmason.html
Specialty: Airplane Design and Applied Aerodynamics
Applications: Airplane design. This includes combining or integrating advances in aerodynamics, propulsion and structures to make airplanes that are more fuel efficient with increased performance. Other applications of this work include designing airplanes to fly at high angles of attack and maneuver more effectively. Specific applications include a transonic transport with a strut, formation flying, and morphing aircraft.
Expertise: Aerodynamic design and analysis, including: optimization and inverse methods for subsonic, transonic, supersonic, and hypersonic flow; aerodynamic design of forebodes for high angle-of-attack, subsonic/transonic expansion corner flows; and multidisciplinary optimization applied to conceptual and preliminary aircraft design. Knowledge of applications of advanced computational fluid dynamics codes; use of supercomputers and related activity in computational flow visualization and grid generation. Includes wind tunnel testing (deputy director of the Virginia Tech Stability Wind Tunnel).
Examples of Funding Sources: NASA, National Science Foundation, Virginia's Center for Innovative Technology, DARPA

AIRPORTS

see **Aviation – Models, Airport Modeling and Engineering***, Trani*

AIR POLLUTION

see also **Environment***, Little*

AIR POLLUTION

Name: **Linsey C. Marr**
Department: Civil and Environmental Engineering
Office Phone: 540-231-6071
FAX: 540-231-7916
E-mail: lmarr@vt.edu
URL: www.airqual.cee.vt.edu
Specialty: Air Quality Engineering
Applications: Air quality management and planning; outdoor air pollution; air quality modeling; environmental exposure and risk assessment; climate change
Expertise: Air pollution emissions; atmospheric models; measurement of gases and particles; motor vehicle emissions; nanoparticles; atmospheric transport, transformation and fate
Examples of Funding Sources: National Science Foundation,

National Oceanic and Atmospheric Administration, U.S. Department of Agriculture

ALGORITHMS

Computational Biology, Bioinformatics

Name: **Lenwood S. Heath**
Department: Computer Science
Office Phone: 540-231-4352
FAX: 540-231-7040
E-mail: heath@vt.edu
URL: http://people.cs.vt.edu/heath/
Specialty: Computational Biology and Bioinformatics
Applications: Microarray experiment design and analysis; multimodal models of biological pathways and networks; genomics; genetic sequence analysis; phylogeny; analysis of biomedical data sets
Expertise: Theoretical computer science; algorithms; graph theory; symbolic computation; computational algebra; computational biology; computational geometry; probabilistic algorithms and analysis; discrete computational models
Examples of Funding Sources: National Science Foundation

ANIMAL WASTE MANAGEMENT

see **Bioresidue Utilization and Management***, Ogejo*

ANSYS FINITE ELEMENT ANALYSIS (SOFTWARE)

see **Mechanical Design***, Ohanehi*

ANTENNAS

see **Communications***, Stutzman*
Radio Engineering*, Ellingson*

ANTENNAS AND COMMUNICATIONS

Name: **William A. Davis**
Department: Electrical and Computer Engineering
Office Phone: 540-231-6307
FAX: 540-231-3362
E-mail: wadavis@vt.edu
URL: http://antenna.ece.vt.edu
Specialty: Antennas, Ultra-Wideband, Planar Antennas, Antenna/Microwave Measurements, Radio Engineering Oscillators, RFID
Applications: Antennas for communication systems, cell phones, and RFID; nonlinear measurement and design of RF circuits, particularly oscillators
Expertise: Analysis, design, simulation and modeling of antennas for communication systems; phased array systems; numerical methods for electromagnetics; RFID; radio frequency circuit analysis, measurement, and design; fundamental limits of antennas and ultra-wideband antennas
Examples of Funding Sources: NASA and U.S. Navy through Applied EM, Inc, Prime Research, Sutron Corporation

ANTENNAS AND COMMUNICATIONS

Name: **Amir I. Zaghloul**
Department: Electrical and Computer Engineering
Office Phone: 703-538-8435
Cell Phone: 301-325-7099
FAX: 703-538-8450
E-mail: amirz@vt.edu
URL: www.ece.vt.edu/faculty/zaghloul.html
Specialty: Antennas, Phased Arrays, Wireless and Satellite Communications
Applications: Antennas for communication systems, satellite and wireless communications, and phased array systems
Expertise: Analysis, design, simulation and modeling of antennas

for satellite and wireless communication systems; phased array systems; beam forming for active phased arrays; multiple-band antennas; printed circuit antennas; RF and microwave systems; communication system analysis and modeling; ground penetrating radar; terahertz technologies; metamaterials

Examples of Funding Sources: National Security Agency's LUCITE Program, National Science Foundation, Space System Loral, AMCON Communications, U.S. Army Research Laboratory

ANTIBIOTIC RESISTANCE

see **Applied Environmental Microbiology***, Pruden*

APPLIED ENVIRONMENTAL MICROBIOLOGY

Name: **Amy Pruden**
Department: Civil and Environmental Engineering
Office Phone: 540-231-3980
FAX: 540-231-7916
E-mail: apruden@vt.edu
URL: www.cee.vt.edu/people/pruden.html

Specialty: Building Advanced Understanding of Complex Microbial Communities in Environmental Systems through the Application of Cutting-Edge Biomolecular Technologies to Improve Engineered Approaches for Achieving Sustainable Water

Applications: Water and waste treatment to reduce antibiotic resistance; fate and transport of antibiotic resistance in urban and environmental systems; environmental bioremediation; acid mine drainage treatment; quantification of Legionella and Mycobacterium

Expertise: Environmental reservoirs of antibiotic resistance; microbial community dynamics in environmental systems; molecular biology

Examples of Funding Sources: National Science Foundation, U.S. Environmental Protection Agency, U.S. Department of Agriculture

APPLIED MATHEMATICS

see also **Fluid Dynamics***, Puri*
Fluid Mechanics*, Stremler*

APPLIED MATHEMATICS (a) and NUCLEAR ENGINEERING (b)

Name: **Mark A. Pierson**
Department: Mechanical Engineering
Office Phone: 540-231-9112
FAX: 540-231-9100
E-mail: mark.pierson @vt.edu

Specialty: Abstract Differential-Algebraic Equations, Applied Functional Analysis (a); Nuclear Safeguards and Nonproliferation, Nuclear Fuel Cycle, Radiation Measurement, Nuclear Reactor Operations and Safety, General Nuclear Engineering (b)

Applications: abstract differential-algebraic equations for Navier-Stokes equations (a); alternative reactor technology including accelerator-driven subcritical systems and proliferation-resistant designs; nuclear fuel cycle analysis and alternative fuel cycles; nuclear waste processing and utilization (b)

Expertise: Existence and uniqueness of solutions; computational solution of equations (a); solving the nuclear waste problem; minimizing proliferation technology from nuclear energy to nuclear weapons (b)

Examples of Funding Sources: Nuclear Regulatory Commission, Department of Energy Office of Nuclear Energy, Army Research Office, NSF, Center for Advanced Engineering and Research (a) and (b)

AQUACULTURE SYSTEMS

see **Environment**, *Boardman*

AQUATIC ECOSYSTEMS

see **Environment**, *Hession*
Environment and Fluvial Hydraulics, *Hester*

ARTIFICIAL INTELLIGENCE

see **Computer Science**, *Egyhazy*

ASSISTIVE TECHNOLOGY

see **Human-Computer Interaction**, *Quek*

ATMOSPHERIC SCIENCE

see **Remote Sensing**, *Bailey*

ATMOSPHERIC AND RADIO SCIENCE

Name: **Wayne A. Scales**
Department: Electrical and Computer Engineering
Office Phone: 540-231-5622
Home Phone: 540-953-2109
FAX: 540-231-3362
E-mail: wscales@vt.edu
Specialty: Atmospheric and Radio Science
Applications: GPS applications
Expertise: Computation science; plasma science; global positioning systems
Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, Office of Naval Research, U.S. Air Force Office of Scientific Research, NASA

AUTOMOBILES

see **Acoustics**, *Fuller*
Injury Biomechanics, *Duma*
Vehicle Dynamics, *Ahmadian*

AUTOMOTIVE POWERTRAINS / ENERGY SYSTEMS

Name: **Douglas Nelson**
Department: Mechanical Engineering
Office Phone: 540-231-4324
FAX: 540-231-9100
E-mail: doug.nelson@vt.edu
URL: www.me.vt.edu/people/faculty/nelson.html
Specialty: Design, Modeling, Analysis, Testing and Research on Hybrid, Plug-in and Electric Vehicle Systems
Applications: Design of hybrid and electric vehicle powertrains to meet performance and fuel economy goals; advance vehicle technology competitions for student projects; construction, testing and validation of vehicle powertrain systems; fuel cell systems for transportation applications; autonomous vehicle energy storage and propulsion
Expertise: Vehicle systems design; energy use in vehicles; electric traction drive systems; battery systems and integration; control systems and hardwars-in-the-loop (HIL); fundamentals of fuel cell energy systems
Examples of Funding Sources: U.S. Department of Energy, Environmental Protection Agency, General Motors

AUTOMOTIVE SAFETY

see **Impact Biomechanics**, *Hardy*

AUTONOMOUS SYSTEMS

Name: **Alexander Leonessa**
Department: Mechanical Engineering
Office Phone: 540-231-6661
FAX: 540-231-9100

E-mail: aleonessa@vt.edu
Specialty: Nonlinear and Adaptive Control, Robotics, Dynamical Systems and Control Theory, Nonlinear System Identification, Underwater Autonomous Vehicles, Control and Navigation Systems, Functional Electrical Stimulation of Human Muscles
Applications: Active control and modeling of propulsion systems; autonomous vehicle control systems; attitude stability and control; robot control; human-robot interaction; functional electrical stimulation
Expertise: System design of robotic platforms; adaptive, self-learning control of autonomous systems; dynamical systems and control theory
Examples of Funding Sources: National Science Foundation, U.S. Office of Naval Research, DARPA

AUTONOMOUS VEHICLES

see **Automotive Powertrains / Energy Systems**, *Nelson*
Control Theory, *Woolsey*
Hydrodynamics, *Neu*

AVIATION

Aviation Modeling, Airport Design and Engineering

Name: **Antonio A. Trani**
Department: Civil and Environmental Engineering
Office Phone: 540-231-4418
Home Phone: 540-953-1617
FAX: 540-231-7532
E-mail: vuela@vt.edu
URL: www.atsl.cee.vt.edu/
Specialty: Modeling and Simulation of Aviation Systems, Large-scale Model Development to Study the Efficiency of Airports and Airspace
Applications: Aviation demand modeling; airport engineering and airport design
Expertise: Aviation systems modeling; airport engineering; airspace and airport analysis interactions
Examples of Funding Sources: NASA, Federal Aviation Administration, National Science Foundation

BEARINGS

see **Rotating Machinery**, *Kasarda*

BIOCHEMICAL ENGINEERING / BIOTECHNOLOGY

Name: **Chenming (Mike) Zhang**
Department: Biological Systems Engineering
Office Phone: 540-231-7601
FAX: 540-231-3199
E-mail: cmzhang@vt.edu
Specialty: Recombinant Protein Expression (Transgenic Plants), Recovery and Purification, Bioprocess Engineering, Biochemical Engineering, Protein Characterization, De Novo Drug Design
Applications: Protein expression, recovery and purification from transgenic plants and other biological systems; therapeutic protein and vaccine production from plants; protein characterization; value-added products from biomaterials and residues; drug designs
Expertise: Process development and optimization for protein recovery and purification; economic assessment of protein purification processes; protein characterizations; plant transformations; design of specific binding domains for enhanced drug-enzyme interaction
Examples of Funding Sources: National Science Foundation, U.S. Department of Agriculture, Jeffress Memorial Trust, National Pork Board

BIOENGINEERING

see **Nondestructive Evaluation of Food***, Mallikarjunan*

BIO-FLUID DYNAMICS

Name: **Sunghwan Jung**
Department: Engineering Science and Mechanics
Office Phone: 540-231-6134
FAX: 540-231-4574
E-mail: sunnyjsh@vt.edu
Specialty: Bio-locomotion in Fluid, Fluid-Structure Interaction
Applications: Small self-propelled machine; cell-material interactions; bio-polymeric fluid
Expertise: Coupling of solid and fluid mechanics; experimental fluid mechanics; theoretical stability analysis

BIOHEAT TRANSFER

see **Heat Transfer***, Mahajan*

BIOINFORMATICS

see **Algorithms***, Heath*
Computational Biology*, Murali*
Computational Science*, Ramakrishnan*
Computer Science*, Feng*
Human-Computer Interaction*, North*
Optimization*, Watson*
Problem Solving Environments*, Shaffer*

BIOINFORMATICS AND BIOIMAGING

Name: **Yue "Joe" Wang**
Department: Electrical and Computer Engineering
Office Phone: 703-528-5500 ext. 223
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E-mail: yuewang@vt.edu
Specialty: Bioinformatics, Bioimaging
Applications: Molecular analysis and personalized treatment of human diseases; computational analysis of gene and protein expressions; predicting pathway gene regulatory networking; computed simultaneous imaging of multiple biomarkers; computer-aided diagnosis
Expertise: Machine learning; neural networks; pattern recognition; computed imaging; multivariate visualization; signal detection and estimation; blind source separation; independent component analysis
Examples of Funding Sources: National Institutes of Health, Department of Defense, National Science Foundation, Department of Energy

BIO-INSPIRED TECHNOLOGY

Name: **Rolf Mueller**
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URL: www.me.vt.edu/people/faculty/Mueller.html
Specialty: Bio-Inspired Technology, Adaptive Beamforming in the Physical Domain, Active and Passive Sonar Sensing, Biological Design Patterns, Neuromimetic Signal Processing
Applications: Wave-based sensing and communication technologies such as sonar and radar; antenna design; autonomous sensing systems for parsimonious smart sensors and autonomous vehicles; biomedical ultrasound and non-destructive testing
Expertise: Analysis of biological form and function; biophysics; acoustics/ultrasonics; numerical analysis; digital signal processing; neural signal processing; statistical signal processing and estimation theory; computer visualization; parallel computing

BIOLOGY

see **Control Systems**, *Baumann*

BIOMASS CONVERSION

Name: **Foster A. Agblevor**
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Specialty: Catalytic Pyrolysis of Biomass, Biomass Characterization, Stream Explosion Treatment of Biomass
Applications: Green diesel production; biomass properties; phenolic chemicals and biobased engineering polymers; xylitol production; odor reducing compounds; low temperature biomass gasification
Expertise: Catalytic pyrolysis; instrumental/chemical characterization of biomass feedstocks; stream explosion of biomass feedstocks; xylitol production from stream exploded material
Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, National Fish and Wildlife Foundation, Farm Pilot Projects Coordination, Bluemoon Fund

BIOMASS HARVEST, STORAGE, AND DELIVERY

Name: **John S. Cundiff**
Department: Biological Systems Engineering
Office Phone: 540-231-7603
FAX: 540-231-3199
E-mail: jcundiff@vt.edu
Specialty: Analysis of Systems for the Harvest, Storage, and Delivery of Biomass; Design of Hydraulics for Mobile Machines
Applications: Design of sensor to measure mass flow into a round baler; use of GIS technology to optimize in-field hauling of round bales; analysis and design of receiving facility to handle herbaceous biomass delivered to a conversion plant; design and testing of frame for shipping round hay bales that emulates the 40 ft. shipping container and uses the mature handling technology developed for loading and unloading these containers
Expertise: Analysis of systems of equipment used to harvest, store, and transport herbaceous biomass to a utilization point; design of machines for harvesting, handling, and preprocessing (wafering, pelleting, cubing) of herbaceous biomass
Examples of Funding Sources: U.S. Department of Agriculture, U.S. Department of Energy, Oak Ridge National Lab, Case-New Holland

BIOMATERIALS

see **Biomaterials and Tissue Engineering**, *Rajagopalan*
Biomechanics, *Dudek*
Biomedical Engineering, *Freeman, Goldstein*
Tissue Engineering, *Morgan*

BIOMATERIALS AND TISSUE ENGINEERING

Name: **Padma Rajagopalan**
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URL: www.che.vt.edu/Faculty/Rajagopalan/
Specialty: Liver and Cornea Tissue Engineering, Cell Mechanics, Design of Synthetic and Natural Polymers for Biomedical Applcations
Applications: Design of three dimensional tissue mimics, cell-cell communications, polymeric basement membranes chemotaxis and mechanotaxis
Expertise: Tissue engineering; design of polymeric biomaterials and biopolymers

Examples of Funding Sources: National Institutes of Health, National Science Foundation, Jeffress Memorial Trust

BIOMECHANICS

see also **Biomedical Engineering***, Grant*
Ergonomics*, Agnew, Nussbaum*
Human Factors and Ergonomics*, Lockhart*
Impact Biomechanics*, Hardy*
Nonlinear Dynamics and Control*, Ross*

BIOMECHANICS

Name: **Raffaella De Vita**
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URL: www.esm.vt.edu/~devita
Specialty: Constitutive Modeling for Nonlinear Elastic, Viscoelastic, Liquid Crystal Biological Systems
Applications: Ligament and tendon grafts; mechanical and biological heart valves; drug delivery systems; biological sensors and actuators
Expertise: Continuum mechanics with emphasis on solid mechanics; cardiovascular mechanics; mechanics of ligaments and tendons; cellular mechanics

BIOMECHANICS

Name: **Daniel M. Dudek**
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URL: www.esm.vt.edu/~dmdudek
Specialty: Biomaterials, Locomotion, and Comparative Organismal Biology
Applications: Biologically inspired robotics; synthetic elastomers
Expertise: Dynamics of running and climbing; mechanics of elastomeric proteins
Examples of Funding Sources: National Science Foundation, National Institutes of Health, DARPA

BIOMECHANICS

Name: **Michael L. Madigan**
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Office Phone: 540-231-1215
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URL: www.biomechanics.esm.vt.edu
Specialty: Biomechanics, Biomedical Engineering
Applications: Musculoskeletal injury prevention; effects of aging on physical performance, balance and fall prevention
Expertise: Biomechanical modeling; effects of neuromuscular fatigue and aging
Examples of Funding Sources: National Science Foundation, National Institutes of Health

BIOMECHANICS

Name: **Jake Socha**
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URL: www.esm.vt.edu/~jjsocha
Specialty: Organismal (Comparative) Biomechanics
Applications: Biomimetics and bio-inspired engineering
Expertise: Animal locomotion; gliding flight in vertebrates; internal flows in insects (including respiration, feeding and circulation);

microtomography; synchrotron x-ray imaging; insects; reptiles
Examples of Funding Sources: National Science Foundation, U.S. Department of Energy

BIOMECHANICS

Crash Safety

Name: **Clay Gabler**
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URL: www.me.vt.edu/gabler
Specialty: Injury Biomechanics, Crash Avoidance, Crashworthiness
Applications: Active and passive crash safety; roadside crash safety; motorcycle crash safety; event data recorders for highway vehicles; advanced airbags; non-invasive detection of alcohol; pedestrian impact protection, reconstruction; societal cost of highway crashes; computational modeling of highway crashes, crash testing
Examples of Funding Sources: National Academy of Science - Transportation Research Board, National Highway Traffic Safety Administration, Federal Highway Administration, New Jersey Department of Transportation

BIOMEDICAL DEVICES

see **Digital Signal Processing***, Nazhandali*

BIOMEDICAL ENGINEERING

see also **Biomechanics***, Madigan*
Energy*, Diller*
Fluid Mechanics*, Vlachos*
Imaging Science*, Wyatt*
Robotics*, Behkam*

BIOMEDICAL ENGINEERING

Name: **Rafael V. Davalos**
Department: School of Biomedical Engineering and Sciences
Office Phone: 540-231-1979
E-mail: davalos@vt.edu
Specialty: Biomedical Microfluidics, Bioheat and Mass Transfer
Applications: Cancer detection and treatment; single cell analysis; image-guided surgery; cell isolation and enrichment
Expertise: Electric fields on cells; dielectrophoretic cell manipulation; irreversible electroporation; micro-electroporation
Examples of Funding Sources: U.S. Department of Engineering

BIOMEDICAL ENGINEERING

Name: **Aaron S. Goldstein**
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FAX: 540-231-5022
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URL: www.che.vt.edu/people_agoldstein.php
Specialty: Musculoskeletal Tissues
Applications: Implantable materials for tissue regeneration
Expertise: Mesenchymal stem cell culture; hydrodynamic shear stress; perfusion bioreactors; cell adhesion; bio-interfacial phenomena; polymer processing
Examples of Funding Sources: National Institutes of Health, National Science Foundation

BIOMEDICAL ENGINEERING

Name: **Joseph W. Freeman**
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Office Phone: 540-231-5686
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Specialty: Ligament Tissue Engineering, Bone Tissue Engineering, Implant Mechanics
Applications: Implantable degradable devices for musculoskeletal tissue regeneration
Expertise: Ligament tissue engineering; bone tissue engineering; collagen mineralization; collagen molecular modeling; soft tissue mechanical behavior; primary cell isolation; cell culture; cellular scaffold production and characterization
Examples of Funding Sources: National Science Foundation, National Institutes of Health

BIOMEDICAL ENGINEERING

Name: **John Wallace "Wally" Grant**
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E-mail: jgrant@vt.edu
Specialty: Biomedical Engineering/Biomechanics
Applications: Applications of engineering principles to medicine, physiology and life sciences
Expertise: Vestibular motion sensing and inner ear physiology and mechanics; aviation medicine; cardiovascular system and function; cardiology; digestive physiology; physiologic modeling
Examples of Funding Sources: National Institutes of Health

BIOMEDICAL ENGINEERING

Name: **Christopher G. Rylander**
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Office Phone: 540-231-0964
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E-mail: cgr@vt.edu
Specialty: Biomedical Optics and Imaging, Bioheat and Mass Transport
Applications: Mechanical and chemical techniques and devices for modifying tissue optical properties; optical coherence tomography (OCT) for in-vivo imaging and diagnosis; laser heating of tissue for therapeutic advantage
Expertise: Optical and thermal laser-tissue interaction; heat and mass transport modeling in biomaterials; experimental techniques including microscopy, infrared thermography and spectrophotometry
Examples of Funding Sources: National Science Foundation, National Institutes of Health

BIOMEDICAL ENGINEERING

Name: **Marissa Nichole Rylander**
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Office Phone: 540-231-3134
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Specialty: Bio-heat Transfer Modeling and Measurement, Thermal Optimization
Applications: Hyperthermia therapies for cancer treatment and cardiac preconditioning; combinatorial procedures using nanotechnology and laser therapy; tumor destruction and likelihood of recurrence prediction following thermal therapy; stress conditioning for tissue engineering and angiogenesis applications
Expertise: Thermal modeling; optimization; parameter estimation; experimental measurement and imaging of protein expression

and injury both in vitro and in vivo; fluorescence microscopy
Examples of Funding Sources: National Science Foundation, National Institutes of Health, Department of Defense; Advance VT

BIOMEDICAL IMAGING

see **Imaging Science***, Wyatt*

BIOPHYSICS

see **Computational Science***, Onufriev*

BIOPOLYMERS

see **Biomaterials and Tissue Engineering***, Rajagopalan*
Polymers*, Barone*

BIOPROCESS ENGINEERING

Bioengineering

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Specialty: Biocatalysts – Cellulase, Fermentation, Recombinant DNA, Sugar Separation and Assays, Biochemical Engineering, Synthetic Biology, Enzyme Engineering, Synthetic Biology, Cellulase Engineering
Applications: New assays developed for enzyme activities, sugars and proteins; production and separation of cellodextrins; cellulase purification by affinity digestion; bioenergetics model for cellulolytic bacteria; novel functionally-based model for biodegradation of solid polymeric substrate; biofuels; cellulosic Ethanol; hydrogen economy; biomass; biorefinery; sugar-powered hydrogen-fuel cell cars; super-energy-storage-density sugar battery (> 10x lithium battery); renewable materials
Expertise: Cellulose hydrolysis mechanisms mediated by cellulases and cellulolytic bacteria; lignocellulose pretreatment; separation of mono-, oligo-mers sugars and protein by chromatography; fermentation scale-up and optimization; reactive biofilm; directed evolution and protein display; biomass conversion; lignocellulose fractionation; cellulose hydrolysis mechanisms and modeling; ultra-low cost recombinant protein purification; directed enzyme evolution; microorganism evolution; cellulose engineering; synthetic enzymatic pathway engineering; the hydrogen economy; carbohydrate economy; sustainability; (transportation) energy efficiency; life cycle analysis
Examples of Funding Sources: U.S. Department of Energy

BIOPROCESS ENGINEERING

Bioproducts Development

Name: **Zhiyou Wen**
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Office Phone: 540-231-9356
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E-mail: wenz@vt.edu
Specialty: Bioprocessing of Agricultural Byproducts, Utilization of Bioresource for Value-Added Products, Development of Bioproducts, Animal Waste Treatment, Fermentation Technology, Process Optimization
Applications: Nutraceuticals (e.g., Omega-3 polyunsaturated fatty acids) production for food industry; anaerobic digestion for biofuel (methane) production and nutrient management; mass algal culture for producing biodiesel feedstock
Expertise: Anaerobic digestion technology; fungal and algal fermentation, plant and animal cell culture fermentation, kinetics and stoichiometry; bioreactor design/operation; scale-up, medium optimization
Examples of Funding Sources: U.S. Department of Agriculture

(National Research Initiative program; Biomass program), Virginia Department of Agriculture and Consumer Services, Virginia Department of Environmental Quality, Virginia Center for Innovative Technology, U.S. Department of Commerce, National Oceanic and Atmospheric Administration

BIORESIDUE UTILIZATION AND MANAGEMENT

Name: **Jactone Arogo Ogejo**
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Specialty: Emission Source Characterization, Waste Treatment Process, Nutrient and Energy (Anaerobic Digestion) Recovery Processes
Applications: Design and evaluation of agricultural waste treatment systems; biogas production from agro-based waste material; monitoring and quantifying gaseous and odor emissions from animal feeding operations; developing mitigation technologies for pollutants from agricultural sources; technology transfer (field scale technology demonstration); nitrogen and phosphorus recovery/removal systems
Expertise: Animal and industrial waste management; mitigation of emissions from agricultural sources; modeling source emissions
Examples of Funding Sources: U.S. Department of Agriculture, U.S. Environmental Protection Agency, National Science Foundation

BRIDGES

see **Construction Materials***, Weyers*

BRIDGE DESIGN

Prestressed Concrete, Reinforced Concrete, FRP Reinforcement for Concrete

Name: **Carin L. Roberts-Wollmann**
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Office Phone: 540-231-2052
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Specialty: Reinforced and Prestressed Concrete Structures, Behavior and Design with Emphasis on Bridges
Expertise: Methods for improving bridge durability and reducing construction time, including RFP reinforcement for concrete, precast concrete bridge deck panels, continuity diaphragm behavior and design
Examples of Funding Sources: Virginia Transportation Research Council, Federal Highway Administration, Precast/Prestressed Concrete Institute, Virginia Center for Innovative Technology

CAPACITY INVESTMENT DECISION

see **Investment***, E. Bish*

CARBON SEQUESTATION

see **Mining***, Karmis*

CATALYSIS

Name: **S. Ted Oyama**
Department: Chemical Engineering
Office Phone: 540-231-5309
FAX: 540-231-5022
E-mail: oyama@vt.edu
Specialty: Environmental Catalysis and Materials
Applications: Reduction of greenhouse emissions (CO_2); activation of methane in membrane reactors; hydrodesulfurization and hydrodenitrogenation of petroleum feedstocks; sulfur-resistant hydrogenation catalysts; ozone decomposition; low-

temperature VOC combustion
Expertise: Catalyst design and synthesis; catalyst characterization and testing; new materials preparation; transition metal carbides, nitrides, and oxides
Examples of Funding Sources: National Science Foundation, Petroleum Research Fund, U.S. Department of Energy

CATALYSIS

Surface Science

Name: **David F. Cox**
Department: Chemical Engineering
Office Phone: 540-231-6829
FAX: 540-231-5022
E-mail: dfcox@vt.edu
Specialty: Surface Science, Catalysis, Surface Chemistry, Computational Chemistry
Applications: Selective oxidation; alkane dehydrogenation; hydroprocessing; crystal chemistry
Expertise: Surface analysis and characterization with photon and electron-stimulated electron spectroscopies; low energy electron diffraction; mass spectrometry; ion scattering spectroscopy; scanning tunneling microscopy; density functional calculations
Examples of Funding Sources: U.S. Department of Energy, National Science Foundation

