The Crashworthiness for Aerospace Structures and Hybrids (CRASH) Lab team works on developing a validated, high fidelity, fully non-linear computational methodology to help assess safe performance of future aircraft concepts when subjected to a planned and controlled emergency landing in water. The desired result would be to reduce high costs associated with the extensive physical tests required during the design and certification phases of new aircraft. From left: Luis Seminario, Lauren Adolph, Matthew Satterwhite, Javid Bayandor, Eric Anderson, Emma Kerr, Scott Bacvinskas, Christopher Richards, and Katie Abruzzo.
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 next to his/her name
* Call the main department or school number listed below
* Or contact the News Office of the College of Engineering at 540-231-6641.

Main Telephone Numbers

Aerospace and Ocean Engineering .......... 540-231-6611
Biological Systems Engineering .......... 540-231-6615
Biomedical Engineering and Mechanics .... 540-231-8191
Chemical Engineering ....................... 540-231-6631
Civil and Environmental Engineering ...... 540-231-6635
Computer Science ................................ 540-231-6931
Electrical and Computer Engineering .... 540-231-6646
Engineering Education ....................... 540-231-6555
Industrial and Systems Engineering ...... 540-231-6656
Materials Science and Engineering ....... 540-231-6640
Mechanical Engineering .................... 540-231-7183
Mining and Minerals Engineering ........ 540-231-6671

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.

Links

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

Facebook:  
https://www.facebook.com/VirginiaTechCollegeofEngineering

Twitter:  
https://twitter.com/VTEngineering

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 Myers Lawson School of Construction.

The College’s 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
Selected Key Accomplishments

* The College climbed to its highest ever ranking in the National Science Foundation's report on engineering schools' research expenditures. The 2015 survey, reporting on figures for fiscal year 2013, shows the college at ninth place with $214.5 million in research expenditures. Virginia Tech's College of Engineering has now passed Stanford, Ohio State, Illinois, University of California at Berkeley, and the University of Texas at Austin.

* In U.S. News & World Report's “America's Best Colleges 2015” survey, released in September 2015, the College of Engineering’s undergraduate program ranked 15th among all undergraduate engineering programs that also offer the Ph.D., and eighth among public universities. The Department of Biomedical Engineering and Mechanics ranked fourth and the Grado Department of Industrial and Systems Engineering ranked fifth. Other notable department rankings are: the Charles E. Via Jr. Department of Civil and Environmental Engineering ranked ninth in civil engineering and 11th in environmental engineering; the Department of Biological Systems Engineering, sixth; the Bradley Department of Electrical and Computer Engineering, 14th; the Department of Mechanical Engineering, 15th; and the Department of Aerospace and Ocean Engineering, 15th.

* The magazine’s “America's Best Graduate Schools 2016” survey, released in March 2015, again ranked the College’s graduate program 21st among all of the nation’s engineering schools. Among fellow public universities, it ranked tenth in the nation. By individual program, those in the top 20 are: the Charles E. Via Department of Civil and Environmental Engineering, ninth for civil engineering programs and tenth among environmental engineering programs; the Grado Department of Industrial and Systems, seventh for industrial/manufacturing programs; and the Department of Biological Systems Engineering, seventh among biological/agricultural programs. Also, the Department of Mechanical Engineering ranked 16th and the Department of Aerospace and Ocean Engineering ranked 11th. Other rankings: the Department of Biomedical Engineering and Mechanics at 40th and the Bradley Department of Electrical and Computer Engineering split among two lists, 24th for electrical and 26th for computer engineering.

(Note: Two departments within the College of Engineering merged. The Department of Engineering Science and Mechanics and the Department of Biomedical Engineering formed the Department of Biomedical Engineering and Mechanics (BEAM) at the start of the 2015 calendar year.)

* The latest national survey, dated June 2015, released by the American Society for Engineering Education (ASEE) ranked the College of Engineering in the following categories for 2014.

educate the engineer, researcher, chief executive officer, or other distinguished leaders for the 21st century; that is, to produce “The Engineer of the Future.”

Counting undergraduate and graduate degrees, Virginia Tech provides over half of all the new engineers educated in the Commonwealth, and is consistently one of the top ten producers of new bachelor’s degrees in engineering in the nation.
It was sixth for the number of tenured/tenure track faculty members, tenth for the number of tenured/tenure track women faculty, 17th for the number of African American faculty, 11th for the number of Asian faculty, and fifth for the number of Hispanic faculty. The data was based on a survey of 358 engineering schools. For total bachelor's degrees awarded by schools, Virginia Tech ranked 5th in the nation; for master's degrees awarded, 36th in the nation; and for doctoral degrees, 11th in the nation. In total enrollment, the College ranked 10th in the nation for undergraduates with 7,410 students (with 352 schools reporting numbers) and 20th in the nation for graduates students at 2,045 (with 261 schools reporting numbers).

* For fall, 2005, 4,800 prospective students applied for admission to the College of Engineering. By fall 2015, more than 9,000 applied, more than a 50 percent increase. Starting with fall 2010, the target size for the freshman engineering class was raised from 1200 to 1300, an 8 percent increase. In fall of 2015 the target was 1650, and some 1800 were admitted. In 2005 the entering engineering freshman class was 15.6 percent female, 2.1 percent African-American, 1.8 percent Hispanic. By comparison, in 2015 the entering engineering freshman class was 23.4 percent female.

The number of entering females is a record, however due to the fact that the overall size of the class is also a record, the percentage of entering females is down just slightly from the 25.4 percent of the 2014 entering class. Members of the underrepresented population make up 11.9 percent (numbers no longer directly correlate because students now identify with more than one segment of the population.)

* Accompanying the record-setting size of the entering 2015 freshman engineering class are the following statistics for 2015-16:
  * A record number of faculty members, a projected 347, which is 7.4% greater than in 2006-07,
  * A record total number of undergraduate students, 7,891, which is 43.7% greater than in 2006-07,
  * A record number of graduate students, 2,290, which is 32.4% greater than in 2006-07,
  * A record undergraduate student-to-teacher ratio, 22.7, which is 33.5% greater than in 2006-07,
  * A record graduate student-to-teacher ratio, 6.6, which is 23.2% greater than in 2006-07.

* Goodwin Hall, the flagship building for the College of Engineering, opened its doors for classes in the fall of 2014. It houses 40 instructional and research labs, eight classrooms, the Quillen Family Auditorium, and 150 offices for several engineering departments. Roughly 240 accelerometers attached to 136 sensor mounts throughout the building's ceilings detect information on the location of people within the structure, measure normal structural settling and wind loads, and track building movement resulting from earthquakes. A sensor array mounted outside the building measures external vibrations, such as wind, traffic on nearby Prices Fork Road, and possible seismic activity. The building was dedicated in the fall of 2014 and is named in recognition of the philanthropy of Alice and Bill Goodwin. Mr. Goodwin is a mechanical engineering graduate, class of 1962.
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ACOUSTICS
see also Human Factors Engineering, Casali Materials, Viehland Vibration, Tarazaga Vibration and Dynamics, Parker

ACOUSTICS
Name: Michael J. Roan
Department: Mechanical Engineering
Office Phone: 540-231-5846
Fax: 540-231-9100
E-mail: mroan@vt.edu
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, NSF, 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

ADVANCED DIAGNOSTICS
Name: Lin Ma
Department: Aerospace and Ocean Engineering
Office Phone: 540-213-2249
Fax: 540-231-9632
E-mail: linma@vt.edu
URL: www.aoe.vt.edu/people/webpages/linma/index-linma.html
Specialty: Laser Diagnostics, Combustion/Flow Instrumentation, Optical Sensing, Volumetric (3-D) Measurements, Signal Processing and Analysis
Applications: Aero-propulsion engines; rocket engines; internal combustion engines; power systems; environmental monitoring; non-intrusive measurements in hostile environments
Expertise: High-speed (50 kHz) temperature measurement in aero-propulsion engines; high-speed (multi-kHz) 3-D combus-
tion measurements; measurements of soot/particulate emissions from engines; thermal management of hybrid (battery) powertrain systems

Examples of Funding Sources: U.S. Air Force, Rolls-Royce, NSF, Honda Motors

ADVANCED MANUFACTURING

see also Polymers, Bortner

ADVANCED MANUFACTURING

Name: Zhenyu “James” Kong
Department: Industrial and Systems Engineering
Office Phone: 540-231-9762
Fax: 540-231-3322
E-mail: zkong@vt.edu

Specialty: Statistical Signal Processing, Sensor Based Estimation and Predictive Modeling, Quality/Reliability Engineering, Data Mining, and Machine Learning

Applications: Ultra precision manufacturing such as chemical mechanical polishing; large and complex manufacturing systems such as auto body assembly process; additive manufacturing

Expertise: Modeling, synthesis and fault diagnosis for manufacturing systems; online real time quality monitoring for ultra-precision machining and additive manufacturing

Examples of Funding Sources: NSF, Department of Transportation, Dimensional Control Systems, Inc.

ADVANCED MATERIALS MANUFACTURING

Name: Hang Yu
Department: Materials Science and Engineering
Office Phone: 540-6640
Fax: 540-231-8919
E-mail: hangyu@vt.edu

Specialty: Additive Manufacturing, Smart Materials, Mechanical Behavior of Materials

Applications: 3-D printing of metallic materials; lightweight structural materials for aerospace and automotive applications; smart materials-based sensors and actuators; heat engines; energy dissipation and damping

Expertise: Advanced materials manufacturing, including additive manufacturing and vapor phase deposition; shape memory materials; meso-structured materials, including functionally graded materials and micro-architected materials; in situ mechanical testing; residual stresses; finite element modeling; materials design and optimization

Examples of Funding Sources: NSF, Office of Naval Research, Department of Energy

ADDITIVE MANUFACTURING

see Advanced Materials Manufacturing, Yu

Computer-Aided Design and Manufacturing, Böhn
Manufacturing, Williams

Polymers, Bortner

AERODYNAMICS

see Aerospace Engineering, Bayandor

Computational Fluid Dynamics, Roy

Fluids and Acoustics, Ng

AERODYNAMICS AND AEROACOUSTICS

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/people/faculty/devenport.html

Specialty: Aerodynamic and Aeroacoustic Testing, Experimental
Studies of Aerodynamics 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, Director of the Virginia Tech Stability Wind Tunnel

Applications: Wind turbine aerodynamics and aeroacoustics; marine propulsors; airframe noise; fan noise; hull noise; aircraft engines; wind turbine noise

Expertise: Hot-wire techniques for single and multi-point three component turbulence measurement; microphone systems for far-field acoustics; pressure-based systems for aerodynamic and boundary condition measurements; particle image velocimetry; surface microphones for pressure measurement; instrumentation development; multidimensional analysis of random data; dynamic calibration techniques

Examples of Funding Sources: General Electric, U.S. Office of Naval Research, NSF, Siemens Wind Power

AEROElasticity

see Aircraft, Kapania

Multiphysics Modeling and Computation, Wang

Aeronautics

Name: Joseph A. Schetz
Department: Aerospace and Ocean Engineering
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

Aeropropulsion

see Advanced Diagnostics, Ma

Aerospace Engineering

Name: Javid Bayandor
Department: Mechanical Engineering
Office Phone: 540-231-8492
Fax: 540-231-9100
E-mail: bayandor@vt.edu

Specialty: Aerospace design, Space Physics, Space Missions, Impact and Crashworthiness, Damage Tolerance, Ballistics, Composite Structures, Bioinspired Flight, Unsteady Propulsion

Applications: Space exploration, aircraft and spacecraft design, flapping flight robotics

Expertise: Spacecraft design; aerospace structures; aircraft design; dynamic damage modeling; fluid-structure interactive systems; unsteady propulsion

Examples of Funding Sources: NASA Lunar Advanced Science and Exploration Research (LASER), NASA In-Space Propulsion

Aerospace Engineering

Name: Robert A. Canfield
Department: Aerospace and Ocean Engineering
Office Phone: 540-231-5981
Fax: 540-231-9632
E-mail: bob.canfield@vt.edu
URL: http://www.aoe.vt.edu/people/faculty/canfield.html

Specialty: Multidisciplinary Design Optimization, Aeroelasticity, Reliability-Based Structural Design

Applications: Aircraft design, space structures, military vehicles;
high altitude long endurance (HALE) aircraft; sensorcraft; slot-
ted waveguide antenna stiffened structures (SWASS) design

**Expertise:** Structural analysis and optimization; aeroelasticity,
airworthiness, integrated structure and control design; sensitiv-
ity analysis

**Examples of Funding Sources:** Air Force Office of Scientific
Research, Air Force Research Laboratory, Naval Air Systems
Command

**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:** Multidisciplinary Analysis and Design
**Applications:** Aircraft and Wind Turbine

**Expertise:** Aeroelasticity; flight dynamics and control; structural
dynamics

**Examples of Funding Sources:** NASA, Air Force Research Labo-
ratory

**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 deploy-
able structures; cell mechanics

**Expertise:** Flight dynamics and control; coordinated vehicles;
structural dynamics

**Examples of Funding Sources:** NASA, NSF, Institute for Criti-
cal Technology and Applied Science, United Technologies
Research Center

**AEROSPACE STRUCTURES**

See **Aerospace Engineering**, Bayandor

**AGING**

See **Ergonomics**, Nussbaum

**AGRICULTURE**

See **Biomass Harvest, Storage, and Delivery**, Grisso

**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, Multi-
disciplinary Design Optimization
**Applications:** Analysis of aerospace structures flight loads; analy-
sis 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 im-
pact, blast, and other short duration loads; aeroelastic tailoring;
computational aeroelasticity; random vibrations; artificial intelli-
gence, genetic algorithms, multidisciplinary design optimization

**Examples of Funding Sources:** The Boeing Company, U.S.

**AIRCRAFT DESIGN**

see Aerospace Engineering, Bayandor

**AIR POLLUTION**

see also Environment, Little Transportation, Rakha

**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  
Specialty: Air Quality Engineering  
Applications: Air quality management and planning; air quality modeling; air pollution control; environmental exposure and risk assessment; nanotechnology; infectious disease transmission  
Expertise: Air pollutant emissions; atmospheric transport, transformation and fate; measurement of gases and particles; greenhouse gases; motor vehicle emissions; nanoparticles; bioaerosols  
Examples of Funding Sources: NSF, Environmental Protection Agency, NIH, U.S. Department of Agriculture

**AIR TRANSPORTATION AND AIRPORT ENGINEERING**

Name: Antonio A. Trani  
Department: Civil and Environmental Engineering  
Office Phone: 540-231-4418  
Fax: 540-231-7532  
E-mail: vuel@vt.edu  
URL: www.cee.vt.edu/people/trani.html  
Specialty: Air Transportation Systems Modeling, Airport Engineering and Planning, Computer Modeling, Systems Engineering Analysis  
Applications: Development of large-scale aviation system planning models; development of airport simulation models; air transportation demand estimation; multi-model transportation planning and analysis  
Expertise: Airport capacity and delay estimation modeling; aviation system analysis; aircraft and airspace interaction analyses; high-speed rail transportation modeling; airport noise modeling  
Examples of Funding Sources: NASA Langley Research Center, NASA Glenn Research Center, Federal Aviation Administration, NSF, National Institute for Aerospace, National Consortium for Aviation Mobility

**ANALYTICAL CHEMISTRY**

see Electronics, Agah

**ANTENNAS**

see Radio Engineering, Ellingson

**ANTIBIOTIC RESISTANCE**

see Environmental Engineering, Pruden
APPLIED MATHEMATICS
see Fluid Mechanics, Stremler

AQUATIC ECOSYSTEMS
see Environment, Hession
Environment and Fluvial Hydraulics, Hester

ARTIFICIAL INTELLIGENCE
see Computer Vision, Parikh
Machine Learning, D. Batra
Robotics, Tokekar
Wireless Communications and Networking, MacKenzie

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

ATMOSPHERIC SCIENCE
see Remote Sensing, Bailey

AUGMENTED REALITY
Name: Joe Gabbard
Department: Industrial and Systems Engineering
Office Phone: 231-3559
Fax: 540-231-3322
E-mail: jgabbard@vt.edu
Specialty: Augmented Reality; Virtual Reality; Visualization; User Experience (UX); Usability Engineering; Cognitive Engineering
Applications: Embedded AR applications for transportation; enhanced military planning and training; handheld augmented reality for sustainable agriculture; novel user interfaces for STEM and graduate education; 3-D visualization of life science data
Expertise: Human factors of novel user interface technologies; mobile augmented reality; color perception in augmented reality; usability evaluation; user interface design; human-computer interaction; 3-D computer graphics
Examples of Funding Sources: NSF, NIH, U.S. Department of Agriculture, U.S. Army, U.S. Navy

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: 540-231-7894
E-mail: doug.nelson@vt.edu
URL: www.me.vt.edu/people/faculty/doug-nelson/
Applications: Design of hybrid and electric vehicle powertrains to meet performance and fuel economy goals; construction,
testing and validation of vehicle powertrain systems; battery energy storage systems; autonomous vehicle energy storage and propulsion

Expertise: Energy use in vehicles; fundamentals of energy management and control strategies; vehicle systems design using model based design and software/hardware in the loop methods

Examples of Funding Sources: U.S. Department of Energy, Argonne National Laboratory, General Motors

AUTOMOTIVE SAFETY
see Injury Biomechanics, Duma

AUTONOMOUS SYSTEMS
see also Control Theory, Woolsey
Mechanical Engineering, Wicks
Robotics, Ben-Tzvi, Tokekar

AUTONOMOUS SYSTEMS

Name: Kevin Kochersberger
Department: Mechanical Engineering
Office Phone: 540-231-5589
Fax: 540-231-9100
E-mail: kkb@vt.edu
URL: www.me.vt.edu/unmanned

Specialty: Design of Unmanned Systems, Design of Aircraft Systems, Vibration and Dynamic Test and Analysis, Stereo and Monofocal Vision Systems

Applications: Sensing; surveillance; unmanned aircraft; noise and vibration; vision sensing and control

Expertise: Mechanical and electrical system design and fabrication analysis; flight test

Examples of Funding Sources: Defense Threat Reduction Agency, Air Force Research Lab

AUTONOMOUS SYSTEMS

Name: Alexander Leonessa
Department: Mechanical Engineering
Office Phone: 540-231-3268
Fax: 540-231-8836
E-mail: leonessa@vt.edu


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: NSF, U.S. Office of Naval Research, DARPA

AUTONOMOUS SYSTEMS

Control theory, Estimation theory

Name: Dan Stilwell
Department: Electrical and Computer Engineering
Office Phone: 540-231-3204
Fax: 540-231-3362
E-mail: stilwell@vt.edu
URL: www.ascl.ece.vt.edu

Specialty: Advanced Control, Navigation, and Guidance for Autonomous Vehicle Systems; Autonomy and Decision Algorithms; Planning Algorithms; Collaborative Control and Estimation for Multi-Vehicle Systems
Applications: Maritime robotic systems, including subsea and surface applications

Expertise: Advanced field trials and experimentation for maritime robotics systems; applied guidance, navigation, and control systems; guidance and decision-making algorithms for autonomous vehicles

Examples of Funding Sources: NSF, Office of Naval Research, DARPA

**AUTONOMOUS VEHICLES**

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

**BALLISTICS**

*see Aerospace Engineering, Bayandor*

**BATS**

*see Bio-inspired Science and Technology, Müller
  Dynamical Systems, Abaid*

**BIG DATA**

*see Advanced Materials Manufacturing, Yu
  Computational Science, Onufriev
  Computer Science, Feng
  Cybersecurity, Yao
  Data Analytics, Ramakrishnan
  Data Mining, Prakash
  Machine Learning, D. Batra*