CERAMICS

see **Materials***, Logan*

CERAMICS AND GLASSES

see **Microwave Processing of Materials***, Folz*

CHEMICAL AND ENVIRONMENTAL ENGINEERING

Information Technology

Name: **Y.A. Liu**
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Office Phone: 540-231-7800
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URL: www.design.che.vt.edu
Specialty: Process System Engineering, Computer-Aided Process and Product Design, Polymerization Process Modeling, Pinch Technology and Process Integration, Molecular Simulation, Environmental Engineering
Applications: Energy and water savings; solvent selections in drug manufacturing; industrial water reuse and wastewater minimization

CHEMICAL ENGINEERING

see also **Chemical and Environmental Engineering***, Y.A. Liu*

CHEMICAL ENGINEERING

Name: **Luke Achenie**
Department: Chemical Engineering
Office Phone: 540-231-4257
FAX: 540-231-5022
E-mail: achenie@vt.edu
Specialty: Computational Modeling
Expertise: Process design; product design; optimization; uncertainty analysis; bioinformatics
Examples of Funding Sources: National Science Foundation, National Institutes of Health, U.S. Department of Energy

CHEMICAL ENGINEERING

Name: **Stephen M. Martin**
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Office Phone: 540-231-3775
FAX: 540-231-5022
E-mail: martinsm@vt.edu
Specialty: Self-Assembly, Membranes, Thin Films, Surfactants, Liquid Crystals, X-ray Scattering, Polymers, Sensors, Materials Science
Applications: Chemical sensing and separations based on self-assembled materials (e.g. liquid crystals); supported membranes for isomeric and enantiomeric separations; synthesis and characterization of functional self-assembled thin films
Expertise: Organic thin film synthesis and fabrication (self-assembled monolayers, Langmuir-Blodgett films); structural characterization of thin film materials (grazing-angle incidence X-ray diffraction – GIXD; GISAXS; X-ray reflectivity; surface tension); membrane fabrication and permeability measurements (gas and liquid phase); synthesis and characterization of thermotropic and lyotropic liquid crystalline materials (e.g. birefringence)
Examples of Funding Sources: American Chemical Society – Petroleum Research Fund (ACS-PRF), NSF, U.S. Department of Energy, Institute for Critical Technology and Applied Science

CHEMICAL ENGINEERING

Name: **John Y. Walz**
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Specialty: Colloidal and Interfacial Phenomena
Applications: Control of the stability of dispersions and emulsions; particle adhesion; understanding and predicting the rate of transport of particles through porous beds (such as soil aquifers); issues in petroleum recovery
Expertise: Interaction forces between particles and surfaces; dispersion stability; colloidal force measurement
Examples of Funding Sources: National Science Foundation, American Chemical Society Petroleum Research Fund, U.S. Department of Agriculture

CIRCUITRY

see **Digital Signal Processing**, *Nazhandali*

CIVIL ENGINEERING

see also **Geotechnical Engineering**, *Brandon*

CIVIL ENGINEERING

Geotechnical Engineering

Name: **Russell A. Green**
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URL: www.cee.vt.edu/people/green.html
Specialty: Geotechnical Engineering, Earthquake Engineering, Engineering Seismology
Applications: Seismic design of foundations, retaining walls, earthen dams, etc.; liquefaction evaluation; site response analysis; seismic hazard analysis
Expertise: Central-eastern U.S. seismic issues
Examples of Funding Sources: National Science Foundation, U.S. Geological Survey, U.S. Army Corps of Engineers

CIVIL ENGINEERING

Geotechnical Engineering

Name: **James K. Mitchell**
Department: Civil and Environmental Engineering
Office Phone: 540-231-7351
Home Phone: 540-552-3992
FAX: 540-231-7532
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Specialty: Geotechnical Engineering with Focus on Soil Properties and Behavior, Soil Mineralogy, Physico-chemical Phenomena in Soils, Soil Stabilization, Ground Improvement, In-situ Testing Methods and their Applications, Time Effects on Soil Properties, Soil Reinforcement
Applications: Ground improvement for mitigation of seismic risk; soil stabilization for roads, airfields, and embankments; swelling soil problems; earth reinforcement for walls and embankments and other earth structures; soil and site characterization using in-situ test methods; evaluation and improvement of embankment dam safety; waste containment
Expertise: Soil mechanics; environmental geotechnics; soil stabilization; geotechnical earthquake engineering; reinforced soil structures; mitigation of seismic risk to dams and foundations; earthwork construction
Examples of Funding Sources: National Science Foundation, Virginia Department of Transportation, U.S. Army Corps of Engineers, U.S. Bureau of Reclamation

CIVIL INFRASTRUCTURE ENGINEERING ASSET MANAGEMENT

Name: **Sunil K. Sinha**
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Specialty: Civil Infrastructure Asset Management, especially Buried Infrastructure Systems
Applications: Problems in the areas of assessment technologies and decision-making methodologies for the rehabilitation/renewal of large-scale civil infrastructure systems, especially water and wastewater systems
Expertise: Asset management; pattern recognition; sensor informatics; computer vision; information technology; trenchless technology
Examples of Funding Sources: National Science Foundation, U.S. Environmental Protection Agency, Water Environmental Research Foundation, Federal Highway Administration

CLIMATE CHANGE

see **Energy-Alternative and Power Grids***, Rahman*

COAL

see **Mining***, et. al.*

COGNITIVE SCIENCE

see **Computer-Supported Collaborative Work***, Tatar*

COMBUSTION AND FIRE SCIENCE

Name: **Brian Lattimer**
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URL: www.me.vt.edu/extreme/main/index.php
Specialty: Experimental and Computational Studies, Material Response at High Temperatures, Coal and Biomass Gasifica-

tion Energy, Heat and Mass Transfer, Fire Dynamics, Hazard Assessment and Mitigation

Applications: Material characterization and evaluation of thermo-structural response during high temperature exposures; gasification of coal and biomass for energy production; material development for improved fire performance; homeland security issues; modeling response of materials exposed to high temperatures in various military and commercial designs; ship design with advanced light-weight materials; modeling fire growth in buildings and transportation vehicles; insensitive munitions; coatings for blast and fire protection; smoke and combustion product movement through structures; hazards of liquid fuel spills; smoke control system design in rail stations and tunnels; suppression of fires

Expertise: Characterization of high temperature material thermophysical-chemical properties; microscopic response of materials at high temperatures; condensed phase combustion; heat and mass transfer in materials exposed to high temperatures; heat fluxes from fires; structural response and integrity of materials during fires; modeling material response to fires (including ignition, heat release rate, flame spread, and combustion product generation); development and evaluation of fire suppression technologies; compartment fire dynamics; buoyancy driven flows

Examples of Funding Sources: Office of Naval Research, ICTAS, Army Research Laboratory, Naval Surface Warfare System, Naval Sea System Command, Parsons-Brinkerhoff, Parsons Transportation, PATH Corporation, Port Authority of New York/ New Jersey, Northrop Grumman, Volpe Research Center

COMBUSTION ENGINES

see **Energy Systems**, *Kornhauser*

COMMUNICATIONS

see also **Antennas and Communications**, *Zaghloul*
Computer and Communications Engineering, *Athanas*
Computers, *Midkiff*
Fiber Optics, *Jacobs*
Radio Engineering, *Ellingson*

COMMUNICATIONS

Name: **Claudio da Silva**
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Specialty: Communication Theory, Wireless Communication Systems, Detection and Estimation Theory, Analysis and Performance Evaluation of Communication Systems, Interference Mitigation

Applications: Wireless communication systems, such as cellular phone, personal communication systems, and wireless local and personal areas networks

Expertise: Performance evaluation of communication systems; interference mitigation; digital communications; spread spectrum communications (including code division multiple access; orthogonal frequency division multiplexing; ultra-wideband; cognitive radio; spectrum sensing

COMMUNICATIONS

Antennas

Name: **Warren L. Stutzman**
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Specialty: Wireless Communications: Antennas, Microwaves, and Propagation
Applications: Antennas for personal and mobile wireless communications; handheld radio antennas; satellite communications antennas; vehicular antennas; WiFi antennas; wideband antennas; ultra-wideband antennas; array antennas
Expertise: Design, measurement, and evaluation of antennas; communication link analysis and design
Examples of Funding Sources: Office of Naval Research, National Science Foundation

COMMUNICATIONS

Wireless Communications

Name: **Jeffrey H. Reed**
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Office Phone: 540-231-2972
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Specialty: Communications and Signal Processing
Applications: Use of DSP in communications for receiver implementation, software radio, cognitive radio, smart antennas, interference rejection and communication system optimization
Expertise: Algorithm development; system analysis; DSP hardware design for wireless communications
Examples of Funding Sources: Samsung, LG Electronics, Raytheon, General Dynamics, Office of Naval Research, Mercury Computer, National Science Foundation, DARPA, Motorola, Science Applications International Corporation, Texas Instruments, Grayson Wireless, ITT, Southwestern Bell, U.S. Army Research Office, Tektronix, Aero Astro, Electronics and Telecommunications Research Institute

COMMUNICATIONS (a) and POSITION LOCATION (b)

Name: **Timothy Pratt**
Department: Electrical and Computer Engineering
Office Phone: 540-231-6681
FAX: 540-231-3355
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Specialty: Satellite Communications (a) and 3-D Position Location Systems (b)
Applications: Geostationary and low earth orbit satellite communication systems; VSAT networks; direct broadcast radio and television; GPS position location; point to point satellite systems; propagation through the earth's atmosphere (a) and sub-millimeter metrology over 30m ranges using rotating laser beams (b)
Expertise: Design and analysis of satellite communication links; performance evaluation; link budgets; modulation techniques; multiple access techniques; error control; GPS; propagation in clear air and rain at frequencies above 10 Ghz; radar analysis of propagation paths; technical due diligence (a) and design and analysis of 3-D position location systems using rotating laser beans (b)
Examples of Funding Sources: Jet Propulsion Laboratory, Intelsat, NASA, Orbcomm, SpaceVest (a) and ArcSecond, Boeing, Lockheed-Martin (b)

COMPOSITES

see **Combustion and Fire Science**, *Lattimer*
Materials, *et al*
Mechanics of Materials, *Case*

COMPUTATIONAL BIOLOGY

see also **Algorithms**, *Heath*

COMPUTATIONAL BIOLOGY

Name: **T.M. Murali**
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URL: http://bioinformatics.cs.vt.edu/~murali/
Specialty: Network Biology, Functional Genomics, Data Mining, Discrete Algorithms, Computational Geometry
Applications: Disease classification; identifying pathways perturbed in disease; gene function predictions; finding processes conserved across different organisms

COMPUTATIONAL BIOLOGY BIOINFORMATICS

see also **Computer Science***, Feng*

COMPUTATIONAL BIOLOGY BIOINFORMATICS

Name: **Liqing Zhang**
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Office Phone: 540-231-9413
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E-mail: lqzhang@cs.vt.edu
Specialty: Comparative Genomics and Evolutionary Biology, Gene Duplication and Molecular Evolution and Population Genetics of Multigene Families, Data Mining in Molecular Biology
Applications: Development of software for bioinformatics
Expertise: Molecular evolution; population genetics; computational biology; evolutionary genetics

COMPUTATIONAL FLUID DYNAMICS

see also **Hydrodynamics***, Neu*

COMPUTATIONAL FLUID DYNAMICS

Name: **Kenneth S. Ball**
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URL: http://www.me.vt.edu/people/faculty/ball.html
Specialty: Computational Fluid Dynamics (CFD) and Heat Transfer; High Performance Computing; Transport Phenomena in Unsteady and Chaotic Flows; Transport Phenomena in Manufacturing, Materials Processing, Biomedical and Nuclear Systems; Hydrodynamic Stability, Transition, and Turbulence; Turbulence Control and Drag Reduction; Radiation Heat Transfer; Buoyancy Induced Flows; Chaos and Dynamical Systems Theory
Applications: Homeland Security issues; counter-terrorism; dispersion of contaminants in air (including biological and chemical contaminants and radionuclides); disposition of special nuclear materials including weapons grade plutonium; risk analysis, assessment, and mitigation of damage resulting from terrorism or natural disasters. Also, heat transfer in nuclear systems including reactors, waste and Pu pit storage; transport in high-speed gas centrifuges; heat transfer issues in semiconductor manufacturing; multimode heat transfer in turbulent flows with applications in combustion, manufacturing, and materials processing; direct numerical simulations of turbulence, turbulence control, and drag reduction; and radiation/turbulence interactions in flows with participating media
Expertise: Numerical methods, modeling, and simulation; heat and mass transfer; fluid dynamics; transport phenomena; turbulence and turbulence control; applied mathematics
Examples of Funding Sources: National Science Foundation, U.S. Office of Naval Research, Air Force Office of Scientific Research, U.S. Department of Energy, SEMATECH Interna-

tional, National Institute of Science and Technology, NASA, South Texas Power Nuclear Operating Company, Whitaker Foundation, Pratt & Whitney

COMPUTATIONAL FLUID DYNAMICS

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URL: www.me.vt.edu/people/faculty/battaglia.html
Specialty: Computational Fluid Dynamics, Building Energy, Multiphase Flows, Turbulent and Reacting Flows
Applications: Fluidized beds; chemical vapor deposition; biomass and coal gasification; bubble columns; airlift reactors; passive heating and cooling of residential buildings; ground-coupled heat pumps
Expertise: Computational modeling and development; numerical methods; numerical simulations; fluid dynamics; gas-solid flows; gas-liquid flows; energy systems
Examples of Funding Sources: Iowa Energy Center, National Science Foundation, U.S. Department of Agriculture, U.S. Department of Energy

COMPUTATIONAL FLUID DYNAMICS

Name: **Christopher J. Roy**
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Specialty: Computational Fluid Dynamics (CFD), Verification and Validation of Computer Simulations, Numerical Error Estimation and Grid Adaptation, Turbulence Modeling, Large Eddy Simulation, Truck Aerodynamics, Nonequilibrium Hypersonic Flows, Microscale Gas Simulations
Applications: Fluid dynamics simulation of gas and liquid flows; verification (numerical accuracy) and validation (physical accuracy) of computer simulations; estimation of grid-related errors and grid adaptation; aerodynamics of cars and trucks; simulation of laminar and turbulent hypersonic flows; simulation of gas flow through microscale devices
Expertise: CDF; numerical error estimation and adaptivity; bluff-body aerodynamics flows; turbulence modeling and simulation; shock-wave/turbulent boundary layer interactions; CFD for MEMS
Examples of Funding Sources: NASA, National Science Foundation, Sandia National Laboratories, U.S. Department of Defense, U.S. Department of Energy, U.S. Department of Transportation

COMPUTATIONAL FLUID DYNAMICS AND HIGH END PARALLEL COMPUTING

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URL: www.hpcfd.me.vt.edu
Specialty: Complex Turbulent Flows, Turbulent Heat Transfer, Direct Numerical Simulations (DNS), Large-Eddy Simulations (LES), Detached Eddy Simulations (DES), Reynolds-Averaged Navier Stokes (RANS), Parallel Computations and Programming Paradigms, Numerical Methods and Discretizations, Algorithms for Navier-Stokes Equations, Lattice-Boltzmann Methods, Finite-Volume Methods
Applications: Heat transfer augmentation in mini- and micro-

scale heat exchangers; internal cooling of turbine blades; film cooling of turbine blades; particle based deposition and fouling; two-phase flows in micro-nano channels; micro-air vehicles flapping flight

Expertise: Complex turbulent flows; turbulent heat transfer; direct numerical simulations (DNS); largy-eddy simulations (LES); detached eddy simulations (DES); reynolds-averaged navier stokes (RANS); parallel computations and programming paradigms; numerical methods and discretizations; algorithms for navier-stokes equations; lattice-boltzmann methods; finite-volume methods

Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, U.S. Army, Modine Manufacturing Company, Shell, Aerojet, U.S. Army Research Office, Pratt & Whitney

COMPUTATIONAL MATERIALS SCIENCE

see **Optoelectronics**, *Asryan*

COMPUTATIONAL MECHANICS

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Specialty: Structural Engineering and High Performance Computing

Applications: Simulation of structural behavior under dynamic loading such as those produced by earthquakes; modeling and simulation of the behavior of reinforced concrete structures; computer modeling of bridges; applications of fiber reinforced polymers to bridges; analysis of jointed plain concrete pavements

Expertise: Nonlinear finite element analysis; structural dynamics; parallel and distributed computing; algorithm development; emerging computing technologies; material constitutive modeling; finite modeling of structures

Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, Engineering Foundation, Federal Highway Administration, Department of Transportation

COMPUTATIONAL MOLECULAR MODELING

see **Computational Science**, *Onufriev*

COMPUTATIONAL SCIENCE

see also **Computer Science**, *Choi*

COMPUTATIONAL SCIENCE

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Specialty: Computational Molecular Biophysics

Applications: Development of computational tools to study molecular motion and interactions

Expertise: Molecular biophysics; biomolecular electrostatics; computational chemistry; molecular dynamics simulations

Examples of Funding Sources: National Science Foundation, National Institutes of Health

COMPUTATIONAL SCIENCE

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Specialty: Data Mining, Bioinformatics, Working with Interdisciplinary Teams of Researchers to Create Useful and Usable Software Systems for Problem Solving
Applications: Systems biology; text mining; literature based discovery; computational neuroscience; computational fluid dynamics; wireless communications
Expertise: Working with massive datasets; designing and implementing algorithms for extracting insights from datasets; simulation and modeling of real world systems on the computer; database management for targeted application domains; problem solving environments for computational science
Examples of Funding Sources: National Science Foundation, National Institutes of Health, DARPA, Office of Naval Research, General Motors Research, Idaho National Lab

COMPUTATIONAL SCIENCE

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Specialty: Computational Science, High Performance Computing
Expertise: Scientific and engineering computing; numerical methods for ODE, PDE, DAE; sparse linear algebra; sensitivity analysis; solution of inverse problems; automatic differentiation; parallel and large scale computing
Examples of Funding Sources: National Science Foundation, NASA, National Oceanic and Atmospheric Administration, National Institutes of Health, Houston Advanced Research Council

COMPUTATIONAL SCIENCE AND ENGINEERING

see **Computational Fluid Dynamics and High End Parallel Computing**, *Tafti*
Computer Science, *Feng*
Parallel Computing, *Ribbens*

COMPUTER-AIDED DESIGN

see **Chemical and Environmental Engineering**, *Y.A. Liu*
Computer Engineering, *Shukla*

COMPUTER-AIDED DESIGN AND MANUFACTURING

see also **Engineering Design**, *Terpenny*

COMPUTER-AIDED DESIGN AND MANUFACTURING

Rapid Prototyping

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Specialty: Rapid Prototyping and Manufacturing, Computer-Aided Engineering, Engineering Design, Engineering Education
Applications: Applications for metallic and ceramic cellular materials such as high temperature filters, structural heat exchang-

ers, low-density structures tissue scaffolds; methods and processes for the design of products and systems in domains including, but not limited to: aerospace, automotive and manufacturing systems

Expertise: Computer-aided geometric modeling; solid modeling; design theory and methodology; product families and product architecture; engineering design education research

Examples of Funding Sources: National Science Foundation

COMPUTER AND COMMUNICATIONS ENGINEERING

Name: **Peter Athanas**
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Specialty: Reconfigurable Computing Architectures, Adaptive Computing Machines, Hardware-Software Co-Design, Rapid Prototyping
Applications: Application of reconfigurable and adaptive computing techniques to applications in wireless communications, autonomous systems, reconfigurable co, mputing architectures, information security, and trust in computing
Expertise: Computer architecture; VLSI design; signal processing; algorithm design
Examples of Funding Sources: National Science Foundation, DARPA, Office of Naval Research, Air Force Research Laboratory, Harris Corporation, AMD

COMPUTER ARCHITECTURE

see also **Computers-Design / Architecture***, J. Paul*

COMPUTER ARCHITECTURE

Name: **Cameron D. Patterson**
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Specialty: High Performance Computing, Algorithms for Synthesizing, Simulating and Implementing Digital Circuits, Platform-based Digital Design, Rapid Prototyping of Digital Hardware
Applications: High speed encryption; field upgradeable hardware; applied digital signal processing; distributed, embedded systems; radio astronomy; softwater defined radio
Expertise: Hardware-based algorithm acceleration; hardware/software codesign; field-programmable gate array technology; reconfigurable computing; computational number theory; architecture extensions for secure computing; lightweight EDA tools
Examples of Funding Sources: DARPA, National Science Foundation, Air Force Research Laboratory, Army Research Laboratory, Missile Defense Agency

COMPUTER DESIGN

see **Computers-Design / Architecture***, J. Paul*

COMPUTER ENGINEERING

see also **Computers***, Midkiff*
Computer Science*, Feng*

COMPUTER ENGINEERING

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Specialty: Design, Test, Verification and Diagnosis of Hardware and Software Systems; Formal Methods and Hybrid Methods

for Test and Verification
Applications: Software design, testing and validation; hardware design, testing and validation; embedded system design and validation; protocol verification
Expertise: Design, test, verification and diagnosis of complex digital systems, both hardware and software
Examples of Funding Sources: National Science Foundation, Semiconductor Research Corporation, National Institute of Justice, DARPA

COMPUTER ENGINEERING

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Specialty: Formal Methods, Formal Verification of Hardware and Software Systems, Computer Aided Design (CAD), Electronic Design Automation (EDA), Programming Models, Models of Computation, Low-Power System Design, Embedded Systems Design, Reliability, System Level Design, Defect- and Fault-Tolerant Computing, Nanocomputing, Safety-Critical Embedded Software and Systems, Automated Software Synthesis, Software Engineering, Real-Time and Embedded Systems, Embedded and Communication Systems for Power Grids
Applications: Electronic design automation tools development; reliability driven design for nano-computing; software synthesis tools from specification for embedded systems; computer-aided software engineering tools
Expertise: Embedded systems; software engineering; VLSI; design automation; nano-computing; nanotechnology; formal methods
Examples of Funding Sources: National Science Foundation, Semiconductor Research Consortium, Intel Corporation, Los Alamos Labs, Bluespec Inc.

COMPUTER ENGINEERING

Embedded Security, Digital System Level Design

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Specialty: Secure Embedded Implementation, Cryptographic Hardware and Software, Implementation Attacks and Countermeasures, Reconfigurable Design, Design Methodology, Embedded Hardware and Software, Hardware/Software Co-design, Application/Architecture Codesign
Applications: Cryptography in wireless applications; cryptography in pervasive computing; secure radio-frequency identifiers (RFID); smart card processors; design security; intellectual-property protection of hardware and software
Expertise: Hardware/software co-design for secure embedded systems; side-channel analysis and countermeasures; secure debugging and protection of embedded firmware; reliable circuits for uniqueness and randomness; cryptographic performance evaluation
Examples of Funding Sources: National Science Foundation, McQ Inc., ICTAS

COMPUTER ENGINEERING

Hardware Design

Name: **Chao Huang**
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Specialty: Application-Specific Integrated Circuit (ASIC) Design, Embedded Systems, Computer Architectures, CMOS VLSI Circuit Design
Applications: Distributed architectures for memory-intensive applications; computation-unit integrated memories for high-performance electronic circuits and systems; computer-aided design algorithms in high-level synthesis; energy-delay product reduction
Expertise: Distributed architectures of computers and electronic systems; electronic design automation methodologies; memory issues in embedded systems; CMOS VLSI circuit design

COMPUTER ENGINEERING

Low-power, Wearable Computers, Electronic Textiles

Name: **Tom Martin**
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Specialty: Mobile/Ubiquitous Computing, Low Power Computer System Design, VLSI Systems, Wearable Computers, Electronic Textiles
Applications: Extending the battery life of handheld, notebook, and wearable computers; wearable computing applications for industrial and personal use; analyzing the power consumption of hardware/software systems; power-based computer security attacks
Expertise: System-level approach to power management including application software, operating system software, hardware subsystems, and power sources, wearable computer design and applications
Examples of Funding Sources: National Science Foundation

COMPUTER SCIENCE

see also **Computational Science***, Ramakrishnan*

COMPUTER SCIENCE

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Specialty: Operating Systems, Runtime Systems and Libraries, Language Virtual Machines, Hardware Virtual Machines, Cloud Computing, Web Architectures, Extension Architectures, High-performance Computing, Software Engineering, Software Visualization, Computer Science Education
Applications: Client-side and server-side web technology; widgets and mash-ups (AJAX); parallel applications and sparse computational methods; library information technology
Expertise: Systems, language design, and building in all of the above areas
Examples of Funding Sources: NSF, Institute for Museum and Library Services (IMLS), Coverity, Inc.