**BIOENGINEERING**

*see Aerospace Engineering, Bayandor
  Bio-inspired Science and Technology, Müller
  Robotics, Ben-Tzvi*

**BIOINFORMATICS**

*see Computational Biology, Murali
  Computational Genomics, Heath
  Computer Science, Feng, Shaffer
  Data Analytics, Ramakrishnan
  Human-Computer Interaction, North
  Optimization, Watson*

**BIOINFORMATICS AND BIOIMAGING**

Name: Yue “Joe” Wang

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  Office Phone: 703-528-5500 ext. 223
  Fax: 703-528-5543
  E-mail: yuewayang@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: NIH, Department of Defense, NSF, Department of Energy

**BIO-INSPIRED SCIENCE AND TECHNOLOGY**

Name: Rolf Müller

*Department: Mechanical Engineering
  Office Phone: 540-231-6005
  Fax: 540-231-9555
  E-mail: rolf.mueller@vt.edu*
URL: www.me.vt.edu/people/faculty/Mueller.html
Specialty: Adaptive Sensing Technology Inspired by the Biosonar System of Bats
Applications: Advanced wave-based sensing methods in engineering; autonomous sensing
Expertise: Biosonar; bio-inspired beam forming and signal processing; dynamic encoding of sensory information; extraction of design rules from nature
Examples of Funding Sources: Army Research Office, NASA, Naval Sea Systems Commands, NSF, NSF of China, Shandong Taishan Fund

BIOMASS HARVEST, STORAGE, AND DELIVERY
Name: Robert “Bobby” Grisso
Department: Biological Systems Engineering
Office Phone: 540-231-6538
Fax: 540-231-3199
E-mail: rgrisso@vt.edu
Specialty: Analysis of Systems for the Harvest, Storage, and Delivery of Biomass
Applications: Use of precision farming techniques for data collection; design of logistics systems to minimize cost of biomass delivery; 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
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

BIOMATERIALS AND TISSUE ENGINEERING
Name: Aaron S. Goldstein
Department: Chemical Engineering; Biomedical Engineering and Sciences
Office Phone: 540-231-3674
Fax: 540-231-5022
E-mail: goldst@vt.edu
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; electrospinning
Examples of Funding Sources: NIH, NSF

BIOMECHANICS
Name: Raffaella De Vita
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-5905
E-mail: devita@vt.edu
URL: www.beam.vt.edu/devita
Specialty: Mechanical Testing and Constitutive Modeling for Non-linear Elastic, Viscoelastic, Liquid Crystal Biological Systems
Applications: Replacement grafts; surgical methods; stretching routines; drug delivery systems; biological sensors and actuators
Expertise: Experimental and theoretical mechanics with emphasis on ligaments, tendons, tracheae, pelvic organs, cellular mechanics
Examples of Funding Sources: NSF

BIOMECHANICS
Name: Daniel M. Dudek
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Office Phone: 540-231-0687
Fax: 540-231-9187  
E-mail: dmdudek@vt.edu  
URL: www.esm.vt.edu/~dmdudek  

**Specialty:** Biomaterials, Locomotion, Comparative Organismal Biology

**Applications:** Biologically inspired robotics; synthetic elastomers

**Expertise:** Dynamics of running and climbing; mechanics of elastomeric proteins

**Examples of Funding Sources:** NSF, NIH, DARPA

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**BIOMECHANICS**

**Crash Safety**

**Name:** Clay Gabler

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**Office Phone:** 540-231-7190

**Fax:** 540-231-0954

**E-mail:** gabler@vt.edu

**URL:** www.sbes.vt.edu/gabler

**Specialty:** Injury Biomechanics, Vehicle Crashworthiness, Crash Modeling, Crash Reconstruction

**Applications:** Advanced airbag systems; active safety systems; event data recorders for cars; roadside crash safety; motorcycle crash safety; side impact safety

**Expertise:** Articulated lumped mass modeling; nonlinear finite element modeling; epidemiology of highway accidents using national databases; social cost of highway accidents

**Examples of Funding Sources:** National Highway Traffic Safety Administration, Federal Highway Administration, Transportation Research Board – National Academy of Sciences, New Jersey Department of Transportation

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**BIOMECHANICS**

**Name:** Robin Queen

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**Office Phone:** 540-231-3134

**E-mail:** rmqueen@vt.edu

**Specialty:** Biomedical Engineering, Orthopaedic Biomechanics, Sports Biomechanics, Clinical Research

**Applications:** Musculoskeletal injury prevention; return of function following surgical interventions; effects of aging on physical performance; balance; and neuromuscular control

**Expertise:** Biomechanical assessment of movement; effects of neuromuscular fatigue on movement; post-operative function following total joint replacement; primary and secondary ACL injury prevention

**Examples of Funding Sources:** NIH, DonJoy Orthopaedics, Stryker, Nike, Orthopaedic Research and Education Foundation

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**BIOMECHANICS**

**Name:** Jake Socha

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**Fax:** 540-231-0696

**E-mail:** jjsocha@vt.edu

**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:** NSF, DARPA

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**BIOMECHANICS**

**Name:** Costin Untaroiu

**Department:** Biomedical Engineering and Mechanics

**Office Phone:** 540-231-8997

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Fax: 540-231-2953
E-mail: costin@vt.edu
URL: http://www.cib.vt.edu/?page_id=351
Specialty: Injury Biomechanics, Computational Biomechanics, Vehicle Crashworthiness, Rotor-dynamics

Applications: Advanced restraint systems; active safety; vehicle safety design
Expertise: Human modeling; mathematical models; finite element modeling; rigid body modeling


BIOMECHANICS

Name: Vincent M. Wang
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Office Phone: 540-231-8191
URL: www.beam.vt.edu
E-mail: vmwang@vt.edu
Specialty: Orthopedic Biomechanics, Connective Tissue Injury and Healing
Applications: Diarthrodial joint and tendon/ligament biomechanics; soft tissue to bone repair; therapeutic mechanical loading
Expertise: Skeletal mechanobiology; animal models of soft tissue injury and healing

Examples of Funding Sources: NIH, Musculoskeletal Transplant Foundation

Name: Yong W. Lee
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Office Phone: 540-231-8484
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URL: www.vascular.sbes.vt.edu/
Specialty: Nanomedicine, Cellular and Molecular Biology
Applications: Biomedical applications of nanotechnology
Expertise: Targeted drug delivery; novel nanomaterials; nanotoxicology; cancer biology; vascular biology

Examples of Funding Sources: NIH, NSF

Name: Chang Lu
Department: Chemical Engineering
Office Phone: 540-231-8681
Fax: 540-231-5022
E-mail: changlu@vt.edu
URL: www.microfluidics.che.vt.edu/
Specialty: Microfluidics, Single Cell Analysis, Epigenetics and Epigenomics, Gene Delivery
Applications: Microfluidic devices for cancer diagnosis and staging; gene delivery for cell therapies; molecular and cellular analysis for epigenetic studies
Expertise: Microfluidics design; fluid mechanics; laser spectroscopy; biophysics of electroporation
Examples of Funding Sources: NIH, NSF, U.S. Department of Agriculture, Wallace Coulter Foundation

BIOMEDICAL ENGINEERING
Name: Scott S. Verbridge
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-6908
E-mail: sverb@vt.edu
URL: www.verbridgelab.org
Specialty: Cancer Microenvironment, Nanotechnology, Microfluidics, Tissue Engineering
Applications: In the Laboratory for Integrative Tumor Ecology (LITE); 3-D, physiologically relevant engineered models of tumor tissues are developed to study the tissue level "ecological" interactions that drive tumor initiation, progression, and response to therapy
Expertise: Microfluidic tumor models; optical measurement of chemical microenvironment; tumor stress response experiments
Examples of Funding Sources: Institute for Critical Technology and Applied Science, NIH

BIOMEDICAL ENGINEERING
Name: Jason J. Xuan
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E-mail: xuan@vt.edu
Specialty: Bioinformatics and Biomedical Imaging
Applications: Bioinformatics, including genomic data analysis and regulatory network modeling for cancer research; computational techniques are key to defining novel molecular diagnostics and discovering drugs for gene-based therapy; in particular, computational modeling is applied to study drug resistance in breast cancer and chemoresistance in ovarian cancer; biomedical imaging – this includes medical image segmentation, image analysis, and image registration; applications of biomedical image analysis include quantitative medicine and radiation therapy planning
Expertise: Cancer bioinformatics; computational systems biology; genomic data analysis; reconstruction of gene regulatory networks; modeling of signaling networks and pathways; biomedical image analysis; radiation therapy planning

BIOMEDICAL IMAGING
Name: Guohua Cao
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URL: www.sbes.vt.edu/cao/index.html
Specialty: Biomedical Imaging, Medical Physics
Applications: Anatomical and functional imaging of heart and lung; cancer imaging; small-animal imaging; radiation therapy
Expertise:Computed Tomography (CT); micro/nano CT; x-ray physics; carbon nanotube x-ray source
Examples of Funding Sources: NSF, NIH
BIOMEDICAL MICROFLUIDICS
Name: Rafael V. Davalos
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-1979
E-mail: davalos@vt.edu
Specialty: Biomedical Microfluidics, Biotransport
Applications: Cancer detection and treatment; single cell analysis; image-guided surgery; cell isolation and enrichment; microfluidics
Expertise: Electric fields on cells; dielectrophoretic cell manipulation; irreversible electroporation; micro-electroporation
Examples of Funding Sources: Coulter Foundation, NSF, NIH

BIOPHYSICS
see Electronics, Agah

BIOPRINTING
Name: Blake N. Johnson
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Office Phone: 540-231-0755
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E-mail: bnj@vt.edu
Specialty: 3-D Bioprinting, Biomedical Devices, Biosensors, Nano-Bio Interface, Wearable Bioelectronics, Neural Engineering, Biommanufacturing, Electrochemistry, Advanced Materials
Applications: Tissue regeneration; neural modulation; human-machine interface; biosensing, molecular diagnostics, environmental monitoring
Expertise: Manufacturing; Bioelectronics
Examples of Funding Sources: NIH, NSF, DARPA, Air Force Research Laboratory, Army Research Laboratory

BRAIN-INSPIRED COMPUTER ARCHITECTURE
Name: JoAnn M. Paul
Department: Electrical and Computer Engineering
Office Phone: 571-858-3146
E-mail: jmpaul@vt.edu
Specialty: "Computational Dreaming” to Achieve Constant Performance Against Increasing Algorithmic Complexity as Applied to Database Dependent – Intelligent Personal Computing Applications, Highly Parallel, Independent Computation Used During a Dream Phase to Develop and Select a Ctom, Simple, Context-Specific Processor for Awake or Day Phase
Applications: Personal mobile computer architecture; basic science in the understanding of the brain; machine intelligence
Expertise: Brain-inspired computer architecture; high level modeling and evaluation of highly parallel, heterogeneous computer systems
Examples of Funding Sources: NSF

BRIDGE DESIGN
see also Structural Engineering, Hebdon

BRIDGE DESIGN
Name: Carin L. Roberts-Wollmann
Department: Civil and Environmental Engineering
Office Phone: 540-231-2052
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E-mail: wollmann@vt.edu
Specialty: Reinforced and Prestressed Concrete Structures, Behavior and Design with Emphasis on Bridges
Expertise: Methods for improving bridge durability and reducing construction time, including precast concrete bridge deck panels; precast inverted tee-beams; ultra-high performance concrete; high performance lightweight concrete; bridge testing and monitoring
Examples of Funding Sources: Virginia Transportation Research Council, Federal Highway Administration, Precast/Prestressed Concrete Institute, National Cooperative Highway Research Program

CANCER
see also Biomechanics, Wang, Queen
Biomedical Engineering, Bickford, Lee, Lu, Verbridge, Xuan
Bioprinting, Johnson
Computer-Aided Design and Manufacturing, Bahn
Electronics, Agah
Robotics, Ben-Tzvi

CATALYSIS
Name: David F. Cox
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Fax: 540-231-5022
E-mail: dfcox@vt.edu
Specialty: Surface Science, Catalysis, Surface Chemistry, Computational Chemistry
Applications: Selective oxidation; alkane dehydrogenation; hydro-processing; 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, NSF

CATALYSIS
Name: S. Ted Oyama
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E-mail: oyama@vt.edu
Specialty: Environmental Catalysis and Materials
Applications: Reduction of greenhouse emissions (CO2); activation of methane in membrane reactors; hydrosulfurization and hydrogenation of petroleum feedstocks; sulfur resistant hydrogenation catalysts; ozone decomposition; low college 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: NSF, Petroleum Research Fund, U.S. Department of Energy

CATALYSIS
Name: Hongliang Xin
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E-mail: hxin@vt.edu
Specialty: Computational Catalysis, Surface Chemistry, Solid State Physics, Artificial Intelligence
Applications: Artificial photosynthesis; fuel cell; solar cell
Expertise: Density functional theory, ab initio molecular dynamics, kinetic monte carlo, machine learning
Examples of Funding Sources: American Chemical Society Petroleum Research Fund

CERAMICS
Name: David E. Clark
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Office Phone: 540-231-9469
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E-mail: dclark@vt.edu
Specialty: Ceramics, Processing and Properties, Materials Engineering
Applications: Nuclear materials; environmental degradation of glass and ceramics; composites; coatings; ceramic superconductors; fibers; recycling
Expertise: Microwave processing; sol-gel processing; glass melting and corrosion; ceramic processing and ceramic properties
Examples of Funding Sources: NSF, Electric Power Research Institute, DARPA, NASA, U.S. Department of Energy, England

CHAOs
see Fluid Mechanics, Stremler
Nonlinear Dynamics and Control, Ross

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: Multi-scale molecular modeling (using agent based approaches), blood-brain-barrier modeling; pharmacokinetic modeling; uncertainty analysis; math programming; machine learning
Examples of Funding Sources: NSF, NIH, Department of Energy

CHEMICAL ENGINEERING, POLYMER SCIENCE AND ENGINEERING
Name: Stephen M. Martin
Department: Chemical Engineering
Office Phone: 540-231-3775
Fax: 540-231-5022
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Specialty: Polymers, Self-Assembly, Membrane Separations, Thin Films, Liquid Crystals, X-ray Scattering, Materials Science
Applications: Gas and liquid transport and separations in new membrane materials with applications for pharmaceutical production, gas purification, CO₂ reduction, and water desalination; processing and properties of polymeric materials and composites
Expertise: Structure and rheology of polymeric materials (block copolymers, crystalline and liquid crystalline polymers, adhesives, polymer films); membrane fabrication, permeability and sorption measurements (gas and liquid phase; polymeric, thin film nanocomposite, carbon nanotube, and metal-organic framework membranes); organic thin film synthesis and fabrication (self-assembled monolayers, Langmuir-Blodgett films); structural and chemical characterization of materials: Small Angle X-ray Scattering (SAXS), Wide-angle X-ray Scattering (WAXS), Grazing-Angle Incidence X-ray diffraction (GIXD), GISAXS, X-ray reflectivity, Infrared Spectroscopy (FTIR), X-ray Photoelectron Spectroscopy (XPS), Atomic Force Microscopy (AFM); synthesis and characterization of thermotropic and lyotropic liquid crystalline materials (e.g. birefringence)
Examples of Funding Sources: American Chemical Society – Petroleum Research Fund, NSF, Office of Naval Research, Institute for Critical Technology and Applied Science

CIVIL ENGINEERING
Name: James K. Mitchell
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Office Phone: 540-231-7351
Name: **Jennifer L. Irish**  
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Office Phone: 540-231-2298  
Fax: 540-231-7532  
E-mail: jirish@vt.edu  
URL: www.coastal.cee.vt.edu  

**Specialty:** Coastal Engineering, Coastal Hazards  
**Expertise:** Storm surge dynamics; extreme-value and forecast statistics; long and short wave dynamics in vegetation; beach, barrier-island, and nearshore morphological response; and impacts of climate change at the coast with emphasis on coastal flooding, damages, and social impacts  
**Examples of Funding Sources:** NSF, U.S. Army Corps of Engineers, U.S. Department of Energy, National Oceanic and Atmospheric Administration Sea Grant Program  

Name: **Heng Xiao**  
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Office Phone: 540-231-0926  
Fax: 540-231-9632  
E-mail: hengxiao@vt.edu  
URL: www.aoe.vt.edu/people/faculty/hengxiao.html  

**Specialty:** Computational Mechanics of Fluids and Particles in Coastal Engineering  
**Applications:** Prediction and mitigation of coastal hazards and their impacts on coastal structures and infrastructure; sediment transport and foundation failure during tsunamis and storm surges; efficiency optimization and environmental impact assessment of wave and tidal farms  
**Expertise:** Fluid dynamics; turbulence modeling; hybrid Large Eddy Simulation/Reynolds-Averaged Navier–Stokes equations
(LES/RANS); sediment transport; wave–soil interactions

Examples of Funding Sources: NSF, Office of Naval Research, Department of Energy

COMMUNICATIONS

Wireless Communications

Name: Jeffrey H. Reed
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Office Phone: 540-231-2972
Fax: 540-231-2968
E-mail: reedjh@vt.edu

Specially: Communications and Signal Processing
Applications: Use of digital signal processing (DSP) in communications for receiver implementation; software radio; cognitive radio; smart antennas; interference rejection; 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, NSF, DARPA, Motorola, Science Applications International Corporation, Texas Instruments, Grayson Wireless, ITT, Southwestern Bell, Army Research Office, Tektronix, Aero Astro, Electronics and Telecommunications Research Institute

COMPOSITES

see also Aerospace Engineering, Bayandor

COMPOSITES

Name: John M. Kennedy
Department: Mechanical Engineering
Office Phone: 540-231-0786
Fax: 540-231-9100
E-mail: jjlc@vt.edu

Specially: Advanced Composites, Mechanics of Advanced Composites, Mechanical Characterization of Materials and Components
Applications: Aircraft and space structures; automotive components

Expertise: Fatigue and fracture of advanced composites; test method design for mechanical components; finite element analysis of structures

Examples of Funding Sources: Department of Energy, NASA, NSF, Office of Naval Research, Veterans Administration

COMPUTATIONAL BIOLOGY

see also Computer Science, Shaffer Optimization, Watson

COMPUTATIONAL BIOLOGY

Name: T.M. Murali
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Office Phone: 540-231-8534
Fax: 540-231-6075
E-mail: murali@cs.vt.edu
URL: www.cs.vt.edu/~murali/

Specially: Computationally-Driven Experimental Biology, Network Biology, Data Mining, Graph Algorithms
Applications: Gene function prediction; pathways perturbed in diseases; infectious diseases; tissue engineering

COMPUTATIONAL BIOLOGY BIOINFORMATICS

Name: Liqing Zhang
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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 CHEMISTRY**
see Catalysis, Xin

**COMPUTATIONAL FLUID DYNAMICS**
see also Transport and Interfacial Phenomena, Qiao

**COMPUTATIONAL FLUID DYNAMICS**
Name: Francine Battaglia
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URL: www.me.vt.edu/fbattaglia
Specialty: Computational Fluid Dynamics, Building Energy, Multi-phase 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: NSF, U.S. Department of Agriculture, U.S. Department of Energy

**COMPUTATIONAL FLUID DYNAMICS**
Name: Christopher J. Roy
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URL: www.aoe.vt.edu/people/faculty/roy.html
Specialty: Computational Fluid Dynamics (CFD), Verification and Validation of Computer Simulations, Numerical Error Estimation and Grid Adaptation, Turbulence Modeling, Large Eddy Simulation, Truck Aerodynamics, Non-equilibrium Hypersonic Flows, Micro-scale 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: CFD; numerical error estimation and adaptivity; bluff-body aerodynamics flows; turbulence modeling and simulation; shock-wave/turbulent boundary layer interactions; CFD for Microelectromechanical Systems

**COMPUTATIONAL FLUID DYNAMICS AND HEAT TRANSFER**
Name: Danesh Tafti
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URL: www.me.vt.edu/hpcfd

**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, Particle Methods

**Applications:** Heat transfer augmentation in mini- and microscale heat exchangers; internal cooling of turbine blades; film cooling of turbine blades; particle based deposition and fouling; cardiovascular bio fluid mechanics; two-phase flows in micronano channels; micro-air vehicles; flapping flight; fluidized beds; carbon capture; nuclear thermal-hydraulics

**Expertise:** 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; particle methods


### COMPUTATIONAL FLUID MECHANICS

**Name:** Anne E. Staples

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**Fax:** 540-231-4574

**E-mail:** aestaples@vt.edu

**URL:** www.esm.vt.edu/~staplesa

**Specialty:** Direct Numerical Simulations (DNS), Biological Fluid Dynamics, Entomological Fluid Dynamics, Computational Multiscale Methods, Numerical Methods, Finite Difference Methods, Large-Eddy Simulation (LES) for Geophysical Flows, Multiscale Modeling of Geophysical Flows, High Performance Computing

**Applications:** Design of biomimetic (insect-inspired) microfluidic devices; design of microscale fluid pumps; cardiovascular flow modeling; ocean basin flow modeling; design of optimal multi-scale algorithms to accelerate isotropic turbulence simulations

**Expertise:** Computational multiscale methods; multiscale turbulence simulations; modeling insect respiratory flows; geometric multiscale models of (human) cardiovascular flows; multiscale methods for geophysics flow computations

**Examples of Funding Sources:** NSF

### COMPUTATIONAL GENOMICS

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**Fax:** 540-231-6075

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**URL:** people.cs.vt.edu/heath/

**Specialty:** Computational Biology and Bioinformatics

**Applications:** RNA-Seq analysis; multimodal models of biological pathways and networks; computational genomics; complex networks; genetic sequence analysis; phylogeny; analysis of signal transduction pathways; viral genomics; genome comparisons

**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:** NSF
COMPUTATIONAL MATERIALS SCIENCE

**see also** Transport and Interfacial Phenomena, Qiao

COMPUTATIONAL MATERIALS SCIENCE

**Name:** Diana Farkas  
**Department:** Materials Science and Engineering  
**Office Phone:** 540-231-4742  
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**E-mail:** diana@vt.edu  
**Specialty:** Computational Materials Science  
**Applications:** Structural materials; nano-scale materials; nuclear materials  
**Expertise:** Metallic materials; intermetallic alloys; nanocrystalline materials; radiation resistant materials; phase transformations; diffusion and kinetics  
**Examples of Funding Sources:** NSF, Department of Energy, Office of Naval Research

COMPUTATIONAL SCIENCE

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**E-mail:** homps@cs.vt.edu  
**URL:** www.cs.vt.edu/~onufriev  
**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:** NSF, NIH

COMPUTATIONAL SCIENCE

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**URL:** www.cs.vt.edu/~asandu  
**Specialty:** Computational Science, High Performance Computing  
**Expertise:** Scientific and engineering computing; numerical methods for ODE, PDE, DAE; solution of inverse problems; uncertainty quantification; parallel computing  
**Examples of Funding Sources:** NSF, NASA, Air Force Office of Scientific Research, National Oceanic and Atmospheric Administration, NIH

COMPUTER-AIDED DESIGN AND MANUFACTURING

**see also** Robotics, Ben-Tzvi

COMPUTER-AIDED DESIGN AND MANUFACTURING

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**URL:** http://www.me.vt.edu/people/faculty/jan-helge-bohn/  
**Specialty:** Computer-Aided Design and Manufacturing, Global Product Development, Collaborative Design and Engineering, Rapid Prototyping, 3-D Printing, Layered Manufacturing, Additive Manufacturing, Software Engineering, Software Integration, Six Sigma, Engineering Education Abroad  
**Applications:** Development of software for advanced CAD/CAM/PLM applications; rapid prototyping and low-volume manufac-
turing using elastomers, fiber composites, and/or integrated electronic components

**Expertise:** Computer-aided geometric modeling; solid modeling; computational geometry; rapid prototyping with advanced engineering materials and components; multi-national engineering curriculum design

**Examples of Funding Sources:** U.S. Navy, U.S. Air Force, DARPA, NASA, NSF, U.S. Department of Education, UVA Medical Center, Baylor College of Medicine, General Motors 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 computing architectures; information security; and trust in computing

**Expertise:** Computer architecture; VLSI design; signal processing; algorithm design

**Examples of Funding Sources:** NSF, DARPA, Office of Naval Research, Air Force Research Laboratory, Harris Corporation

**COMPUTER ENGINEERING**

**Name:** Michael S. Hsiao  
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**Office Phone:** 540-231-9254  
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**E-mail:** mhsiao@vt.edu  
**URL:** www.faculty.ece.vt.edu/mhsiao

**Specialty:** Design, Test, Verification and Diagnosis of Secure and Trustworthy Hardware and Software Systems; Formal and Hybrid Methods for Test and Verification; Video Game Design

**Applications:** Secure software; anti-tamper design; trustworthy hardware; embedded system design and validation; protocol verification; video game design

**Expertise:** Design, analysis, test, verification, and diagnosis of secure and complex digital systems, video game engines

**Examples of Funding Sources:** NSF, Semiconductor Research Corporation, National Institute of Justice, DARPA

**COMPUTER ENGINEERING**

**Low-power, Wearable Computers, Electronic Textiles**

**Name:** Tom Martin  
**Department:** Electrical and Computer Engineering  
**Office Phone:** 540-231-1739  
**Fax:** 540-231-8292  
**E-mail:** tmartin@vt.edu  
**URL:** www.ece.vt.edu/faculty/martin.html

**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: NSF

COMPUTER ENGINEERING
Embedded Systems, Cryptographic Engineering
Name: Patrick Schaumont
Department: Electrical and Computer Engineering
Office Phone: 540-231-3553
Fax: 540-231-3362
E-mail: schaum@vt.edu
URL: www.ece.vt.edu/schaum


Applications: Cryptography and security for embedded applications such as RFID; smart-cards; set-top boxes and sensor nodes; intellectual property protection for embedded applications; hardware acceleration; hardware co-processing for real-time embedded processing

Expertise: Cryptographic implementation of symmetric-key and public-key systems; side-channel resistance measurement and analysis of embedded implementations; hardware/software co-design and co-simulation; system-level modeling and performance evaluation of embedded software and hardware; hardware co-processor design; field-programmable gate array prototyping; physically unclonable functions

Examples of Funding Sources: NSF, National Institute of Standards and Technology, Scientific Research Corporation, Intel Corporation

COMPUTER ENGINEERING
Name: Chao Wang
Department: Electrical and Computer Engineering
Office Phone: 540-231-6904
E-mail: chaowang@vt.edu

Specialty: Formal Verification, Software Verification, Program Analysis, Program Synthesis, SAT Solvers, SMT Solvers, Binary Decision Diagrams, Concurrency, Multicore Programming

Applications: Developing software testing and verification tools; developing hardware testing and verification tools; specification and verification of concurrent systems (hardware, software, and embedded systems)

Expertise: Embedded systems; software engineering; VLSI; design automation; concurrent software; formal methods; software security

Examples of Funding Sources: NSF, Office of Naval Research, Fujitsu Labs of America, Inc.

COMPUTER-GENERATED HOLOGRAPHY
see Holography, Poon

COMPUTER SCIENCE
see also Computer Engineering, Wang

COMPUTER SCIENCE
Name: Godmar Back
Department: Computer Science
Office Phone: 540-231-3046
Fax: 540-231-9218
E-mail: gback@cs.vt.edu

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, Coverity, Inc.

### COMPUTER SCIENCE

**Name:** Yang Cao
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**Office Phone:** 540-231-1417
**Fax:** 540-231-6075
**E-mail:** ycao@cs.vt.edu

**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:** NSF, NIH

### COMPUTER SCIENCE

**Name:** Wu Feng
**Department:** Computer Science, Electrical and Computer Engineering, Health Sciences, and Virginia Bioinformatics Institute
**Office Phone:** 540-231-1192
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**URL:** www.cs.vt.edu/~feng

**Specialty:** High-Performance Computing Systems, Parallel Computing, Distributed Computing, Multi-Core and Many-Core Computing, Autonomic Computing, Green Computing, Supercomputing in Small Spaces, Bioinformatics

**Applications:** Life sciences and biomedical applications; data mining; genome analysis; sequence alignment; molecular dynamics; large-scale computational simulations; computer science education for K-12; energy-efficient applications; Green500 List

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


### COMPUTER SCIENCE

**Name:** Edward A. Fox
**Department:** Computer Science
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**Home Phone:** 540-552-8667
**Fax:** 540-231-6075
**E-mail:** fox@vt.edu
**URL:** fox.cs.vt.edu

**Specialty:** Digital Libraries, Information Storage and Retrieval, Machine Learning, Multimedia, Hypermedia, Hypertext, Knowledge Management, Computing Education

**Applications:** Search engines; libraries; information systems; Web archiving; crisis/disaster recovery; education; internet expertise: annotation; content-based image retrieval; classification; clustering; collaborative filtering; computational linguistics; computer/server log analysis; computing curriculum; concept
maps; crisis response; cross-language retrieval; data management; digital libraries/curation/preservation; digital video; digitization; distributed processing; 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; natural language processing; open archives; personalization; preservation; quality metrics; query splitting; ranking; recommender systems; reiki; relevance feedback; scenarios; schema mapping; social networks; 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 Institute of Justice, NIH, NSF, U.S. Department of Education

**COMPUTER SCIENCE**

**Name:** Chang-Tien Lu  
**Department:** Computer Science  
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**Specialty:** Spatial Databases, 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:** NSF, U.S. Department of Defense, DARPA, U.S. Army Research Laboratory, Missile Defense Agency, Department of Transportation, Federal Highway Administration, Virginia Department of Transportation, NIH, Census Bureau, U.S. Geological Survey, U.S. Environmental Protection Agency

**COMPUTER SCIENCE**

**Name:** Cliff Shaffer  
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**URL:** www.cs.vt.edu/~shaffer

**Specialty:** Digital Education, Visualization and Simulation for Education, Hierarchical Data Structures, Algorithm Visualization

**Applications:** Bioinformatics; geographic information systems; computer graphics; computational biology; training and education

**Expertise:** Computational biology, problem solving environments, distance education; visualization for simulation and modeling; algorithm design and analysis; data structures

**Examples of Funding Sources:** NSF, NIH, DARPA, NASA, Fund for the Improvement of Post-Secondary Education

**COMPUTER SECURITY**

see Software Engineering, Ryder
Software Systems, Kafura

**COMPUTER SYSTEMS**

see Computer Science, Feng
Power Electronics, Lee
COMPUTERS
see also Computer Science, Feng, Fox
Optimization, Sherali

COMPUTERS
Network and Computer Security, VLSI Circuit Design

Name: Joseph G. Tront
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Office Phone: 540-231-5067
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E-mail: jgtront@vt.edu
Specially: Secure Communications, Intrusion Detection, Intrusion Protection, Testable Designa and Fault-Tolerant Architectures, Microprocessors, Multimedia
Applications: Hardware and software solutions for secure systems; special purpose integrated circuit design; built-in self-testing integrated circuits; application-specific integrated circuits; electromagnetic compatibility issues in integrated circuits; embedded microprocessor applications; use of advanced educational technology in the classroom; synchronized streaming media presentations; handheld devices for educational applications
Expertise: Cybersecurity education; use of CAD tools to design and develop integrated circuits for vendor specific applications; fabrication using silicon foundries; functional testing in-house; development of CAD tools for use in integrating testability into integrated circuit designs; development of customized microprocessor-based systems; development of multimedia tools for education; network security
Examples of Funding Sources: Naval Research Labs, NSF, General Electric, NASA, Office of Naval Research

COMPUTER VISION
see also Machine Learning, D. Batra

COMPUTER VISION
Name: Lynn Abbott
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Office Phone: 540-231-4472
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URL: www.ece.vt.edu/faculty/abbott.html
Specialty: Computer Vision, Image Processing
Applications: Manufacturing automation, especially in the areas of industrial inspection and robotics; biometrics, such as face recognition and fingerprint analysis; navigation for autonomous vehicles; medical image analysis; and remote sensing, often involving satellite imagery
Expertise: Stereo range estimation and surface reconstruction; fingerprint image quality human face detection; industrial inspection, including detection of defects in wood; special-purpose computer architectures for image processing; detection of explosives in x-ray images
Examples of Funding Sources: National Institute of Justice, NSF, Federal Aviation Administration, NASA, U.S. Department of Agriculture Forest Service, BAE Inc., American Woodmark Corporation

COMPUTER VISION
Name: Devi Parikh
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Office Phone: 540-231-6714
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Specially: Semantic Image Understanding, Visual Recognition, Human Computation
Applications: Intelligence; surveillance; autonomous vehicles; image search; personal photo organization; manufacturing automation

Expertise: Detecting and recognizing objects in images; recognizing scenes; detecting properties of objects and scenes; human-machine communication; contextual reasoning; data fusion; ensemble of classifiers; crowd sourcing

Examples of Funding Sources: NSF, Office of Naval Research, DARPA, Intelligence Advanced Research Projects Activity, Google, Microsoft

COMPUTING

see Computer Science, Fox
Computer and Communications Engineering, Athanas Networking and Computing, Chen

CONCRETE

see Bridge Design, Roberts-Wollmann

CONSTRUCTION

see Human Factors Engineering / Ergonomics, Kleiner

CONSTRUCTION ENGINEERING AND MANAGEMENT

Project Controls; Infrastructure Asset Management

Name: Jesús M. de la Garza
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E-mail: chema@vt.edu

Specialty: Project Controls and Infrastructure Asset 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 industry; developed models for Virginia DOT regarding the impact of deferring maintenance on highways which enables the formulation, simulation, and assessment of policies for Interstate highway maintenance; developed models for wireless communications and computing technology at the jobsite

Expertise: Information technology; planning and scheduling; forensic schedule analysis; project controls; technology transfer; public-private partnerships; highway maintenance management

Examples of Funding Sources: NSF, Virginia Department of Transportation, Construction Industry Institute

CONSTRUCTION ENGINEERING AND MANAGEMENT

Name: Tripp Shealy
Department: Civil and Environmental Engineering
E-mail: tshealy@vt.edu

Specialty: Decision Making for Sustainable Infrastructure
Applications: Rating systems for sustainability, building codes, design and construction methods at the community-scale, multi-stakeholder infrastructure planning, disaster mitigation and risk-analysis

Expertise: Behavioral science, data mining, education for sustainability

Examples of Funding Sources: NSF, Federal Emergency Management Agency

CONSTRUCTION ENGINEERING AND MANAGEMENT

Name: John E. Taylor
Department: Civil and Environmental Engineering
Office Phone: 540-231-0972
Name: William T. Baumann  
Department: Electrical and Computer Engineering  
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E-mail: baumann10@vt.edu  
URL: www.ece.vt.edu/faculty/baumann.html  
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: NIH, U.S. Department of Energy, Office of Naval Research  

CONTROL SYSTEM SECURITY  
Name: Cameron D. Patterson  
Department: Electrical and Computer Engineering  
Office Phone: 540-231-8397  
Fax: 540-231-3362  
E-mail: cdp@vt.edu  
Applications: Supervisory control and data acquisition systems; cyber-physical systems; autonomous systems; internet of things; resilience to malware in embedded system firmware and third-party IP  
Expertise: Formal verification; hardware/software partitioning; field programmable gate array technology; trusted reconfigurable computing; architecture extensions for secure computing; root-of-trust synthesis; platform- and model-based design; high performance embedded computing  
Examples of Funding Sources: NSF, DARPA, Air Force Research Laboratory, Army Research Laboratory, Missile Defense Agency  

CONTROL THEORY  
see also Autonomous Systems, Stilwell
CONTROL THEORY

Name: Craig A. Woolsey
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Office Phone: 540-231-8117
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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: Nonlinear control of mechanical systems; vehicle dynamic modeling; data filtering/state estimation
Examples of Funding Sources: NSF, Office of Naval Research, U.S. Air Force Office of Scientific Research, NASA

CONTROL THEORY / AUTONOMOUS SYSTEMS

Name: Mazen Farhood
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Office Phone: 540-231-2983
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URL: www.aoe.vt.edu/~farhood
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: NSF, Office of Naval Research, U.S. Air Force Office of Scientific Research

CORROSION CONTROL

Name: Marc A. Edwards
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Office Phone: 540-231-7236
Fax: 540-231-7916
E-mail: edwardsm@vt.edu
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, NSF

CRASH SAFETY

see Biomechanics, Gabler

CYBERPHYSICAL SYSTEMS

see Robotics, Tokekar

CYBER SECURITY

Name: Danfeng (Daphne) Yao
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Office Phone: 540-231-7787
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URL: www.cs.vt.edu/~danfeng/
Applications: Computer and network integrity analysis; operating system design; computer forensics; detection of malicious software; enterprise security; securing autonomous robots and their communications; physical security and personal privacy

Expertise: Human-behavior based malware detection; device and hardware based security; data loss prevention; cloud-computing security; security analysis on network protocols and system designs; security analysis of cryptography protocols

Examples of Funding Sources: NSF, Army Research Office, Department of Homeland Security, Institute for Critical Technology and Applied Science, Office of Naval Research

DAM ENGINEERING

see Geotechnical Engineering, Brandon, Duncan, Fitiz, Green

DAMAGE SCIENCE AND MECHANICS

see also Aerospace Engineering, Bayandor

DAMAGE SCIENCE AND MECHANICS

Name: John C. Duke, Jr.
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-6063
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URL: www.beam.vt.edu/duke

Specially: Research, Development and Application of Structural Health Monitoring (SHM) and Nondestructive Evaluation (NDE); Research, Development and Application of all Forms of Energy for Materials Characterization

Applications: SHM and NDE for preservation of: transportation structures, service induced deterioration, precursor damage, subsequent critical damage for metal alloys components and structures, induced deterioration, precursor damage, transitions of precursor damage to critical damage of composite materials and structural components; ultrasound interaction with multilayer polymer sheets, thermal monitoring of mechanical mean and cyclic stresses and changes associated with damage

Expertise: Identification of appropriate measurement approaches and the integration of equipment, instrumentation, and software for accomplishing difficult measurement tasks


DATA ANALYTICS

Name: Naren Ramakrishnan
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Specially: Data Analytics and Data Mining

Applications: Intelligence analysis; sustainability; systems biology; health informatics; text mining; literature-based discovery

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: Intelligence Advanced Research Projects Activity, NSF, Department of Homeland Security, NIH, National Endowment for the Humanities, US Army, DARPA, Office of Naval Research, General Motors, HP Labs, NEC Laboratories America, Advance Auto Parts
Databases
see Computer Science, Lu

Data Mining
see also Advanced Manufacturing, Kong
Optimization, Watson

Data Mining
Name: B. Aditya Prakash
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Office Phone: 540-231-0906
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E-mail: badityap@cs.vt.edu
Specialty: Data Mining, Applied Machine Learning and Databases
Applications: Epidemiology and public health; social media and the web; wired/wireless networking and cyber security
Expertise: Extracting knowledge from massive datasets (especially networks and time-series); design, analysis and implementation of models and algorithms for real-world systems and datasets; general database management for applications
Examples of Funding Sources: NSF, Symantec Corp., National Endowment for Humanities, National Security Agency, Facebook