COMPUTER SCIENCE

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Specialty: Numerical Analysis, Computational Biology, Scientific Computing
Applications: Gene regulation network; cell cycle modeling
Expertise: Stochastic modeling and simulation; chemical reaction network; uncertainty analysis; sensitivity analysis; parameter estimation; numerical solution for ordinary differential equations and differential-algebraic equations
Examples of Funding Sources: National Science Foundation, National Institutes of Health

COMPUTER SCIENCE

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Specialty: Adiabatic Quantum Computation, Computational Biology
Applications: Optimization problems arising in communication networks; allocation of public resources; drug design; bioinformatics
Expertise: Design, analysis, and implementation of algorithms; graph theory
Examples of Funding Sources: National Science Foundation, U.S. Department of Energy

COMPUTER SCIENCE

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Specialty: Medical Informatics, Databases, Agent Technology, Artificial Intelligence, Software Architecture
Applications: Medical; healthcare; electronic patient record
Expertise: Information filtering; information fusion; information modeling; information retrieval; interoperability; metadata; modeling/simulation; enterprise architecture; UML; agent system design; O-O design and implementation; knowledge representation; ontology formulation; medical ontologies; ontology web language
Examples of Funding Sources: National Library of Medicine, Sun Microsystems, Cougaar Inc., State of Virginia

COMPUTER SCIENCE

Name: **Wu Feng**
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Specialty: Efficient Computing Systems, Autonomic Run-Time Systems, Accelerator-Based Computing, Multi-Core and Many-Core Computing, Green Datacenters and Embedded Systems, Supercomputing in Small Spaces
Applications: Healthcare and biomedical applications; data mining; drug design; pairwise and multiple sequence alignment; molecular dynamics; large-scale computational simulations;

science and engineering education, e.g. K-12 pedagogy; energy-efficient applications; Green500 list

Expertise: High-performance computing and networking; parallel and distributed computing; cloud computing; green computing; bioinformatics; computational science

Examples of Funding Sources: National Science Foundation, National Institutes of Health, Naval Research Office, U.S. Department of Energy, DARPA, Advanced Micro Devices, Eli Lilly & Company, NVIDIA

COMPUTER SCIENCE

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Specialty: Spatial Databases, Spatial Data Mining, Spatial Data Visualization, Data Warehousing, Geographic Information Systems; Intelligent Transportation Systems

Applications: Sensor data visualization; highway traffic data analysis; spatial data archive and information retrieval; watershed data management; web-based spatial data management system

Expertise: High performance algorithm design; spatial database architecture and performance optimization; 2-D and 3-D data visualization; web databases; spatial data analysis and pattern extraction; spatial outlier detection

Examples of Funding Sources: National Science Foundation, U.S. Department of Defense, DARPA, U.S. Army Research Laboratory, Missile Defense Agency, Department of Transportation, Federal Highway Administration, Virginia Department of Transportation, National Institutes of Health, Census Bureau, U.S. Geological Survey, U.S. Environmental Protection Agency

COMPUTER SCIENCE

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Specialty: Digital Libraries as well as other Related Work with Information, such as: Hypermedia, Hypertext, Information Storage and Retrieval, Institutional Repositories, Knowledge Management, Multimedia; Computing Education

Applications: Archaeology; crises recovery; education; information systems; internet; libraries; Second Life; WWW

Expertise: Annotation; CBIR; classification; clustering; collaborative filtering; computer/server log analysis; computing curriculum; concept maps; crises response; cross-language retrieval; data management; digital libraries/curation/preservation; digital video; digitization; distributed processing; genetic programming; electronic theses and dissertations; energy medicine; hashing; human-computer image retrieval; interaction; information filtering; information fusion; information integration; information modeling; information retrieval; interoperability; inverted files; library automation; machine learning; metadata; modeling/simulation of computer clusters; Open Archives Initiative; personalization; preservation; quality metrics; query splitting; ranking; recommender systems; Reiki; relevance feedback; scenarios; schema mapping; Second Life; superimposed information; text classification; tragedy recovery; vector space model; visualization; web crawling; web services; XML; 5S theory

Examples of Funding Sources: Google, IBM, Institute of Museum

and Library Services, Microsoft, National Library of Medicine, National Science Foundation, Sun Microsystems, U.S. Department of Education

COMPUTER SIMULATION

see **Materials**, *Kriz*

COMPUTER-SUPPORTED COLLABORATIVE LEARNING

see **Computer-Supported Collaborative Work**, *Tatar*
Engineering Education, *Johri*

COMPUTER-SUPPORTED COLLABORATIVE WORK

see also **Engineering Education**, *Johri*
Human-Computer Interaction, *Quek*

COMPUTER-SUPPORTED COLLABORATIVE WORK

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Specialty: K-12 Math and Science Education, Handheld Computing, People and Parallel, Distributed Computing
Applications: GroupScribbles; Playground Games
Examples of Funding Sources: National Science Foundation

COMPUTER SYSTEMS

see **Computer Science**, *Back, Feng*
Power Electronics, *Lee*
Software Engineering, *Ryder*

COMPUTER VISION

see **Human-Computer Interaction**, *Quek*

COMPUTERS

see also **Computer Science**, *Egyhazy, Feng, Fox*
Optimization, *Sherali*

COMPUTERS

Name: **Dong S. Ha**
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Specialty: Digital, Analog, Mixed-Signal and RF ASIC Design, Low-Power ASIC Design, RF IC Design for Wireless Communications including UWB, Low-Power Structural Health Monitoring Systems, Power Conditioning Circuits for Energy Harvesting, Wireless Body Area Networks, Wireless Sensor Networks, ASIC Design for Power Line Communications
Applications: ASICs are ubiquitous in these days ranging from a toy to a cell phone to a satellite. ASICs offer small footprint, low power, and low cost under large volume; CESCA specializes in low-power, ASIC design for virtually all applications and frequently fabricates test chips
Expertise: Low-power ASIC design; digital, analog, mixed-signal and RF IC design systems; UWB systems; wireless sensors and sensor networks; power conditioning circuits for energy harvesting
Examples of Funding Sources: DARPA, U.S. Department of Defense, ETRI (Korea), Intel, IBM, National Semiconductor,

NASA, NIST, National Science Foundation, Pratt & Whitney, Semiconductor Research Corporation, Samsung

COMPUTERS

Design / Architecture

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Specialty: Computer Systems, Computer Design, Computer Architecture and Evaluation of Single Chip Heterogeneous Multiprocessors for Mobile Computers
Applications: Mobile computers
Expertise: Modeling; simulation; design; evaluation
Examples of Funding Sources: National Science Foundation, Semiconductor Research Corporation, ST Microelectronics

COMPUTERS

Networks, Telecommunications, Computer Engineering

Name: **Scott F. Midkiff**
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Specialty: Computer Networks, Network Protocols, Wireless Networks, Pervasive Computing
Applications: Methods for routing, quality of service, network management, and security in mobile ad hoc networks (MANETs) are being developed, analyzed, and tested. Techniques for cross-layer optimization in wireless networks considering application, network, and medium access control layers are being investigated and evaluated. Architectures and adaptive protocols for rapidly-deployed fixed broadband wireless for homeland security and disaster response are being developed and prototyped. Systems that integrate land mobile radio and Internet technologies are being evaluated through test bed experiments and simulations. Experimental prototypes and simulation models are used to study feasibility and performance of wireless networks and mobile systems.
Expertise: Protocols and architectures for wireless networks; rapidly-deployable and self-configuring networks; network support for cyber-physical systems and mobile and pervasive computing; security for wireless networks and mobile systems; performance evaluation of wireless networks and mobile systems
Examples of Funding Sources: National Science Foundation, Office of Naval Research, Intel Corporation, Microsoft Research

COMPUTERS

VLSI Circuit Design, Multimedia

Name: **Joseph G. Tront**
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Specialty: Testable Designs and Fault-Tolerant Architectures, Microprocessors, Multimedia
Applications: Special purpose integrated circuit design; built-in self-testing integrated circuits; ASICs; electromagnetic compatibility issues in ICs; embedded microprocessor applications; use of advanced educational technology in the classroom; synchronized streaming media presentations; handheld devices for educational applications
Expertise: Use of CAD tools to design and develop ICs for vendor specific applications; fabrication using silicon foundaries;

functional testing in-house; development of CAD tools for use in integrating testability into IC designs; development of customized microprocessor-based systems; development of multimedia tools for education; network security

Examples of Funding Sources: Naval Research Labs, National Science Foundation, General Electric, NASA, Office of Naval Research

COMPUTING

see **Computer and Communications Engineering**, *Athanas*
Computer Science, *Egyhazy, Fox*
Networking, *Chen*
Parallel Computing, *Ribbens*

CONCRETE

see **Bridge Design**, *Roberts-Wollmann*

CONSTRUCTION ENGINEERING AND MANAGEMENT

Computer-integrated Construction

Name: **Jesús M. de la Garza**
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Specialty: Advanced Computing in Construction Engineering and Management
Applications: Research thrusts comprise: information technology in construction and highway infrastructure management; developed models of design rationale for use in the architecture-engineering-construction (AEC) industry; developed models for Virginia DOT regarding the impact of deferring maintenance on highways which enables the formulization, simulation, and assessment of policies for Interstate highway maintenance; developed models for wireless communications and computing technology at the jobsite
Expertise: Information technology; schedule analysis; project control; technology transfer; public-private partnerships
Examples of Funding Sources: National Science Foundation, Virginia Department of Transportation, Construction Industry Institute

CONSTRUCTION MANAGEMENT

Building on-time and on-budget

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Specialty: Civil Engineering Construction Management
Applications: The management of civil engineering construction projects requires special skills in both the technical and interpersonal arena. These are used to bring projects in on time and on budget and include subjects such as contract administration, planning, scheduling, estimating and cost control.
Expertise: Construction, contract administration, scheduling, schedule impact analysis and dispute resolution; construction equipment and methods; equipment economics, life, repair, rebuild and maintenance policy; development and midcareer training for engineering and construction managers
Examples of Funding Sources: National Science Foundation, Construction Industry Institute, Strategic Highway Research Program, Virginia Department of Transportation

CONSTRUCTION MATERIALS

see also **Combustion and Fire Science***, Lattimer*

CONSTRUCTION MATERIALS

Name: **Richard Weyers**
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Specialty: Concrete Materials and Ingredients, Corrosion of Reinforcing Materials, Service Life Modeling, Repair and Rehabilitation of Bridges
Applications: Environmental deterioration of civil structures
Expertise: Corrosion of reinforcing materials in concrete and service life modeling
Examples of Funding Sources: Virginia Transportation Research Council, Strategic Highway Research Program, Federal Highway Administration, National Cooperative Highway Research Program, Wisconsin Department of Transportation, Port Authority of New York and New Jersey

CONSTRUCTION SAFETY

see **Human Factors Engineering / Ergonomics***, Kleiner*

CONTROL

see **Aerospace Engineering***, Sultan*

CONTROL SYSTEMS

Name: **William T. Baumann**
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Specialty: Control Systems, Systems Biology, System Identification
Applications: Modeling of biological systems at the cellular level; vibration and acoustic control system design and implementation; noise cancellation; active combustion control
Expertise: Biological modeling and simulation; control system design; real-time implementation of control systems
Examples of Funding Sources: National Institutes of Health, U.S. Department of Energy, Office of Naval Research

CONTROL THEORY

Name: **Craig A. Woolsey**
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URL: www.aoe.vt.edu/~cwoolsey
Specialty: Nonlinear Control, Multibody Dynamics, Robotics, Autonomous Systems
Applications: Guidance, navigation, and control of aerospace and ocean vehicles; control of robotic systems
Expertise: Nonlilnear control of mechanical systems; vehicle dynamic modeling; data filtering/state estimation
Examples of Funding Sources: National Science Foundation, Office of Naval Research, U.S. Air Force Office of Scientific Research, NASA

CONTROL THEORY / AUTONOMOUS SYSTEMS

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Specialty: Robust Control of Complex and Hybrid Engineering Systems, Distributed Control over General Graph Topologies, Model Reduction
Applications: Robotic control of high-performance mechanical and electrical systems; trajectory planning and control of agile aerial vehicles; distributed control of robotic systems
Expertise: Cooperative control of multi-vehicle systems; controlled maneuvers and tracking along trajectories; model reduction; semi-definite programming
Examples of Funding Sources: National Science Foundation, Office of Naval Research, U.S. Air Force Office of Scientific Research

CONTROL OF LARGE SPACE STRUCTURES

see **Engineering Education**, *Goff*

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see **Software Engineering**, *Arthur*

CORROSION CONTROL

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Specialty: Aquatic Chemistry, Corrosion, Physical-Chemical Treatment
Applications: Potable water treatment; wastewater treatment; environmental chemistry
Expertise: Corrosion of potable water systems; corrosion of wastewater systems; lead and copper contamination of water supplies
Examples of Funding Sources: American Water Works Association Research Foundation, National Science Foundation, Copper Development Association

CORROSION IN GLASSES AND CERAMICS

see **Microwave Processing of Materials**, *Clark*

COUNTER-TERRORISM

see **Computational Fluid Dynamics**, *Ball*

CRASH SAFETY

see **Biomechanics**, *Gabler*

CROP MANAGEMENT

see **Agricultural Machinery**, *Grisso*

DAM ENGINEERING

see **Geotechnical Engineering**, *Brandon*

DATA MINING

see **Computational Science**, *Ramakrishnan*
Computer Science, *Feng*

DATABASES

see **Computer Science**, *C-T. Lu*

DECISION MAKING

see **Optimization**, *Sherali*

DECISION MAKING IN ORGANIZATIONS AND COMPLEX SYSTEMS

Name: **Christian Wernz**
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E-mail: wernz@vt.edu
Specialty: Multiscale Decision Making, Organizational Design, Game Theory, Stochastic Processes
Applications: Healthcare industry; manufacturing and service enterprise systems
Expertise: Modeling organizations and interactions between decision-maker across multiple organizational and temporal levels to determine efficient and effective incentives and organizational structures

DECISION MAKING UNDER UNCERTAINTY

see **Investment***, E. Bish*

DESIGN

see **Engineering Education***, Goff*

DIGITAL SIGNAL PROCESSING

Name: **A.A. (Louis) Beex**
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Specialty: Stochastic and Adaptive Digital Signal Processing
Applications: Vowel characterization for improvement of speech coding quality; signal separation for interference mitigation; adaptive interference mitigation for communication channels; adaptive beamforming using coupled nonlinear oscillators; analysis of electro-encephalographic signals for detection or existence of specific conditions; prototype development for signal processing solutions; localization and characterization of sources using sensor arrays; analysis and usage of nonlinear effects in adaptive filters; robust speech coding; design and performance enhancement of systems operating in a varying, not completely known, environment
Expertise: Signal analysis and characterization; spectral analysis and modeling; digital filter design; system identifier structure analysis; image representation, coding, and reconstruction; sensor array signal processing; robust digital communication system design for noisy time-varying environments
Examples of Funding Sources: KAB Labs, Adaptive Dynamics Inc., SPAWAR Systems Center, AUSGAR Technologies Inc., U.S. Office of Naval Research

DIGITAL SIGNAL PROCESSING

Name: **Leyla Nazhandali**
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Office Phone: 540-231-4755
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URL: www.ece.vt.edu/Nazhandali/index
Applications: Low-power biomedical implantable devices; low-power environmental/structural and other types of monitoring; low-power digital signal processing including image processing; trustworthy embedded applications such as RFIDs, smart-cards, and sensor nodes
Expertise: Low-power hardware (ASIC) design; power side-channel resistant design using circuit techniques; exploiting process variation in circuits to create unique chip fingerprints; energy-efficient design of highly to semi parallel digital signal processing algorithms using subthreshold voltage operation
Examples of Funding Sources: NSF

DISASTERS

see **Earthquakes / Disaster Engineering***, J. Martin*

DISTANCE LEARNING

see **Instructional Technology**, *G. Scales*

DIVERSITY IN ENGINEERING

see **Engineering Outreach and Education**, *Watford*

DRUG DELIVERY

see **Biomechanics**, *De Vita*
Heat Transfer, *Huxtable*
Tissue Engineering, *Morgan*

DRUG DESIGN

see **Biochemical Engineering**, *C. Zhang*
Computer Science, *Feng*

DURABILITY

see **Mechanics of Materials**, *Dillard*

DYNAMIC STABILITY

see **Mechanical Vibrations**, *Kirk*

DYNAMICS

see **Aerospace Engineering**, *Sultan*
Fluid Mechanics, *Stremler*

DYNAMICS AND CONTROL

see also **Nonlinear Dynamics and Control**, *Ross*
Vibration, *Inman*

DYNAMICS AND CONTROL

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Specialty: Vibration Control, Noise Control, Motion Control, Adaptive Control, Adaptive Filtering, Inverse Control, Nonlinear Systems and Control, Numerical Simulation, Embedded Control System Design and Implementation, System Identification, Estimation, Sensor Design
Applications: Vehicle and seat suspensions; magneto-rheological fluid devices; eight-post shaker rig testing; driving simulator testing; quarter-vehicle testing; commercial and military aerospace and ground vehicles; heavy truck; automotive and race vehicles; isolation tables; motion control systems; active and semi-active suspensions; ultrasonic acoustic health monitoring
Expertise: Dynamic system modeling and system identification with experimental validation; systems engineering; real-time embedded control systems; active noise and vibration control; rapid-prototyping of control systems; hardware-in-the-loop simulation; human-in-the-loop simulation; array processing; mechatronics; intellectual property
Examples of Funding Sources: Lord Corporation, Volvo Truck International, U.S. Army TACOM, Association of American Railroads, Virginia Tobacco Indemnification and Community Revitalization Commission

DYNAMICS, VIBRATIONS, CONTROLS

see also **Nonlinear Dynamics and Control**, *Ross*

DYNAMICS, VIBRATIONS, CONTROLS

Name: **Scott L. Hendricks**
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Specialty: Flow-Induced Vibration, Stability Theory, System Identification, Nonlinear Dynamics and Chaos
Applications: Dynamics and control of rigid bodies, flexible bodies, and bodies that interact with fluids; liquid and gas centrifuges; system identification for vibrating flexible bodies including bridges and space vehicles; linear and nonlinear stability of dynamical systems; chaotic motion of mechanical systems
Expertise: Advanced dynamics; vibrations; controls; stability theory; nonlinear motions
Examples of Funding Sources: Department of Energy, U.S. Air Force Office of Scientific Research, NASA

EARTHQUAKE ENGINEERING

see **Civil Engineering**, *Green, Mitchell*
Earthquakes / Disaster Engineering, *J. Martin*
Structural Engineering, *Charney*

EARTHQUAKES / DISASTER ENGINEERING

Name: **James R. Martin**
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Specialty: Earthquake Engineering, Soil and Site Improvement, Foundation Engineering
Applications: Hazard assessment of urban areas; construction of infrastructure for increased resilience to natural and human-induced (terrorism) hazards; foundation engineering
Expertise: Geotechnical earthquake engineering; soil and site improvement; liquefaction; ground motion and site response analysis; soil-structure interaction; hazard assessment and mitigation of natural and human-induced disasters; numerical methods; engineering education
Examples of Funding Sources: National Science Foundation, Federal Emergency Management Agency, Department of Homeland Security, United States Geological Survey, United States Army Corps of Engineers, Federal Emergency Management Agency

ECOLOGICAL ENGINEERING

see also **Environment**, *Hession*

ECOLOGICAL ENGINEERING

Name: **Theresa (Tess) Wynn**
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Specialty: Stream and Wetland Restoration, Watershed Management, Hydrology, Low Impact Development
Applications: Stream and wetland restoration design; measurement and modeling of stream bank erosion; stream bank stabilization; design and evaluation of best management practices for the control of nonpoint source pollution from urban, agricultural, and forest lands; development of water quality monitoring networks
Expertise: Cohesive soil erosion, stream and wetland restoration; urban stormwater management; hydrology
Examples of Funding Sources: National Science Foundation, U.S. Environmental Protection Agency, U.S. Department of Agriculture, Virginia Department of Conservation and Recreation

ELASTOMERS

see **Mechanics of Materials**, *Dillard*

ELECTRIC POWER AND ENERGY

Name: **Kwa-Sur Tam**
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Specialty: Development and Application of Advanced Devices and Systems for a Variety of Civilian and Military Applications
Applications: Energy infrastructure; homeland security; national defense
Expertise: Modeling and simulation; interdependent systems; power electronics; energy storage; microgrid; power quality and control
Examples of Funding Sources: U.S. Department of Energy

ELECTRIC VEHICLE

see **Automotive Powertrains / Energy Systems**, *Nelson*
Power Electronics, *Lee*

ELECTRICAL ENGINEERING

Name: **Tamal Bose**
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Office Phone: 540-231-2964
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Specialty: Communications and Signal Processing
Applications: Wireless communication systems
Expertise: Adaptive signal processing; spectrum sensing; cognitive radios; channel equalization
Examples of Funding Sources: NSF, NASA, U.S. Office of Naval Research, U.S. Army, Rockwell Collins, Center for Advanced Engineering Research, Institute for Critical Technology and Applied Science

ELECTROMAGNETICS

see **Space Science**, *Baker*

ELECTRONICS

see also **Radio Engineering**, *Ellingson*

ELECTRONICS

Name: **Masoud Agah**
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Specialty: Microelectromechanical Systems (MEMS)
Applications: Environmental monitoring; automotive industry; biomedicine; homeland security
Expertise: Microfluidics; MEMS-based gas chromatography; wafer-level packaging; microfabrication technologies; MEMS-based chemical sensing; environmental and biomedical applications of MEMS; packaging for MEMS/NEMS devices
Examples of Funding Sources: National Science Foundation, NASA, National Institutes of Health, DARPA, U.S. Department of Energy

ELECTRONIC AND OPTICAL MATERIALS

see **Optoelectronics**, *Asryan*

ELECTRONIC DESIGN AUTOMATION

see **Computer Engineering**, *Shukla*

ELECTRONIC TEXTILES

see **Computer Engineering**, *T. Martin*

EMBEDDED SYSTEMS

see **Computer Engineering**, *Shukla*

ENERGY

see also **Applied Mathematics**, *Pierson*
Computational Fluid Dynamics, *Battaglia*
Energy Systems and Components, *von Spakovsky*
Fluid Dynamics, *Puri*
Materials, *K. Lu*
Mechanics of Materials, *Dillard*
Structures and Materials, *Lesko*

ENERGY

Alternative and Power Grids

Name: **Saifur Rahman**
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Specialty: Energy
Applications: Electric power; energy efficiency; climate change
Expertise: Design, evaluation, and analysis of energy systems
Examples of Funding Sources: National Science Foundation, U.S. Department of Defense, U.S. Department of Energy

ENERGY

Heat Transfer

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Specialty: Heat Transfer, Biomedical Engineering
Applications: Developing new heat and flow measurement techniques for high technology processes; direct applications include advanced propulsion systems, gas turbine engines, industrial processes, heat transfer and perfusion measurements on the human body, thermal control systems, thin-film sensors and combustion systems
Expertise: Heat flux measurement; unsteady heat flux; heat transfer; measurement of thermal properties; gas turbine; turbulence modeling; high temperature sensors
Examples of Funding Sources: National Science Foundation, NASA, Air Force Office of Scientific Research, Whitaker Foundation, Department of Energy, National Institutes of Health

ENERGY CONVERSION

see also **Energy Systems and Components**, *von Spakovsky*
Heat Transfer, *Huxtable*

ENERGY CONVERSION

Name: **Srinath V. Ekkad**
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Specialty: Thermal Science and Engineering, Experimental Methods, Energy Production, Gas Turbines
Applications: Power plants; aero-propulsion; electronic cooling
Expertise: Design and development of new energy systems; im-

provement in efficiency of fossil fuel based coal systems; cooling of hot components

Examples of Funding Sources: U.S. Department of Energy, Siemens Power Generation, Rolls-Royce North America, Toyota, Solar Turbines

ENERGY SYSTEMS

see also **Applied Mathematics**, *Pierson*
Automotive Powertrains / Energy Systems, *Nelson*
Combustion and Fire Science, *Lattimer*
Energy Conversion, *Ekkad*

ENERGY SYSTEMS

Name: **Alan A. Kornhauser**
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Specialty: Internal Combustion Engines, Industrial Energy Management, Refrigeration, Fuel Cells

Applications: Internal combustion engine modeling; new engine concept development; industrial energy surveys; advanced refrigeration systems; direct coal fuel cells

Expertise: Modeling, testing, and development for both advanced energy systems and for systems using mature technology

Examples of Funding Sources: U.S. Department of Energy, National Institute of Standards and Technology, NASA, Virginia Department of Mines, Minerals and Energy, Lennox, Ingersoll-Rand

ENERGY SYSTEMS AND COMPONENTS

Name: **Michael R. von Spakovsky**
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Specialty: Thermodynamics (Irreversible, Equilibrium and Quantum Thermodynamics), Thermoeconomics/Environomics/ Energy Analysis, Decomposition Strategies for Large Scale Optimization (Quasi-stationary and Dynamic), Heat, Mass and Charge Transport, Numerical Modeling

Applications: Fuel cell applications for transportation as well as distributed, stationary and portable power and cogeneration; high performance aircraft including hypersonic and supersonic vehicles

Expertise: Computation methods for modeling and optimizing (deterministically or probabilistically) complex energy conversion systems; methodological approaches for the integrated synthesis, design, operation and control of energy conversion systems (e.g., stationary and portable power as well as aircraft systems); theoretical irreversible and equilibrium thermodynamics; Quantum thermodynamics (unified quantum theory of mechanics and thermodynamics); kinetic theory

Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, Air Force Office of Scientific Research, Air Force Research Lab/Department of Defense, U.S. Environmental Protection Agency, United Technologies, Thaerocomp Technical Corp., Luna Innovations, Inc., U.S. State Department (Fullbright), Spanish Government, Swiss Fond National

ENGINEERING DESIGN

see also **Computer-Aided Design and Manufacturing**, *Williams*

ENGINEERING DESIGN

Name: **Janis P. Terpenny**
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Specialty: Engineering Design Process and Decision-making Methods, Knowledge Capture and Reuse, Engineering Education with a Focus on Preparing Students to Solve Real-World Complex Problems in Multidisciplinary Teams
Applications: Methods and process for the design of products and systems; example application domains include, but are not limited to: aerospace, automotive, medical devices, manufacturing systems, and systems for process improvement
Expertise: Conceptual design and function-based modeling; concurrent engineering and intelligent design systems; problem solving in engineering design; design theory and methodology; information technology for distributed collaborative design; solution synthesis methods to automate and speed the consideration of design concepts in light of multiple life-cycle considerations; product families and platform planning; component obsolescence planning
Examples of Funding Sources: National Science Foundation, Kollmorgen, Pratt & Whitney, Texas Instruments, Apprentice Systems, and industry members of the NSF Center for e-Design

ENGINEERING DESIGN

Robotics

Name: **Robert H. Sturges, Jr.**
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Specialty: Design Theory and Methodology, Manufacturing Processes, Human and Machine Dexterity, Robotics
Applications: Design for assembly; product and process design; industrial automation; hazardous environment teleoperation
Expertise: Integrated design/manufacturing methods; design and development of advanced automation equipment and robotics; CAD-driven flexible manufacturing systems for sheet metal, wiring assemblies, and composite materials; Measurement and prediction of task/effector dexterity in human and mechanical systems for assembly analysis; nuclear service and manufacturing robotics
Examples of Funding Sources: National Science Foundation, NASA, AT&T, Boeing Helicopter, U.S. Postal Service, U.S. Amada, Westinghouse, Long-Airdox, Virginia Center for Innovative Technology, Virginia Commonwealth Technology Research Fund

ENGINEERING EDUCATION

see also **Computer-Aided Design and Manufacturing**, *Williams*
Engineering Design, *Terpenny*
Motivation, *Matusovich*
Problem Solving Environments, *Shaffer*
Rotating Machinery, *Kasarda*

ENGINEERING EDUCATION

Name: **Maura Jenkins Borrego**
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Specialty: Cultural Change and Collaboration in Engineering Education, Research Methods, Interdisciplinary Graduate Education and Faculty Research
Applications: Assessment; dissemination plan development; educational research design (engineering settings)
Expertise: Qualitative research methods; surveys
Examples of Funding Sources: National Science Foundation

ENGINEERING EDUCATION

Name: **Richard M. Goff**
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Specialty: Engineering Course and Hands-On Development, Engineering Design and Design Education, Engineering Educational Research, Mechanical Testing, Motorcycle Dynamics and Diagnostics Systems, Control of Large Space Structures
Applications: Designing and teaching engineering design courses at all levels; teaching design in engineering education and practice; mechanical testing of new materials; motorcycle diagnostics systems analysis and research; design of vibrational control of large space structures
Expertise: Course development; teaching engineering and design; design team management; mechanical testing to ASTM standards; engineering educational research; research in motorcycle dynamics and diagnostics; design of control of large space structures
Examples of Funding Sources: National Science Foundation

ENGINEERING EDUCATION

Name: **Aditya Johri**
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Specialty: In-Depth Studies of Globally Distributed Engineering, Application of Learning Sciences to Engineering Education
Applications: Design of learning environments; knowledge and expertise management in organization; designing distributed work practices
Expertise: Learning sciences; workplace studies; engineering learning; human cognition; globally distributed work
Examples of Funding Sources: National Science Foundation

ENGINEERING EDUCATION

Name: **Glenn Kraige**
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Specialty: Engineering Mechanics Education, Statics, Dynamics, Vibration, Spacecraft Attitude Dynamics and Control
Expertise: Development of course software for statics, dynamics, mechanics of deformable bodies, and vibrations; authoring engineering mechanics textbooks; curriculum design
Examples of Funding Sources: State Council of Higher Education for Virginia, National Science Foundation, John Wiley and Sons, Inc.