Decision Making
see Construction Engineering and Management, Shealy
Optimization, Sherali

Decision Making in Organizations, Complex Systems
see also Systems Engineering, Salado

Decision Making in Organizations, Complex Systems and Healthcare
Name: Christian Wernz
Department: Industrial and Systems Engineering
Office Phone: 540-231-9772
Home Phone: 540-553-1657
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E-mail: cwernz@vt.edu
Applications: Health care; hospital management; medical technologies; health information technology; manufacturing and service enterprise systems; systems engineering
Expertise: Applied and theoretical research on socio-technical systems, e.g., U.S. health care system, accounting for interactions between decision-maker across multiple organizational, temporal and data scales to determine optimal decisions and efficient and effective incentives and organizational structures
Examples of Funding Sources: NSF, Agency for Healthcare Research and Quality (AHRQ), Harvey L. Neiman Health Policy Institute of the American College of Radiology, Carilion Clinic, Rolls-Royce

Decision Making under Uncertainty
see Investment, Bish

Desalination
see Fluid-Structure Interaction, Boreyko

Design
see Engineering Education, Goff
DIGITAL EDUCATION
see Computer Science, Shaffer

DIGITAL SIGNAL PROCESSING
Name: A.A. (Louis) Beex
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Fax: 540-231-3362
E-mail: beex@vt.edu
URL: www.ece.vt.edu/faculty/beex.html; www.dsprl.ece.vt.edu/
Specialty: Stochastic and Adaptive Digital Signal Processing
Applications: Design of an acoustic communications system for operation in a severe multipath and Doppler environment; analysis and advantageous usage of nonlinear effects in adaptive filters; robust speaker identification and verification; automatic dialect identification; robust speech coding; adaptive interference mitigation; localization and characterization of sources using sensor arrays and/or networks; beam forming using adaptive coupled nonlinear oscillator arrays; analysis of electro-encephalographic signals for the design of detectors for the existence of specific conditions; prototype development for signal processing solutions; design and performance enhancement of systems operating in a varying, not completely known environment
Expertise: Spectral analysis and modeling; digital filter design; identifier structure analysis; image representation, coding, and reconstruction; sensor array signal processing; robust digital communication system design for noisy time-varying environment
Examples of Funding Sources: NSF, Power FingerPrinting Inc., SPAWAR Systems Center San Diego, AUSGAR Technologies Inc., Office of Naval Research

DIGITAL SIGNAL PROCESSING
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Specialty: Low-Power Uses
Applications: Low-power biomedical implantable devices; low-power environmental/structural and other types of monitoring; low-power digital signal processing including image processing; trust worthy embedded applications such as RFID's, smartcards, 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 sub threshold voltage operation
Examples of Funding Sources: NSF

DISTANCE LEARNING
see Instructional Technology, Scales

DISTRIBUTION
see Logistics, Ellis

DREAMING
see Brain-Inspired Computer Architecture, Paul

DRUG DELIVERY
see Biomechanics, De Vita
Fluid Dynamics, Jung
Polymer and Colloid Chemistry, Davis
DRUG DESIGN

see Computer Science, Feng

Optimization, Watson

DURABILITY

see Infrastructure Performance, Flint

Mechanics of Materials, Dillard

DYNAMICS

see Aerospace Engineering, Sultan

Fluid Mechanics, Stremler

DYNAMICAL SYSTEMS

Name: Nicole Abaid
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Specialty: Distributed Systems, Nonlinear Dynamics and Control, Robotics, Swarming

Applications: Dynamics and control of multi-vehicle robotic teams; synchronization and consensus in dynamical systems; animal-robot interactions

Expertise: Network theory; modeling and data-driven analysis of collective behavior; animal-robot interactions; stochastic systems

Examples of Funding Sources: NSF, Office of Naval Research

DYNAMICS AND CONTROL

see also Robotics, Ben-Tzvi

DYNAMICS AND CONTROL

Name: Steve C. Southward
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URL: www.me.vt.edu/people/faculty/southward.html; www.me.vt.edu/cvess/PERL/index.php

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: Fuel injector control and engine knock signal processing; vehicle primary suspensions; magneto-rheological fluid devices; n-post shaker rig testing; driving simulator testing; quarter-vehicle testing; human-in-the-loop 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 Tank-Automotive and Armaments Command, Association of American Railroads, Virginia Tobacco Indemnification Commission

DYNAMICS, VIBRATIONS, CONTROLS

see also Nonlinear Dynamics and Control, Ross
DYNAMICS, VIBRATIONS, CONTROLS
Name: Scott L. Hendricks
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-7154
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E-mail: hndrxsl@vt.edu
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 also Structural Engineering, Eatherton, Charney Geotechnical Engineering, Filz, Green, Ziotopoulou, Rodriguez-Marek

EARTHQUAKE ENGINEERING
Name: Roberto Leon
Department: Civil and Environmental Engineering
Office Phone: 540-231-7408
Fax: 540-231-7532
E-mail: rleon@vt.edu
Specialty: Seismic Design; Steel Structures; Composite Steel-Concrete Structures; Structural Testing
Applications: Design and retrofit of buildings, bridges, and building-like structures
Expertise: Development of structural members and connections; structural testing and instrumentation; post-earthquake investigations
Examples of Funding Sources: NSF, Federal Highway Administration

ECOLOGICAL ENGINEERING
Name: Theresa (Tess) Wynn Thompson
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URL: www.bse.vt.edu/people_tenure-track/thompson-theresa.html
Specialty: Stream and Wetland Restoration, Streambank Erosion, Watershed Management, 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 storm water management; hydrology
Examples of Funding Sources: NSF, U.S. Environmental Protection Agency, U.S. Department of Agriculture, Virginia Department of Conservation and Recreation

ELECTRIC POWER
Name: Robert Broadwater
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Office Phone: 540-231-3771
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E-mail: dew@vt.edu

**Specialty:** Integrated Modeling and Analysis of Electric Power Transmission, Radial Distribution, and Networked Distribution Systems 

**Applications:** Multi-million node, multi-phase power system models that interface to customer and system measurements; distributed power flow solutions; design over time varying load patterns for best economic decisions; analysis of the effects of electric vehicle and distributed energy resource adoption; IEEE 1547 impact analysis of distributed energy resource adoption; Monte Carlo analysis of electric power system reliability

**Expertise:** Object-oriented analysis; generic programming and analysis


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**ELECTRIC VEHICLES**  
*see Automotive Powertrains, Nelson*

**ELECTROCHEMICAL ENGINEERING**  
*see Transport and Interfacial Phenomena, Qiao*

**ELECTROMAGNETICS**  
*see also Energy Conversion Systems, Odendaal*

**ELECTROMAGNETICS**

**Name:** Majid Manteghi  
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**Office Phone:** 540-597-7710  
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**E-mail:** manteghi@vt.edu

**Specialty:** Antennas and Microwave 

**Applications:** Radio frequency circuit and systems; radiation and propagations mechanism; antennas; microwave circuits and systems; radio frequency identification (RFID) circuits and systems

**Expertise:** Nonlinear and time variant antennas; small antennas; ultra wideband antennas; target identification techniques; chipless radio-frequency identification; wireless power transfer; phased array; implanted antennas and wireless power transfer systems

**Examples of Funding Sources:** NSF, Intel Corp, Center for Advanced Engineering Research, FBI

**ELECTRONIC TEXTILES**  
*see Computer Engineering, Martin*

**ELECTRONICS**  
*see also Semiconductor Materials and Devices, Guido*

**ELECTRONICS**

**Name:** Masoud Agah  
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**Office Phone:** 540-231-2653  
**Fax:** 540-231-2978  
**E-mail:** agah@vt.edu

**Specialty:** Microelectromechanical Systems (MEMS) 

**Applications:** Environmental monitoring; biomedicine; homeland security

**Expertise:** Microfluidics; miniaturized analytical chemistry; microfabrication technologies; biomedical microdevices; microelectrode assays; nanotechnology; biophysics of living cells
Examples of Funding Sources: NSF, NIH, DARPA, National Institute of Occupational Safety and Health

**ELECTRONICS**

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E-mail: ha@vt.edu  
URL: www.mics.ece.vt.edu  

Specialty: Analog and RF Integrated Circuits (ICs) and Systems  
Applications: Energy harvesting; power management ICs (PMICs); high temperature RF ICs and systems for down hole communications for oil/gas drilling, jet engines, and spacecraft; high speed optical communications; wireless sensor nodes  

Expertise: Low-power analog and RF IC design; power management ICs and circuits for energy harvesting; power management ICs; high temperature RF IC and circuit design; high speed IC and circuit design for optical communications; low-power analog and RF ICs and systems design for virtually all applications and frequently fabricates test chips  

Examples of Funding Sources: ETRI (Korea), Ford Motors, Texas Instruments, NASA, NSF, Pratt & Whitney, Semiconductor Research Corporation

**ENERGY**

see also Biomass Harvest, Storage, and Delivery, Grisso  
Computational Fluid Dynamics, Battaglia  
Structures and Materials, Lesko  
Transportation, Rakha

**ENERGY**

Heat Transfer  

Name: T.E. Diller  
Department: Mechanical Engineering  
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Home Phone: 540-951-0933  
Fax: 540-231-9100  
E-mail: tdiller@vt.edu  
URL: www.me.vt.edu/MENewSite/Faculty/Diller/diller.html

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: NSF, NASA, Air Force Office of Scientific Research, Whitaker Foundation, NIH, Department of Energy, Sandia National Labs

**ENERGY**

Name: Vassilis Kekatos  
Department: Electrical and Computer Engineering  
Office Phone: 540-231-1672  
Fax: 540-231-3362  
E-mail: kekatos@vt.edu


Applications: Monitoring; renewable energy management; data centers; electric vehicles; microgrids; smart grid big data; optimal power flow

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Expertise: Algorithmic solutions targeting power system problems related to monitoring, management, control, and learning

Examples of Funding Sources: NSF, Department of Energy

ENERGY
Electric Power, Renewables, Smart Grids, Energy Efficiency
Name: Saifur Rahman
Department: Electrical and Computer Engineering
Office Phone: 571-858-3301
Home Phone: 703-734-6948
E-mail: srahman@vt.edu
URL: www.saifurrahman.org
Specialty: Smart Grids, Energy Efficiency, Renewables, Climate Change, and Critical Infrastructures
Applications: Distributed energy sources modeling and evaluation; the smart grid; climate change issues; critical infrastructure modeling and assessment
Expertise: Analysis and design of power, telecom, and internet services for remote areas; analysis of greenhouse gas emission mitigation alternatives; uncertainty and risk assessment; evaluation of alternative energy systems; microgrid development

ENERGY AND MATERIALS
see also Mechanics of Materials, Case

ENERGY AND MATERIALS
Name: Ranga Pitchumani
Department: Mechanical Engineering
Office Phone: 540-231-1776
Fax: 734-423-0683
E-mail: pitchu@vt.edu
URL: www.me.vt.edu/amtl
Applications: Research in the Advanced Materials and Technologies Laboratory focuses on issues pertaining to the design and manufacturing science of advanced materials; developing an understanding of the complex physical phenomena governing their fabrication through theoretical and experimental investigations; practical process development, design, optimization, and control
Expertise: Computational modeling; prototype processing; materials characterization; property measurements; experimental facilities for variety of fabrication, testing, control, and verification

ENERGY CONVERSION SYSTEMS
Name: Willem G. Odendaal
Department: Electrical and Computer Engineering
Office Phone: 540-231-6560
E-mail: wgo@vt.edu
URL: www.ece.vt.edu/faculty/odendaal.php
Specialty: Energy Conversion Systems
Applications: Navy Electromagnetic Launcher (Railgun); radar; lasers; masers; transformers; inductors; power converters; alternative energy; energy harvesting; secure sustainable environment; characterization; computer-aided design
Expertise: Pulse-power electronics; energy conversion; power electronics; EMI/EMC; low-frequency electromagnetics; electromagnetics; thermodynamics; thermal management
Examples of Funding Sources: Office of Naval Research, Naval Surface Warfare Center at Dahlgren, Navy Engineering Education Center, NSF

ENERGY HARVESTING
see Electronics, Ha
Multifunctional Materials and Systems, Priya
Nonlinear Dynamics, Hajj
Thermal Management, Ekkad

ENERGY MANAGEMENT
see Fluids and Acoustics, Ng

ENERGY STORAGE
see also Transport and Interfacial Phenomena, Qiao

ENERGY STORAGE CONVERSIONS
Name: Celine Hin
Department: Materials Science and Engineering and Mechanical Engineering
Office Phone: 540-231-1924
E-mail: celhin@vt.edu
Specialty: Materials Science and Engineering
Applications: Li-ion batteries; nanostructured materials for thermoelectric devices; materials for fusion and generation IV fission reactor systems, insulating materials
Expertise: Physical metallurgy; behavior of materials under extreme environments; statistical physics; physics; thermoelectric properties; electrochemistry; and the development of analytical and numerical models
Examples of Funding Sources: Air Force, Department of Energy-Nuclear Energy University Program, Oak Ridge National Laboratory, Institute for Critical Technology and Applied Science

ENERGY SYSTEMS
see also Automotive Powertrains / Energy Systems, Nelson

ENERGY SYSTEMS
Name: Alan A. Kornhauser
Department: Mechanical Engineering
Office Phone: 540-231-7064
Home Phone: 540-552-9028
Fax: 540-231-9100
E-mail: alkorn@vt.edu
URL: www.me.vt.edu/people/faculty/kornhauser.html
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
Cloud Computing, Power Systems, Renewable Energy

Name: Kwa-Sur Tam
Department: Electrical and Computer Engineering
Office Phone: 540-231-4448
E-mail: ktam@vt.edu


Applications: Solar power forecasting; wind power forecasting; electric load forecasting; economics of plug-in hybrid electric vehicles and distributed generation; cloud computing applications; monitoring and analysis of complex systems

Expertise: Forecasting of solar and wind power; cloud computing; economic analysis; uncertainty analysis; electric load forecasting; system modeling and analysis

Examples of Funding Sources: NSF, Microsoft Corporation, Northrop Grumman Corporation

ENGINEERING DESIGN
see also Transportation, Rakha

NAME: Robert H. Sturges, Jr., P.E.
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Home Phone: 540-951-4898
Fax: 540-231-3322
E-mail: sturges@vt.edu

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


ENGINEERING EDUCATION
see also Computer Science, Shaffer Machine Health Monitoring, Kasarda Motivation, Matusovich

NAME: Stephanie G. Adams
Department: Engineering Education
Office Phone: 540-231-6555
Fax: 540-231-6903
E-mail: sgradams@vt.edu

Specialty: Engineering Education, Teamwork, Graduate Student and Faculty Development, International Education, Broadening Participation and Quality Control/Management

Applications: Engineering education and manufacturing

Examples of Funding Sources: NSF
ENGINEERING EDUCATION
Name: Diana Bairaktarova
Department: Engineering Education
Office Phone: 540-231-3645
Fax: 540-231-6903
E-mail: dibairak@vt.edu
Specialty: Experiential Learning, Mechanical Objects and the Engineering Learner, Design Thinking, Human-centered Design, Empathic Design, Motivation and Abilities, Pedagogies of Engagement, Engineering Ethics, Industry Engagement
Applications: Curriculum development, engineering education research, design education, student retention and placement, student-centered education
Expertise: Engineering education, interactive engineering design graphics, design for innovation
Examples of Funding Sources: NSF, Engage Engineering, Center for Teaching Excellence

ENGINEERING EDUCATION
Name: Richard M. Goff
Department: Engineering Education
Office Phone: 540-231-9537
Fax: 540-231-6903
E-mail: richgoff@vt.edu
Specialty: Co-Director of the Center for e-Design, Engineering Course Development, Engineering Design, Design Education Research, Motorcycle Fuel Economy Research, Electric Transportation, Mechanical Testing
Applications: Designing and teaching engineering design courses at all levels; teaching design in engineering practice; mechanical testing of materials and composites; motorcycle streamlining and fuel economy
Expertise: Course development; teaching engineering and design; design team management; mechanical testing to ASTM standards; engineering educational research; research in streamlining motorcycle fuel economy and electric vehicles
Examples of Funding Sources: NSF, Commonwealth Commercialization Research Fund

ENGINEERING EDUCATION
Name: David B. Knight
Department: Engineering Education
Office Phone: 540-231-2563
Fax: 540-231-6903
E-mail: dbknight@vt.edu
Applications: Educational research; designing teaching and learning improvements; curriculum development; assessment; evaluation; organizational change
Expertise: Quantitative research methods; survey research; organizational theory
Examples of Funding Sources: NSF

ENGINEERING EDUCATION
Name: Walter C. Lee
Department: Engineering Education
Office Phone: 540-231-3234
Fax: 540-231-6903
E-mail: walterl@vt.edu
Specialty: Student Retention, Co-curricular Support, Broadening Participation
Applications: Program evaluation, educational research, student...
support

**Expertise:** Designing/evaluating student interventions, qualitative research methods

**Examples of Funding Sources:** NSF

### ENGINEERING EDUCATION

**Name:** Vinod K. Lohani  
**Departments:** Engineering Education and Civil and Environmental Engineering  
**Office Phone:** 540-231-9545  
**Fax:** 540-231-6903  
**E-mail:** vlohani@vt.edu  
**URLs:** www.enge.vt.edu and www.lewas.centers.vt.edu

**Specialty:** Engineering Education, Hydrology and Water Resources, Interdisciplinary Research, International Collaboration

**Applications:** Real-time water and weather monitoring system; introduction of sustainability concepts and design experiences at freshman level; reformulations of engineering curriculum using educational theories; assessment in engineering education; technology (Tablet PCs/dyknow) integration in engineering instruction; undergraduate research in interdisciplinary water sciences and engineering; knowledge maps; Internationalization of engineering courses; design of study abroad experiences and international collaboration in engineering education

**Expertise:** Real-time environmental monitoring; engineering education research; hydrologic modeling

**Examples of Funding Sources:** NSF, U.S. Environmental Protection Agency, U.S. Department of Education, Virginia Water Resources Research Center

### ENGINEERING EDUCATION

**Name:** Marie C. Paretti  
**Department:** Engineering Education  
**Office Phone:** 540-231-1812  
**E-mail:** mparetti@vt.edu  
**URL:** www.enge.vt.edu/paretti

**Specialty:** Design Education; Gender, Race, Class, and Identity in Engineering Education; Engineering Communication; Teamwork and Collaboration in Engineering; Interdisciplinarity

**Applications:** Engineering courses and programs

**Expertise:** Design education; gender, race, class, and identity in engineering education; engineering communication; teamwork and collaboration; interdisciplinary collaboration; assessment

**Examples of Funding Sources:** NSF

### ENVIRONMENT

**see also** Air Pollution, Marr  
**Transportation, Rakha**

### ENVIRONMENT

**Industrial Waste Management, Water and Wastewater Treatment, Toxicology**

**Name:** Gregory D. Boardman  
**Department:** Civil and Environmental Engineering  
**Office Phone:** 540-231-1376  
**Fax:** 540-231-7916  
**E-mail:** gboard@vt.edu

**Specialty:** Industrial Waste Management, Water and Wastewater Treatment, Water Conservation and Reuse, Environmental Toxicology

**Applications:** Developing operations and systems for the management of waste liquids and solids; 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 physicochem-
ical and biological systems; evaluation of toxicity; developing short-term methods for the early assessment of toxicity

Examples of Funding Sources: Hampton Roads Sanitation District, National Energy Technology Laboratory, U.S. Environmental Protection Agency, Virginia Department of Environmental Quality, Virginia Department of Health