ENGINEERING EDUCATION

Name: **Vinod K. Lohani**
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URL: www.enge.vt.edu
Specialty: Engineering Education, Hydrology and Water Resources, Interdisciplinary Research
Applications: Web-based decision support system for watershed management; energy use in water supply and treatment; introduction of sustainability and systems concepts at freshman level; reformulations of engineering curriculum using educational theories; assessment in engineering education; technology integration in engineering instruction; undergraduate research; design in freshman year; internationalization of freshman engineering courses; design of study abroad experiences and international collaboration in engineering education
Expertise: Hydrologic modeling; drought analysis; engineering education research
Examples of Funding Sources: National Science Foundation, U.S. Environmental Protection Agency, U.S. Department of Education, Virginia Water Resources Research Center

ENGINEERING EDUCATION

Name: **Tom Walker**
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FAX: 540-231-6903
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Specialty: Use of Educational Technologies in Engineering Education
Applications: Modern engineering classrooms; distance-learning; computer-enhanced learning

ENGINEERING EDUCATION

Early Design, Freshman Programs, Graduate Programs, Learning Systems

Name: **Odis Hayden Griffin, Jr.**
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Office Phone: 540-231-6555
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Specialty: Design and Assessment of Engineering Education, Courses and Programs, Early Design, Freshman Programs, Design of Learning Environments, Failure Analysis, Mechanical System Performance Analysis
Applications: All educational settings; design and analysis of mechanical parts; consulting in the area of failure of mechanical systems, including, but not limited to, automotive equipment, construction equipment, and power tools, including safety features and performance; industrial training
Expertise: Engineering education, including course and curriculum design, including ABET considerations; theory and application of closed form solutions and finite element analysis to

solid mechanics problems; postmortem analysis of mechanical systems
Examples of Funding Sources: National Science Foundation

ENGINEERING MECHANICS

see **Biomedical Engineering**, *Grant*

ENGINEERING OUTREACH AND EDUCATION

Name: **Bevlee A. Watford**
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Expertise: Student recruitment and retention; K-12 outreach; diversity; student support programs
Examples of Funding Sources: Lockheed Martin, Boeing, National Science Foundation, NASA, Alltria, Northrup Grumman, Nucor

ENGINES

see **Aerodynamics**, *Telionis*
Energy Conversion, *Ekkad*

ENVIRONMENT

see also **Agriculture**, *Dillaha*
Air Pollution, *Marr*
Fluid Dynamics, *Puri*
Water, *Moglen*

ENVIRONMENT

Name: **W. Cully Hession**
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Specialty: Fluvial Geomorphology and Aquatic Ecosystem Linkages, Watershed Hydrology
Applications: Research and consulting to quantifying physical characteristics of streams and their relationships to aquatic ecosystem health; develop and review stream/river restoration designs; watershed management; constructed wetlands for pollution abatement
Expertise: Emphasis on cross-disciplinary stream and wetland research, relating physical processes (hydrology/hydraulics/sediment transport) to aquatic habitat
Examples of Funding Sources: National Science Foundation, U.S. Environmental Protection Agency-STAR, U.S. Department of Agriculture-Forest Service and Agricultural Research Service, Virginia Department of Conservation and Recreation

ENVIRONMENT

Name: **John Novak**
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Specialty: Bioremediation, Water and Wastewater Treatment, Hazardous Waste Treatment, Sludge Treatment, Solid Waste Management
Applications: Advanced anaerobic digestion processes for the reduction of solids and odors; treatment of contaminated sites including waste petroleum products, creosote, chlorinated solvents and industrial chemicals; studies of the benefits of landfill bioreactors; sludge conditioning and dewatering processes and the economical application of conditioning chemicals
Expertise: Advanced sludge digestion for improved solids destruction and reduction of odor causing compounds; treatment

of hazardous wastes and remediation of contaminated sites using bioremediation and phytoremediation; improving treatment for the chemical industry for industrial wastewaters

Examples of Funding Sources: Los Angeles County Sanitation District, District of Columbia Water and Sewage Authority, Water Environment Research Foundation, Siemans Corporation

ENVIRONMENT

Name: **Mary Leigh Wolfe**
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Specialty: Nonpoint Source Pollution, Small Watershed Hydrology
Applications: Quantifying risk of nonpoint source (NPS) pollution; developing computerized decision support and planning systems for watersheds and farms; evaluating best management practices for controlling NPS pollution; managing soil and water resources; understanding hydrologic processes
Expertise: NPS and hydrologic modeling; risk assessment; animal waste/nutrient management
Examples of Funding Sources: U.S. Department of Agriculture, Chesapeake Research Consortium, Virginia Water Resources Research Center, U.S. Environmental Protection Agency, Virginia Department of Conservation and Recreation, Virginia Department of Environmental Quality

ENVIRONMENT

Environmental Engineering and Sciences

Name: **Andrea M. Dietrich**
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Specialty: Water Quality and Treatment, Taste and Odor Assessment,
Applications: Drinking water treatment; sensory analysis of compound in drinking water; water quality and household plumbing; assessing the environmental impact of pollutants; interdisciplinary research that integrates technology, science, and society
Expertise: Water quality; chemical monitoring; sensory (taste and odor) analysis; fate, transport and toxicity of pollutants
Examples of Funding Sources: American Water Works Association Research Foundation, U.S. Department of Defense, National Science Foundation, U.S. Environmental Protection Agency, Virginia Department of Health

ENVIRONMENT

Environmental Engineering and Toxicology

Name: **Gregory D. Boardman**
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Specialty: Industrial Waste Management, Water and Wastewater Treatment, Environmental Toxicology, Aquaculture
Applications: Developing operations and systems for the management of waste liquids and solids, and water reuse; evaluating the performance of treatment systems; developing methods for the assessment of toxicity; determining the environmental impact of pollutants
Expertise: Conducting treatability studies with both physicochemical and biological systems; developing short-term methods for the early assessment of toxicity; evaluating effectiveness of

aquacultural systems
Examples of Funding Sources: U.S. Department of Energy, U.S. Environmental Protection Agency, Sea Grant, Commercial Fish and Shellfish Technology Program, Virginia Department of Environmental Quality, Virginia Department of Health, U.S. Department of Agriculture

ENVIRONMENT

Environmental Engineering, Indoor Air Pollution

Name: **John C. Little**
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URL: www.cee.vt.edu/people/little.html
Specialty: Environmental Transport Processes
Applications: Lake and reservoir management; treatment process technologies; indoor air pollution; environmental exposure and risk assessment
Expertise: Evaluating performance and costs of environmental technologies including aeration oxygenation devices, air stripping towers, and aerated biological filters; quantifying exposure to chemical contaminants in drinking water; evaluating sediment oxygen demand; developing a mechanistic understanding of sources of indoor air pollution
Examples of Funding Sources: U.S. Department of Energy, U.S. Department of Education, U.S. Environmental Protection Agency, National Science Foundation, Tennessee Valley Authority

ENVIRONMENT

Water and Wastewater Treatment

Name: **William R. Knocke**
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Specialty: Environmental Engineering (Water and Wastewater Treatment, Sludge Dewatering and Disposal)
Applications: Research and consulting aimed at improving the treatment technologies used to purify waters for drinking; provide treatment of municipal and industrial wastewaters prior to their release to the environment; and development of methods for treating waste residues prior to their ultimate disposal
Expertise: Emphasis areas include coagulation and flocculation of waters; applications of alternative oxidants for trace metal removal (Fe and Mn); characterization of water distributions present in water and wastewater sludges
Examples of Funding Sources: National Science Foundation, U.S. Environmental Protection Agency, U.S. Department of the Interior, DuPont Chemical, General Chemical, NALCO Chemical Company, Union Camp

ENVIRONMENT AND FLUVIAL HYDRAULICS

Name: **Panos Diplas**
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Specialty: Experimental, Field, and Numerical Studies in Environmental and Fluvial Hydraulics; Stream Restoration; River Mechanics and Morphology; Ecological Hydraulics; Wetland Hydrodynamics; Turbulent Flows over Rough Boundaries; Mechanics of Two-Phase, Solid-Fluid Flow, Watershed Man-

agement

Applications: Behavior of rivers during floods; impact of human activities on fish habitat; impact of dam-controlled rivers on stream stability; movable bed model studies; sediment and pollutant transport in surface waters; water and pollutant movement through wetlands; soil erosion prediction and prevention; hydraulic structures; scour around bridge piers and abutments; unique experimental facilities available at the Baker Environmental Hydraulics Laboratory

Expertise: Numerical and experimental modeling of fluvial phenomena; gravel-bed stream dynamics; turbulent boundary layers over rough surfaces; solid-liquid separation processes

Examples of Funding Sources: National Science Foundation, U.S. Environmental Protection Agency, U.S. Geological Survey, U.S. Army Corps of Engineers, Office of Army Research, Defense Advanced Research Projects Agency, Office of Naval Research, NASA, Virginia Transportation Research Council, Virginia Department of Game and Inland Fisheries, Nature Conservancy, Dominion Power, Pacific Gas and Electric

ENVIRONMENT AND FLUVIAL HYDRAULICS

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Specialty: Hydrology, Hydraulics Ecology, Restoration of Streams, Rivers, and Wetlands

Applications: Research relating physical characteristics of streams human activities, and aquatic ecosystem health; preservation of healthy streams, rivers, and wetlands; stream, river, and wetland restoration design; watershed management; modeling of water flow and pollutant transport in streams, rivers, wetlands, and groundwater

Expertise: Interdisciplinary studies relating hydraulics and ecological health (ecohydraulics) in streams, rivers, and wetlands; modeling and measuring surface water-groundwater (hyporheic exchange) in steams, rivers, and wetlands; heat and pollution migration in streams, rivers, and wetlands; impacts of pollution, climate change, and land use change on aquatic ecosystems; improving stream, river, and wetland restoration design and watershed planning

Examples of Funding Sources: U.S. Environmental Protection Agency

ENVIRONMENT AND NANOTECHNOLOGY

Name: **Peter Vikesland**
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Specialty: Environmental Engineering, Environmental Nanotechnology

Applications: Research activities are aimed at development of improved technologies to sense and remediate waterborne environmental contaminants, optimize drinking water disinfection practices, and understand corrosion processes in both engineered and natural systems

Expertise: Development of engineered nanoparticles for use as environmental sensors and for contaminated site remediation; characterization of surface mediated reactions in both engineered and natural systems; examination of disinfectant interactions with oxidizable materials in drinking water

Examples of Funding Sources: American Water Works Association Research Foundation, National Science Foundation, Vir-

ginia Water Resources Research Center, U.S. Environmental Protection Agency

ENVIRONMENTAL ENGINEERING

see also **Chemical and Environmental Engineering**, *Y.A. Liu*
Corrosion Control, *Edwards*
Groundwater, *Widdowson*

ENVIRONMENTAL ENGINEERING

Name: **Adil N. Godrej**
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Specialty: Surface Water Quality Modeling, Watershed Management, Lake and Reservoir Management, Urban Runoff
Applications: Modeling of surface water quality in watersheds, lakes and reservoirs; monitoring of nonpoint source pollution; studies of the impact of urban runoff on receiving water quality; assessment of stream and reservoir water quality; tracer (dye) dispersion studies; performance monitoring of best management practices (BMPs)
Expertise: Environmental assessment; environmental chemistry; water quality modeling
Examples of Funding Sources: Virginia Department of Environmental Quality, Metropolitan Washington Council of Governments, Fairfax Water, City of Manassas, Prince William County

ENVIRONMENTAL RADAR

see **Space Science**, *Baker*

ENVIRONMENTAL REMEDIATION

see **Applied Environmental Microbiology**, *Pruden*

ENZYMES

see **Bioprocess Engineering**, *Y. Zhang*

EPITAXIAL FILMS

see **Materials**, *Abiade*

ERGONOMICS

see also **Human Factors Engineering / Ergonomics**, *Casali*

ERGONOMICS

Name: **Michael J. Agnew**
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Specialty: Occupational Biomechanics and Ergonomics, Human Factors
Applications: Development of ergonomic guidelines for use in industry; ergonomic evaluation of industrial tools and assistive devices
Expertise: Biomechanical modeling; electromyography; psychophysics; localized muscle fatigue

ERGONOMICS

Name: **Maury A. Nussbaum**
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Specialty: Human Factors Engineering, Biomechanics, Aging
Applications: Design and evaluation of occupational tasks to minimize injury risk and maximize performance; consumer product design

Expertise: Biomechanical modeling of spine and shoulder; fatigue assessment and measurement; physical impairments associated with aging; design and analysis of consumer technology and products

Examples of Funding Sources: National Institute for Occupational Safety and Health, Honda of America Manufacturing, Inc., Toshiba Corporation, Hyundai Motor Company

FAILURE ANALYSIS

see **Engineering Education***, Griffin*

FALLS

see **Biomechanics***, Lockhart, Madigan*

FARM MACHINERY

see **Biomass Harvest**, *Cundiff*

FARM SAFETY

see **Agricultural Machinery**, *Grisso*

FAULT TOLERANCE

see **High Performance Computing***, Varadarajan*

FIBER OPTICS

see also **Photonics***, A. Wang*

FIBER OPTICS

Communications

Name: **Ira Jacobs**
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Specialty: Fiber Optic Communications Technology and Systems, Telecommunication Networks and Applications

Applications: Use of fiber optic technology for the transmission of voice, video and data signals. This includes short distance applications (e.g., within a building or onboard an automobile, airplane or ship), intermediate distances (e.g., CATV within a city), or for long distances (e.g., transcontinental and intercontinental communications). The advantages of fiber optics are the extremely large communication capacities that may be achieved with small diameter, lightweight cables, the long distances that may be traversed before amplification is required, and the interference free performance

Expertise: Fiber optic communication system architecture, design, and analysis; fiber optic access, local area, metropolitan-area and wide-area networks; network topology, architecture, and standards; transmission of microwave signals on fiber and hybrid fiber/wireless networks; broadband access technologies and applications; fiber optic cable, transmitter, receiver, and wavelength division multiplexing technologies; telecommunication system design, performance analysis and application studies

Examples of Funding Sources: AT&T Bell Laboratories, Bellcore, MCI, National Science Foundation, Newport News Shipbuilding

FILE AND STORAGE SYSTEMS

Name: **Ali R. Butt**
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URL: http://people.cs.vt.edu/~butta/

Specialty: File and Storage Systems, High Performance Computing, Distributed Systems and Grid Computing, Peer-to-Peer Systems, Operating Systems

Applications: Large scale storage management for HPC applications
Expertise: Systems and applications I/O modeling and performance tuning; I/O subsystem analysis; operating system optimizations
Examples of Funding Sources: National Science Foundation, Oak Ridge National Laboratory, Department of Energy Office of Science

FINITE ELEMENT ANALYSIS

see **Aircraft**, *Kapania*
Engineering Education, *Griffin*
Finite Element Analysis, *Batra*

FINITE ELEMENT METHOD / COMPUTATIONAL MECHANICS

Name: **Romesh C. Batra**
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Specialty: Finite Element Method, Meshless Methods, Functionally Graded Materials, Smart Structures, Microelectromechanical Systems, Damage in Metals and Composites under Dynamic Loading, Carbon Nanotubes
Applications: Blast mitigation; MEMS; sensors and actuators; structural analysis and design; failure analysis; vibration and noise control
Expertise: Constitutive relations for soft tissues; thermal stresses; stress analysis under harsh thermal and electromagnetic environments; rubberlike materials; coupled thermo-electromechanical problems

FIRE SCIENCE

see **Combustion**, *Lattimer*

FLOODING

see **Environment and Fluvial Hydraulics**, *Diplas*
Water Control, *Kibler*

FLUID DYNAMICS

see also **Nonlinear Dynamics**, *Hajj*

FLUID DYNAMICS

Name: **Mark A. Stremler**
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Specialty: Theoretical Fluid Mechanics, Laminar Flows, Chaos and Dynamical Systems Theory Applied to Fluid Motion
Applications: Microfluidics; mixing and separation in highly viscous and/or non-Newtonian fluids; fluid transport and mixing in biological systems; vortex dynamis
Expertise: Mathematical and numerical modeling of fluid flows; applications of dynamical systems theory; topological chaos
Examples of Funding Sources: NSF, U.S. Army Research Office, National Institutes of Health

FLUID DYNAMICS

Name: **Robert W. Walters**
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E-mail: rwalters@vt.edu
Specialty: Computational Fluid Dynamics, Stochastic Fluid Dynamics, Uncertainty Analysis

Applications: Advanced design of space, air and undersea vehicles; engine design; re-entry problems; configuration aerodynamics
Expertise: Numerical analysis and modeling for compressible flow simulations; uncertainty analysis using chaos theory; thermo-chemical non-equilibrium fluid dynamics
Examples of Funding Sources: NASA

FLUID DYNAMICS

Fire Safety, Mechanics

Name: **Ishwar K. Puri**
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URL: www.esm.vt.edu/~ikpuri/
Specialty: Microfluidics, Nanofluidics, Fluid Dynamics, Nanomaterial Synthesis and Fabrication, Nanomaterial Characterization, Combustion, Fire Safety, Mechanistic Modeling
Applications: Nano/biosensors; hydrogen storage; magnetic fluids; nanoparticle systhesis
Expertise: Experiments; terascale simulations
Examples of Funding Sources: National Science Foundation, NASA, Environmental Protection Agency

FLUID DYNAMICS, TURBULENCE AND TURBULENT FLOWS

Name: **Roger L. Simpson**
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Specialty: Fluid Mechanics, Turbulent Flow Measurements, Modeling
Applications: Aircraft; submarines; turbomachines
Expertise: Structure of turbulent flows, including separation, unsteadiness, rough walls, and 3-D effects; measurement of such flows by special laser techniques; modeling of such flows, with applications to aircraft, submarines, and turbomachines; unsteady aero- and hydro-dynamics, such as occurs over maneuvering aircraft and undersea vehicles, including separation phenomena; development of new three-velocity component laser-Doppler techniques, hardware, and software, especially miniature systems; measurements of surface pressure fluctuations produced by turbulence
Examples of Funding Sources: National Science Foundation, NASA, U.S. Department of Defense, Newport News Shipbuilding

FLUID MECHANICS

see also **Applied Mathematics**, *Pierson*
Computational Fluid Dynamics, *Battaglia*
Computational Fluid Dynamics and High End Parallel Computing, *Tafti*
Gas Turbines – Propulsion / Instrumentation, *O'Brien*

FLUID MECHANICS

Name: **Hassan Aref**
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Specialty: Theoretical Fluid Mechanics, Computational Fluid Dynamics, Chaos Theory Applied to Fluid Motions, Physics of Foams
Applications: Elucidation of various flow phenomena through

analysis and/or numerical simulation of interacting vortices; application of the concept of chaos in a dynamical system to various fluid flow situations, in particular vortex interactions, and fluid stirring and mixing at low Reynolds number; theory and numerical simulation of dry foams

Expertise: Lagrangian approach to flow simulation; adaptation of concepts from modern physics and mathematics to fluid flow (e.g., solitons on vortices, chaotic advection, topological fluid dynamics); numerical simulation of structure and dynamics of dry foams

Examples of Funding Sources: National Science Foundation, U.S. Department of Energy (Basic Energy Sciences), NASA (Microgravity Fluid Physics), DARPA (micro-fluids)

FLUID MECHANICS

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Specialty: Nanotechnology, CFD, Computational Nano-Fluidics
Applications: Aerodynamics; propulsion systems; molecular dynamics
Expertise: Use of continuum and molecular models to carry out numerical simulations of fluid flows
Examples of Funding Sources: U.S. Office of Naval Research, Naval Surface Warfare Center - Dahlgren Division, Nuclear Regulatory Commission

FLUID MECHANICS

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Specialty: Experimental Measurements and Analysis of Complex Thermo-Fluid Systems, Physiological and Engineered Systems, Laminar and Turbulent Flows, Flows in Micro-Scales
Applications: Biomedical implant devices such as mechanical heart valves and vascular stents; flow and biomedical sensors; aero and hydrodynamic applications including reducing drag, reducing acoustic signature, lift enhancement and vertical/short take-off and landing; mixing and separation processes involving polydispersed multi-phase flows with particles and bubbles; spray atomization for jet engine combustors and afterburners
Expertise: Experimental fluid mechanics; applications of optical diagnostics; development of flow sensors and actuators; advance instrumentation; signal and image processing; cardiac and arterial flows and implants; flow control of laminar/turbulent flows; multi-phase flows; wind and water tunnel testing
Examples of Funding Sources: National Science Foundation, Department of Energy, Office of Naval Research, U.S. Navy, U.S. Air Force Office of Scientific Research, U.S. Air Force Research Laboratories, NASA

FLUID MECHANICS / HEAT TRANSFER

see also **Combustion and Fire Science***, Lattimer*

FLUID MECHANICS / HEAT TRANSFER

Name: **Mark Paul**
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Specialty: Large-Scale Parallel Computation, Nonlinear Dynamical Systems, Fluid Mechanics, Thermodynamics, Heat Transfer, Modeling of Micro and Nanoscale Systems
Applications: Nanoscale science and technology for biological applications; single molecule biophysics using nanoscale sensors; quantifying the predictability of large complex systems exhibiting chaotic dynamics; stochastic models of cell dynamics
Expertise: The use of analytical methods and large-scale numerical computation to explore nanoscale systems for biological applications and the complex spatiotemporal dynamics of very large systems driven far-from-equilibrium
Examples of Funding Sources: National Science Foundation, DARPA

FLUIDS AND ACOUSTICS

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Specialty: Aerodynamics, Fluid Flow, Flow Control, Acoustics and Heat Transfer
Applications: Develop experiments and computational programs to understand behavior of fluid flows; improve the performance and energy efficiency of fluid machinery
Expertise: Instrumentation; high-frequency unsteady measurement techniques; wind tunnel testing; computational methods for fluid flow problems. Teach short course in energy management for cogeneration and combined cycles.
Examples of Funding Sources: NASA Langley, NASA Glenn, Rolls-Royce Corporation, General Electric Company, Pratt and Whitney Aircraft, Sandia National Laboratory, Westinghouse, Air Force Office of Scientific Research, DARPA, U.S. Air Force Research Lab, Westinghouse/Siemens

FLUIDS AND HEAT TRANSFER

see **Energy**, *Diller*

FLUVIAL FORMS AND PROCESSES

see **Environment**, *Hession*

FLYWHEELS

see **Rotating Machinery**, *Kasarda*

FOOD INDUSTRY

see **Bioprocess Engineering**, *Wen*

FOOD QUALITY

see **Nondestructive Evaluation of Food**, *Mallikarjunan*

FORMAL METHODS

see **Computer Engineering**, *Shukla*

FRACTURE MECHANICS

see **Mechanics of Materials**, *Dillard*

FUEL CELLS

see **Automotive Powertrains**, *Nelson*
Bioprocess Engineering, *Y. Zhang*
Energy Systems, *von Spakovsky*
Mechanics of Materials, *Dillard*
Polymers, *Baird*

GAME THEORY

see **Networks**, *L. DaSilva*
Wireless Networks, *MacKenzie*

GAS TURBINES

Propulsion, Instrumentation

Name: **Walter F. O'Brien**
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Specialty: Fluid Mechanics, Thermodynamics
Applications: Turbomachinery and gas turbines for stationary and airborne applications (propulsion), ramjets and rockets, and scramjets; plasma ignition and flow control devices and related instrumentation
Expertise: Analysis, modeling and design of turbomachinery and components for gas turbines and propulsion engines; compression system operability; combustion ignition
Examples of Funding Sources: NASA, Pratt and Whitney, ATK Inc, Electric Jet, LLC, Prime Photonics

GENOMICS

see **Algorithms**, *Heath*
Computational Biology, *Murali, L. Zhang*

GEOGRAPHIC INFORMATION SYSTEMS (GIS)

see **Computer Science**, *C-T. Lu*

GEOSPATIAL DECISION MAKING

Transportation

Name: **Kathleen L. Hancock**
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Specialty: Geospatial Decision Making in Civil Engineering, Geographic Information Systems in Transportation, Freight Transportation Operations and Planning, Transportation Planning
Applications: Transportation systems; infrastructure management; asset management; information technology
Expertise: Application of geospatial information to civil engineering problems; transportation engineering and planning; freight planning and operations; transportation safety
Examples of Funding Sources: National Science Foundation, Federal Highway Administration, Transportation Research Board, National Cooperative Highway Research Program, Massachusetts Highway Department, Massachusetts Governor's Highway Safety Bureau, City of Alexandria, Arlington County

GEOTECHNICAL ENGINEERING

see also **Civil Engineering**, *Green, Mitchell*

GEOTECHNICAL ENGINEERING

Name: **Thomas L. Brandon**
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Specialty: Geotechnical Engineering, Dam and Levee Design and Analysis, Geotechnical Laboratory Testing
Applications: Earth and rockfill dams, levees, retaining walls, and embankments

Expertise: Geotechnical engineering; dam and levee design and analysis; geotechnical laboratory testing
Examples of Funding Sources: U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, National Science Foundation

GEOTECHNICAL ENGINEERING

Name: **Joseph E. Dove**
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URL: www.cee.vt.edu/people/dove.html
Specialty: Geotechnical Engineering
Applications: Land development; soil and rock grouting; geo-synthetics; retaining walls; slopes; foundations; sustainable engineering
Expertise: Multi-scale experimental methods in geomechanics; ground improvement; site characterization and assessment; material surface and image analysis; remote and close-range sensing
Examples of Funding Sources: National Science Foundation, Virginia Transportation Research Council

GEOTECHNICAL ENGINEERING

Earth Structures and Foundations

Name: **J. Michael Duncan**
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Home FAX: 540-552-4508
Specialty: Geotechnical Engineering
Applications: Design of earth dams, earth retaining structures, and foundations
Expertise: Soil mechanics; settlement, bearing capacity, slope stability analyses; finite element analyses of stress distribution, seepage, and consolidation
Examples of Funding Sources: U.S. Army Corps of Engineers, National Cooperative Highway Research Program, Bureau of Reclamation

GEOTECHNICAL ENGINEERING

Name: **George Filz**
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Specialty: Ground Improvement, Foundation Engineering, Soil-Structure Interaction, Environmental Geotechnics
Applications: Foundations; retaining walls; landslides; embankments; levees; landfills; and subsurface barriers to groundwater flow
Expertise: Ground improvement and reinforcement; numerical analysis of soil-structure interaction; geotechnical composite systems; containment technologies for waste disposal facilities and sites of uncontrolled contaminant release
Examples of Funding Sources: National Science Foundation, Virginia Transportation Research Council, U.S. Army Corps of Engineers, U.S. Air Force Research Laboratory, U.S. Federal Highway Administration, U.S. Department of Education

GLOBAL ENGINEERING

see **Engineering Education***, Johri*

GLOBAL WARMING

see **Energy***, Rahman*

GPS

see **Atmospheric and Radio Science***, W. Scales*
Communications*, Pratt*

GREEN COMPUTING

see **Computer Science***, Feng*
Parallel and Distributed Systems*, Cameron*

GREENHOUSE EMISSIONS

see **Catalysis***, Oyama*

GROUNDWATER

see also **Environment and Fluvial Hydraulics***, Hester*

GROUNDWATER

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Specialty: Groundwater, Contaminant Transport, Modeling, Remediation of Groundwater, Soil and Sediment Systems, Natural and Enhanced Attenuation, Bioremediation, Phytoremediation, Capping Sediments, Groundwater Resources
Applications: Modeling of groundwater flow and contaminant transport problems; computational tools and decision-making software for remediation of contaminated groundwater and marine/river sediment systems; application of combined remedies at Superfund sites including source and plume remediation technologies; decision-making software tools for groundwater resources development and management; monitoring and characterization of groundwater pollutants
Expertise: Groundwater; contaminant transport in groundwater systems; models and software development for groundwater flow and contaminant transport; wells, springs, public water supply and domestics wells, monitoring wells; groundwater resource development and management; monitored natural attenuation, bioremediation, phytoremediation, soil and groundwater remediation, hazardous waste management; aquifer characterization, field tests, pumping tests, slug tests; Superfund, groundwater contamination, remediation of chlorinated solvents (PCE, TCE, vinyl chloride), petroleum hydrocarbon compounds (BTEX), polycyclic aromatic hydrocarbon (PAH) compounds, heavy metals, nitrate, nitrite, and radionuclides; non-aqueous phase liquids (DNAPL and LNAPL); decision-making software tools for remediation of contaminated groundwater; application of monitored natural attenuation and phytoremediation to Superfund sites; decision-making software tools for groundwater resource development and management; monitoring of groundwater pollutants; novel methods for characterization of aquifer and soil flow and transport properties
Examples of Funding Sources: U.S. Navy Facilities Engineering Command, U.S. Geological Survey, Strategic Environmental Research and Development Program, Environmental Security Technology Certification Program and U.S. Environmental Protection Agency

HARDWARE DESIGN

see **Computer Engineering***, Hsiao, Shukla*

HAZARDOUS WASTE

see **Environment***, Novak*

HEALTHCARE

see **Computer Science***, Egyhazy, Feng*

HEALTHCARE SYSTEMS

see **Decision Making in Organizations and Complex Systems**, *Wernz*

HEARING PROTECTION

see **Human Factors Engineering / Ergonomics**, *Casali*

HEART VALVES

see **Biomechanics**, *De Vita*

HEAT TRANSFER

see also **Biomedical Engineering**, *C. Rylander, M. Rylander*
Computational Fluid Dynamics, *Ball*
Computational Fluid Dynamics and High End Parallel Computing, *Tafti*

HEAT TRANSFER

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Specialty: Micro/Nanoscale Heat Transfer, Nanoscale Energy Conversion
Applications: Thermal management of power electronics; thermoelectric cooling and power generation; waste heat recovery systems; harvesting ambient thermal energy; thermal barrier coatings; nanofluids and heat transfer fluids; micro/nano sensors and actuators; thermal effects in medical therapies; photothermally activated drug delivery
Expertise: Thermal transport through nanostructures and nanostructured composites; thermal transport through interfaces; microfabrication; MEMS, NEMS; nanotechnology; thermal property measurements as a function of temperature and pressure; optical techniques for measuring thermal conductance and thermal conductivity of thin films and nanostructures including carbon nanotubes and DNA; molecular thermometry
Examples of Funding Sources: National Science Foundation