ENVIRONMENT

Environmental Engineering

Name: Andrea M. Dietrich
Department: Civil and Environmental Engineering
Office Phone: 540-231-5773
Fax: 540-231-7916
E-mail: andread@vt.edu

Specialty: Water Quality and Water Treatment with Focus on Health and Aesthetic Issues

Applications: Drinking water treatment; sensory analysis of drinking water; consumer-related water quality issues; premise plumbing; interdisciplinary research that integrates technology, science, and society

Expertise: Water quality; sensory (taste, odor, color) analyses of water; fate, transport, and toxicity of contaminants

Examples of Funding Sources: Water Research Foundation, NSF, Virginia Department of Health

ENVIRONMENT

Water and Wastewater Treatment

Name: Zhen He
Department: Civil and Environmental Engineering
Office Phone: 540-231-1346
Fax: 540-231-7916
E-mail: zhenhe@vt.edu

Specialty: Environmental Engineering, Wastewater Treatment, Water Desalination

Applications: Recovery of bioenergy and value-added products from wastewater; anaerobic treatment of domestic wastewater and sludge; energy-efficient wastewater treatment or water desalination by using bioelectrochemical systems such as microbial fuel cells or microbial desalination cells; groundwater remediation

Expertise: Environmental biotechnology; biological wastewater treatment; bioelectrochemical systems

Examples of Funding Sources: NSF, Qatar National Research Fund, Binational Agricultural Research and Development Fund, Veolia Water, Gannett Fleming

ENVIRONMENT

Name: W. Cully Hession
Department: Biological Systems Engineering
Office Phone: 540-231-9480
URL: www.bse.vt.edu/people/tenure-track/hession-cully.html

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: NSF, U.S. Environmental Protection Agency-STAR, U.S. Department of Agriculture-Forest Service and Agricultural Research Service, Virginia Department of Conservation and Recreation
ENVIRONMENT

Water and Wastewater Treatment

Name: William R. Knocke
Department: Civil and Environmental Engineering
Office Phone: 540-231-6635
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E-mail: knocke@vt.edu

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: NSF, U.S. Environmental Protection Agency, U.S. Department of the Interior, DuPont Chemical, General Chemical, NALCO Chemical Company, Union Camp

ENVIRONMENT

Name: John C. Little
Department: Civil and Environmental Engineering
Office Phone: 540-231-0836
E-mail: jcl@vt.edu

Specialty: Environmental Transport Processes

Applications: Lake and reservoir management; emissions from building materials and consumer products; migration of chemicals through plastic pipes; environmental exposure and risk assessment

Expertise: Evaluating strategies to improve water quality in lakes and reservoirs using oxygenation systems; evaluating sediment oxygen demand; developing a mechanistic understanding of sources of indoor air pollution; developing reference materials for emissions testing; quantifying exposure to chemical contaminants in drinking water

Examples of Funding Sources: Environmental Protection Agency, National Institute of Standards and Technology, NSF

ENVIRONMENTAL ENGINEERING

Name: Amy Pruden
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Fax: 540-231-7816
E-mail: apruden@vt.edu
URL: www.cee.vt.edu/people/pruden.html

Specialty: Characterizing the Microbial Ecology of Engineered and Natural Water Systems in Order to Better Inform Design, Operation, and Monitoring

Applications: Microbiology of the built environment; monitoring of emerging and opportunistic pathogens such as antibiotic resistance genes and legionella pneumophila in water systems; antibiotic resistance on farms and in produce; antibiotic resistance genes in recycled water; environmental implications of nanotechnology

Expertise: Environmental biotechnology


ENVIRONMENTAL FLUID HYDRAULICS

see Environmental Hydraulics, Strom
ENVIRONMENTAL HYDRAULICS
Name: Kyle Strom
Department: Civil and Environmental Engineering
Office Phone: 540-231.0979
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E-mail: strom@vt.edu
URL: http://www.strom.cee.vt.edu
Specialty: Hydraulic Engineering, Fluvial Geomorphology, Environmental Fluid Mechanics
Applications: Predicting water and sediment movement and landform change in rivers, deltas, reservoirs, estuaries, and submarine fans over short (seconds) and large (100s of years) time-scales
Expertise: Sediment transport, river mechanics, stratified flows, particle-particle interactions, mountain streams, estuaries, cohesive mud transport, experimental methods
Examples of Funding Sources: ExxonMobil Upstream Research Company, Petroleum Research Fund, Texas Water Development Board, Texas Department of Transportation, U.S. Department of Agriculture

ENVIRONMENT, ENVIRONMENTAL HYDRAULICS
Name: Erich T. Hester
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Office Phone: 540-231-9758
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URL: www.flow.cee.vt.edu
Specialty: Hydrology, Hydraulics, Groundwater, Ecology, Restoration of Streams, Rivers, and Wetlands
Applications: Stream, river, and wetland restoration design; environmental sustainability of watershed management; modeling of water flow and pollutant transport in streams, rivers, wetlands, and groundwater; water flow and solute transport in Appalachian surface coal mine lands
Expertise: Interdisciplinary studies relating hydrology, hydraulics, water quality, and ecological health in streams, rivers, and wetlands; modeling and measuring surface water-groundwater (hyporheic exchange) in streams, rivers, and wetlands; heat and pollution migration in streams, rivers, wetlands, and groundwater; quantifying environmental sustainability of water management practices; improving stream, river, and wetland restoration design and watershed planning
Examples of Funding Sources: NSF, Wells Fargo & Company

ENVIRONMENT AND NANOTEchnology
Name: Peter Vikesland
Department: Civil and Environmental Engineering
Office Phone: 540-231-3568
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E-mail: pvikes@vt.edu
URL: www.cee.vt.edu/people/pvikes.html
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 Associa-
tion Research Foundation, NSF, Virginia Water Resources Research Center, U.S. Environmental Protection Agency

**Epidemiology**
see Data Mining, Prakash

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

**Ergonomics**
Name: Michael J. Agnew
Department: Industrial and Systems Engineering
Office Phone: 540-231-0083
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E-mail: mjagnew@vt.edu
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

Name: Maury A. Nussbaum
Department: Industrial and Systems Engineering
Office Phone: 540-231-6053
Fax: 540-231-3322
E-mail: nussbaum@vt.edu
URL: www.ise.vt.edu/nussbaum
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 and obesity; assessment and control of slip/trip/fall risks; 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

**Estimation Theory**
see Autonomous Systems, Stilwell

**Falls**
see Materials, Pickrell

**Fatigue and Fracture**
see Structural Engineering, Hebdon

**Fiber Optics**
see Photonics, Wang
Materials, Pickrell

**File and Storage Systems**
Name: Ali R. Butt
Department: Computer Science
Office Phone: 540-231-0489
E-mail: butta@vt.edu
URL: people.cs.vt.edu/~butta/
Applications: Large scale storage management for HPC applications
Expertise: Systems and applications input and output modeling and performance tuning; input and output subsystem analysis; operating system optimizations
Examples of Funding Sources: NSF, Oak Ridge National Laboratory, Department of Energy Office of Science

FINITE ELEMENT METHOD
see also Aerospace Engineering, Bayandor

FINITE ELEMENT METHOD / COMPUTATIONAL MECHANICS / SOFT MATERIALS
Name: Romesh C. Batra
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-6051
Fax: 540-231-4574
E-mail: rbatra@vt.edu
Specialty: Finite Element Method, Meshless Methods, Functionally Graded Materials, Smart Structures, Microelectromechanical Systems, Damage and Failure in Metals and Composites under Dynamic Loading, Carbon Nanotubes, Constitutive Relations
Applications: Blast mitigation; microelectromechanical; sensors and actuators; structural analysis and design; failure analysis; vibration and noise control; material modeling
Expertise: Constitutive relations for soft tissues; thermal stresses; stress analysis under extreme thermal and mechanical environments; rubberlike materials; coupled thermo-electromechanical problems; molecular mechanics/dynamics modeling

FLOODING
see Water, Dymond

FLUID DYNAMICS
see also Mechanics of Thin and Flexible Structures, Hanna Nonlinear Dynamics, Hajj

FLUID DYNAMICS
Name: Weiwei Deng
Department: Mechanical Engineering
Office Phone: 540-231-7183
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E-mail: weiwei@vt.edu
URL: www.deng-lab.com
Specialty: Experimental Fluid Dynamics; Spray and Atomization; Droplets Based Advanced Manufacturing
Applications: Roll-to-roll deposition and printing of advanced materials; scalable fabrication of polymer and perovskite solar cells; cathode layer manufacturing of lithium ion batteries; printing of sensors; spray drying for nanoparticles for drug delivery; spray cooling
Expertise: Electrospray; development of roll-to-roll deposition/ printing system based on multiplexed electrospray
Examples of Funding Sources: NSF, Applied Materials, ExxonMobil

FLUID DYNAMICS
Name: Sunghwan Jung
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Office Phone: 540-231-5146
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URL: www.esm.vt.edu/~sunnyjsh/sunghwan/index.html
Specialty: Bio-Fluid Mechanics; Nonlinear Dynamics; Bio-Locomotion
Applications: Fluid transport systems; microfluidics
Expertise: Experiment; analytical modeling
Examples of Funding Sources: NSF, American Chemical Society
FLUID DYNAMICS AND DIAGNOSTICS

Laser Flow Diagnostics

Name: K. Todd Lowe
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Home Phone: 540-797-0643
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E-mail: kelowe@vt.edu
URL: www.aoe.vt.edu/people/faculty/lowe.html
Applications: Development of instrumentation and experiments to address pressing needs in the propulsion, energy, and aerospace engineering communities; quieter aircraft with cleaner emissions; supersonic jet noise; particle-based measurements at micro- and macro-scale
Expertise: Fundamental expertise in turbulence and aeroacoustics applied to propulsion and energy systems studied using advanced instrumentation, developer of a number of flow velocimetry applications based upon planar doppler velocimetry/doppler global velocimetry, laser doppler velocimetry, particle image velocimetry, novel instrumentation for gas turbines
Examples of Funding Sources: Office of Naval Research, NASA Langley Research Center, Virginia Space Grant Consortium, U.S. Air Force Arnold Engineering Development Center, propulsion and energy corporations, Department of Defense / NASA Small Business Innovation Research / Small Business Technology Transfer programs

FLUID MECHANICS

see also Computational Fluid Dynamics, Battaglia
High-End Parallel Computing, Tafti

FLUID MECHANICS

Name: Mark A. Stremler
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-1227
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E-mail: stremler@vt.edu
URL: www.beam.vt.edu/stremler
Specialty: Fluid Mechanics, Non-linear Dynamical Systems, Reduced Order Modeling
Applications: Microfluidics; mixing/separation in complex flows; fluid transport and mixing in biological systems; fluid-structure interaction; hydrokinetic energy harvesting
Expertise: Mathematical and numerical modeling of fluid flows; applications of dynamical systems theory to fluid systems; chaotic advection; vortex dynamics
Examples of Funding Sources: NSF, Center for Innovative Technology

FLUID MECHANICS / HEAT TRANSFER

Name: Mark Paul
Department: Mechanical Engineering
Office Phone: 540-231-4758
Fax: 540-231-9100
E-mail: mrp@vt.edu
URL: www.me.vt.edu/mpaul
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:** NSF, DARPA

### FLUID-STRUCTURE INTERACTION

**Name:** Jonathan Boreyko  
**Department:** Biomedical Engineering and Mechanics  
**Office Phone:** 540-231-0469  
**E-mail:** boreyko@vt.edu  
**Specially:** Fluid-Structure Interaction; Phase-Change Phenomena; Thermo-Fluids  
**Applications:** Enhanced condensation heat transfer; anti-frosting surfaces; superhydrophobic surfaces; vapor chambers; water harvesting; lipid bilayers; desalination  
**Expertise:** Experiment; analytical modeling  
**Examples of Funding Sources:** NSF, American Chemical Society

### FLUIDS AND ACOUSTICS

**Name:** Wing-fai Ng  
**Department:** Mechanical Engineering  
**Office Phone:** 540-231-7274  
**Home Phone:** 540-951-1054  
**Fax:** 540-231-9100  
**E-mail:** wng@vt.edu  
**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  

### FLUVIAL FORMS AND PROCESSES

see Environment, Hession

### FLYWHEELS

see Machine Health Monitoring, Kasarda

### FRACTURE MECHANICS

see Mechanics of Materials, Dillard

### FREIGHT OPERATIONS AND PLANNING

see Transportation, Hancock

### FUEL CELLS

see Automotive Powertrains, Nelson  
**Energy Systems, Kornhauser**  
**Mechanics of Materials, Dillard**  
**Polymers, Baird**

### FUNCTIONAL NANOCOMPOSITES

**Name:** E. Johan Foster  
**Department:** Materials Science and Engineering  
**Office Phone:** 540-231-8165  
**Fax:** 540-231-8919
E-mail: johanf@vt.edu  
Specialty: Stimuli Responsive Materials and Nanocomposites, Supramolecular Materials, Biomaterials, Cellulose Nanocrystals  
Applications: Biomedical devices, engineering plastics, electronic devices, coatings  
Expertise: Design, synthesis and engineering of functional polymer nanocomposites  
Examples of Funding Sources: NSF, NIH, P3Nano

FUSION ENERGY SCIENCE  
see Plasma Physics, Srinivasan

GAME THEORY  
see Decision Making in Organizations, Wernz  
Wireless Communications and Networks, MacKenzie

GAS TURBINES  
Name: Walter F. O'Brien  
Department: Mechanical Engineering  
Office Phone: 540-231-9104  
Home Phone: 540-552-2844  
Fax: 540-231-9100  
E-mail: walto@vt.edu  
Specialty: Fluid Mechanics, Thermodynamics, Instrumentation  
Applications: Turbomachinery and gas turbines for stationary and airborne applications (propulsion); ramjets, 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; experimental research in turbomachinery, gas turbines, and high speed propulsion  
Examples of Funding Sources: Air Force Research Laboratory, NASA, Pratt and Whitney, Electric Jet, LLC, Prime Photonics, LC

GENE-BASED THERAPY  
see Biomedical Engineering, Xuan

GEARS / TRANSMISSIONS  
see Vibration and Dynamics, Parker

GENOME ANALYSIS  
see Computer Science, Feng

GENOMICS  
see Computational Biology, Murali, Zhang  
Computational Genomics, Heath

GEOGRAPHIC INFORMATION SYSTEMS (GIS)  
see Computer Science, Lu, Shaffer  
Transportation, Hancock  
Water, Dymond

GEOSCIENCES  
see Natural Gas / Coal Mining, Ripepi

GEOSPATIAL ANALYSIS (GIS)  
see Transportation, Hancock

GEOSPATIAL DECISION MAKING  
see Transportation, Hancock
GEOTECHNICAL ENGINEERING
Name: Thomas L. Brandon
Department: Civil and Environmental Engineering
Office Phone: 540-231-4454
Home Phone: 540-544-DIRT
Fax: 540-231-1620
E-mail: tb@vt.edu
Specialty: Geotechnical Engineering, Civil Engineering
Applications: Construction of roads, dams, bridges, foundations, and retaining walls
Expertise: Measurement of soil properties; in situ testing; development of laboratory equipment; slope stability analysis; foundation and retaining wall design; settlement analyses; site investigation and assessment
Examples of Funding Sources: U.S. Bureau of Reclamation, NSF, Atlantic Construction Fabrics, Amoco, U.S. Air Force Civil Engineering Research Laboratory

GEOTECHNICAL ENGINEERING
Earth Structures and Foundations
Name: J. Michael Duncan
Department: Civil and Environmental Engineering
Office Phone: 540-231-5103
Home Phone: 540-552-5822
Fax: 540-231-7532
E-mail: jmd@vt.edu
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
Department: Civil and Environmental Engineering
Office Phone: 540-231-7151
Fax: 540-231-7532
E-mail: filz@vt.edu
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

GEOTECHNICAL ENGINEERING
Name: Russell A. Green
Department: Civil and Environmental Engineering
Office Phone: 540-231-9826
Home Phone: 540-382-1031
Fax: 540-231-7532
E-mail: rugreen@vt.edu
URL: www.cee.vt.edu/people/green.html
Specialty: Geotechnical Engineering, Earthquake Engineering, Engineering Seismology
Applications: Liquefaction evaluations; paleoliquefaction investigations; ground improvement; seismic site response analyses; seismic design of foundations, retaining walls, earthen dams, etc.; seismic hazard analysis

Expertise: Geotechnical earthquake engineering; engineering seismology, soil and site improvement

Examples of Funding Sources: NSF, U.S. Geological Survey, U.S. Army Corps of Engineers

GEOTECHNICAL ENGINEERING
Name: Adrian Rodriguez-Marek
Department: Civil and Environmental Engineering
Office Phone: 540-231-5788
Home Phone: 540-951-0342
Fax: 540-231-7532
E-mail: adrianrm@vt.edu
URL: www.cee.vt.edu/people/adrian.html
Specialty: Geotechnical Engineering, Earthquake Engineering, Engineering Seismology
Applications: Seismic hazard analysis; site response analysis; seismic design of geotechnical systems
Expertise: Seismic hazard analysis
Examples of Funding Sources: NSF, U.S. Geological Survey

GEOTECHNICAL ENGINEERING
Name: Nina Stark
Department: Civil and Environmental Engineering
Office Phone: 540-231-7152
Fax: 540-231-7532
E-mail: ninas@vt.edu
Specialty: Coastal and Marine Geotechnics, Subaqueous Sediment Dynamics, Offshore Structure – Seabed Interaction, Instrument Development
Applications: Beach erosion and coastline development; ocean renewable energies; port and coastal engineering; navigation channel maintenance; offshore cables and pipelines
Expertise: Geotechnical surveying in the coastal zone and marine environment; offshore-going quasi-static and dynamic penetrometers; seafloor sediment sampling; acoustic and visual seafloor imaging; scour monitoring

GEOTECHNICAL ENGINEERING
Name: Katerina Ziotopoulou
Department: Civil and Environmental Engineering
Office Phone: 540-231-9200
Fax: 540-231-7532
E-mail: katerina@vt.edu
Specialty: Geotechnical Engineering, Earthquake Engineering
Applications: Seismic site response analysis, liquefaction evaluations, embankment dams, seismic design of shallow and deep foundations, underground structures, properties and behavior of liquefiable soils
Expertise: Numerical modeling of geostuctures; performance-based evaluation of liquefaction effects on structures; constitutive modeling of the monotonic and cyclic response of soils; verification, implementation and validation of numerical models for soils

GLOBAL PRODUCT DEVELOPMENT
see Computer-Aided Design and Manufacturing, Bøhn

GLOBAL WARMING
see Energy, Rahman
GREEN COMPUTING
see Computer Science, Feng
Parallel and Distributed Systems and Applications, Cameron

GREENHOUSE EMISSIONS
see Air Pollution, Marr
Catalysis, Oyama
Transportation, Rakha

GROUNDWATER
Name: Mark A. Widdowson
Department: Civil and Environmental Engineering
Office Phone: 540-231-7153
Fax: 540-231-7532
E-mail: mwiddows@vt.edu
URL: www.cee.vt.edu/people/widdowson.html
Applications: Modeling of groundwater flow and contaminant transport problems; management, protection and risk analysis of water resources, including aquifers and surface water; decision-making software tools for groundwater resource development and management; novel applications of bioremediation, monitored natural attenuation and phytoremediation at Superfund sites; decision-making software tools for remediation of contaminated soil and groundwater; monitoring of groundwater pollutants
Expertise: Groundwater; water resources sustainability; contaminant transport in groundwater systems; models and software development for groundwater flow and contaminant transport; wells, springs, public water supply, and domestic 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 characterization methods for subsurface flow and transport properties