HEAT TRANSFER

Name: **Roop Mahajan**
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Specialty: Metal Foams, Micro/Nano Devices, Artificial Neural Networks, Chemical Vapor Deposition Systems, Thermal Management
Applications: Electronic cooling; RF ablation and hyperthermia treatment of cancer; carbon nanotubes based high power calorimeters and force transducers; ANN-based electronic ear and classifier; thin-film solar lighting systems
Expertise: Computation and experimental heat transfer; fabrication and characterization of micro/nano devices; modeling, diagnosis, and control of engineering and biological processes; humanistic engineering
Examples of Funding Sources: National Science Foundation, National Institutes of Health, Department of Energy, Valleylab, National Institute of Standards and Technology, DARPA, Department of Commerce, AT&T, Lockheed Martin

HEAT TRANSFER

Name: **Brian Vick**
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Specialty: Heat Transfer, Tribology, Wave Mechanics, Numerical Analysis
Applications: Heat transfer in heterogeneous materials; thermal analysis of compressors and brakes; thermomechanical and thermionic emission studies in tribological processes; investigation into true contact area and thermal effects at sliding contacts
Expertise: Modeling complex processes using cellular automata; development of computationally efficient algorithms for analysis of multiphysics processes
Examples of Funding Sources: National Science Foundation, U.S. Air Force Office of Scientific Research, SUCCEED

HIGH PERFORMANCE COMPUTING

see also **Computational Fluid Dynamics and High End Parallel Computing**, *Tafti*
Computational Mechanics, *Sotelino*
Computational Science, *Feng, A.Sandu*
Computer Architecture, *Patterson*
Computer Science, *Feng*
File and Storage Systems, *Butt*
Optimization, *Watson*
Parallel and Distributed Systems, *Cameron*
Parallel Computing, *Ribbens*
Software Engineering, *Ryder*

HIGH PERFORMANCE COMPUTING

Name: **Srinidhi Varadarajan**
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Specialty: Scalable Network Emulation, Compiler Directed Strategies for Flexible Data Sharing Models, Routing Algorithms for Backbone IP Networks and Automatic Fault Detection and Recovery Mechanisms for Massively Parallel Supercomputers
Applications: Building a distributed network emulation system that can scale to emulate hundreds of thousands of virtual nodes. This work involves research on several areas, including compiler directed mechanisms transparent generation of reentrant code from non-reentrant sources, automatic checkpointing and recovery, code migration, dynamic load balancing and 3D environments for network traffic visualization
Expertise: High performance; fault tolerance; network routing; distributed simulation; network emulation
Examples of Funding Sources: National Science Foundation, NASA

HISTORY AND PHILOSOPHY OF SCIENCE & TECHNOLOGY

see **Materials**, *Staley*

HOLOGRAPHY

3-D Information and Image Processing; 3-D Microscopy, Optical Cryptography

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Specialty: Electronic Holography, Hybrid (Optical/Electronic) Image Processing, 3-D Microscopy, Optical Cryptography

Applications: Developing optical scanning techniques to generate holographic (or 3-D) information in a single 2-D scan for applications in 3-D object recognition; 3-D fluorescence microscopy; optical scanning cryptography; developing realtime optical image processing systems for 2-D pattern recognition
Expertise: Electronic holography; hybrid image processing; 3-D microscopy; acousto-optic signal processing; optical cryptography
Examples of Funding Sources: National Science Foundation, National Institutes of Health, Army Research Office

HOMELAND SECURITY

see **Computational Fluid Dynamics**, *Ball*
Computers, *Midkiff*

HUMAN BEHAVIOR ANALYSIS

see **Human-Computer Interaction**, *Quek*

HUMAN-COMPUTER INTERACTION

see also **Computer Science**, *Feng*
Computer-Supported Collaborative Work, *Tatar*
Engineering Education, *Johri*
Usability Engineering, *Winchester*
Virtual Environments, *Bowman*

HUMAN-COMPUTER INTERACTION

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Specialty: Social Impact of Computing, Diffusion and Use of Information and Communication Technology
Applications: Communication and information technology use and social effects; human-computer interaction
Expertise: Social computing; community networking; development communication; survey research; semi-structured interviews
Examples of Funding Sources: National Science Foundation, U.S. Department of Commerce

HUMAN-COMPUTER INTERACTION

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Specialty: Human-computer Interaction, Notification Systems, Design and Software Reuse in HCI, Interface Design, Usability Testing
Applications: Evaluating information design in dual-task situations; ubiquitous computing design and evaluation
Expertise: Design and evaluation of notification systems; design and analysis of mechanisms for knowledge reuse; tools for supporting collaboration
Examples of Funding Sources: National Science Foundation, National Institute of Standards and Technology, Virginia Center for Innovative Technology, Microsoft

HUMAN-COMPUTER INTERACTION

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URL: http://people.cs.vt.edu/~north/
Specialty: Information Visualization, Evaluating Visualizations, Large High-Resolution Displays, Bioinformatics Visualization, Geospatial Information Visualization
Applications: Numeric and non-numeric data visualization and analysis for bioinformatics, geographic information systems, digital libraries, network intrusion detection, intelligence analysis and other domains; development of user interfaces for web-based dissemination of large or complex information; designing user interfaces for large high-resolution displays for control rooms, visualization labs, or classrooms
Expertise: Design, development, and evaluation of user interfaces and visualizations; information visualization; multi-dimensional data visualization; multiple-view coordination; information and application integration; web-based software architectures; architecting tiled, high-resolution displays and visualizations
Examples of Funding Sources: National Science Foundation, National Geospatial-intelligence Agency, Advanced Research and Development Activity, U.S. Bureau of the Census

HUMAN-COMPUTER INTERACTION

Name: **Manuel A. Pérez-Quiñones**
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E-mail: perez@cs.vt.edu
URL: www.cs.vt.edu/~perez
Specialty: User Interface Software, Personal Information Management, Evaluations of Interactive Systems
Applications: Design and development of interactive computer-based applications; assessment of computer use in educational settings; development of web-based applications; design and development of applications for multiple devices including interactive desktop applications, web-based database-driven applications, and handheld devices such as iPhones
Expertise: Design, development and evaluation of interactive systems; usability engineering; experimental design to support the design and evaluation of user interfaces
Examples of Funding Sources: National Science Foundation, IBM Corporation, Microsoft

HUMAN-COMPUTER INTERACTION (a) and COMPUTER VISION (b)

Name: **Francis Quek**
Department: Computer Science
Office Phone: 540-231-8453
FAX: 540-231-9218
E-mail: quek@vt.edu
Specialty: (a) Embodied Cognition and Interaction, Human Multimodal Behavior Analysis, Human Multimodal Language Analysis, Meeting Analysis, Assistive Technologies for the Blind, User Interfaces Systems that Support Human Learning and Knowing, Agent-Based Vision Systems, Computer Vision-Based Interfaces, (b) Human Multimodal Behavior Analysis, Human Multimodal Language Analysis, Meeting Analysis, Computer Vision-Based Interfaces, Medical Imaging, Dynamic Vision, Agent-Based Vision Systems, Vision Processing Using Modern Graphical Processing Hardware
Applications: (a) Human meeting analysis; distance tutoring avatars; systems to support mathematics instruction for the blind; sensemaking systems; simulation-based training; computer gaming systems; human creativity nurturing systems; tabletop interaction technology; (b) Human meeting analysis; tabletop interaction technology; medical imaging and modeling
Expertise: (a) Human computer interaction; embodied cognition and interaction; computer vision-based interaction; (b) Human

computer interaction; embodied cognition and interaction; computer vision-based interaction

Examples of Funding Sources: (a) and (b) National Science Foundation, Intelligence Advanced Research Projects Agency, National Research Foundation of Singapore (by way of collaboration with the National University or Singapore), Carilion Clinic

HUMAN FACTORS

see **Human-Computer Interaction***, Quek*

HUMAN FACTORS AND ERGONOMICS

Name: **Thurmon E. Lockhart**
Department: Industrial and Systems Engineering
Office Phone: 540-231-9088
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URL: www.locomotion.ise.vt.edu/

Specialty: Biomechanics of Slips and Falls; Relationships Between Age-Related Physiological, Biomechanical, and Psychological Changes and Their Ultimate Effect on the Processes of Slip and Fall Accidents; Causes of Slip Initiation; Deficits in Balance and Recovery Capabilities of Older Adults; Gait Abnormalities

Applications: Application of biomechanics and physical ergonomics principles towards evaluating industrial tasks in terms of injury risks and performance. Current interests in this area include: 1) development of screening and intervention strategies for workplace slip and fall accidents; 2) development of biomechanical model of lumbar spine and musculature during slip and fall accidents. Application of biomechanics towards evaluating and preventing elderly individual's risk of fall injuries. Current interest in this area includes: development of intervention strategies for elderly individual's slip and fall accidents including nursing home fall accidents; development of hip protective devices for hip fractures in the elderly; development and evaluation of biomechanical model of slip and fall accidents applicable to shoe design and assertive devices.

Expertise: Biomechanical modeling of lower extremity dynamics and whole body center of mass during slip and fall accidents; human motor control; gait mechanics, musculoskeletal and sensory effects of aging on slip perturbation; industrial ergonomics and work physiology; psychophysics; occupational safety and health; human factors and system design

Examples of Funding Sources: National Institute of Occupational Safety and Health, Whitaker Foundation, Toyota Motor Corporation, Johns Hopkins University, United Parcel Service, National Science Foundation/Small Business Innovative Research

HUMAN FACTORS ENGINEERING

see also **Ergonomics***, Nussbaum*
Industrial Hygiene*, Young-Corbett*

HUMAN FACTORS ENGINEERING

Name: **Thomas A. Dingus**
Department: Civil and Environmental Engineering
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URL: www.vtti.vt.edu

Specialty: Human Factors Engineering, Intelligent Transportation, Transportation Safety

Applications: Development of crash avoidance technology; development of naturalistic driving behavior database

Expertise: Systems including the safety and usability of advanced in-vehicle devices; large-scale studies of driver behav-

ior and performance; truck driver fatigue; driver distraction and attention research

Examples of Funding Sources: National Highway Traffic Safety Administration, Federal Highway Administration, Federal Motor Carrier Safety Administration, Virginia Transportation Research Council, General Motors, National Institutes of Health, Society of Automotive Engineers

HUMAN FACTORS ENGINEERING / ERGONOMICS

Human Engineering, Acoustics, Noise, Vehicle Design, Safety

Name: **John G. Casali**
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E-mail: jcasali@vt.edu
URL: www.ise.vt.edu/people/casali; Lab: www.ise.vt.edu/facilities/facility.php?content_id=344&type=lab
Specialty: Ergonomics in Workplace and Product Design, Acoustics and Human Hearing, Vehicle Human Factors Engineering, Noise Impact on Humans
Applications: Design of consumer and safety products, such as personal protection equipment; design of hearing protectors and communication headsets; in-vehicle displays; industrial, product, and community noise measurement and assessment; patent development and litigation
Expertise: Human factors engineering and ergonomics; acoustics; hearing protection; noise measurement and its effects on humans; forensics
Examples of Funding Sources: National Institute for Occupational Safety and Health, U.S. Army Aeromedical Research Laboratory, Battelle, Inc., Federal Highway Administration, NASA, Bose Corporation, Shure Corporation, Sound Innovations, Inc., United Parcel Service

HUMAN FACTORS ENGINEERING / ERGONOMICS

Safety, Systems Ergonomics, Function Allocation in System Design

Name: **Brian M. Kleiner**
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Office Phone: 540-231-4926
FAX: 540-231-3322
E-mail: bkleiner@vt.edu
Specialty: Systems Safety Management, Work System Analysis and Design, Degree of Automation in Systems Design
Applications: Improvement of work and consumer processes; specification of level of technology in automation and system design; industrial inspection improvement; design of group interfaces
Expertise: Analysis and design of work systems and work system interfaces; function allocation in system design, training/communication/information system support system design; design of collaborative environments; human reliability and decision making in quality control; engineering and project management; safety
Examples of Funding Sources: NASA, National Science Foundation, U.S. Department of Education, NSWC Dahlgren, U.S. Army Research Lab, Walter Reed Army Institute of Research, National Institute of Occupational Safety and Health

HUMAN MOTOR CONTROL

see **Human Factors and Ergonomics***, Lockhart*

HUMAN-SYSTEMS INTERACTION

see **Occupational Safety, Consumer Safety**, *Smith-Jackson*

HUMANISTIC ENGINEERING

see **Heat Transfer**, *Mahajan*

HYBRID VEHICLES

see **Automotive Powertrains**, *Nelson*

HYDRODYNAMICS

Name: **Wayne L. Neu**
Department: Aerospace and Ocean Engineering
Office Phone: 540-231-7061
FAX: 540-231-9632
E-mail: wneu@vt.edu
Specialty: Analysis and Applications of Free Surface and Subsurface Flow of Fluids
Applications: Hydrodynamic design of autonomous underwater vehicles including control surface and propulsion system design; numerical analysis of complex free surface and subsurface flow fields
Expertise: Small autonomous underwater vehicles; propulsion of marine vehicles; computation of free surface flows; hydrodynamic modeling
Examples of Funding Sources: U.S. Office of Naval Research, DARPA

HYDROGEN ECONOMY

see **Energy**, *Rahman*

HYDROLOGY

see **Ecological Engineering**, *Wynn*
Engineering Education, *Lohani*
Environment, *Hession, Wolfe*
Environment and Fluvial Hydraulics, *Diplas, Hester*

IMAGING

see **Biomedical Engineering**, *C. Rylander*

IMAGING SCIENCE

Name: **Christopher L. Wyatt**
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URL: www.ece.vt.edu/faculty/wyatt.html
Specialty: Multidimensional Signal Analysis, Computed Tomography, Magnetic Resonance Imaging, Computer Vision
Applications: Analysis, modeling, and prediction of biological processes using imaging and biosensing; pattern recognition; diagnosis, treatment planning and monitoring in biomedicine; autonomous vehicles and systems
Expertise: Multidimensional signal analysis using deformable models, pattern recognition and other computer vision techniques; image reconstruction and analysis for detection and measurement in cancer imaging and neuroimaging
Examples of Funding Sources: National Institutes of Health, National Science Foundation, U.S. Office of Naval Research

IMPACT BIOMECHANICS

Name: **Warren N. Hardy**
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Specialty: Injury Mitigation through Empirical Determination of Trauma Mechanisms
Applications: Establishment of injury criteria; development of physical and numerical surrogates for injury prediction; design of safer environments; implementation of improved restraint systems and protective equipment
Expertise: Human response and tolerance to impact; properties of biological materials; mechanisms associated with neurotrauma, cardiovascular injury and abdominal impact; automotive crash testing
Examples of Funding Sources: National Institute of Neurological Disorders and Stroke, National Highway Traffic Safety Administration, Japan Automobile Research Institute, Southern Consortium for Injury Biomechanics, Ford Motor Company, Toyota Motor Corporation

INDOOR AIR POLLUTION

see **Air Pollution**, *Marr*
Environment, *Little*
Industrial Hygiene, *Young-Corbett*

INDOOR ENVIRONMENTAL QUALITY

see **Industrial Hygiene**, *Young-Corbett*

INDUSTRIAL AND SYSTEMS ENGINEERING

see **Logistics**, *Taylor*

INDUSTRIAL ENGINEERING AND MANAGEMENT SYSTEMS ENGINEERING

Name: **Eileen M. Van Aken**
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Specialty: Performance Measurement Systems, Organizational Assessment and Improvement, Collaborative and Team-Based Work Systems, Kaizen Events, Lean Work Systems
Applications: Design and implementation of performance measurement (scorecard) systems; design and implementation of organizational assessment and process and improvement in manufacturing and service industries; customer satisfaction measurement; employee satisfaction measurement; design and evaluation of Kaizen events and Kaizen event programs
Expertise: Performance measurement (scorecards); organizational assessments including Baldrige-based assessments and focus groups; organizational analysis, modeling, and improvement; survey research, design, and analysis; strategic planning; customer and employee satisfaction measurement; lean work systems; Kaizen events
Examples of Funding Sources: Danaher, AT&T, ITT Night Vision, USDA Forest Service, National Science Foundation

INDUSTRIAL ENGINEERING, SIMULATION, SYSTEMS MODELING

Name: **C. Patrick Koelling**
Department: Industrial and Systems Engineering
Office Phone: 540-231-8755
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E-mail: koelling@vt.edu
Specialty: Operations Research, Industrial Engineering
Applications: Engineering economic analysis; analysis and optimization
Expertise: Engineering economy; system modeling; simulation modeling and analysis; mathematical modeling; heuristics
Examples of Funding Sources: York Hospital, National Science Foundation, U.S. Department of Energy, Rowe Furniture

INDUSTRIAL ERGONOMICS

see **Human Factors and Ergonomics**, *Lockhart*

INDUSTRIAL HYGIENE

Name: **Deborah Young-Corbett**
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Home Phone: 540-230-7389
E-mail: dyoung@vt.edu
Specialty: Indoor Environmental Quality, Multivariate Modeling to Describe Relationships Among Climatic Factors, HVAC, Performance Data, Spore Counts and Building Inhabitant Symptoms, GIS Mapping of Building Related Epidemiologic Parameters and Fungal Distributions, Dust Control in Construction Operations, Re-design of Dust Control Tools, Construction Worker Health Protection and Engineering Controls
Expertise: Certified industrial hygienist; certified hazardous materials manager; certified safety profession
Examples of Funding Sources: National Institute for Occupational Safety and Health, National Institutes of Health, Johns Hopkins University

INDUSTRIAL WASTE

see **Environment**, *Boardman*

INFORMATION PERSONALIZATION

see **Computational Science**, *Ramakrishnan*

INFORMATION TECHNOLOGY

see **Chemical and Environmental Engineering**, *Y.A. Liu*
Computers, *Midkiff*
Computer Science, *Egyhazy, Feng, Fox*
Engineering Education, *Johri*
Water, *Moglen*

INFRASTRUCTURE MANAGEMENT

see also **Pavements**, *Flintsch*

INFRASTRUCTURE MANAGEMENT

Name: **Michael J. Garvin**
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URL: www.cee.vt.edu/people/garvin.html
Specialty: Infrastructure/Real Asset Management, Infrastructure/Real Asset Investment and Finance Decisions, Project Delivery and Procurement Systems
Applications: Development of decision support systems to assist owners of large collections of real assets during capital planning, resource allocation and acquisition/procurement
Expertise: Alternative project delivery systems; program management; decision science
Examples of Funding Sources: National Science Foundation

INJURY BIOMECHANICS

Automobile Safety, Military Restraints, Sports Biomechanics

Name: **Stefan Duma**
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URL: www.CIB.vt.edu
Specialty: Experimental and Computational Injury Biomechanics
Applications: Injury criteria for improved automobile safety systems; design and development of advanced military restraints;

evaluating and predicting injuries in sports biomechanics
Expertise: Analysis and design of automobile safety programs; development of computational models of the human body for injury prediction; analysis of field data to predict national injury incidence patterns
Examples of Funding Sources: U.S. Army, National Highway Traffic Safety Administration, Toyota Motor Company, Autoliv, Ford Motor Company

INSTRUCTIONAL TECHNOLOGY

Name: **Glenda R. Scales**
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URL: www.eng.vt.edu/overview/odlc.php
Specialty: Solutions, Human Performance Technology – Electronic Performance Support Systems, Leading Teams to Implement Computing Resource Solutions for Research and Teaching Faculty at Home and Abroad
Expertise: Faculty development; instructional technology; implementing distance learning and international programs

INTERNATIONAL DEVELOPMENT

see **Agriculture***, Dillaha*

INVESTMENT

Name: **Ebru K. Bish**
Department: Industrial and Systems Engineering
Office Phone: 540-231-7099
FAX: 540-231-3322
E-mail: ebru@vt.edu
Specialty: Supply Chain Management, Logistics, Decision Making Under Uncertainty, Capacity Investment Decision
Applications: Manufacturing and service industries; not-for-profit companies
Expertise: Linear and nonlinear optimization; probability theory; economic decision analysis
Examples of Funding Sources: NSF, Boeing

IONOSPHERIC PHYSICS

see **Space Science***, Ruohoniemi*

K-12 EDUCATION AND OUTREACH

see **Computer-Supported Collaborative Work***, Tatar*
Engineering Outreach and Education*, Watford*

LAKE AND RESERVOIR MANAGEMENT

see **Environmental Engineering***, Godrej*

LANDFILLS

see **Geotechnical Engineering***, Filz*

LANDMINE DETECTION

see **Multifunctional Materials***, Priya*

LASERS

see **Optoelectronics***, Asryan*

LOGISTICS

see also **Investment***, E. Bish*
Operations Research*, D. Bish*

LOGISTICS

Industrial Engineering, Simulation

Name: **G. Don Taylor**
Department: Industrial and Systems Engineering

Office Phone: 540-231-9079
Home Phone: 540-552-0082
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URL: http://ise.vt.edu
Specialty: Applied Mathematical Programming and Discrete Event System Simulation to Solve Large-scale Problems in the Field of Engineering Logistics; Particular Interest in the Truck, Rail and Barge Industries
Applications: Trucking and freight shipment; material handling
Expertise: Applied mathematical programming and discrete event system simulation
Examples of Funding Sources: National Science Foundation

MACHINERY HEALTH MONITORING

see **Rotating Machinery**, *Kasarda*

MACROMOLECULES AND INTERFACES

see **Polymers**, *Baird*

MAGNETIC BEARINGS

see **Mechanical Vibrations**, *Kirk*
Rotating Machinery, *Kasarda*

MAGNETIC LEVITATION

see **Motor Drives**, *Ramu*

MANAGEMENT SYSTEMS

Name: **Hazhir Rahmandad**
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URL: http://filebox.vt.edu/users/hazhir/www/index.html
Specialty: Dynamic Modeling of Complex Socio-Technical Systems, Organizational Learning, Building Management Flight Simulators and Microworlds
Applications: Health policy analysis using simulation; product development dynamics; impact of time delays on organizational learning; understanding the diffusion of green buildings; simulation based training tools and environments for software development
Expertise: System dynamics; agent-based modeling; parameter estimation and calibration of differential equation models; management science tools (simulation, optimization, decision analysis)
Examples of Funding Sources: Performance measurement and management systems by McClatchy Tribune, Software development dynamics by Avaya; Web 2.0 applications in Innovation by PRTM and UPM-Kymmene Oyj

MANUFACTURING

Name: **Subhash C. Sarin**
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Specialty: Production Planning and Scheduling, Applied Mathematical Programming, Design and Mathematical Analysis of Manufacturing Systems
Applications: Development of algorithms for the planning, scheduling and control of production systems (aggregate planning, capacity planning, cellular manufacturing and distribution logistics, material flow control, lot sizing, machine sequencing, workforce scheduling and advanced planning and scheduling [planning and scheduling across different parts of a supply chain]); electronics manufacturing; assembly systems design;

environmentally conscious design and manufacturing (disassembly)
Expertise: Production scheduling, model and algorithmic development; mathematical programming
Examples of Funding Sources: NSF, U.S. Department of Agriculture, U.S. Department of the Interior, Virginia Department of Transportation, Commonwealth Technology Research Fund, Virginia Center for Innovative Technology, Universal Instruments, Infineon Technologies, ITT, M/A-COM, Ericsson, Sperry-Marine

MANUFACTURING DESIGN

see **Engineering Design**, *Sturges*

MANUFACTURING SYSTEMS

Name: **Jaime A. Camelio**
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URL: www.filebox.vt.edu/users/jcamelio
Specialty: Manufacturing Processes, Manufacturing Systems, Statistical Quality Control, Manufacturing Information Systems
Applications: Optimal manufacturing systems design; dimensional quality control; construction safety surveillance; health systems monitoring
Expertise: Design of embedded quality systems; manufacturing process monitoring and control; active monitoring in health systems; design under uncertainty of production systems; variation analysis in manufacturing systems; surveillance algorithms applied in safety problems; data mining in production systems
Examples of Funding Sources: National Science Foundation, Quality Measurement Control, Inc., FARO, Inc., Metalsa

MANUFACTURING SYSTEMS

Name: **John P. Shewchuk**
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Specialty: Lean Manufacturing, Manufacturing Systems Engineering, Production Planning and Control
Applications: Modeling, analysis and design of manufacturing and production systems; lean manufacturing facility design/conversion; lean building construction; computer-based decision support tools; virtual and augmented reality in manufacturing
Expertise: Lean manufacturing principles, practices, and techniques; production planning and control; discrete-event simulation and animation; discrete mathematical modeling and algorithm development (optimal and heuristic methods); relational database design and implementation
Examples of Funding Sources: National Institute of Standards and Technology, National Institute for Occupational Safety and Health, The Aerostructures Corporation, BBA Friction Incorporated, Virginia Church Furniture

MATERIAL MODELS

see **Finite Element Method / Computational Mechanics**, *Batra*

MATERIALS

see also **Chemical Engineering**, *S. Martin*
Mechanics of Materials, *et al*

MATERIALS

Name: **Jeremiah T. Abiade**
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Specialty: Thin Film Synthesis, Processing, Characterization
Applications: Epitaxial growth; oxide thin films and multilayers; magnetic thin films and nanoparticles; thermoelectric materials; self-assembled nanostructures; wafer planarization
Expertise: Thin film synthesis by pulsed laser deposition; magnetic property measurements; powder and high resolution x-ray diffraction; chemical mechanical polishing
Examples of Funding Sources: National Science Foundation

MATERIALS

Name: **Sean G. Corcoran**
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Office Phone: 540-231-8309
FAX: 540-231-3554
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Specialty: Materials Education, Learning Technologies in Engineering, Corrosion, Electrochemistry, Nanoporous Metals
Applications: Development of education modules for visualizing engineering concepts; computational methods for the classroom; electropolishing; development of new materials through electrochemical processing
Expertise: Methods in mathematica for teaching engineering; learning technologies in the classroom; electrochemical processing; corrosion
Examples of Funding Sources: National Science Foundation, Department of Energy

MATERIALS

Name: **Kathryn V. Logan**
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Office Phone: 757-325-6820
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E-mail: kvlogan@vt.edu
Specialty: Materials, Synthesis, Processing, Forming, Characterization and Design
Applications: Designer extreme materials: “Moon Brick,” solid oxide fuel cell; synergistic, integrated commercial aircraft design: landing brakes; earth to orbit spaceliner; leading edge material, high temperature sensors; affordable exploration: radiation and meteoroid shielding material for space suits and lunar habitats
Expertise: Design of multifunctional materials accomplished by investigating, creating, and implementing advanced, new, unique, or improved already existing materials (including ceramics, metals, polymers, composites) through synthesis (creating foundation material), processing (creating particles, porous, dense shapes), forming (shaping the material into useable form), and characterization technologies (documenting physical and chemical properties)
Examples of Funding Sources: NASA, U.S. Army Research Office, DARPA

MATERIALS

Electronics

Name: **Guo-Quan Lu**
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Specialty: Nanomaterials and Nanotechnology
Applications: Solid-state or light-emitting diode (LED) lighting systems; electronic packaging and assembly of microelectronic, power electronic, and optoelectronic systems
Expertise: Synthesis and processing of nanoscale powder materials and colloidal suspensions; design and fabrication of microelectronic, power electronic, and optoelectronic products; testing and failure analysis of electronic, magnetic, and optoelectronic materials, devices, and systems
Examples of Funding Sources: National Science Foundation, Office of Naval Research, Army Research Lab

MATERIALS

Name: **Kathy Lu**
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URL: www.lu.mse.vt.edu
Specialty: Particulate Materials Synthesis, Forming, Sintering, and Characterization, Nanomaterials, Energy Material Design and Processing, Composites and Functionally/Structurally Graded Materials, Porous Materials, as well as Simulations in the above areas
Applications: Nano-patterning; large surface area materials; light materials; high temperature and harsh environment applications; energy; defense; and other functional materials
Expertise: Nanoparticulate material design; synthesis; colloidal processing; freeze casting; sintering and characterization; energy material design and processing
Examples of Funding Sources: National Science Foundation, Office of Naval Research, U.S. Army Research Office, Department of Energy

MATERIALS

Name: **Amrinder Singh Nain**
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Office Phone: 540-231-8250
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Specialty: Polymeric Micro/Nanofiber Manufacturing and Characterization, Nano-Biotechnology
Applications: Advanced materials; high strength textiles; surface activated fibers for air filtration in hazardous conditions; in vitro platform to study cellular dynamics; bioreactor based strategies for drug testing; biofilm mitigation strategies; tissue engineering
Expertise: Aligned deposition of polymeric fiber arrays (diameter: sub 50nm-microns, length: microns-cm) in single and multiple layers; mechanical characterization of as deposited individual micro/nanofibers; fabrication of customized biological scaffolds for studying cellular dynamics in the presence of artificial topological constraints; culturing and studying cellular behavior (hepatocytes, neural, muscle, etc.) for tissue engineering applications on polymeric fibrous single and multiple layer scaffolds

MATERIALS

Name: **Gary Pickrell**
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Specialty: Photonic Materials, Fiber Optic Sensors, Novel Optical Fibers, Micro and Nano-Porous Materials, Nano-Biotechnology, Experimental Design, Six Sigma and Lean Six Sigma
Applications: Fiber optic sensors for measurement of chemi-

cal and physical properties; random hole optical fibers and devices; porous materials for filtration, aeration, catalytic and structural applications

Expertise: Ceramics and glass processing and property characterization; design and fabrication of novel "holey" fibers; biologically derived micro and nano-porous materials; business process improvement through Six Sigma and Lean Six Sigma methodologies; new product development

Examples of Funding Sources: National Science Foundation, Department of Energy

MATERIALS

Name: **Thomas W. Staley**

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Specialty: Semiconductor Growth and Analysis, Historical Development of Chemical Technologies

Applications: Semiconductor alloy thin films; ordered alloys; materials analysis; optoelectronics; signal processing; structural simulation; nanomaterials; electronic materials; engineering education

Expertise: Molecular beam epitaxial growth; electron microscopy; high resolution multi-axis crystallography; data optimization & processing; history and philosophy of human sensory processes; chemical sensation; philosophy of nanotechnology; engineering ethics

Examples of Funding Sources: National Science Foundation

MATERIALS

Name: **Dwight Viehland**

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Specialty: Ferroelectrics, Dielectrics, Piezoelectrics, Phase Transitions, and Acoustics

Applications: Development of improved materials performance characteristics for acoustic, electrical, dielectric, and optical applications

Expertise: Investigations of structure-property relationships in materials; characterization of electrical and electromechanical properties of materials, synthesis, and processing of inorganic oxides

Examples of Funding Sources: Office of Naval Research, Naval Undersea Warfare Center, NASA

MATERIALS

Computer Simulation

Name: **Ronald D. Kriz**

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URL: www.sv.vt.edu/krizbio.html

Specialty: Mechanics of Materials, Stress Wave Propagation, Computer Simulation of Physical Phenomena, Scientific Data Visualization

Applications: Simulations of laboratory experiments on supercomputers; wave propagation in anisotropic media; models of micro-scale damage processes in composite materials; volume visualization for interpretation and analysis of distributed damage in composite materials; collaborative engineering design tools in shared virtual environments from the desktop to fully

immersive virtual environments such as a CAVE™
Expertise: Simulation models of mechanical behavior of composite materials that scale from the nano- to micro-scale; development of visual data analysis tools that are used to interpret and analyze simulation model results of dynamic mechanical behavior in anisotropic media; development of Web-based interactive interfaces that allow researchers, educators, and students to create, maintain, and archive, numerous parametric studies based on their legacy computer simulations
Examples of Funding Sources: National Science Foundation, Office of Naval Research, NASA, Visual Numerics, Inc., Sun Microsystems Inc.