HARDWARE DESIGN
see Computer Engineering, Hsiao

HEALTHCARE
see Decision Making in Organizations, Wernz
Investment, Bish

HEARING PROTECTION
see Human Factors Engineering, Casali

HEAT TRANSFER
see also Parallel Computing, Tafti
HEAT TRANSFER
Name: Scott Huxtable
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Home Phone: 540-552-6777
Fax: 540-231-9100
E-mail: huxtable@vt.edu
URL: www.me.vt.edu/people/faculty/huxtable.html
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 nanstructured composites; thermal transport through interfaces; microfabrication; microelectromechanical, nanoelectromechanical; 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: NSF

HEAT TRANSFER
Name: Zhiting Tian
Department: Mechanical Engineering
Office Phone: 540-231-6803
Fax: 540-231-0422
E-mail: zhiting@vt.edu
Specialty: Nanoscale Heat Transfer
Applications: Solar/Thermal energy conversion; thermal management of microelectronics; nanotherapeutics cancer treatment
Expertise: First-principles density functional theory; molecular dynamics simulations; Monte Carlo simulations; thermoreflectance measurements; inelastic x-ray scattering
Examples of Funding Sources: DARPA

HEAT TRANSFER
Name: Brian Vick
Department: Mechanical Engineering
Office Phone: 540-231-7596
Fax: 540-231-9100
E-mail: bvick@vt.edu
Applications: Heat transfer in heterogeneous materials; thermal analysis of compressors and brakes; investigation into true contact area and thermal effects at sliding contacts
Expertise: Applied mathematics; modeling complex processes using cellular automata; development of computationally efficient algorithms for analysis of multiphysics processes
Examples of Funding Sources: NSF, U.S. Air Force Office of Scientific Research

HIGH PERFORMANCE COMPUTING
see Computing, Tafti
Computational Science, Sandu
Computer Architecture, Patterson
Computer Science, Feng
File and Storage Systems, Butt
Optimization, Watson
Parallel and Distributed Systems, Cameron
Parallel Computing, Ribbens
HIGHER EDUCATION
see Engineering Education, Knight

HIGH SPEED RAIL
see Air Transportation and Airport Engineering, Trani

HIGHWAY SAFETY
see Transportation, Hancock

HOLOGRAPHIC MICROSCOPY
see Holography, Poon

HOLOGRAPHY
Name: Ting-Chung Poon
Department: Electrical and Computer Engineering
Office Phone: 540-231-4876
Home Phone: 540-552-5787
Fax: 540-231-3362
E-mail: tcpoon@vt.edu
Specialty: Digital Holography, Hybrid (Optical/Electronic) Image Processing, 3-D Holographic Microscopy, Computer-Generated Holography
Applications: Developing optical scanning techniques to generate holographic (or 3-D) information in a single 2-D active scan; developing real-time optical image processing systems
Expertise: Electronic/digital holography; hybrid image processing; 3-D holographic microscopy; acousto-optic signal processing
Examples of Funding Sources: NSF, NIH, Army Research Office

HOMELAND SECURITY
see Electronics, Agah

HUMAN-COMPUTER INTERACTION
see also Computer Science, Feng Robotics, Ben-Tzvi Virtual Environments, Bowman

HUMAN-COMPUTER INTERACTION
Name: Denis Gracanin
Department: Computer Science
Office Phone: 540-231-2060
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URL: www.cs.vt.edu/~gracanin
Specialty: Human-Computer Interaction, Visualization, Privacy
Applications: Navigation interaction techniques; brain-computer interfaces; smart house; community privacy enabled systems
Expertise: Virtual reality and brain-computer interfaces based intervention tools; domain specific information visualization; user interfaces for control and communication systems; sensor networks; computer supported collaborative work
Examples of Funding Sources: NSF, U.S. Army

HUMAN-COMPUTER INTERACTION
Name: D. Scott McCrickard
Department: Computer Science
Office Phone: 540-231-6698
Fax: 540-231-6075
E-mail: mccricks@cs.vt.edu
URL: people.cs.vt.edu/~mccricks/
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: NSF, National Institute of Standards and Technology, Virginia Center for Innovative Technology, Microsoft

HUMAN-COMPUTER INTERACTION
Name: Chris North
Department: Computer Science
Office Phone: 540-231-2458
Fax: 540-231-6075
E-mail: north@vt.edu
URL: people.cs.vt.edu/~north/

Specialty: Interactive Visual Analytics, Intelligence Analysis, 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; multidimensional data visualization; multiple-view coordination; information and application integration; web-based software architectures; architecting tiled, high-resolution displays, and visualizations

Examples of Funding Sources: NSF, National Geospatial-Intelligence Agency, Advanced Research and Development Activity, U.S. Bureau of the Census

HUMAN FACTORS ENGINEERING
see also Augmented Reality, Gabbard
Ergonomics, Nussbaum
Industrial Hygiene, Dickerson

HUMAN FACTORS ENGINEERING
Name: Thomas A. Dangus
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-1501
FAX: 540-231-1555
E-mail: tdingus@vt.edu
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 behavior 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, NIH, Society of Automotive Engineers

HUMAN FACTORS ENGINEERING / ERGONOMICS / ACOUSTICS
Human Engineering, Acoustics, Noise, Vehicle Design, Safety
Name: John G. Casali
Department: Industrial and Systems Engineering
Office Phone: 540-231-5073
Fax: 540-231-3322
E-mail: jcasali@exchange.vt.edu
URL: www.ise.vt.edu/people/casali
URL: filebox.vt.edu/users/jcasali/John_Casali_short_vita.pdf
URL (Lab): filebox.vt.edu/users/jcasali/VT_Auditory_Systems_Lab_Overview.pdf


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: Office of Naval Research, National Institute for Occupational Safety and Health, U.S. Army Aeromedical Research Laboratory, 3M, ITT-Exelis, Federal Highway Administration, NASA, Bose Corporation, Shure Corporation, Etymotic Research, Inc., United Parcel Service

HUMAN FACTORS ENGINEERING / ERGONOMICS

Safety, Systems Ergonomics, Function Allocation in System Design

Name: Brian M. Kleiner
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Fax: 540-231-3322
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URL: www.mlsoc.vt.edu/users/bkleiner

Specialty: Safety, Systems Ergonomics or Macroergonomics (work system and work system interface design, including CSCW), Function Allocation in Automation and System Design, and Design of Collaborative Work Systems

Applications: Improvement of industrial work processes (also military, healthcare, construction); 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 (macroergonomics); 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, NSF, U.S. Department of Education, Naval Surface Warfare Center-Dahlgren, U.S. Army Research Lab, Walter Reed Army Institute of Research, National Institute of Occupational Safety and Health

HYBRID VEHICLES

see Automotive Powertrains / Energy Systems, Nelson

HYDRODYNAMICS

Name: Wayne L. Neu
Department: Aerospace and Ocean Engineering
Office Phone: 540-231-7061
Fax: 540-231-9632
E-mail: neu@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 de-
sign; numerical analysis of complex free surface and subsur- 
face flow fields

**Expertise:** Autonomous underwater vehicles; propulsion of ma- 
rine vehicles; computation of free surface flows; hydrodynamic 
modeling

**Examples of Funding Sources:** Office of Naval Research, Naval 
Oceanographic Office, DARPA

**HYDROLOGY**

see also Ecological Engineering, Thompson 
Engineering Education, Lohani 
Environment, Hession 
Environmental and Fluvial Hydraulics, Hester

**Name:** Zachary M. Easton 
**Department:** Biological Systems Engineering 
**Office Phone:** 540-231-0689 
**Fax:** 540-231-3199 
**E-mail:** zeaston@vt.edu

**Specialty:** Watershed Modeling, Hydrological Modeling, Green- 
house Gas Emissions, Climate Change, Agricultural Non-Point 
Source Pollution, Data Access Tools

**Applications:** Non-point source pollution control; hydrological 
controls on biogeochemical processes; climate change as- 
essment

**Expertise:** Development and application of process based water- 
shed and hydrological models to define and manage pollutant 
source areas, predicting and adapting to climate change, de- 
veloping novel best management practices to reduce non-point 
source pollution, developing tools to access large, complex 
data set

**Examples of Funding Sources:** U.S. Environmental Protection 
Agency, U.S. Department of Agriculture-Agriculture and Food 
Research Initiative, U.S. Department of Agriculture-Natural 
Resource Conservation Service, NSF

**HYDROLOGY**

**Name:** Durelle Scott 
**Department:** Biological Systems Engineering 
**Office Phone:** 540-231.2449 
**Fax:** 540-231.2449 
**E-mail:** dscott@vt.edu 
**Web:** http://ww2.bse.vt.edu/scottlab

**Specialty:** Water Quality Monitoring and Modeling; Watershed 
Hydrology; Contaminant Transport Through Rivers, Flood- 
plains, and Wetlands

**Applications:** Research and consulting to quantify water and 
contaminant fluxes through river systems; development of 
monitoring networks combining in-situ sensors with laboratory 
analysis in the Water Quality Laboratory; use of environmental 
tracers to identify water/contaminant sources/cycling; tracer 
injection techniques to quantify water/contaminant loads, 
sources and in-stream removal processes

**Expertise:** Contaminant transport through watersheds; eco- 
system services within rivers-wetlands-floodplains; aquatic 
biogeochemistry; stream and wetland restoration

**Examples of Funding Sources:** NSF, U.S. Department of Agricul- 
ture, National Oceanic and Atmospheric Administration

**IMAGE PROCESSING**

see Computer Vision, Parikh

**IMAGING SCIENCE**

**Name:** Christopher L. Wyatt 
**Department:** Electrical and Computer Engineering, Biomedical 
Engineering and Mechanics

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Office Phone: 540-231-6658
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E-mail: clwyatt@vt.edu
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: NIH, NSF, U.S. Office of Naval Research

INDOOR AIR POLLUTION
see Air Pollution, Marr
Environment, Little
Industrial Hygiene, Dickerson

INDUSTRIAL AND SYSTEMS ENGINEERING
see also Logistics, Taylor
Systems Engineering, Salado

INDUSTRIAL ENGINEERING AND MANAGEMENT SYSTEMS ENGINEERING
Name: Eileen M. Van Aken
Department: Industrial and Systems Engineering
Office Phone: 540-231-2780
Fax: 540-231-3322
E-mail: evanaken@vt.edu
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: Belgian Armed Forces, Danaher, AT&T, ITT Night Vision, U.S. Department of Agriculture Forest Service, NSF

INDUSTRIAL ENGINEERING, SIMULATION, SYSTEMS MODELING
Name: C. Patrick Koelling
Department: Industrial and Systems Engineering
Office Phone: 540-231-8755
Fax: 540-231-3322
E-mail: koelling@vt.edu
Specialty: Operations Research, Industrial Engineering
Applications: Analysis and optimization; engineering economic analysis; health care systems
Expertise: System modeling; simulation modeling and analysis; mathematical modeling; heuristics; engineering economy
Examples of Funding Sources: York Hospital, NSF, U.S. Department of Energy, Ericsson, Rowe Furniture
INDUSTRIAL HYGIENE
Name: Deborah Dickerson
Department: Civil and Environmental Engineering and Myers-Lawson School of Construction
Office Phone: 540-449-2068
E-mail: dyoung@vt.edu
Specialty: Indoor Environmental Quality, Asbestos and Lead in School Facilities, Construction Operations, Re-Design of Dust Controls Tools, Prevention through Design (PtD)
Expertise: Certified industrial hygienist; certified hazardous materials manager; certified safety profession
Examples of Funding Sources: NSF

INDUSTRIAL SYSTEMS AND MANAGEMENT ENGINEERING
Name: Konstantinos (Kostas) Triantis
Department: Industrial and Systems Engineering
Office Phone: 703-538-8446
Fax: 703-538-8450
E-mail: triantis@vt.edu
Applications: Social services and social service enterprises; research and development enterprises; transportation systems and planning; implementation of new technologies; manufacturing systems; infrastructure systems and management; road maintenance; congestion pricing
Expertise: Data envelopment analysis; system dynamics modeling; systems engineering; cost estimation/affordability; fuzzy sets and inference

INFECTIOUS DISEASE
see Computational Biology, Murali

INFECTIOUS DISEASE TRANSMISSION
see Air Pollution, Marr

INFORMATION AND IMAGE PROCESSING
see Holography, Poon

INFORMATION TECHNOLOGY
see Computer Science, Feng, Fox
Geographic Information Systems, Dymond

INFRASTRUCTURE
see Pavements, Flintsch

INFRASTRUCTURE DEVELOPMENT
see Construction Engineering and Management, Shealy
Public-Private Partnerships, Garvin

INFRASTRUCTURE MANAGEMENT
see Public-Private Partnerships, Garvin

INFRASTRUCTURE PERFORMANCE
Name: Madeleine M. Flint
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Office Phone: 540-231-7150
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E-mail: mflint@vt.edu  
SPECIALTY: Performance-Based Engineering; Structural Reliability; Corrosion in Reinforced Concrete; Life-Cycle Assessment; Climate Change Impact Assessment  
APPLICATIONS: Multi-hazard building design; durability and service life of bridges and buildings; impact of climate change on structural performance and failure  
EXPERTISE: Development of performance-based approaches for assessing the durability, resilience, and sustainability of built infrastructure; considering the impact of climate change  
EXAMPLES OF FUNDING SOURCES: NSF, Transportation Research Board, National Institute of Standards Technology, Virginia Center for Transportation Innovation and Research  

INJURY BIOMECHANICS  
Automobile Safety, Military Restraints, Sports Biomechanics  
Name: Stefan Duma  
Department: Biomedical Engineering and Mechanics  
Phone: 540-231-8191  
Fax: 540-231-9738  
URL: www.sbes.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  

INSTRUCTIONAL TECHNOLOGY  
Name: Glenda R. Scales  
Department: Engineering Education  
Office Phone: 540-231-9754  
Fax: 540-231-3031  
E-mail: gscales@vt.edu  
URL: www.eng.vt.edu/overview/cgep  
SPECIALTY: Solutions, Human Computer Interaction, International Programs, Instructional Design  
EXPERTISE: Faculty development; instructional technology; implementing distance learning; and international programs  

INSTRUMENTATION  
see Gas Turbines, O’Brien  

INVESTMENT  
Name: Ebru K. Bish  
Department: Industrial and Systems Engineering  
Office Phone: 540-231-7099  
Fax: 540-231-3322  
E-mail: ebru@vt.edu  
APPLICATIONS: Healthcare industry; manufacturing and service industries; not-for-profit companies  
EXPERTISE: Stochastic optimization; probability theory; risk analysis; economic decision analysis  
EXAMPLES OF FUNDING SOURCES: NSF, The Carilion Clinic, Agency for Healthcare Research and Quality (AHRQ), Virginia Tech-Carilion Research Institute, Boeing
IONOSPHERIC AND SPACE PHYSICS
Name: J. Michael Ruohoniemi
Department: Electrical and Computer Engineering
Office Phone: 540-231-1482
Fax: 540-231-5918
E-mail: mikeruo@vt.edu
Specialty: Application of Radar Techniques to Study Earth’s Upper Atmosphere and Space Weather
Applications: Monitoring weather and storms in earth’s upper atmosphere; space weather hazards; and ionospheric propagation
Expertise: Radar; ionospheric physics; space weather; satellite communications
Examples of Funding Sources: NSF, NASA

K-12 ENGINEERING EDUCATION
see Machine Health Monitoring, Kasarda

KINESIOLOGY
see Biomechanics, Queen

LANDFILLS
see Geotechnical Engineering, Filz

LANDMINE DETECTION
see Multifunctional Materials and Systems, Priya

LOGISTICS
Name: Kimberly Ellis
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URL: www.ise.vt.edu/People/Faculty/Bios/Ellis_bio.html
Specialty: Logistics, Distribution, Production Planning and Control, Manufacturing Logistics, Material Flow, Supply Chain Management, Applied Operations Research
Applications: Improving material flow within a facility to increase customer responsiveness; improving hub operations for a freight transportation company; allocating resources to improve distribution operations for an industrial gas producer; determining appropriate levels of inventory at different points in a supply chain to ensure responsiveness to customer demand; scheduling test operations in a semiconductor manufacturing facility to minimize lead time
Expertise: Applying operations research techniques to improve production planning, logistics, distribution, material flow, and supply chain operations in an organization
Examples of Funding Sources: NSF, Air Liquide, Eastman, Averitt Express, Danaher, Ericsson

LOGISTICS
Industrial Engineering, Simulation
Name: G. Don Taylor
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Office Phone: 540-231-9079
Home Phone: 540-552-0082
Fax: 540-231-3322
E-mail: don.taylor@vt.edu
URL: 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; warehousing
Expertise: Applied mathematical programming and discrete event system simulation
Examples of Funding Sources: NSF

MACHINE HEALTH MONITORING AND STRUCTURAL HEALTH MONITORING (A) AND ENGINEERING EDUCATION (B)

Name: Mary Kasarda
Department: Mechanical Engineering
Office Phone: 540-231-8552
Fax: 540-231-9100
E-mail: maryk@vt.edu

Specialty: (a) Health Monitoring in Rotating Machinery, Health Monitoring in Civil Structures, Magnetic Bearings, Dynamic Force Measurements on Rotating Equipment for Improved Process Control, Rotor Dynamics (b) K-12 Teacher Professional Development in Engineering, Engineering Design in Undergraduate Engineering and K-12 Classrooms

Applications: (a) Instrumentation of buildings for dynamic measurements with implications for smart building technology; utilizing magnetic bearings as mid-span actuators for interrogating rotor health; application of magnetic bearings for the measurement of forces on rotating shafts for monitoring manufacturing processes (i.e., textiles, films) (b) Partnership with VT School of Education faculty for providing K-12 teacher professional development to support teachers in putting engineering in their classrooms; training mechanical engineering students to be mentors to high school students

Expertise: High-speed rotating machinery and magnetic bearing experience; machinery health monitoring; instrumentation of buildings for dynamic measurements

Examples of Funding Sources: NSF, NASA, Revolve Technologies Inc., Daimler Chrysler

MACHINE LEARNING

see also Computer Vision, Parikh

MACHINE LEARNING

Name: Dhruv Batra
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Specialty: Deep Learning, Probabilistic Graphical Models, Structured-Output Prediction, Multiple Hypothesis Systems

Applications: Autonomous systems; surveillance; biometrics

Expertise: Large-scale methods for object recognition/detection/segmentation; interactive co-segmentation of objects from image collections; human body pose estimation; activity recognition; depth estimation; scene understanding; vision and language

Examples of Funding Sources: NSF, Army Research Office, Office of Naval Research, DARPA, Intelligence Advanced Research Projects Agency

MACHINE LEARNING

Name: Bert Huang
Department: Computer Science
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E-mail: bhuang@vt.edu

Specialty: Machine Learning, Structured Prediction, Multi-Relational Learning, Large-Scale Machine Learning, Probabilistic Inference, Belief Propagation, Network Analysis, Graph Mining, Combinatorial Optimization, Computational Learning Theory, Social Media Analysis, Data Science, Big Data, Computational Social Science
Applications: Automating computer models for social network analysis, biological network analysis, intelligence, computer vision, education data analysis, energy data analysis

Expertise: Algorithms, theory, applications of machine learning with complex data and models

Examples of Funding Sources: Intelligence Advanced Research Projects Activity

MACROMOLECULES AND INTERFACES
see Polymers, Baird, Bortner

MAGNETIC BEARINGS
see Machine Health Monitoring, Kasarda

MANAGEMENT SYSTEMS ENGINEERING
see Industrial Engineering and Management Systems, Van Aken
Systems Engineering, Salado