MATERIALS ENGINEERING

Name: **Carlos T.A. Suchicital**
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Specialty: Ceramic Materials and Composites, Processing and Applications
Applications: Semiconductor, electronic, electrooptical, electromechanical; electronic packaging for power systems; rapid prototyping and free forming of devices; microwave processing of materials
Expertise: Processing of ceramic materials and composites; processing of materials in thin film and bulk forms; materials for rapid prototyping and free forming processes
Examples of Funding Sources: National Science Foundation, NASA, LUNA Innovations, Peak Materials, U.S. Department of Energy

MATERIALS PROCESSING

see **Microwave Processing of Materials***, Clark, Folz*

MATHEMATICAL ANALYSIS

see **Optimization***, Sherali*
Transportation*, Rakha*

MECHANICAL DESIGN

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E-mail: dohanehi@vt.edu
Specialty: Mechanical Design, Teaching of Basic Freshmen and Sophomore Engineering Classes
Applications: Bio-adhesives; electrically conductive adhesives; tissue adhesives; biomechanical analysis and design with emphasis on finite element analysis and materials mechanical testing; tissue adhesives; bioadhesion and bioadhesives; tissue welding; PORP (partial ossicular replacement prosthesis) bond-failure measurements for auditory implant applications; microhardness testing on nanoparticulate hydroxyapitite for bone implant applications; ANSYS (finite element) numerical modeling of the peeling of tape from a compliant substrate (simulating skin); ANSYS numerical modeling for drug delivery targeting; ANSYS finite element analysis; structural, thermal stress, and magnetics; composite bridge deck; biomechanics; active-magnetic bearing hardware; electric motor hardware; pump; and simulated peel test; LS-DYNA3D (DYNA) finite element analysis; drop impact of bonded printed-circuit board assembly; materials mechanical testing - Instron and creep testing; adhesively bonded joints; ressure-sensitive adhesive tapes; recycled high-density polyethylene composites; rotordynamics analysis; compressors; motors; turbines; technical

writing including proposals; literature retrieval; teaching of mechanical testing lab classes
Expertise: Mechanical design
Examples of Funding Sources: NSF, HUD

MECHANICAL TESTING

see **Engineering Education***, Goff*

MECHANICAL VIBRATIONS

Name: **R. Gordon Kirk**
Department: Mechanical Engineering
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FAX: 540-231-9100
E-mail: gokirk@vt.edu
URL: www.rotorlab.me.vt.edu/
Specialty: Turbomachinery Stability, Hydrodynamic Bearing Design and Analysis, Liquid Seal Analysis, Gas Labyrinth Seal Analysis, Balancing, Diagnostic Expert System, Turbomachinery Design Audits, Thermal Synchronous Instability
Applications: Industrial turbomachinery for power generation, chemical, petrochemical, and aerospace applications; fluidfilm bearings and seals for rotating machinery; prediction of vibration response and stability of rotating machinery, turbocharger stability
Expertise: Analysis, experimental testing and evaluation of field problems related to dynamics of machinery; computer program development for advanced analysis of machinery vibration and stability; balancing of high speed machinery; solving field problems related to bearings, seals and aerodynamic excitation
Examples of Funding Sources: Industry Affiliates Group, ExxonMobil, BP America, Bently Nevada, Dresser-Rand Turbo Division, Elliott, Goulds, Atlas-Copco, GE Oil & Gas Operations LLC, Odegaard & Danneskiold-Samsoe A/S, Rotating Machinery Technology, Rolls Royce Energy Systems, Siemens Demag Delaval Turbomachinery, NASA, Virginia CIT, National Science Foundation

MECHANICS OF MATERIALS

see also **Biomechanics***, De Vita*
Materials*, Logan*

MECHANICS OF MATERIALS

Name: **Scott W. Case**
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E-mail: scase@vt.edu
URL: www.esm.vt.edu/mrg
Specialty: Strength, Fracture, Durability, and Lifetime Prediction of Polymers and Composite Materials
Applications: Polymer and composite materials in automotive, aerospace, infrastructure, and commercial products including fuel cells
Expertise: Fatigue; creep; creep rupture; life prediction; design tool development; test methods for composite materials; environmental effects
Examples of Funding Sources: National Science Foundation, U.S. Air Force Office of Scientific Research, Office of Naval Research, U.S. Army Research Office, NIAA, NASA, Schlumbeger-Doll Research, Owens Corning, Pratt and Whitney, Goodyear, The Dow Chemical Company, General Motors

MECHANICS OF MATERIALS

Behavior, Fatigue

Name: **Norman E. Dowling**
Department: Engineering Science and Mechanics, and Materials

Science and Engineering
Office Phone: 540-231-5399
Home Phone: 540-951-7354
FAX: 540-231-4574
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Specialty: Mechanical Behavior of Materials
Applications: Developing and applying methods for predicting the strength and life of parts of machines, vehicles, and structures
Expertise: Fatigue of materials, including strain-based fatigue analysis and life prediction; fracture mechanics; irregular service loading
Examples of Funding Sources: NASA, MTS Systems Corporation, Ford Motor Company

MECHANICS OF MATERIALS

Fracture Mechanics and Time Dependence

Name: **David A. Dillard**
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Office Phone: 540-231-4714
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E-mail: dillard@vt.edu
Specialty: Strength, Fracture, and Durability of Polymers and Adhesives, Proton Exchange Membranes (PEM), Fuel Cell Durability
Applications: More widespread utilization of adhesives and polymers is dependent on improved understanding of the long-term structural integrity of structures utilizing these materials. Fracture, fatigue, viscoelastic behavior, and environmental aspects all influence the durability of polymers and adhesively bonded systems
Expertise: Viscoelasticity; experimental methods; creep and creep rupture; fracture mechanics of adhesive joints; test methods for adhesion; and environmental effects in polymers; PEM fuel cell durability
Examples of Funding Sources: DuPont, Dow, Boeing, National Science Foundation, Hewlett-Packard, Motorola, General Motors, UTC Power, Johnson & Johnson, 3M

MECHANICS OF MATERIALS

Name: **M.W. Hyer**
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Specialty: Composite Materials and Structures, Smart Materials
Applications: Composite materials are used to stiffen, strengthen, and decrease the weight of a variety of items ranging from sporting equipment to automobiles to spacecraft. Smart materials are designed to sense and control the response of structures and can be easily integrated into composite structures
Expertise: Structural mechanics; stress analysis; materials characterization; thermal effects; stability
Examples of Funding Sources: NASA, Office of Naval Research, National Institute of Standards and Technology, U.S. Air Force Office of Scientific Research, National Science Foundation

MEDICINE

see **Biomedical Engineering***, et al*
Computer Science*, Egyhazy*

METABOLIC ENGINEERING

Name: **Ryan Senger**
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Specialty: Genome-Scale Modeling of Prokaryotes
Applications: Cellulose utilization; biobutanol and hydrogen production
Expertise: Gram positive anaerobes
Examples of Funding Sources: NSF, National Institutes of Health, U.S. Department of Energy

METALLURGY

Name: **Alex O. Aning**
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E-mail: aaning@vt.edu
Specialty: Metallurgy, Powder Processing, Composites
Applications: Structural materials for aerospace and bio applications; materials for energy solutions
Expertise: Processing and synthesis of metallic, amorphous and nano materials and in situ metal matrix composites; alloy development
Examples of Funding Sources: National Science Foundation, ALCOA, U.S. Department of Energy, General Electric, Kyanite Mining Corporation

MICROBIAL COMMUNITIES

see **Applied Environmental Microbiology***, Pruden*

MICROELECTROMECHANICAL SYSTEMS (MEMS)

see **Electronics***, Agah*
Finite Element Method / Computational Mechanics*, Batra*
Fluid Mechanics*, Stremler*
Multifunctional Materials*, Priya*

MICROMECHANICS MODELING OF MULTI-FUNCTIONAL MATERIALS AND COMPOSITES

see **Multiscale Modeling of Nanocomposites***, Seidel*

MICROSCALE GAS SIMULATIONS

see **Computational Fluid Dynamics***, Roy*

MICROWAVE PROCESSING OF MATERIALS

Name: **David E. Clark**
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URL: www2.mse.vt.edu/People/Faculty/DEClark/tabid/523/Default.aspx; www2.mse.vt.edu/ResearchGroups/MicrowaveResearchFacility/tabid/393/Default.aspx
Specialty: Microwave Processing of Materials, Microwave Property Characterization and Testing, Fundamentals of Microwave-Material Interactions, Sol-Gel Materials, Corrosion in Materials
Applications: Sintering inert matrix materials for next generation nuclear fuels; nuclear and hazardous waste treatment; glass corrosion; nucleation and crystallization in glass-ceramics; surface modification and coatings; combustion synthesis
Expertise: Microwave processing of materials; materials processing; corrosion
Examples of Funding Sources: U.S. Department of Energy, Science Applications International Corporation, U.S. Advanced Ceramics Association, National Science Foundation, Savannah River National Laboratory

MICROWAVE PROCESSING OF MATERIALS

Name: **Diane C. Folz**
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URL: faculty page: www2.mse.vt.edu/People/VisitingFacultyandResearchfaculty/DianeFolz/tabid/543/Default.aspx;microwave processing research facility: www2.mse.vt.edu/ResearchGroups/MicrowaveResearch Facility/tabid/393/Default.aspx
Specialty: Microwave Processing of Ceramics, Glass, and Polymers; Microwave Property Characterization and Testing in Materials; Equipment and Methodology Development; Microwave-Material Interactions
Applications: Sintering inert matrix materials for next generation nuclear fuels; nuclear and hazardous waste treatment; glass corrosion; nucleation and crystallization in glass-ceramics; surface modification and coatings
Expertise: Microwave Processing of materials; ceramic and glass processing and characterization/testing
Examples of Funding Sources: U.S. Department of Energy, Science Applications International Corporation; U.S. Advanced Ceramics Association, National Science Foundation, Savannah River National Laboratory

MINERAL PROCESSING

Name: **Greg T. Adel**
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URL: www.mining.vt.edu/facultystaff/adel.htm
Specialty: Process Modeling and Simulation, Optimization, Process Control
Applications: Modeling and simulation of unit operations such as crushing, grinding, flotation, gravity separation, wet classification, screening, etc.; mine-to-mill optimization of crushed stone operations; video-based sensors for on-line assaying, sizing, particle characterization, etc.
Expertise: Population balance modeling; image analysis; particulate separation; software development
Examples of Funding Sources: U.S. Department of Energy, National Science Foundation

MINING

Name: **Kray Luxbacher**
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E-mail: kraylux@vt.edu
URL: www.mining.vt.edu/facultystaff/luxbacher.htm
Specialty: Ventilation Engineering
Applications: Utilization of schlieren and shadowgraph techniques to image airflow in underground mines; applications of computational fluid dynamics to mine ventilation systems; use of novel tracer gases for measurement of ventilation in underground mines; optimization of coalbed methane degasification systems; coalbed methane reservoir modeling; quantification of greenhouse gas emissions due to mining; health aspects of mine ventilation including methods for mitigation of airborne dust; methods for inertization of sealed areas in underground mines
Expertise: CBM reservoir modeling; degasification design and optimization; underground ventilation modeling and design
Examples of Funding Sources: National Institute of Occupational

Safety and Health; Environmental Protection Agency

MINING

Coal

Name: **Roe-Hoan Yoon**
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E-mail: ryoon@vt.edu
Specialty: Mineral Processing, Dewatering, Hydrophobic Force, Fine Coal Cleaning, Microcell Technology
Applications: Development of advanced technologies in solid-solid and solid-liquid separations for mining industry to produce high quality solid fuels in an environmentally sustainable manner
Examples of Funding Sources: U.S. Department of Energy

MINING

Sustainable Development

Name: **Michael Karmis**
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Office Phone: 540-231-7057
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FAX: 540-231-4070
E-mail: mkarmis@vt.edu
Specialty: Mining Engineering
Applications: Developing new technologies for the sustainable development of mineral and energy resources
Expertise: Rock mechanics; ground control; design of mining systems; health, safety and environmental factors; carbon management technologies
Examples of Funding Sources: U.S. Department of the Interior, U.S. Department of Energy

MINING

Name: **Erik C. Westman**
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FAX: 540-231-4070
E-mail: ewestman@vt.edu
Specialty: Rock Mechanics
Applications: Strata monitoring
Expertise: Instrumentation and monitoring; tomographic imaging; digital data acquisition and signal processing; geographic information systems (GIS); coal reserves
Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, National Institute of Occupational Safety and Health

MIXING

see **Fluid Mechanics**, *Stremler*

MOBILE COMPUTING

see **Computers-Design / Architecture**, *J. Paul*

MODELING

see **Management Systems**, *Rahmandad*

MODELING AND ANALYSIS

see **Optimization**, *Sherali*
Transportation, *Rakha*

MODELING AND SIMULATION (a), SOFTWARE ENGINEERING (b), and VERIFICATION AND VALIDATION (c)

Name: **Osman Balci**
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URL: http://manta.cs.vt.edu/balci
Specialty: (a) Modeling and Simulation (M&S) Methodologies, Formalisms, Conceptual Frameworks; M&S Development Environments; Visual Object-Oriented M&S; Web-Based M&S; (b) Network-Centric Software Engineering; Network-Centric System Architectures and (c) Verification and Validation (V&V), Testing, Quality Assurance, Quality Assessment and Certification of (i) Models and Simulations, and (ii) Complex Software Systems
Applications: (a) Solving complex problems using M&S in many application areas such as air traffic control, biological systems, computer systems, manufacturing systems, military systems, network–centric systems, and transportation systems; (b) Internet-based distributed network-centric software systems, network-centric system of systems; (c) quality assessment of complex system designs; assessment of network-central system architectures
Expertise: (a) M&S methodology; conceptual frameworks; visual object-oriented simulation; simulation model development environments; web-based M&S; (b) engineering of e-systems (e.g., e-solutions, e-business, e-commerce); engineering of client/server web-based software systems; web services; software development environments; (c) V&V, testing, quality assurance, quality assessment, and certification of (i) models and simulations, and (ii) complex software systems.
Examples of Funding Sources: Defense Modeling and Simulation Office, NASA Langley Research Center, National Institute of Aerospace, Naval Research Laboratory, Naval Sea Systems Command, Naval Surface Warfare Center Dahlgren Division, Office of Naval Research

MOLECULAR BIOLOGY

see **Applied Environmental Microbiology***, Pruden*

MOLECULAR LEVEL SIMULATIONS

see **Finite Element Method / Computational Mechanics***, Batra*

MOLECULAR MODELING

see **Computational Science***, Onufriev*

MOTIVATION

Name: **Holly M. Matusovich**
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Specialty: Student Motivation for Learning Engineering, Career Choice, Retention of Students in Engineering, Science, Math and Technology Fields, Diversity and Engineering
Applications: Understanding how campus and classroom climates impact motivation; increasing student motivation through pedagogical practice; designing courses to meet the motivation needs of diverse groups of learners
Expertise: Qualitative research methods
Examples of Funding Sources: National Science Foundation

MOTOR DRIVES

Power Electronics and Applied Control

Name: **Krishnan Ramu** (*a.k.a.* **R. Krishnan**)
Department: Electrical and Computer Engineering
Office Phone: 540-231-4311
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URL: www.ece.vt.edu/faculty/ramu.html
Specialty: Magnetic Levitation Using Linear Motor Drives; Rotating Machine Drives for Industrial, Commercial, Aerospace and Defense Applications in all the aspects of Electrical Machines; Induction, Permanent Magnet Synchronous and Switched Reluctance Motor Drives; Design of Electrical Machines; Power Converters for Electrical Machines; Control of Power Converters and Electrical Machines, and Applied Control
Applications: Transportation; industrial applications such as conveyors, elevators, home appliances, aerospace actuators, and special drive systems for medical centrifuges and defense needs
Expertise: Variable speed motor drive systems for various applications

MOTORCYCLE DYNAMICS AND DIAGNOSTICS SYSTEMS

see **Engineering Education**, *Goff*

MULTI-CORE COMPUTING

see **Computers-Design / Architecture**, *J. Paul*

MULTIDIMENSIONAL SIGNAL PROCESSING AND ANALYSIS

see **Imaging Science**, *Wyatt*

MULTIDISCIPLINARY DESIGN AND OPTIMIZATION

see **Aircraft**, *Kapania*
Engineering Design, *Terpenny*

MULTIFUNCTIONAL MATERIALS

see **Materials**, *Logan*

MULTIFUNCTIONAL MATERIALS AND SYSTEMS

Name: **Shashank Priya**
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URL: http://cehms.mse.vt.edu
Specialty: Smart Materials and Composites, Sensors, Actuators, Energy Harvesting, MEMS, Biomimetic Design, Humanoids
Applications: Electric energy generation from vibrations; wind and magnetic field; landmine detection; current probes; EMI shielding; transformer; high frequency components; unmanned undersea vehicles; ultrasonic motor; robots
Expertise: Piezoelectric and magnetoelectric characterization; rf magnetron sputtering; pulsed laser deposition; tape-casting; cyclic voltammetry; sol-gel deposition; windmill characterization; electronic component testing; and energy harvester
Examples of Funding Sources: NSF, Department of Energy, Office of Naval Research, Army Research Office, Air Force Office of Scientific Research, Institute for Critical Technology and Applied Science, National Institutes of Health, Texas Micro Power, Defense Advanced Research Projects Agency

MULTIMEDIA

see **Computers**, *Tront*

MULTISCALE MODELING OF NANOCOMPOSITES

Name: **Gary Don Seidel**
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Specialty: Multiscale Modeling of the Multifunctional Properties of Polymer Nanocomposites for Aerospace Systems, Modeling of Damage Evolution in Polymer Matrix Composites
Applications: Design of multifunctional nanocomposites for structural integrity; thermal management; electrostatic discharge; and structural health monitoring in composites for aerospace vehicles
Expertise: Carbon nanotube-polymer nanocomposites; analytic and computational micromechanics; multiscale modeling; nonlinear finite element analysis; molecular mechanics; continuum mechanics and mechanics of materials; viscoelasticity; interface modeling; modeling of active/smart materials and composites; coupled field modeling
Examples of Funding Sources: U.S. Air Force Office of Scientific Research, NASA, NSF, Sandia National Laboratory

NANOCOMPUTING

see **Computer Engineering**, *Shukla*

NANOELECTRONICS

see **Optoelectronics**, *Asryan*

NANOMAGNETISM

see **Materials**, *Abiade*

NANOMATERIALS

see **Materials**, *Abiade*

NANOSTRUCTURES

see **Finite Element Method / Computational Mechanics**, *Batra*

NANOTECHNOLOGY

see **Air Pollution**, *Marr*
Computer Engineering, *Shukla*
Environment, *Vikesland*
Fluid Dynamics, *Puri*
Fluid Mechanics, *E. Brown, M. Paul*
Heat Transfer, *Mahajan*
Materials, *Corcoran, K. Lu, Nain, Pickrell*
Optoelectronics, *Guido*
Optoelectronics and Sensors, *Meehan*

NAVAL ARCHITECTURE

Vessel Dynamics, CFD

Name: **Leigh McCue**
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Specialty: Nonlinear Dynamics, CFD
Applications: Analytical, numerical and experimental modeling of capsize; liquefied natural gas carrier dynamics; real-time identification of vessel instabilities; real-time indication of vessel quiescence; smoothed particle hydrodynamics; fluid structure interaction

Expertise: Linear, nonlinear and chaotic ship dynamics; probabilistic methods; smoothed particle hydrodynamics
Examples of Funding Sources: Office of Naval Research, Naval Surface Warfare Center, Carderock Division, National Science Foundation

NETWORK EMULATION

see **High Performance Computing**, *Varadarajan*

NETWORK SECURITY

Name: **Jung-Min "Jerry" Park**
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Specialty: Security in Wireless Sensor Networks, Intrusion Detection, IP Traceback and MAC-Layer Traceback, Attack-Resilient Routing in Wireless Ad Hoc Networks, Security in Software Defined Radio / Cognitive Radio Networks, Privacy Enhancing Technologies
Applications: Key management in wireless sensor networks; intrusion detection in high-bandwidth networks; IP traceback and MAC-layer traceback; attack-resilient routing in wireless ad hoc networks; privacy enhancing technologies; security issues in cognitive radio networks; security issues in software defined radio networks
Expertise: Applied cryptography; network attack countermeasures; anomaly detection systems; cryptographic protocol design/analysis; security issues in cognitive radio networks
Examples of Funding Sources: National Science Foundation, Samsung Electronics, SANS (SysAdmin, Audit, Network, Security) Institute, SCA Technica Inc.

NETWORKING

Name: **Yaling Yang**
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Specialty: Mobile Computing, Ad Hoc Networks, Sensor Networks, Cognitive Radio Networks, Secure Localization, Network Security
Applications: Sensor network hardware and software codesigns; attack source localization in wireless networks; performance optimization and modeling of cognitive radio networks; real-time communication support in wireless networks; composable design of networking softwares; topology control
Examples of Funding Sources: NSF, Qualcomms, National Security Agency

NETWORKING AND COMPUTING

Name: **Ing-Ray Chen**
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Specialty: Mobile Computing, Multimedia, Sensor Networks, Network and Computer Security, Performance and Reliability Analysis, Real-Time Intelligent Systems
Applications: Mobile ad hoc instant messenger; wireless secure group communication; multimedia video servers; integrated location and service management in wireless networks; admission control for revenue optimization with quality of service guarantees
Expertise: Mobile computing; multimedia; sensor networks; net-

work and computer security; performance and reliability analysis; real-time intelligent systems
Examples of Funding Sources: National Science Foundation, Microsoft Research, Intel

NETWORKS

see also **Computers**, *Midkiff*
Computer Science, *Feng*
Fiber Optics, *Jacobs*
Wireless Networks, *MacKenzie*

NETWORKS

Name: **Luiz DaSilva**
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Specialty: Wireless and Ad Hoc Networks, Cognitive Networks, Resource Management for Wireless Neworks
Applications: Application of game theory to wireless networks; cooperation and reputation management; cognitive networks; adaptive networks; topology control; interoperability of heterogeneous networks
Expertise: Wireless and ad hoc network protocols; game theory; cognitive radios and networks; cooperation in wireles networks
Examples of Funding Sources: National Science Foundation, Office of Naval Research, Intel, U.S. Department of Homeland Security (Customs), Microsoft Research

NEURAL NETWORKS

see **Heat Transfer**, *Mahajan*

NOISE AND VIBRATION CONTROL

see **Acoustics**, *Fuller*

NOISE CONTROL

see **Acoustics**, *Fuller*
Dynamics and Control, *Southward*
Human Factors Engineering / Ergonomics, *Casali*

NONDESTRUCTIVE EVALUATION OF FOOD QUALITY

Name: **P. (Kumar) Mallikarjunan**
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Specialty: Nondestructive Evaluation of Food Quality and Safety Using Electronic Nose Technology, Ultrasonics and FTIR Spectra Based Techniques, Biomedical Applications of Ultrasonics and Electronic Nose Systems in Developing Rapid Nondestructive Diagnostic Devices, Nano-Biosensors, Biodegradable and Edible Packaging Materials, Food Process Engineering: Microwave Processing, High Hydrostatic Pressure Processing and Irradiation, Extraction of Polyphenolic Compounds from Agricultural By-Products, Incorporation of Omega-3 Lipids in Dairy Food Systems, Physical Properties of Biological Materials
Applications: Non-destructive rapid evaluation of wine-grape maturity; non-destructive rapid evaluation of aflatoxin contamination in peanuts and peanut products, non-destructive evaluation of crispness in fried foods, determining quality of frying oil, measuring ice crystal size in frozen foods, evaluating nuts for rancidity, and determining microbial contamination; high pressure processing and irradiation; development of deep-fat frying methods to reduce oil uptake in breaded fried foods; using

edible biopolymers for reducing oil uptake, delaying rancidity, enhancing shelf life, enhancing nutritional value and preventing microbial contamination

Expertise: Correlations of objective quality parameters with sensory attributes; process development and optimization to obtain value added food products; modeling and simulation using finite difference and finite element methods; simultaneous heat and mass transfer in biological/food systems

Examples of Funding Sources: U.S. Department of Agriculture, National Science Foundation, National Oceanic and Atmospheric Administration, NASA, Center for Innovative Technology

NONLINEAR CONTROL

see **Dynamics and Control***, Southward*

NONLINEAR DYNAMICS

Name: **Muhammad R. Hajj**
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Specialty: Fluid Mechanics, Fluid-Structure Interactions, Signal Processing and Nonlinear System Identification
Applications: Wind loads on structures; ship motions; aeroelasticity; damage detection
Expertise: Analysis of nonlinear dynamics in fluid flows, fluid-structure interactions; application of higher-order spectral analysis; wavelet analysis
Examples of Funding Sources: National Science Foundation, National Institute of Standards and Technology, Office of Naval Research, U.S. Air Force Office of Scientific Research, NASA