MANUFACTURING
see also Advanced Manufacturing, Kong
Computer-Aided Design and Manufacturing, Bøhn

MANUFACTURING
Name: Ran Jin
Department: Industrial and Systems Engineering
Office Phone: 540-231-2262
Fax: 540-231-3322
E-mail: jran5@vt.edu

Specialty: Manufacturing Systems, Data Fusion, Data Visualization

Applications: Aero-engine manufacturing; semiconductor manufacturing; fiber manufacturing; automobile manufacturing; biomedical informatics (organ transplant)

Expertise: Manufacturing scale-up; manufacturing system modeling, monitoring, diagnosis and control; image-based quality control; engineering driven data fusion; data visualization

Examples of Funding Sources: NSF, Commonwealth Center for Advanced Manufacturing, Rolls-Royce

MANUFACTURING
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E-mail: cbwill@vt.edu
URL: www.me.vt.edu/dreams

Specialty: Additive Manufacturing, 3-D Printing, Computer-Aided Engineering, Engineering Design, Engineering Education

Applications: Additive Manufacturing (3-D Printing) of polymers, ceramics, metallic, and composite materials for end-use applications including structural heat exchangers, high temperature filters, 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: Additive manufacturing systems; additive manufacturing process/property/structure relationships of ceramics, metals, and polymers; computer-aided modeling; design theory and methodology; engineering design education research

Examples of Funding Sources: NSF, NASA, Air Force Research Lab, Proctor&Gamble, ExOne, General Motors

MANUFACTURING DESIGN
see Engineering Design, Sturges
MANUFACTURING PROCESSES / SYSTEMS

see Advanced Manufacturing, Kong

MANUFACTURING SYSTEMS

see also Advanced Manufacturing, Kong

Logistics, Ellis
Optimization, Sarin

MANUFACTURING SYSTEMS

Name: Jaime A. Camello
Department: Industrial and Systems Engineering
Office Phone: 540-231-8976
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E-mail: jcamelio@vt.edu
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: NSF, Quality Measurement Control, Inc., Metalsa

MARINE RENEWABLE ENERGY

see Coastal Engineering, Xiao

MATERIALS

see also Mechanics of Materials, Case Metallurgy, Aning

MATERIALS

Name: Sean G. Corcoran
Department: Materials Science and Engineering
Office Phone: 540-231-8309
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E-mail: sgcor@vt.edu

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: NSF, Department of Energy

MATERIALS

Name: Guo-Quan (GQ) Lu
Department: Materials Science and Engineering and Electrical and Computer Engineering
Office Phone: 540-231-8686
Fax: 540-231-8919
E-mail: gqu@vt.edu

Specialty: Materials Synthesis and Processing for Additive Manufacturing of Electrical Components, Power Electronics Packaging and Integration

Applications: Electric vehicles; power supplies; renewable energy systems; power grid; LED lighting; communication systems

Expertise: Design, processing, and analysis of nanoscale and
microscale powders, pastes, and preforms; sintering of metal and/or ceramic powders; electronic packaging of wide band-gap power devices/modules; integration technologies for high power, high density, and high temperature electronics

Examples of Funding Sources: NSF, Department of Energy, U.S. Army Research Labs, Ford, Mitsubishi Electric, Samsung

**MATERIALS**

**Name:** Kathy Lu  
**Department:** Materials Science and Engineering  
**Office Phone:** 540-231-3225  
**Fax:** 540-231-8919  
**E-mail:** klu@vt.edu  
**URL:** www.mse.vt.edu/people/faculty/KathyLu.html  

**Specialty:** Powder Material (ceramic and metal) Synthesis, Characterization, Forming, Sintering, including Digital Free Forming and in Situ Sintering, Composites and Functionally/structurally Graded Materials and Porous Materials, Powder Processing Related Simulations  

**Applications:** Nano-patterning; high strength and lightweight materials; high temperature and harsh environment application; automobiles; defense; electronic and other functional materials  

**Expertise:** Nano and micron powder material design; synthesis; colloidal processing; forming; sintering; characterization  

**Examples of Funding Sources:** NSF, Department of Energy

**MATERIALS**

**Name:** Amrinder Singh Nain  
**Department:** Mechanical Engineering  
**Office Phone:** 540-231-6036  
**Fax:** 540-231-9100  
**E-mail:** nain@vt.edu  

**Specialty:** Polymeric Micro/Nanofiber Manufacturing and Characterization, Nano-Biotechnology  

**Applications:** Advanced materials; in vitro platform to study cellular dynamics; bioreactor-based strategies for drug testing; tissue engineering; wound healing  

**Expertise:** Aligned deposition of polymeric fiber arrays (diameter: sub 50nm-microns, length: microns-cm) in single and multiple layers; mechanical characterization of deposited individual micro/nanofibers; fabrication of customized biological scaffolds for studying cellular dynamics including protrusions and migration; tissue engineering; fused and suspended fiber nanonets for measuring cell forces; cancer mechanobiology

**MATERIALS**

**Name:** Gary Pickrell  
**Department:** Materials Science and Engineering  
**Office Phone:** 540-231-3504  
**Fax:** 540-231-8919  
**E-mail:** pickrell@vt.edu  


**Applications:** Fiber optic sensors for measurement of chemical 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; plasma spray coating process; business process improvement through Six Sigma and Lean Six Sigma methodologies; new product development  

**Examples of Funding Sources:** NSF, Department of Energy
MATERIALS
Name: Dwight Viehland
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Office Phone: 540-231-2276
Fax: 540-231-8919
E-mail: dviehlan@vt.edu
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 GENOME
see Catalysis, Xin

MATHEMATICAL ANALYSIS
see Optimization, Sherali

MECHANICAL BEHAVIOR OF MATERIALS
see Advanced Materials Manufacturing, Yu

MECHANICAL ENGINEERING
see also Robotics, Ben-Tzvi

MECHANICAL ENGINEERING
Name: Alfred L. Wicks
Department: Mechanical Engineering
Office Phone: 540-231 4323
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E-mail: awicks@vt.edu
Specialty: Sensors, Instrumentation, Signal Processing, Experimental Dynamics, Autonomous Systems, Perception, Medical Devices
Applications: Robotic systems; autonomous vehicles; dynamics of rail guns; design and development of pediatric medical devices; design and development of mechatronic systems; analysis of data; data fusion techniques; applied perception for navigation
Examples of Funding Sources: Naval Surface Warfare Center Dahlgren, DARPA, Pediatric Medical Device Institute, Marine Warfighting Laboratory, Childress Institute for Pediatric Trauma

MECHANICAL SYSTEMS
see Vibration and Dynamics, Parker

MECHANICS OF MATERIALS
see also Composites, Kennedy
Mechanics of Thin and Flexible Structures, Hanna

MECHANICS OF MATERIALS
Fracture Mechanics and Time Dependence
Name: David A. Dillard
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-4714
Fax: 540-231-4574
E-mail: dillard@vt.edu
Specialty: Strength, Fracture, and Durability of Polymers, Adhesives, and Photon Exchange Membranes (PEM); Fuel Cell Durability; Elastomer Behavior
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; fuel cell PEM durability

**Examples of Funding Sources:** 3M, Boeing, Dow, Dow Corning, DuPont, General Motors, Hewlett-Packard, Motorola, National Starch, NSF, NASA, U.S. Department of Agriculture

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**MECHANICS OF MATERIALS**

**Name:** Scott W. Case  
**Department:** Biomedical Engineering and Mechanics  
**Office Phone:** 540-231-3140  
**Fax:** 540-231-9187  
**E-mail:** scase@vt.edu  
**Specialty:** Strength, Fatigue, Creep, and Durability of Polymers, Metals, and Composites  
**Applications:** Composite materials subjected to combined environmental and structural loadings; fuel cell seal and membrane materials  
**Expertise:** Experimental characterization; strain rate effects; analytical and computational modeling  
**Examples of Funding Sources:** Office of Naval Research, Army Research Laboratory, Army Research Office, NSF, General Motors, Luna Innovations

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**MECHANICS OF MATERIALS**

**Name:** Norman E. Dowling  
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**Office Phone:** 540-231-5399  
**Home Phone:** 540-951-7354  
**Fax:** 540-231-8919  
**E-mail:** ndowling@vt.edu  
**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, U.S. Navy, U.S. Air Force, Ford Motor Company

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**MECHANICS OF THIN AND FLEXIBLE STRUCTURES**

**Name:** James Hanna  
**Department:** Biomedical Engineering and Mechanics  
**Office Phone:** 540-231-9071  
**Fax:** 540-231-4574  
**E-mail:** hannaj@vt.edu  
**Specialty:** Strings, Chains, Cables, Rods, Sheets, Membranes, Shells, Thin and/or Flexible Structures  
**Applications:** Tethered and towed instrumentation and structures; textile and sheet material processing; rotating machinery; adaptive and deployable structures; energy harvesting; microfluidics; powder metallurgy  
**Expertise:** Geometric nonlinearities and differential geometric techniques; dynamics of thin structures; mechanics of materials; low Reynolds number fluid dynamics; metallic powder extrusion  
**Examples of Funding Sources:** NSF, Office of Naval Research, Air Force Office of Scientific Research, Army Research Office
MEDICAL DEVICES
see Mechanical Engineering, Wicks

METALLURGY
Name: Alex O. Aning
Department: Materials Science and Engineering
Office Phone: 540-231-6849
Fax: 540-239-8919
E-mail: aaning@vt.edu
Specially: Metallurgy, Powder Processing, and Metal Matrix Composites
Applications: Structural materials for aerospace, defense, and bio applications; materials for energy solutions; heat sink materials for electronic applications
Expertise: Processing and synthesis of metallic, amorphous and nanomaterial; in situ metal matrix composites; alloy development
Examples of Funding Sources: Prime Photonics LC, NASA, Commonwealth Center for Advanced Manufacturing, NSF, Aluminum Company of America, U.S. Department of Energy, General Electric, Kyanite Mining Corporation

METALLURGY
Metallurgical Engineering, Materials Science, Foundry, Failure Analysis
Name: Alan P. Druschitz
Department: Materials Science and Engineering
Office Phone: 540-315-5198
Home Phone: 205-420-2063
Fax: 540-231-8919
E-mail: adrus@vt.edu
Specially: Metallurgy, Melting and Casting, Failure Analysis, Heat Treatment, Corrosion, Ballistic Materials
Applications: Development of cast metals and components for the automotive industry; development of cast vehicle armor (metal-ceramic composites); optimization of metal manufacturing processes; failure analysis
Expertise: Melting and casting of ferrous and non-ferrous alloys; failure analysis of automotive components; automotive component testing; heat treatment of ferrous and non-ferrous alloys; welding; non-destructive testing, electrochemical corrosion testing
Examples of Funding Sources: Department of Defense, Army Research Laboratory, Department of Energy, American Foundry Society, Association of Iron and Steel Technology, NACE International

MICROELECTROMECHANICAL SYSTEMS (MEMS)
see Electronics, Agah
Finite Element Method / Computational Mechanics, Batra
Fluid Mechanics, Stremler
Multifunctional Materials and Systems, Priya

MICROELECTRONICS
see Materials, Lu

MICROFLUIDICS
see Biomedical Engineering, Verbridge
Electronics, Agah

MICROFLUIDICS, NANOFLOWDICS, AND OPTOFLOWDICS
Name: Jiangtao Cheng
Department: Mechanical Engineering
Office Phone: 540-231-7183
Fax: 540-231-9100
E-mail: chengjt@vt.edu


Applications: Optofluidic solar concentrators; adaptive hot spot cooling; binary photonic crystallization; liquid-based intelligent high-frequency components

Expertise: Thermal-fluid sciences; microelectromechanical systems; micro/nano-fabrication; computational fluid dynamics and numerical simulation; surface plasmon resonance and terahertz technology

Examples of Funding Sources: NSF, DARPA, Advanced Research Projects Agency-Energy, NASA, National Science Foundation of China

MICROMECHANICS
see Aerospace Engineering, Bayandor

MICROSCALE GAS SIMULATIONS
see Computational Fluid Dynamics, Roy

MINERAL PROCESSING

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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, NSF

MINERAL PROCESSING

Coal Preparation

Name: Gerald H. Luttrell
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Home Phone: 540-230-7112
Fax: 540-231-4070
E-mail: luttrell@vt.edu
URL: www.mining.vt.edu/facultystaff/luttrell.htm

Specialty: Coal Preparation and Primary/Secondary Materials Processing

Applications: Development of innovative solid-solid and solid-liquid separation technologies for coal preparation; minerals processing; pollution prevention and environmental restoration; formulation and application of fundamental process engineering concepts for advanced particulate separations including equipment design, process scale-up, modeling, and circuit simulation; plant optimization and process automation and control; promotion of technology transfer via industrially-oriented short courses, workshops, and extension activities

Expertise: Removing critical technology barriers in coal, mineral and other particulate processing industries that reduce waste, provide energy savings, minimize pollution, create new markets, and increase the rate of return on investment

Examples of Funding Sources: U.S. Department of Energy
MINING
Name: Mario G. Karfakis
Department: Mining and Minerals Engineering
Office Phone: 540-231-5085
Fax: 540-231-4070
E-mail: mario@vt.edu
Specialty: Rock Mechanics
Applications: Rock structure stability; in situ testing and monitor-
ing
Expertise: Rock fragmentation; surface mining
Examples of Funding Sources: National Institute for Occupa-
tional Safety and Health

MINING
Sustainable Development of Mineral and Energy Resources and Carbon Management
Name: Michael Karmis
Department: Mining and Minerals Engineering
Office Phone: 540-231-5273
Home Phone: 540-953-1722
Fax: 540-231-4078
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; mining systems; energy systems; health, safety, and environment; carbon man-
agement technologies
Examples of Funding Sources: U.S. Department of Energy, National Institute for Occupational Safety and Health, U.S. Environmental Protection Agency

MINING
Name: Kray Luxbacher
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Office Phone: 540-231-2244
Home Phone: 540-641-2046
Fax: 540-231-4070
E-mail: kraylux@vt.edu
URL: www.mining.vt.edu/facultystaff/luxbacher.htm
Specialty: Ventilation Engineering
Applications: Utilization of schlieren and shadowgraph tech-
niques 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 under-
ground mines; optimization of coal bed methane degasification systems; coal bed 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; real time atmospheric monitoring of underground coal mines
Expertise: Coalbed-methane reservoir modeling; degasification design and optimization; underground ventilation modeling and design; atmospheric monitoring; gas analyses
Examples of Funding Sources: National Institute of Occupational Safety and Health, U.S. Environmental Protection Agency

MINING
Name: Erik C. Westman
Department: Mining and Minerals Engineering
Office Phone: 540-231-7510
Fax: 540-231-4070
E-mail: ewestman@vt.edu
Specialty: Rock Mechanics/Geomechanics
Applications: Strata monitoring
Expertise: Instrumentation and monitoring; tomographic imaging; digital data acquisition and signal processing
Examples of Funding Sources: NSF, U.S. Department of Energy, National Institute of Occupational Safety and Health

MINING
Name: Roe-Hoan Yoon
Department: Mining and Minerals Engineering
Office Phone: 540-231-7056
Fax: 540-231-3948
E-mail: ryou@vt.edu
Specialty: Mineral Processing, Fine Particle Dewatering, Hydrophobic Interaction, Colloid and Surface Chemistry, Fine Coal Cleaning, Corrosion Inhibition, Flotation, Modeling Flotation, Electrochemistry
Applications: Fine coal dewatering; fine particle separation; flotation reagent; process development for mineral and coal processing
Examples of Funding Sources: U.S. Department of Energy, FLSmidth

MINING AND MINERALS ENGINEERING / ENVIRONMENTAL ENGINEERING
Name: Emily Sarver
Department: Mining and Minerals Engineering
Office Phone: 540-231-8139
Fax: 540-231-4070
E-mail: esarver@vt.edu
Specialty: Resource Production, Environment
Applications: Mine environmental monitoring and characterization; sustainable development of energy and mineral resources; consumer and industry issues associated with premature corrosion
Expertise: Mining and environment, mineral processing; water quality; corrosion
Examples of Funding Sources: National Institute for Occupational Safety and Health, Alpha Foundation for Improvement of Mine Safety and Health, Appalachian Research Initiative for Environmental Science

MIXING
see Fluid Mechanics, Stremler

MODELING AND ANALYSIS
see Optimization, Sherali

MOLECULAR BIOLOGY
see Environmental Engineering, Pruden

MOLECULAR LEVEL SIMULATIONS
see Finite Element Method / Computational Mechanics, Batra

MOLECULAR MODELING
see Computational Science, Onufriev

MOTIVATION
Name: Holly M. Matusovich
Department: Engineering Education
Office Phone: 540-231-4205
Fax: 540-231-6903
E-mail: matushm@vt.edu
Specialty: Student Motivation for Learning Engineering, Career Choice, Retention of Students in Engineering, Science, Math and Technology Fields, Diversity and Engineering, Engineering Identity Development, Faculty Motivation to Adopt Optimal Teaching Practices
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 and mixed education research methods
Examples of Funding Sources: NSF

MULTIFUNCTIONAL MATERIALS
see also Polymers, Bortner

MULTIFUNCTIONAL MATERIALS AND SYSTEMS
Name: Shashank Priya
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E-mail: spriya@vt.edu
URL: www.sites.me.vt.edu/cehms
Specially: Smart Materials and Composites; Nanostructures; Energy Harvesting; Bio-inspired Technology
Applications: Electric energy generation from vibrations, wind, sunlight, and magnetism; wireless sensors and communication; unmanned vehicles; power electronics; ultrasonic motor; robots
Expertise: Piezoelectric, magnetoelectric, thin film deposition; multilayer manufacturing; 3-D printing; bio-inspired robot manufacturing; energy harvester based system design

MULTIMEDIA
see Computers, Tront

MULTIPHYSICS MODELING AND COMPUTATION
Name: Kevin G. Wang
Department: Aerospace and Ocean Engineering
Office Phone: 540-231-6611
Fax: 540-231-9632
E-mail: kevinwgy@vt.edu
Applications: Unmanned underwater vehicles; underwater explosion and implosion; micro aerial vehicle; shock wave lithotripsy
Expertise: Fluid-structure coupled analysis; nonlinear aeroelasticity; high-performance computing; atomic-to-continuum computing
Examples of Funding Sources: Office of Naval Research, Army Research Laboratory

MULTISCALE COMPUTING
see Fluid-Structure Interaction, Wang

NANOBIO TECHNOLOGY
see Materials, Pickrell

NANOCOMPOSITES
see also Polymers, Bortner

NANOCOMPOSITES
Name: Gary Don Seidel
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Office Phone: 540-231-9897
Fax: 540-231-9632
E-mail: gary.seidel@vt.edu
URL: www.aoe.vt.edu/~gdseidel

**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

**NANOMATERIALS**

*see Metallurgy, Aning Multifunctional Materials and Systems, Priya Polymers, Bortner*

**NANOSCALE DEVICES AND SYSTEMS**

**Name:** Wei Zhou
**Department:** Electrical and Computer Engineering
**Office Phone:** 540-231-7494
**Fax:** 540-231-3362
**E-mail:** wzh@vt.edu

**Specialty:** Nanophotonic and Nanoelectronic Devices, Systems

**Applications:** Point-of-care testing and diagnosis, wearable and implantable biomedical devices and systems, nanoscale components for optical interconnects in the next generation computing system, thin film photovoltaics

**Expertise:** Development and fabrication of novel nanoscale devices and systems, electrical and optical characterization, numerical simulation and modeling

**Examples of Funding Sources:** NSF, NIH, U.S. Department of Energy

**NANOSCALE MATERIALS CHARACTERIZATION**

**Name:** Mitsuhiro (Mitsu) Murayama
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**Office Phone:** 540-357-0466
**Fax:** 540-231-8919
**E-mail:** murayama@vt.edu