NONLINEAR DYNAMICS AND CONTROL

Name: **Shane D. Ross**
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Office Phone: 540-231-1616
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URL: www.esm.vt.edu/~sdross
Specialty: Nonlinear Dynamics and Control, Chaos
Applications: Analysis of biomechanical data; biomechanics of bipedal gait and postural control; analyzing and utilizing transport processes in complex flows; atmospheric flow analysis; orbital mechanics and interplanetary space mission design
Expertise: Dynamical systems analysis; stability and control in nonlinear systems; dynamics of natural and engineered systems; computer visualization
Examples of Funding Sources: National Science Foundation, National Institutes of Health, NASA

NONLINEAR SYSTEMS

see **Aerospace***, Hall*

NONPOINT SOURCE POLLUTION

see **Agriculture***, Dillaha*
Watershed Management*, Benham*

NUCLEAR ENGINEERING

see **Applied Mathmatics**, *Pierson*

NUCLEAR SYSTEMS

see **Computational Fluid Dynamics***, Ball*

NUMERICAL ANALYSIS

see **Optimization***, Watson*
Transportation*, Rakha*

OCCUPATIONAL HEALTH

see **Industrial Hygiene**, *Young-Corbett*

OCCUPATIONAL SAFETY

see **Human Factors Engineering**, *Kleiner*
Human Factors Engineering / Ergonomics, *Casali*

OCCUPATIONAL SAFETY AND HEALTH

see **Human Factors and Ergonomics**, *Lockhart*

OCCUPATIONAL SAFETY, CONSUMER SAFETY (a) and HUMAN-SYSTEMS INTERACTION (b)

Cognitive Ergonomics Applied to Occupational Safety and Design of Training and Education

Name: **Tonya L. Smith-Jackson**
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Specialty: (a) Application of Cognitive Ergonomics to the Design of Safety Programs, Procedures, and Risk Communications; (b) Application of Cognitive and Cultural Ergonomics to the Design of Computer Interfaces, Appliances, and Products
Applications: (a) Safety program development and evaluation; training systems development and evaluation; development and evaluation of risk communications; patient safety systems design and evaluation; (b) Product design and usability testing; design of consumer information and instructions; design evaluations
Expertise: Education: human information processing; statistics and research methods; occupational safety and health; consulting in civil litigation related to occupational and consumer safety; assessment procedures
Examples of Funding Sources: (a) National Institute for Occupational Safety and Health, National Park Service, Carilion Biomedical Institute; (b) Virginia Department of Rehabilitation, Toshiba Corporation of Japan

OCEAN

Design of Ocean Structures, Ship Design, Ship Structures, Structural Analysis and Design

Name: **Owen Hughes**
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Specialty: Structural Design of Ships and Ocean Structures
Applications: Developing improved methods for the computer-aided structural design of large ocean structures: ships, submarines, semi-submersibles and other mobile or tethered ocean platforms. The goal is to achieve a unified and efficient integration of finite element analysis, limit state analysis, general (nonlinear) structural optimization and computer graphics.
Expertise: Design-oriented finite element modeling; ultimate strength and other limit states of large structures, including dynamic aspects; structural optimization
Examples of Funding Sources: Naval Sea Systems Command, U.S. Coast Guard, Office of Naval Research

OIL TANKERS

see **Ship Design**, *A. Brown*

OPERATIONS RESEARCH

see also **Industrial Engineering Simulation**, *Koelling*
Manufacturing, *Sarin*
Optimization, *Sherali*

OPERATIONS RESEARCH

Name: **Douglas R. Bish**
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Specialty: Operations Research, Network Analysis, Systems Engineering, Logistics
Applications: Disaster and evacuation management; healthcare; transportation
Expertise: Applying operations research techniques, including optimization and simulation, to improve system performance
Examples of Funding Sources: National Science Foundation

OPTIMIZATION

see also **Manufacturing**, *Sarin*
Transportation, *Rakha*

OPTIMIZATION

High Performance Computing

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Specialty: Numerical Analysis, Optimization, Scientific Computing
Applications: Aircraft, automobile, and ship design; design and optimization of mechanical systems and manufacturing processes; modeling of biological systems and drug design
Expertise: Nonlinear programming; homotopy methods for nonlinear systems of equations; mathematical software; computational solid and fluid mechanics; image processing; parallel computing; bioinformatics; multidisciplinary design optimization
Examples of Funding Sources: U.S. Air Force Office of Scientific Research, NASA, National Science Foundation, National Institutes of Health, Michelin Americas

OPTIMIZATION

Optimization and Modeling

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Specialty: Optimization
Applications: Mathematical modeling; analysis and development of algorithmic solution procedures for various decision-making problems arising in business, transportation, engineering design, location-allocation, industrial, air traffic management, and defense contexts
Expertise: Modeling, analysis and algorithmic developments for linear, networks, nonlinear, nonconvex and discrete optimization problems having different structures and arising in various applications
Examples of Funding Sources: National Science Foundation, Naval Surface Warfare Center, NASA, ARPA/FBI, Federal Aviation Administration, Federal Highway Administration, Virginia Department of Transportation, U.S. Geological Survey, Asso-

ciation of American Railroads, U.S. Department of the Interior

OPTOELECTRONICS

Name: **Levon V. Asryan**
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Specialty: Physics, Electronics
Applications: Semiconductor (diode); telecommunications; optical fiber communication; Internet; local and computer networks and connections; optical data storage and recording; optical signal processing; optical pumping of solid-state lasers; free-space and satellite communications; chemical sensing and spectroscopy; material processing and manufacturing technologies; medical
Expertise: Physics of semiconductor materials and devices, nano- and microelectronics, optoelectronics and photonics; low dimensional heterostructures, nanostructures, quantum dots and quantum wells; theory of semiconductor quantum dot lasers and quantum well lasers
Examples of Funding Sources: National Science Foundation, U.S. Air Force Office of Scientific Research, U.S. Army Research Office, Office of Naval Research

OPTOELECTRONICS

Name: **Louis J. Guido**
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Specialty: Optoelectronics, RF Electronics, Semiconductor Nanostructures
Applications: Optical communications; semiconductor lasers; solid-state lighting; optical data storage; RF power amplifiers
Expertise: Nucleation phenomena and kinetics of crystal growth; metalorganic chemical vapor deposition; self-diffusion, interdiffusion, and impurity diffusion in semiconductors; compound semiconductor alloys and nanostructures; measurement of electronic and optical phenomena in nanoscale semiconductor materials and devices; physics of photonic devices operating in the ultraviolet and infrared spectrum; physics of electronic devices operating at high-power and high-frequency
Examples of Funding Sources: National Science Foundation, U.S. Air Force Office of Scientific Research, U.S. Army Research Office, NASA

OPTOELECTRONICS AND SENSORS

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URL: www.ece.vt.edu/optical/
Specialty: Semiconductor Physics, Optical Engineering, Materials Science, Nano and Nano-Bio Technology
Applications: Design, fabrication, and characterization of nanoscale materials for biological and environmental sensing; UV/Vis/IR spectroscopic studies of materials; design, fabrication and characterization of optoelectronic and plasmonic structures
Expertise: Nanoscale materials synthesis and characterization; semiconductor processing research and development; optoelectronic device design and modeling; sensor design and simulation; surface plasmon resonance and related phenomena; systems integration

Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, U.S. Environmental Protection Agency

ORGANIZATION STUDIES

see **Engineering Education***, Johri*

OXIDES

see **Materials***, Abiade*

OZONE

see **Aircraft Design***, Mason*
Air Pollution*, Marr*
Catalysis*, Oyama*

PARALLEL AND DISTRIBUTED COMPUTING

see ***Computer Science****, Feng*

PARALLEL AND DISTRIBUTED SYSTEMS

see **Software Engineering***, Ryder*

PARALLEL AND DISTRIBUTED SYSTEMS AND APPLICATIONS

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Specialty: High-Performance and Grid Computing, Parallel and Distributed Applications, Computer Architecture, Power-Aware Systems, Performance Evaluation and Prediction, Green Computing
Applications: Large-scale simulations of weather, hydrodynamics, complex fluid flow, weapon and aircraft designs
Expertise: System and application performance modeling and analysis; application performance tuning; high-performance and power-aware system design; tera- and peta-scale computing
Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, Intel Corporation, Ixia Corporation, National Partnership for Advanced Computational Infrastructure, National Center for Supercomputing Applications

PARALLEL COMPUTING

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Specialty: Parallel Algorithms and Software, Scientific Computing, Computational Science and Engineering, High-End Computing Systems, Numerical Methods for Linear Algebra and Partial Differential Equations, Mathematical Software
Applications: Large-scale simulations of physical and engineered systems; improving performance and usability of supercomputing systems; programming multi-core processors
Expertise: Algorithm and code development for modern high-end computing systems; software tools and frameworks for high-end systems, including load-balancing, performance analysis and improvement, code composition, and problem-solving environments; parallel programming for distributed-memory and shared-memory architectures
Examples of Funding Sources: National Science Foundation, U.S. Department of Energy

PATHOGENS

see **Applied Environmental Microbiology**, *Pruden*

PAVEMENTS

Infrastructure Management Systems

Name: **Gerardo W. Flintsch**
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Specialty: Infrastructure Management Systems, Pavement Engineering
Applications: Planning and programming of infrastructure construction, rehabilitation and maintenance works; design of highway and airport pavements; condition assessment, risk analysis, and life-cycle cost analysis of constructed facilities
Expertise: Infrastructure condition assessment and performance prediction; pavement evaluation, design and management; application of soft computing, geographic information systems and other emerging technologies to support infrastructure data management, analysis and decision-making; non-destructive evaluation; life-cycle-cost analysis; winter maintenance; asset management
Examples of Funding Sources: National Science Foundation, The National Academies, Federal Highway Administration, Virginia Department of Transportation, Virginia's Center for Innovative Technologies

PERFORMANCE MEASUREMENT

see **Industrial and Systems Engineering**, *Van Aken*

PERSONALIZED MEDICINE

see **Bioinformatics and Bioimaging**, *J. Wang*

PESTICIDES

see **Agricultural Machinery**, *Grisso*

PHOTONICS

see also **Optoelectronics**, *Asryan*

PHOTONICS

Name: **Anbo Wang**
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Specialty: Fiber Optics, Sensors, Biophotonics, 3-D Imaging
Applications: Sensors for harsh environments; communication components; 3-D surface or temperature mapping; optical slip rings; biomedical instruments
Expertise: System design; fabrication; testing; modeling; error analysis and self-calibration
Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, NASA, Air Force, Electric Power Research Institute, Virginia Center for Innovative Technology, Siemens Westinghouse Power, Chevron, SensorHighway (UK), Carilion Health System

PHOTONIC MATERIALS

see **Materials**, *Pickrell*

POLLUTION

see **Environmental Engineering**, *et al*
Water Quality, *Mostaghimi*

POLYMERIC MATERIALS

see **Finite Element Method / Computational Mechanics**, *Batra*

POLYMERS

see also **Mechanics of Materials**, *Dillard*
Supercritical Fluids, *Kiran*
Tissue Engineering and Biomaterials, *Goldstein*

POLYMERS

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Specialty: Structure and Properties of Biopolymers, Processing of Polymers
Applications: High-performance peptides; bio-based polymers
Expertise: Synthesis, processing, and characterization of polymers
Examples of Funding Sources: Environmental Protection Agency, National Science Foundation

POLYMERS

Behavior of Materials

Name: **Garth L. Wilkes**
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Specialty: Polymeric Materials – Structure Property Behavior
Applications: Investigations concern the structure-property behavior of polymeric based materials. Studies include understanding materials that are semicrystalline, amorphous and crosslinked or thermoset (crosslinked) materials; property studies include mechanical, optical and viscoelastic response; new hybrid networks based on sol gel reactions between functionalized polymers, oligomer or “small organic molecures” and inorganic metal alkoxides – these materials are called creamers; cellular materials with an emphasis on synthesis and properties of polyurethane foams
Expertise: Morphology/structure; mechanical properties of polymers; optical properties of polymers; crystallization behavior of polymers
Examples of Funding Sources: National Science Foundation, Department of Energy, Dow Chemical, Celgard, Chevron Phillips Plastics, Bayer, U.S. Army Research Office

POLYMERS

Processing of Materials

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Specialty: Polymer Processing and Rheology
Applications: Control the properties of polymeric materials and composites through the appropriate application of thermal and deformation history as well as mass transfer. Novel processes are developed which lead to structures with excellent mechanical properties. Examples include generation of membranes for water purification; use of supercritical carbon dioxide to replace toxic organic solvents; micro-composite materials; ex-

foliated nano-clays using supercritical carbon dioxide; simulation of processing of fiber-reinforced thermoplastics; design of elastomers for absorbing shockwaves
Expertise: Polymer rheology and flow; mechanical properties of polymers and their relation to processing; processing operations including injection molding, thermoforming, film blowing, extrusion, and compression molding
Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, Nanosonic, Department of the Navy, Performance Fibers

POSITION LOCATION

see **Communications***, Pratt*

POWER ELECTRONICS

Name: **Jason Lai**
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Specialty: Power Converter Design, Simulation, Implementation, Advanced Power Converter Circuit Topologies such as Soft Switching and Multi-Level Converters
Applications: Distributed and renewable energies; automotive power converters and motor drives; fuel cell power conditioning systems
Expertise: Conceptual design; computer simulations; digital signal processor control; analog signal conditioning circuits for power converters
Examples of Funding Sources: U.S. Department of Energy, Northrop Grumman, Ballard, Delphi, Tatung, Turbocor

POWER ELECTRONICS

Power Conversion and Applications

Name: **Fred C. Lee**
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Specialty: Power Electronics
Applications: Develop efficient power conversion components and equipment with reduced size and weight to efficiently control and condition electric power for applications ranging from electric car, mass transportation, industrial drives, automation, and power supplies for computer and communication systems
Expertise: High frequency power conversion; distributed power systems; space power systems; high power, motor drives, and industrial control; power components characterization; power quality; power hybrids; computer-aided design tools
Examples of Funding Sources: National Science Foundation, NASA, U.S. Army Research Lab, Office of Naval Research, U.S. Department of Defense, U.S. Department of Energy, Intel, Delta Electronics, Inc., General Electric, Texas Instruments, National Semiconductors, Hitachi, Matsushita, and 80 other industry members in the Center for Power Electronics Systems' Partnership Consortium

POWER SYSTEMS

see **Computer Engineering***, Shukla*

POWER SYSTEMS PROTECTION AND CONTROL

Name: **James S. Thorp**
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Specialty: Power System Protection and Control Using Wide-Area Measurements
Applications: Application of phasor measurements to adaptive protection; control of oscillations; state estimation; wide-area monitoring
Expertise: Protection systems; algorithms for power system control
Examples of Funding Sources: National Science Foundation, U.S. Department of Energy, California Energy Commission

PROBLEM SOLVING ENVIRONMENTS

see also **Computational Science**, *Ramakrishnan*
Engineering Design, *Terpenny*
Engineering Education, *Johri*

PROBLEM SOLVING ENVIRONMENTS

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Specialty: Problem Solving Environments, Digital Education, Hierarchical Data Structures, Algorithm Visualization
Applications: Bioinformatics; geographic information systems; computer graphics; digital education
Expertise: Computer-supported cooperative work; visualization; algorithm design and analysis; data structures; algorithm visualization
Examples of Funding Sources: National Science Foundation, National Institutes of Health, DARPA, NASA, Fund for the Improvement of Post-Secondary Education

PRODUCT DESIGN

see **Occupational Safety**, *Smith-Jackson*

PRODUCT DEVELOPMENT

see **Management Systems**, *Rahmandad*

PRODUCTION PLANNING

see **Manufacturing Systems**, *Shewchuk*

PROJECT MANAGEMENT

see **Human Factors Engineering / Ergonomics**, *Kleiner*

PROPAGATION

see **Radio Engineering**, *Ellingson*

PROTEINS

see **Biochemical Engineering**, *C.Zhang*

PUBLIC-PRIVATE PARTNERSHIPS

see **Infrastructure Management**, *Garvin*

QUANTITATIVE POLYMERASE CHAIN REACTION

see **Applied Environmental Microbiology**, *Pruden*

RADAR

see also **Space Science**, *Ruohoniemi*

RADAR

Name: **Gary S. Brown**
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Specialty: Radio Wave Propagation and Scattering, Radar, Theoretical and Applied Electromagnetics, Microwave Remote Sensing

Applications: Predicting the performance of tracking and surveillance radars in the presence of terrain or ocean clutter; modeling and understanding remote sensing of ocean surface characteristics from air- or space-borne platforms; use of radars in observation or detection of targets obscured by clouds, foliage, ice/snow, or ground; development and implementation of efficient and robust numerical methods for determining the effect of extended rough surfaces on radar or wireless systems; conceptualization and development of new electromagnetic or signal processing techniques for the enhancement of communications and target detection in conventional and imaging sensors; detection and mapping of buried ordnance; use of RF energy to noninvasively heat human tumors; ultra wide band propagation of RF signals over real terrain; radio wave propagation over rough terrain and oceans; predicting the uncertainty in over-terrain-propagation predictions due to sparse sampling of the actual terrain height; incorporating the effects of large amplitude, small period surface roughness in surface scattering predictions

Expertise: Scattering by randomly rough extended surfaces (acoustic through optical frequencies); propagation through discrete random media with emphasis on foliage, snow, and the earth; theoretical and numerical scattering analysis methods and techniques; active or passive microwave remote sensing; propagation over rough surfaces in the presence of atmospheric ducting; wireless propagation analysis and modeling

Examples of Funding Sources: U.S. Army, U.S. Navy, U.S. Air Force, U.S. Department of Defense, Lawrence Livermore National Laboratory, NASA

RADIO ENGINEERING

Name: **Steven W. Ellingson**
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Specialty: Design of Radio Frequency Systems including Arrays, Multiband and Software-Defined Transceivers, and Instrumentation

Applications: Vehicular radio communications systems; software-defined radio; phased arrays; emitter location; interference mitigation; radio astronomy; microwave remote sensing

Expertise: Design of antennas and radio electronics; DSP system design; analysis of radio frequency signals; RF system design and analysis

Examples of Funding Sources: National Science Foundation, Office of Naval Research, U.S. Department of Justice (National Institute of Justice), NASA, Aerospace Vehicles Systems Institute

RADIO SCIENCE

see **Atmospheric and Radio Science**, *W. Scales*
Radio Engineering, *Ellingson*

RADIO TRANSMITTER AND RECEIVER DESIGN

see **Radio Engineering**, *Ellingson*
Wireless Communications, Cognitive and Software Radio, *Bostian*

RAPID PROTOTYPING

see **Computer-Aided Design and Manufacturing**, *Williams*

REACTING FLOWS

see **Computational Fluid Dynamics**, *Battaglia*

REMOTE SENSING

see also **Space Science**, *Baker, Ruohoniemi*

REMOTE SENSING

Name: **Scott Bailey**
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Specialty: Ultraviolet, X-ray Remote Sensing, The Earth's Upper Atmosphere, Noctilucent Clouds, Polar Mesospheric Clouds, Space Science
Applications: Remote sensing; atmospheric physics; chemistry; dynamics
Expertise: Remote sensing; the Earth's upper atmosphere; noctilucent clouds; polar mesospheric clouds; space science
Examples of Funding Sources: ASA, NSF, U.S. Office of Naval Research

ROBOTICS

see also **Autonomous Systems**, *Leonessa*
Control Theory, *Woolsey*
Engineering Design, *Sturges*
Multifunctional Materials, *Priya*

ROBOTICS

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Specialty: Micro-Robotics, Micro-Hydrodynamics
Applications: Harvesting motility, sensing, and control mechanisms of microorganisms towards development of hybrid (biotic/abiotic) micro-robots; design, microfabrication, and micro-assembly of biomimetic micro-robots; micro-robotic applications in minimally invasive diagnosis and localized treatment of diseases, environmental monitoring, and homeland security; hydrodynamics of motility of an individual cell and of a cell population as a whole; studying the mechanism of biofilm formation with the goal of developing biofilm mitigation technologies
Expertise: Design, modeling, microfabrication and micro-assembly of biologically integrated micro/nano-systems, biomimetic micro-robotics, miniature medical devices, biosensors, bioMEMS, microfluidics and micro-hydrodynamics; biophysics of bacteria motility and adhesion
Examples of Funding Sources: Jeffress Memorial Trust

ROBOTICS

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Specialty: Autonomous Vehicles, Robotics, Kinematics, Dynamics, Mechanical Design
Applications: Mobile robots for scientific exploration, search and rescue missions, and medical applications; bipedal humanoid robots; medical devices and equipment; rehabilitation robotics
Expertise: Design, analysis and fabrication of mobile robotic sys-

tems and robotic manipulators; novel robot locomotion strategies; walking robots; robotic hand grasping; space robotics; kinematic design and analysis of mechanical systems; design of medical devices; soft robotics

Examples of Funding Sources: National Science Foundation, Office of Naval Research, NASA, Jet Propulsion Laboratory, DARPA

ROTATING MACHINERY

see also **Mechanical Vibrations**, *Kirk*

ROTATING MACHINERY (a) and ENGINEERING EDUCATION (b)

Name: **Mary Kasarda**
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Specialty: Magnetic Bearings, Dynamic Force Measurements on Rotating Equipment for Improved Process Control, Rotor Dynamics, Analytical and Experimental Evaluation of High Speed Rotating Machinery, Machinery Health Monitoring (a). FIRST Robotics in Public Schools, K-12 Teacher Training in Engineering Topics, Engineering Design in Undergraduate Engineering, Vibration and Industrial Rotating Machinery Topics in Undergraduate Engineering (b)

Applications: Application of magnetic bearings for the measurement of forces on rotating shafts for monitoring manufacturing processes (i.e., textiles, films); analysis of base motion effects on systems supported by magnetic bearings such as flywheels in space or vehicular applications; evaluation of power loss mechanisms in magnetic bearings; magnetic dampers for improved rotor dynamic performance of turbomachinery (a). Support of Montgomery County Public School FIRST robotics team by incorporating mechanical engineering students design projects to support the FIRST program in conjunction with VT School of Education. The mechanical engineering students are given formal training to be successful mentors to high school students in this project (b).

Expertise: Design of experiments for magnetic bearing systems, rotor dynamics, and general rotating machinery experience

Examples of Funding Sources: National Science Foundation, NASA, Revolve Technologies, Inc., Daimler Chrysler

ROTOR DYNAMICS

see **Rotating Machinery**, *Kasarda*

SATELLITE COMMUNICATIONS

see **Antennas and Communications**, *Zaghloul*
Communications, *Pratt, Stutzman*

SCIENTIFIC COMPUTING

see **Computational Science**, *Ramakrishnan*
High Performance Computing, *Varadarajan*

SEALANT TESTING

see **Mechanical Design**, *Ohanehi*

SEALS, DESIGN AND ANALYSIS OF

see **Mechanical Vibrations**, *Kirk*

SEMICONDUCTORS

see **Optoelectronics**, *Asryan, Guido*

SENSORS

see **Energy**, *Diller*
Fluid Mechanics, *Vlachos*
Optoelectronics and Sensors, *Meehan*

SERVICE INDUSTRY

see **Decision Making in Organizations and Complex Systems**, *Wernz*

SHIP DESIGN

see also **Ocean**, *Hughes*

SHIP DESIGN

Naval Architecture, Marine Safety, Ship Dynamics

Name: **Alan J. Brown**
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Specialty: Ship Design Optimization, Ship Grounding and Collision, Ship Damage
Applications: Naval ship design; oil tanker risk analysis and design
Expertise: Multi-attribute optimization and value theory; extreme ship motions; ship dynamics in grounding and collision; ship structural damage; ship salvage; ship design
Examples of Funding Sources: U.S. Navy, U.S. Coast Guard, Ship Structure Committee, SNAME, Newport News Shipyard

SHIP DYNAMICS

see **Naval Architecture**, *McCue*

SHIPS

see **Ocean**, *Hughes*

SIGNAL PROCESSING

see **Acoustics**, *Roan*
Computer and Communications Engineering, *Athanas*
Dynamics and Control, *Southward*
Radio Engineering, *Ellingson*

SIMULATION

see **Computers**, *Midkiff*
Industrial Engineering, *Koelling*
Materials, *Kriz*

SIX SIGMA

see **Computer-Aided Design and Manufacturing**, *Williams*

SLUDGE

see **Environment**, *Novak*

SMART CARDS

see **Digital Signal Processing**, *Nazhandali*

SMART MATERIALS

see **Transportation**, *Rakha*
Vehicle Dynamics, *Ahmadian*

SMART MATERIALS AND STRUCTURES

Name: **Donald J. Leo**
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Specialty: Synthesis, Modeling and Control of Piezoelectric,

Shape Memory Alloy and Electroactive Polymer Materials; Engineering of Sensing and Actuation Devices that Incorporate Smart Materials with an Emphasis on the Use of Polymeric Materials; Recent Research Focuses on the use of Natural Materials such as Proteins in Engineering Devices
Applications: Sensing and actuation systems for vibration suppression, noice suppression and motion control; low power sources for autonomous sensing; biological sensors
Expertise: Mechanics of materials; control theory; systems-level modeling

SMART MATERIALS AND STRUCTURES

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Specialty: Smart Structures, Structural Dynamics, Vibrations, Vibration Control
Applications: Adaptive space reflectors using smart materials; variable modulus materials for morphing skins
Expertise: Smart materials: structural dynamics; vibration; experimentation

SMART STRUCTURES

see **Vibration**, *Inman*

SOFTWARE

see **Computer Engineering**, *Shukla*

SOFTWARE ENGINEERING

see also **Computer Engineering**, *Shukla*
Modeling and Simulation, *Balci*

SOFTWARE ENGINEERING

Name: **James D. Arthur**
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Specialty: Requirements Engineering, (Independent) Verification and Validation, Software Quality Assessment and Prediction
Applications: Software development project and process management; assessing and predicting the quality of software products and their development processes; requirements evolution; requirements verification and validation
Expertise: (Software) Copyright infringement; evolving require ments that meet the customer's needs and intent; applying verification and validation strategies to produce a quality software product; instrumenting software development processes to effect quality-oriented feedback control

SOFTWARE ENGINEERING

Information Retrieval

Name: **William B. Frakes**
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Specialty: Software Reuse, Domain Engineering, Experimental Methods
Examples of Funding Sources: NASA

SOFTWARE ENGINEERING

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URL: http://people.cs.vt.edu/~ryder
Specialty: Program Analysis, Testing, Programming Languages and Compilers, Software Maintenance, Debugging, Object-Oriented Languages and Systems
Applications: Tool support for software developers to estimate the impact of changes to a codebase during team development, i.e., to allow early check-in of changes; analyses enabling performance diagnosis for framework-based software systems, especially Web applications; testing and validating exception handling in large object-oriented codes
Expertise: Static and dynamic program analyses; pointer/reference and side-effect analyses, especially for object-oriented systems; blended static/dynamic analysis to identify object churn
Examples of Funding Sources: National Science Foundation, IBM Research, HP Labs

SOFTWARE SYNTHESIS

see **Computer Engineering**, *Shukla*

SOFTWARE SYSTEMS

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Specialty: Computer Security, Distributed Systems, Object-Oriented Software, Concurrent Programming, Software Engineering
Applications: Secure collaboration in computational grids across organizational boundaries; active-object models of computation; object-oriented protocol implementations; synchronization mechanisms in object-oriented systems; definition and validation of software metrics
Expertise: Authentication and authorization in distributed computing environments; privilege management models; grid computing; access control enforcement mechanisms; object-oriented languages and systems
Examples of Funding Sources: National Science Foundation, Fermi National Labs, Commonwealth Information Security Center, IBM Shared University Research

SOIL

see **Geotechnical Engineering**, *Mitchell*

SOLAR AND RENEWABLES

see **Energy**, *Rahman*

SOLID MECHANICS

see **Mechanics of Materials**, *Dowling*

SPACE

see **Atmospheric and Radio Science**, *W. Scales*

SPACECRAFT DYNAMICS AND CONTROL

see **Aerospace**, *Hall*

SPACE EXPLORATION

see **Materials**, *Logan*

SPACE PHYSICS

see **Space Science**, *Baker*

SPACE SCIENCE

see also **Remote Sensing**, *Bailey*

SPACE SCIENCE

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Specialty: Atmospheric and Space Science
Applications: HF propagation; environmental radar; space weather
Expertise: Space plasma physics; radiowave propagation
Examples of Funding Sources: NASA, National Science Foundation

SPACE SCIENCE

Name: **J. Michael Ruohoniemi**
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Specialty: Space Science, HF Radar
Applications: Investigation of the electrodynamics of Earth's space environment; scattering from plasma irregularities in the ionosphere; plasma physics; HF radio wave propagation; space weather
Expertise: Application of radar to remote sensing of the upper atmosphere and ionosphere; radar technology; space physics
Examples of Funding Sources: NASA, National Science Foundation

SPACE STRUCTURES ANALYSIS

see **Aircraft**, *Kapania*

SPACE SYSTEMS

see **Aerospace**, *Hall*

SPACE WEATHER / SPACE PLASMA PHYSICS

Name: **C. Robert Clauer**
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Specialty: Atmospheric and Space Science
Applications: Understanding and forecasting space weather disturbances
Expertise: Space plasma physics
Examples of Funding Sources: NASA, National Science Foundation

SPACECRAFT DYNAMICS AND CONTROL

see **Aerospace**, *Hall*

SPEECH PROCESSING

see **Digital Signal Processing**, *Beex*

SPORTS BIOMECHANICS

see **Biomechanics**, *Madigan*

SPORTS MEDICINE

see **Injury Biomechanics**, *Duma*

STOCHASTIC SIGNAL PROCESSING

see **Digital Signal Processing**, *Beex*

STREAMS

see **Ecological Engineering**, *Wynn*
Environment, *Hession*
Environment and Fluvial Hydraulics, *Diplas, Hester*

STRUCTURAL AND BRIDGE ENGINEERING

Name: **Tommy Cousins**
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Specialty: Behavior of Bridge Structures, Use of High Performance Materials (concrete, steel, composites) in Structures, Prestressed Concrete Structures, Experimental Research
Examples of Funding Sources: Virginia Transportation Research Council, Federal Highway Administration

STRUCTURAL DYNAMICS AND CONTROLS

see **Smart Materials and Structures**, *Philen*

STRUCTURAL ENGINEERING

see also **Structural Safety and Reliability**, *Rojiani*

STRUCTURAL ENGINEERING

Structural Dynamics, Earthquake Engineering

Name: **Finley A. Charney**
Department: Civil and Environmental Engineering
Office Phone: 540-231-1444
FAX: 540-231-7532
E-mail: fcharney@vt.edu
Specialty: Structural Engineering, Earthquake Engineering, Wind Engineering
Applications: Buildings; bridges; arenas; towers; dams
Expertise: Structural analysis; structural dynamics; finite element analysis; structural engineering software development; engineering education
Examples of Funding Sources: National Institute of Building Science, Federal Emergency Management Agency, Simpson Strong Tie Inc.

STRUCTURAL ENGINEERING DESIGN

Name: **W. Samuel Easterling**
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Applications: Investigate structural adequacy of building components and assemblages; investigations typically involve laboratory tests to failure and subsequent analysis; results are often used to clarify or modify design specifications
Expertise: Steel-concrete composite structures; steel structures; cold-formed steel structures; experimental research
Examples of Funding Sources: NUCOR Research and Development, Steel Deck Institute, American Institute of Steel Construction, National Science Foundation, American Iron and Steel Institute, Wheeling Corrugating Company

STRUCTURAL ENGINEERING DESIGN

Name: **Thomas M. Murray**
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E-mail: thmurray@vt.edu
Specialty: Structural Engineering, Structural Steel Design, Ex-

perimental Research
Applications: Developing new and better methods to design bridges, buildings and other structures; testing of new and old designs to ensure structural safety
Expertise: Steel structures; structural connections; serviceability of floor systems; residential steel framing; experimental research
Examples of Funding Sources: American Institute of Steel Construction, American Iron and Steel Institute, Metal Building Manufacturers Association, National Science Foundation, Virginia Department of Transportation

STRUCTURAL MECHANICS

see also **Aircraft***, Kapania*
Mechanics of Materials*, Hyer*
Thin-Walled Structures*, Moen*

STRUCTURAL MECHANICS

Name: **Richard Benson**
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URL: www.eng.vt.edu/overview/bio.php?bioid=112
Specialty: Mechanics of Highly Flexible Structures
Applications: Modeling of magnetic disks and tapes, paper sheets, soft contact lenses, photographic films, and other easily deformed structures
Expertise: Structural mechanics; design and applied mathematics; structural stability; plates and shells; elasticity and continuum mechanics
Examples of Funding Sources: Eastman Kodak, Hewlett Packard, Bausch and Lomb, Xerox Corporation

STRUCTURAL SAFETY AND RELIABILITY

Name: **Kamal B. Rojiani**
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Office Phone: 540-231-7150
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E-mail: krojiani@vt.edu
Specialty: Structural Safety and Reliability, Risk Analysis, Computer Applications in Structural Analysis and Design
Applications: Reliability analysis of steel, concrete and timber structures; Monte Carlo simulation; analysis and modeling of structural systems; finite element analysis of structures; development of web-based object-oriented applications
Expertise: Code calibration; reliability analysis of structures; structural engineering software development
Examples of Funding Sources: National Science Foundation, National Cooperative Highway Research Program

STRUCTURAL STABILITY

see **Thin-Walled Structures***, Moen*

STRUCTURES

see **Aerospace Engineering***, Sultan*

STRUCTURES AND MATERIALS

Name: **John J. "Jack" Lesko**
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Specialty: Mechanics of Polymer and Composites; Strength, Life, and Durability; Hygrothermal Mechanical Damage, Degradation, and Corrosion of Materials; Fire Response of Materials;

Composites Structural Design; Processing and Design of Low Cost Composites; Adhesion Mechanics and Bond Design
Applications: Design, testing, installation, and monitoring of composite highway structures including bridge deck, girders and bonded repairs; naval composite structural design; army lightweight multifunctional composite armor; design and material selection for pultruded composite shapes; design and evaluation of structural adhesive bonds; reliability based design guide development and evaluation of composite materials and structures; design, development, and evaluation of fuel cell materials and components; design and modeling of fire resistant composites
Expertise: Composite mechanics and design; energy systems
Examples of Funding Sources: Strongwell Corporation, Dow Chemicals, UTC Fuel Cells, National Science Foundation, Federal Highway Administration, Office of Naval Research, Army Research Laboratory, U.S. Coast Guard

SUBMARINES

see **Fluid Dynamics**, *Simpson*
Ocean, *Hughes*

SUPERCRITICAL FLUIDS

Name: **Erdogan Kiran**
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E-mail: ekiran@vt.edu
Specialty: Use of High Pressure Techniques to Generate Fundamental Data Pertaining to Supercritical Fluid Systems, Polymer Solutions and Mixtures
Applications: Use of supercritical fluids in polymer synthesis; polymer modification and polymer processing; production of nano and/or microstructured materials (particles, fibers, foams)
Expertise: Capabilities to conduct high pressure research at pressures up to 1000 bar; capabilities to work with supercritical fluid mixtures; capabilities to explore thermodynamic and transport properties of mixtures and to investigate time-dependent property changes during physical and chemical transformations; capabilities to explore kinetics of fluid-fluid and fluid-solid phase separations; polymer dissolution and crystallization processes

SUPPLY CHAIN MANAGEMENT

see **Investment**, *E. Bish*

SURFACE CHEMISTRY AND ENGINEERING

Name: **William Ducker**
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Specialty: Surface Chemistry, Adsorption, Surface Forces, Surfactants, Polymers, Lubrication, Peptides, Colloidal Stability
Applications: Colloidal stability; lubrication; friction
Examples of Funding Sources: NSF, American Chemical Society Petroleum Research Find

SURVEILLANCE

see **Radar**, *G. Brown*

SYSTEM DYNAMICS

see **Management Systems**, *Rahmandad*

SYSTEMS BIOLOGY

see **Computational Biology**, *Murali*
Control Systems, *Baumann*
Metabolic Engineering, *Senger*

SYSTEMS ENGINEERING

see **Engineering Design**, *Terpenny*

TEACHING AND LEARNING TECHNOLOGIES

see **Human-Computer Interaction**, *Quek*

TECHNICAL COMMUNICATION

Linguistics, Collaboration, Communication

Name: **Lisa DuPree McNair**
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Specialty: Interdisciplinary Collaboration, Language in Society, Identity Theory
Applications: Communication and teamwork assignments; communication in the workplace; assessment of communication and collaboration skills; using ePortfolios for program evaluation, promoting reflective learning development, and building professional identities
Expertise: Helping faculty design, integrate and evaluate writing and speaking assignments; teaching and learning in interdisciplinary contexts; facilitating ePortfolio initiatives via participatory design
Examples of Funding Sources: National Science Foundation, Engineering Information Foundation, Council of Writing Program Administrators

TECHNICAL COMMUNICATION / ENGINEERING EDUCATION

Technical Writing

Name: **Marie C. Paretti**
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Specialty: Professional and Technical Communication, Interdisciplinary Collaboration, Design Education, Cross-Cultural Communication and Collaboration, Women in Engineering, Teamwork Environmental Communication, Gender and Feminist Theory, Design Communication
Applications: Communication, teamwork, and design education in engineering, science or other disciplinary courses; communication in the workplace; assessment of communication and collaboration skills; gender and engineering education; design in engineering curricula
Expertise: Helping faculty design, integrate and evaluate writing and speaking assessments; helping departments assess communication, collaboration, and design skills
Examples of Funding Sources: National Science Foundation, Council of Writing Program Administrators

TECHNICAL WRITING AND ENGINEERING COMMUNICATION

Name: **Christine B. Burgoyne**
Department: Materials Science and Engineering and Engineering Science and Mechanics
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Specialty: Technical Writing, Engineering Communication, Cross-Cultural Communications, Critical Discourse Analysis
Applications: Communication instruction in MSE/ESM courses that are integrated with intensive writing requirements: Physical Ceramics Lab, Physical Ceramics Lecture, Mechanical Behavior Lab, Fluids Mechanics Lab, Physical Metallurgy Lab, and Fundamentals of Materials Engineering

THERMOELECTRICITY

see **Materials**, *Abiade*

THIN FILMS

see **Materials**, *Abiade*

THIN-WALLED STRUCTURES

Name: **Cristopher D. Moen**
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URL: www.moen.cee.vt.edu/
Specialty: Buckling of Thin-Walled Structures, Cold-Formed Steel Behaviors and Design, Computational Mechanics
Applications: Design of cold-formed steel building systems; analysis and optimization of aerospace vehicles; behavior of cellular structures; computational modeling of buildings and bridges; buckling of human bones
Expertise: Structural stability; structural mechanics; computational modeling to collapse; experimental facility for testing thin-walled structural components
Examples of Funding Sources: National Science Foundation, National Institute of Standards and Technology, American Iron and Steel Institute, Virginia Tech Institute for Critical Technology and Applied Science, Metal Building Manufacturers Association

TIME AND MOTION STUDY

see **Human Factors and Ergonomics**, *Lockhart*

TISSUE ENGINEERING

see also **Biomaterials and Tissue Engineering**, *Rajagopalan*
Biomedical Engineering, *Freeman, Goldstein*
Materials, *Nain*

TISSUE ENGINEERING

Name: **Abby W. Morgan**
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Specialty: Musculoskeletal Tissues
Applications: Implantable scaffolds and drug delivery systems for tissue regeneration
Expertise: Cell adhesion; in vitro biomaterial evaluation; in vivo biomaterial evaluation; drug delivery; and scaffold design
Examples of Funding Sources: National Science Foundation, Institute for Critical Technologies and Applied Sciences

TISSUE MECHANICS

see **Biomedical Engineering**, *Freeman*

TISSUE REGENERATION

see **Tissue Engineering**, *Morgan*

TOXICOLOGY

see **Environment**, *Boardman*

TRANSGENIC PLANTS

see **Biochemical Engineering**, *C. Zhang*

TRANSPORT PHENOMENA

see **Computational Fluid Dynamics**, *Ball*
Fluid Dynamics, *Puri*

TRANSPORTATION

see also **Automotive Powertrains / Energy Systems**, *Nelson*
Biomechanics, *Gabler*
Combustion and Fire Science, *Lattimer*
Computer Science, *C-T Lu*
Geospatial Decision Making, *Hancock*
Human Factors Engineering, *Dingus*
Vehicle Dynamics, *Ahmadian*

TRANSPORTATION

Name: **Pamela Murray-Tuite**
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Specialty: Transportation Systems
Applications: Transportation modeling; risk modeling; estimating reliability under extreme conditions and with security policies; evacuation modeling; travel time estimation; resilience assessment
Expertise: Path prediction; transportation engineering; transportation networks analysis; risk; reliability; evacuation modeling
Examples of Funding Sources: National Science Foundation, Virginia Transportation Research Council, Advance VT

TRANSPORTATION

Name: **Hesham Rakha**
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Specialty: Transportation Analysis, Traffic Engineering, Transportation Modeling and Simulation, Traffic Flow Theory, Transportation Control and Optimization, Transportation Environmental Modeling, Transportation Safety Modeling
Applications: Transportation modeling; environmental modeling; traffic safety modeling; evaluation of Intelligent Transportation System applications
Expertise: Transportation analysis; traffic engineering; traffic flow theory; traffic modeling; environmental modeling; safety modeling; and statistics
Examples of Funding Sources: National Science Foundation, Virginia Department of Transportation, Federal Highway Administration, Mid-Atlantic Transportation Center, Intelligent Transportation Center, Virginia Department of Environmental Quality, National Park Service, Cambridge Systematics, Battelle, Science Applications International Cooperation, and Virginia Transportation Research Council

TRANSPORTATION

Pavements and Materials

Name: **Linbing Wang**
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Specialty: Transportation Engineering with Focus on Pavements

and Materials
Applications: Asphalt mix design optimization; development of pavement management system; materials characterization; pavement rehabilitation; pavement testing; smart infrastructure; sensor technology application, impact and penetration
Expertise: Characterization; modeling and simulation of pavement performance and materials; microstructure and micromechanics of infrastructure materials; image processing and analysis; x-ray computed tomography; damage characterization and modeling; FEM/DEM simulation; multiscale modeling
Examples of Funding Sources: National Science Foundation, U.S. Department of Defense, National Cooperative Highway Research Program, U.S. Department of Agriculture

TURBULENCE

see **Computational Fluid Dynamics and High End Parallel Computing**, *Tafti*

TURBULENCE AND TURBULENT FLOWS

see **Aero-Hydrodynamics**, *Devenport*
Computational Fluid Dynamics, *Ball*

TURBULENCE MODELING AND SIMULATION

see **Computational Fluid Dynamics**, *Roy*

UNDERWATER VEHICLE DESIGN

see **Hydrodynamics**, *Neu*

UNMANNED SYSTEMS

see **Automotive Powertrains / Energy Systems**, *Nelson*
Autonomous Systems, *Leonessa*
Control Theory, *Woolsey*

URANIUM

see **Mining**, *Karmis*

USABILITY ENGINEERING / HUMAN-COMPUTER INTERACTION

Name: **Woodrow W. Winchester, III**
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Specialty: Usability Engineering, Human-Computer Interaction, Applications of Advanced Information Technologies (Augmented Reality), Undergraduate HCI Education
Applications: Product and systems improvement and design; interface design and development; cognitive systems design
Expertise: Exploring innovative (holistic) approaches to product and systems design; user requirements gathering and analyses; heuristic and formal usability testing
Examples of Funding Sources: Center for Innovation in Construction Safety and Health, National Science Foundation

VEHICLE DESIGN

see **Automotive Powertrains / Energy Systems**, *Nelson*

VEHICLE DYNAMICS

see also **Biomechanics**, *Gabler*

VEHICLE DYNAMICS

Name: **Mehdi Ahmadian**
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Specialty: Vibration Control, Vehicle Dynamics, Vehicle Stability, Rollover Dynamics Analysis, Suspensions and Smart Materials, Rail Transportation Systems, Magneto-Rheological Damper
Applications: Vehicle suspensions; magneto-rheological dampers; highway trucks; locomotive bogies (trucks); interior noise and vibration control; seat suspensions design; cab suspensions design; active vibration isolation analysis; semiactive dampers
Expertise: Vehicle stability analysis; rollover dynamics analysis; ground vehicle suspension testing and modeling; vehicle noise and vibration reduction; rail vehicle dynamics and stability analysis; application of active and semi-active primary and secondary suspensions in ground vehicles; application of smart materials in reducing noise and vibration in vehicles; magneto-rheological damper applications
Examples of Funding Sources: U.S. Air Force Office of Scientific Research, Federal Highway Administration, GE Transportation Systems, Lord Corporation, Lear Corporation, National Science Foundation, Center for Innovative Technologies, Volvo Heavy Truck, American Society of Mechanical Engineers, Visteon, United Defense, ROHO Groups

VEHICLE DYNAMICS

Name: **John B. Ferris**
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Specialty: Vehicle Dynamics, Vehicle Terrain Interaction, Virtual Proving
Applications: Highway and off-road terrain; tire modeling; vehicle loads; vehicle development and testing
Expertise: Nonlinear tire modeling; terrain scanning and characterization as realizations of a stochastic process; multi-body dynamic simulations of vehicles traversing uneven terrain; prediction of vehicle performance; durability testing; ride quality analysis
Examples of Funding Sources: Army National Automotive Center, Federal Highway Administration, State Departments of Transportation

VEHICLE DYNAMICS

Name: **Corina Sandu**
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Specialty: Vehicle Dynamics, Modeling and Simulation of Multibody Dynamic Systems, Terramechanics
Applications: Off-road vehicle performance and mobility studies; vehicle modeling and control; vehicle-terrain interaction for military and commercial applications; tire modeling; impact of vehicle dynamics on driver comfort and fatigue; mobility and performance analysis for planetary exploration rovers
Expertise: Multibody dynamics approach to vehicle systems; treatment of systems with uncertainties; terramechanics; tire modeling; stochastic soil and terrain modeling
Examples of Funding Sources: National Science Foundation Advance VT program, Virginia Tech ASPIRES program, Association of American Railroads, Goodyear Rubber and Tire Company, NASA Langley Research Center, Automotive Research Center, NASA Glenn Research Center, Caterpillar, Liebherr

VERIFICATION AND VALIDATION OF COMPUTER SIMULATIONS

see **Computational Fluid Dynamics***, Roy*

VIBRATION

see also **Dynamics***, S. Hendricks*
Dynamics and Control*, Southward*

VIBRATION

Name: **Daniel J. Inman**
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Specialty: Vibrations, Vibration Suppression and Smart Structures, Energy Harvesting and Structural Health Monitoring, Morphing Structures.
Applications: Energy harvesting for small electronics; structural health monitoring of aircraft structures; wind turbine blades and bridges; using structural systems; energy harvesting using ambient vibration, ambient thermal gradients, and light energy to charge and/or replace small batteries for extending the life of monitoring systems and other electronic systems including control systems; morphing applications for changing the shape of control surfaces in a distributed fashion
Expertise: Vibration analysis and testing; applied control; application of smart structures for solving engineering problems; modeling of elastic systems; experimental facilities for testing
Examples of Funding Sources: Acellent Technologies, National Institute of Standards, U.S. Air Force Office of Scientific Research, Arizona State University, University of Washington, U.S. Office of Naval Research, NASA, NSF

VIRTUAL ENVIRONMENTS

Name: **Doug A. Bowman**
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Specialty: 3-D User Interface Design, Virtual Environments, Human-Computer Interaction, 3-D Computer Graphics
Applications: 3-D architectural design and visualization; virtual environments for science and engineering education; 3-D visualization of scientific and engineering data; virtual reality phobia therapy; 3-D visualization of biological processes
Expertise: Design and evaluation of user interfaces for immersive virtual environments; 3D interaction techniques; comparison of 3D display devices; comparison of 3D input devices; software systems for virtual environments; human factors in virtual environments; interfaces for travel, wayfinding, object selection, object manipulation, system control, symbolic input in immersive virtual environments; presence and immersion in virtual environments
Examples of Funding Sources: National Science Foundation, National Institutes of Health

VIRTUAL REALITY

see **Virtual Environments***, Bowman*

VIRTUAL WORK

see **Engineering Education***, Johri*

VISCOELASTICITY

see **Mechanics of Materials***, Dillard*

VISUALIZATION

see **Computer Science**, *C-T. Lu*
Human Computer Interaction, *North*
Materials, *Kriz*
Problem Solving Environments, *Shaffer*

VISUAL INFORMATICS

see **Human-Computer Interaction**, *Quek*

VLSI

see **Computer Engineering**, *Hsiao*
Computers, *Tront*

WASTE DISPOSAL

see **Environment**, *Knocke*

WASTE TREATMENT

see **Microwave Processing of Materials**, *Clark*

WATER

see also **Computer Science**, *C-T. Lu*
Corrosion Control, *Edwards*
Groundwater, *Widdowson*

WATER

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Specialty: Geographic Information Systems (GIS), Watershed Hydrology, Urban Hydrology
Applications: Use of GIS to automate hydrologic analyses of watersheds for purposes of quantifying both water quality (floods or droughts) and water quality (nutrient loading, eutrophication); Application of optimization techniques to land development decision-making (e.g. “Smart Growth”)
Expertise: Surface water hydrology; hydrologic modeling; urban hydrology; flooding; statistical hydrology; GIS for landscape analysis; land use change; remote estimation of impervious surfaces
Examples of Funding Sources: Maryland State Highway Administration, Maryland Sea Grant/National Oceanographic and Atmospheric Administration, Maryland Department of the Environment, U.S. Environmental Protection Agency

WATER AND WASTEWATER TREATMENT

see **Environment**, *Boardman, Novak*

WATER CONTROL

Flooding, Stormwater Management

Name: **Randy Dymond**
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Specialty: Hydraulics, Hydrology, GIS, Water Resources Management
Applications: Flood control and forecasting by watershed rainfall runoff models; floodplain modeling and delineation; design of storm sewers, detention facilities, best management practices; MS4 permit regulations; hydrologic assessment of land use change
Expertise: Urban hydrology; stormwater control; GIS; land de-

velopment design; water resources management; low impact development

Examples of Funding Sources: U.S. Environmental Protection Agency, Virginia Department of Conservation and Recreation, Federal Emergency Management Agency, Virginia Water Resources Research Center, Virginia Department of Emergency Management

WATER CONTROL

Flooding; Stormwater Management

Name: **David F. Kibler**
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Specialty: Hydraulics, Hydrology, and Water Resources Management
Applications: Flood control and forecasting by watershed rainfall runoff models; design of dams, reservoirs, storm sewers and detention facilities; hydroplaning analysis for major runways and highways; hydrologic assessment of land use change
Expertise: Urban hydrology, stormwater control, and water resources management; non-point source pollutant modeling; overland sheet flow processes
Examples of Funding Sources: Federal Highway Administration, Waterways Experiment Station, U.S. Geological Survey, Federal Aviation Administration, Virginia Department of Conservation and Recreation, National Science Foundation, U.S. Environmental Protection Agency

WATER PLANNING AND MANAGEMENT

Environmental Protection

Name: **William E. Cox**
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Specialty: Water Supply Planning, Evaluation of Alternative Water Management Strategies
Applications: Local, regional, and state water supply planning; feasibility assessment for water development proposals
Expertise: Planning; analysis of water policy, laws, and regulations; development of water management strategies
Examples of Funding Sources: Virginia Department of Environmental Quality, Institute for Water Resources (U.S. Army Corps of Engineers), U.S. Geological Survey, Rappahannock River Basin Commission, Virginia Water Resources Research Center

WATER QUALITY

see **Agriculture**, *Dillaha*
Corrosion Control, *Edwards*
Ecological Engineering, *Wynn*
Environment, *Dietrich, Wolfe*
Watershed Management, *Benham*

WATER QUALITY MODELING

see **Environmental Engineering**, *Godrej*
Water, *Moglen*

WATER QUALITY, NONPOINT SOURCE POLLUTION

Name: **Saied Mostaghimi**
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Specialty: Nonpoint Source Pollution Control, Environmental Monitoring, BMP Impact Assessment, Water Quality
Applications: Characterize the impact of urban and agricultural activities on nonpoint source pollution; develop improved methods for assessing impacts of management practices on surface and groundwater quality; develop TMDLs for priority watersheds; watershed management
Expertise: Design and development of environmental monitoring network; use of computer simulation models and GIS technologies for watershed assessment; surface and groundwater quality
Examples of Funding Sources: National Science Foundation, U.S. Environmental Protection Agency, U.S. Department of Agriculture, Virginia Department of Conservation and Recreation, USAID

WATER RESOURCES

see **Groundwater***, Widdowson*

WATER RESOURCES

Name: **Jeffrey B. Connor**
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Specialty: Water Planning, Computer Simulation, Hydrology
Applications: Municipal, state and federal water resources planning and management
Expertise: Hydraulic and hydrologic modeling; computer simulation

WATERSHED MANAGEMENT

see also **Ecological Engineering***, Wynn*
Engineering Education*, Lohani*
Environment*, Hession*
Environmental Engineering*, Godrej*
Water*, Moglen*

WATERSHED MANAGEMENT

Name: **Brian Benham**
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URL: www.tmdl.bse.vt.edu; www.wellwater.bse.vt.edu
Specialty: Nonpoint Source Pollution Assessment and Control, Watershed Management, Household Drinking Water Quality
Expertise: Nonpoint source pollution assessment and control; watershed management; household drinking water quality
Examples of Funding Sources: United States Department of Agriculture, Virginia Department of Environmental Quality, Virginia Department of Conservation and Recreation, U.S. Environmental Protection Agency

WATERSHED MANAGEMENT

Name: **Conrad Heatwole**
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Specialty: Geographic Information Systems, Watershed Modeling, Hydrology, Nonpoint Source Pollution Control
Applications: Nonpoint source pollution modeling; hydrology of upland areas; agricultural land use assessment and modeling; TMDL development; source water protection; land use map-

ping; land use management
Expertise: Watershed modeling with GWLF, HEC-HMS, HSPF, etc.; geographical information systems (GIS)
Examples of Funding Sources: Virginia Department of Environmental Quality, Virginia Department of Conservation and Recreation, Virginia Department of Health, U.S. Geological Survey, U.S. Department of Agriculture, U.S. Environmental Protection Agency

WEARABLE COMPUTERS

see **Computer Engineering**, *T. Martin*

WETLAND RESTORATION

see **Ecological Engineering**, *Wynn*

WIFI

see **Communications**, *Stutzman*

WIRELESS COMMUNICATIONS

see **Communications**, *et al*
Computational Science, *Ramakrishnan*
Digital Signal Processing, *Beex*

WIRELESS COMMUNICATION, COGNITIVE AND SOFTWARE RADIO

Name: **Charles W. Bostian**
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URL: www.cognitiveradio.wireless.vt.edu
Specialty: Cognitive and Software Defined Radio
Application: Public safety communications
Examples of Funding Sources: NSF, National Institute of Justice, DARPA

WIRELESS NETWORKING

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Specialty: Resource (Spectrum) Management and Networking Issues for Cognitive Radio Based Wireless Networks, Optimization and Algorithm Design for Wireless Ad Hoc and Sensor Networks, Video Communications over Dynamic Ad Hoc Networks
Applications: Wireless communication networks; public safety communications; tactical communication networks
Expertise: Cross-layer optimization; algorithm design; prototype and testbed
Examples of Funding Sources: National Science Foundation, Office of Naval Research

WIRELESS NETWORKS

see also **Computers**, *Midkiff*
Computer Science, *Feng*
Networks, *L. DaSilva*
Radio Engineering, *Ellingson*

WIRELESS NETWORKS

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Specialty: Wireless Networks, Cognitive Radio, Cognitive Networks, Cross-Layer Optimization, Game Theory
Applications: Interoperability in public safety communications; application of artificial intelligence to control communication and network parameters; power and topology control in wireless networks; dynamic spectrum sharing; analysis of networks using game theory
Expertise: End-to-end evaluation of wireless networks; applications of decision theory, game theory and artificial intelligence to analyze, optimize and design cognitive wireless systems; analytical, simulation and experimental methods to understand network and communication system performance
Examples of Funding Sources: National Science Foundation, National Institute of Justice, Defense Advanced Research Projects Agency

WOMEN IN ENGINEERING

see **Engineering Education**, *Watford*
Technical Communication / Engineering Education, *Paretti*

WORK MEASUREMENT

see **Human Factors and Ergonomics**, *Lockhart*

WORK PHYSIOLOGY

see **Human Factors and Ergonomics**, *Lockhart*

WORK PLACE DESIGN

see **Ergonomics**, *Nussbaum*

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