**URL:** www.geochem.geos.vt.edu/environano/welcome.html

**Specialty:** Scanning/Transmission Electron Microscopy (S/TEM), Electron Tomography, Energy Dispersive X-ray Spectroscopy, Electron Energy Loss Spectroscopy

**Applications:** Nanoscale materials characterization of structural and functional materials (metallic materials, ceramics, etc); chemical analysis and quantitative 3-D microstructure characterization of nanostructured materials; nano-minerals; soft materials; nanoscale characterization of surface reaction such as passivation, corrosion, and catalytic reaction

**Expertise:** Atomic resolution electron microscopy; electron energy loss spectroscopy; electron tomography

**Examples of Funding Sources:** U.S. Department of Energy, NSF, Japan Society for the Promotion of Science, Japan Science and Technology Agency, 3M

**NANOSCIENCE**

*see Nuclear Engineering, Pierson*
NANOstructures
see Finite Element Method / Computational Mechanics, Batra
Multifunctional Materials and Systems, Priya

Nanotechnology
see Air Pollution, Marr
Biomedical Engineering, Bickford, Verbridge
Environment, Vikesland
Fluid Mechanics, Paul
Heat Transfer, Huxtable
Materials, Lu, Pickrell
Optoelectronics, Asryan
Semiconductor Materials and Devices, Guido
Theoretical and Experimental Solid Mechanics, Al-Haik

Natural Gas / Coal Mining
Name: Nino Ripepi
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Office Phone: 540-231-5458
Fax: 540-231-4078
E-mail: nino.ripepi@vt.edu
Specialty: Unconventional Natural Gas Production and Enhancement, Underground Coal Mine Degasification, Hydraulic Fracturing
Applications: Greenhouse gas mitigation; carbon sequestration; enhanced gas recovery
Expertise: Geologic characterization; reservoir modeling; field monitoring (wellbore logging and microseismic monitoring)
Examples of Funding Sources: U.S. Department of Energy, U.S. Environmental Protection Agency, National Institute of Occupational Safety and Health

Networks
see Computer Science, Feng

Network and Information Security
Name: Wenjing Lou
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Office Phone: 703-538-3774
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URL: www.cnsr.ictas.vt.edu/
Applications: Authentication, integrity, confidentiality for wireless networks, networked information systems, and cloud computing; key management in mobile systems; user data privacy protection in cloud computing; DDoS attacks; botnet detection
Expertise: Security and privacy protocols and architectures; physical layer security in wireless networks; network security monitoring; cryptographic protocol design and analysis
Examples of Funding Sources: NSF, Office of Naval Research

Network Dynamics
see Construction Engineering and Management, Taylor

Network Security
see also Network and Information Security, Lou

Network Security, Wireless Networking
Name: Jung-Min (Jerry) Park
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URLs: www.ece.vt.edu/faculty/park.html; www.arias.ece.vt.edu/
www.bwac.wireless.vt.edu; www.wireless.vt.edu
Applications: Wireless communications and networking; security and privacy
Expertise: Cognitive radio networks; dynamic spectrum sharing technologies; wireless security; privacy enhancing technologies; applied cryptography
Examples of Funding Sources: NSF, DARPA, NIH Army Research Office, Office of Naval Research

NETWORKING AND COMPUTING
Name: Ing-Ray Chen
Department: Computer Science
Office Phone: 703-538-8376
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E-mail: irchen@vt.edu
URL: www.cs.vt.edu/~irchen
Applications: Adaptive network defense management for countering smart attack and selective capture in wireless sensor networks; trust-based service management for social Internet of things systems; behavior rule specification-based intrusion detection for safety critical medical cyber physical systems; dynamic trust management for delay tolerant networks and its application to secure routing; hierarchical trust management for wireless sensor networks and its application to trust-based routing and intrusion detection
Expertise: Network and service management; performance and reliability analysis
Examples of Funding Sources: NSF, Microsoft Research, Intel, Army Research Office, Army Research Lab, Naval Research Office, Army Corps of Engineers, SAIC

NEUROENGINEERING
Name: Pamela J. VandeVord
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Office Phone: 540-231-1994
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E-mail: pvord@vt.edu
Specialty: Neurotrauma, Injury Biomechanics, Tissue Engineering
Applications: Traumatic brain injury; protective equipment; nanomedicine; rehabilitation; nerve conduits; electrodes; cell models; molecular biology
Expertise: Development; implementation and testing of novel treatments for cellular injury
Examples of Funding Sources: Veterans Administration, U.S. Department of Defense, NIH, U.S. Army

NOISE
see Acoustics, Fuller
Human Factors Engineering, Casali

NONDESTRUCTIVE EVALUATION (NDE)
see Damage Science and Mechanics, Duke

NONLINEAR DYNAMICS
Name: Muhammad R. Hajj
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Nonlinear Dynamics and Control, Chaos, Time-Series Analysis
Detecting causality in complex systems; analysis of complex flows; environmental flow analysis; airborne microbe spread and modeling; Lagrangian coherent structures; critical transitions; bifurcation analysis and prediction; stirring and mixing; analysis of biomechanical data; biomechanics of bipedal gait and postural control; atmospheric flow analysis; orbital mechanics and interplanetary space mission design.
Dynamical systems analysis; time-series analysis; causality detection; bifurcation analysis; stability and control in nonlinear systems; state space reconstruction; transfer operators; dynamics of natural and engineered systems; computer visualization; Hamiltonian systems.

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Mechanical Engineering
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Particle Transport Theory and Simulation; Monte Carlo Methods; Parallel Computing; Reactor Design, Physics and Analysis Methods; Generation of Multigroup Cross Sections; Real-System Modeling and Simulation; Radiation Shielding and Dosimetry; Design of Nondestructive Passive Detection and Active Interrogation Systems; Nuclear Nonproliferation, Security and Safeguards; Perturbation and Sensitivity Methods in Reactor Analysis; Applied Mathematics and Numerical Techniques; Simulation-Based Medical Imaging; Digital Instrumentation and Monitoring; Software Development; Determination of Computational Uncertainties; Digital Reactor Protection System Licensing; Research Reactor Licensing.
Nuclear power; nuclear security and safeguards for nonproliferation; nuclear policy; radiation diagnosis and therapy.
Development of numerical methods for solving the...
linear Boltzmann equation; development of variance reduction techniques for the Monte Carlo methods; development of unbiased and statistically reliable Monte Carlo techniques; reactor physics theory analysis methodologies; multi-scale, multi-physics modeling and simulation of nuclear systems; development of efficient and accurate hybrid methodologies; development of parallel algorithms; development of advanced methodologies for multigroup cross-section generation; design of nondestructive passive detection and active interrogation systems for specialized nuclear materials (SNMs) and nuclear safeguards; development of simulation-based imaging algorithms for medical devices; design and analysis of digital protection systems; design of reactor on-line monitoring systems


NUCLEAR ENGINEERING

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URL: www.me.vt.edu/nuclear
Applications: Nuclear safeguards and nonproliferation through alternative reactor design and alternative fuels; nuclear fuel cycle analysis and alternative fuel cycles; radiation detection arrays
Expertise: Alternative reactor technology; accelerator-driven sub-critical systems; computational reactor kinetics; computational particle transport; radiation detection; nano-nuclear science
Examples of Funding Sources: Nuclear Regulatory Commission, Department of Energy – Office of Nuclear Energy, National Nuclear Security Agency

OCEAN

see Geotechnical Engineering, Stark

OPERATIONS RESEARCH

see also Industrial Engineering Simulation, Koelling Optimization, Sherali

OPERATIONS RESEARCH

Name: Douglas R. Bish
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E-mail: drb1@vt.edu
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: NSF
OPTICAL IMAGING
Name: Yizheng Zhu
Department: Electrical and Computer Engineering
Office Phone: 540-231-1973
Fax: 540-231-3362
E-mail: yizhu1@vt.edu
Specialty: 2-D and 3-D Imaging, Biomedical Imaging, Optical Endoscope
Applications: Cell and tissue characterization; disease diagnosis; surface profiling; particle tracking
Expertise: Coherent imaging; phase microscopy; optical interferometry; clinical system development
Examples of Funding Sources: NSF, NIH

OPTICAL MICROSCOPY
see Optical Imaging, Zhu

OPTICAL SENSING
see Advanced Diagnostics, Ma

OPTIMIZATION
see also Manufacturing, Sarin
Transportation, Rakha

OPTIMIZATION
Name: Subhash C. Sarin
Department: Industrial and Systems Engineering
Office Phone: 540-231-7140
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E-mail: sarins@vt.edu
URL: www.ise.vt.edu/People/Sarin
Specialty: Optimization, Production Scheduling, Production Planning and Control
Applications: Modeling; analysis; and algorithmic development for various problems encountered in manufacturing/logistics systems (scheduling; sequencing; lot sizing; lot streaming; aggregate/capacity planning; assembly line design; distribution logistics; reverse supply chain; batching; advanced planning and scheduling (over a supply chain); and biomass logistics)
Expertise: Algorithmic development; modeling and analysis; applied mathematical programming

OPTIMIZATION
Optimization and Modeling
Name: Hanif D. Sherali
Department: Industrial and Systems Engineering
Office Phone: 540-231-5474
Home Phone: 540-808-5471
Fax: 540-231-3322
E-mail: hanifs@vt.edu
URL: https://sites.google.com/a/vt.edu/sherali-webpage/
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 development for linear, networks, nonlinear, non-convex, and discrete optimization problems having different structures and arising in various applications

OPTIMIZATION
High Performance Computing
Name: Layne T. Watson
Department: Computer Science; Mathematics; Aerospace and Ocean Engineering
Office Phone: 540-231-7540
Fax: 540-231-6075
E-mail: ltw@vt.edu
URL: www.cs.vt.edu/~ltw/
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; machine learning
Examples of Funding Sources: U.S. Air Force Office of Scientific Research, NASA, NSF, NIH, Michelin Americas, Department of Energy

OPTOELECTRONICS
see also Semiconductor Materials and Devices, Guido

OPTOELECTRONICS
Name: Levon V. Asryan
Department: Materials Science and Engineering
Office Phone: 540-231-7033
Fax: 540-231-8919
E-mail: asryan@vt.edu
URL: http://www.mse.vt.edu/people/faculty/asryan.html
Specialty: Physics, Electronics
Applications: Semiconductor (diode) lasers; telecommunication, optical fiber communication; optical data storage and recording; optical signal processing; optical pumping of solid-state lasers; chemical sensing and spectroscopy
Expertise: Physics of semiconductors and semiconductor devices; optoelectronics and photonics, nano- and microelectronics; low dimensional heterostructures, nanostructures, quantum dots, and quantum wells; theory of semiconductor quantum dot lasers and quantum well lasers
Examples of Funding Sources: U.S. Army Research Office, U.S. Air Force Office of Scientific Research

ORGANIZATIONS
see Industrial Engineering and Management Systems, Van Aken

ORTHOPEDICS
see Biomechanics, Queen

OZONE
see Air Pollution, Marr
Catalysis, Oyama
PARALLEL AND DISTRIBUTED SYSTEMS AND APPLICATIONS

Name: Kirk W. Cameron
Department: Computer Science
Office Phone: 540-231-4238
Fax: 540-231-6075
E-mail: cameron@vt.edu
URL: scape.cs.vt.edu


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: NSF, U.S. Department of Energy, Intel Corporation, Ixia Corporation, National Partnership for Advanced Computational Infrastructure, National Center for Supercomputing Applications

PARALLEL COMPUTING

see also Optimization, Watson

PARALLEL COMPUTING

Name: Cal Ribbens
Department: Computer Science
Office Phone: 540-231-6262
Fax: 540-231-6075
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URL: people.cs.vt.edu/~ribbens


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: NSF, U.S. Department of Energy

PATHOGENS

see Environmental Engineering, Pruden

PATTERN RECOGNITION

see Computer Vision, Parikh

Machine Learning, D. Batra

PAVEMENTS

Infrastructure Management Systems, Sustainable Infrastructure

Name: Gerardo W. Flintsch
Department: Civil and Environmental Engineering
Office Phones: 540-231-9748 (CEE); 232-1569 (VTTI)
Fax: 540-231-7532 (CEE); 231-1555 (VTTI)
E-mail: flintsch@vt.edu

Specially: Infrastructure Management, Pavement Engineering, Sustainable Infrastructure

Applications: Planning and programming of infrastructure
construction, rehabilitation, and maintenance works; design of highway and airport pavements; condition assessment, risk analysis, and life-cycle analysis of constructed facilities; development of more sustainable construction materials, construction and maintenance processes; and preservation and renewal programs

**Expertise:** Infrastructure condition assessment and performance prediction; pavement evaluation, design, and management; application of soft computing, geographic information systems

**Examples of Funding Sources:** NSF, The National Academies, Federal Highway Administration, Virginia Department of Transportation, Virginia’s Center for Innovative Technology, Strategic Highway Research Program 2

**PERFORMANCE**

see Industrial Engineering and Management Systems, Van Aken

**PERSONALIZED MEDICINE**

see Bioinformatics, Wang

**PHOTONICS**

see also Materials, Pickrell

**PHOTONICS**

*Name:* Anbo Wang  
*Department:* Electrical and Computer Engineering  
*Office Phone:* 540-231-4363  
*E-mail:* awang@vt.edu  
*URL:* www.photonics.ece.vt.edu  
*Specialty:* Fiber Optics, Sensors  
*Applications:* Point and distributed sensors for physical, chemical or biological measurement; sensors for extreme physical and chemical conditions  
*Expertise:* Development of novel fiber optic sensors and instrumentation systems and self-calibrated sensor signal processing  
*Examples of Funding Sources:* NSF, U.S. Department of Energy, Electric Power Research Institute, General Electric, Pratt & Whitney, Siemens, Chevron

**PHOTONIC MATERIALS**

see Optoelectronics, Asryan  
*Materials,* Pickrell

**PLASMA PHYSICS**

*Name:* Bhuvana Srinivasan  
*Department:* Aerospace and Ocean Engineering  
*Office Phone:* 505-667-3399  
*E-mail:* bhuvana@lanl.gov  
*Specialty:* Computational Plasma Physics, Space Plasma Propulsion, Inertial/Magnetic Confinement Fusion, Space Plasma Physics, High Energy Density Physics, Numerical Methods for Hyperbolic Problems  
*Applications:* Fusion energy; advanced space propulsion; interactions of solar mass ejections with satellites; studying the earth’s magnetosphere and ionosphere  
*Expertise:* Computational and theoretical development to support experiments in plasma physics relevant to propulsion, fusion, and space plasma physics  

**PLASMA PROPULSION**

see Plasma Physics, Srinivasan
POLYMER AND COLLOID CHEMISTRY

Name: Richey M. Davis
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Specialty: Polymer and Colloid Chemistry; Block Copolymers; Ion-Containing Polymers; Water-Soluble Polymers; Self-Assembled Thin Films; Synthesis and Characterization of Polymeric, Metal Oxide, and Metallic Nanoparticles; Suspension Rheology

Applications: Improve drug delivery using polymer nanoparticles with controlled size and composition to control biodistribution; develop nanoparticles with magnetic resonance imaging agents to track drug delivery and biodistribution; develop novel methods for producing nanoparticles with improved control of size distribution, surface chemistry, and chemical composition for use in pharmaceuticals, coatings, adhesives, and electronics

Expertise: Self-assembly of polymers at interfaces and the engineering of nanostructured particles for biomedical applications such as drug delivery and imaging; physical and colloid chemistry of polymer solutions and suspensions and adsorption and self-assembly at interfaces; adsorption of polymers onto suspended colloidal particles; processing of fluids such as pharmaceutical products, ceramic suspensions for structural and electronic applications, adhesives, paper coatings, paints, and processed foods; rheology control agents and microencapsulation systems

POLYMERS

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

POLYMERS

Processing of Polymers and Their Composites; Rheology; Non-Newtonian Fluid Mechanics; Properties

Name: Donald G. Baird
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URL: www.che.vt.edu/Faculty/Baird/home.html
E-mail: dbaird@vt.edu

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 compression moldable composites for the generation of bipolar plates in fuel cells; use of supercritical carbon dioxide to replace toxic organic solvents; micro-composite materials; exfoliated nano-clays using supercritical carbon dioxide; simulation of processing of fiber-reinforced thermoplastics; generation of composite materials for use in additive manufacturing

Expertise: Polymer rheology and flow; mechanical properties of polymers and their relation to processing; processing operations including injection molding, thermoforming, film blowing, extrusion, additive manufacturing, and compression molding

Examples of Funding Sources: NSF, Department of Energy, DARPA, Air Force Office of Scientific Research, American Chemical Council, Bayer, General Motors, Equisat Chemicals, Oak Ridge National Laboratory
POLYMERS
Name: Justin Barone
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Office Phone: 540-231-0680
Fax: 540-231-3199
E-mail: jbarone@vt.edu
Specialty: Biopolymers, Extrusion, Fibers, Injection-Molding, Polymer Physics and Processing
Applications: Biodegradable Plastics, High Performance Fibers
Expertise: Engineering proteins to self-assemble into high performance fibers, biomanufacturing of new biopolymer materials
Examples of Funding Sources: NSF, Environmental Protection Agency

POLYMERS
Name: Michael Bortner
Department: Chemical Engineering
Office Phone: 540-231-4213
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E-mail: mbortner@vt.edu
Specialty: Polymer Nanocomposites; Nanostructured Materials and Surfaces; Polymer Morphology and Structure-Property Relationships; Surface and Interface Phenomena in Polymers
Applications: Additive manufacturing; composite processing; smart materials; advanced materials; structural composites; multifunctional coatings
Expertise: Nanomaterial dispersion and characterization; manufacturing process development; novel nanocomposite characterization techniques; transport at polymer / particle interfaces and in multi-phase systems
Examples of Funding Sources: Office of Naval Research, Air Force Research Laboratory, U.S. Dept. of Energy, Army Research Laboratory, U.S. Department of Agriculture

POWER ELECTRONICS
see also Materials, Lu

POWER ELECTRONICS
Name: Jason Lai
Department: Electrical and Computer Engineering
Office Phone: 540-231-4741
Fax: 540-231-3362
E-mail: laijas@vt.edu
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; photovoltaic and wind power generation; utility grid
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,Voltar, Ford, Texas Instruments, Industrial Technology Research Institute, Korean Electrotechnology Research Institute

POWER ELECTRONICS
Power Conversion and Applications
Name: Fred C. Lee
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E-mail: fcllee@vt.edu
Specialty: Power Electronics
Applications: Develop efficient power conversion technologies ranging from power supplies for microprocessors, comput-
ers, mobile devices, communication equipment and systems; transportations, electric vehicles, renewable energy, and smart grids

Expertise: High frequency power semiconductor devices; high frequency magnetics; soft switching technologies; power conversion topologies and architectures; distributed power systems; space power systems; power electronics packaging and integrations; power quality; EMI/EMC; modeling and control, computer-aided design tools


POWER ELECTRONICS

Name: Khai Ngo
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Specialty: High Density Integration, Modeling and Control, Power Conversion, Topologies and Architectures, Power Electronics Components, Packaging

Applications: Power management for computers; telecommunications; renewable energy systems; vehicular power converter systems

Examples of Funding Sources: Boeing, Department of Energy, Nissan, Texas Instruments, NSF, Rolls-Royce, Toyota, Mitsubishi, Halliburton

POWER SYSTEMS ANALYSIS

Name: Cansin Yaman Evrenosoglu
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Office Phone: 540-231-1672
Fax: 540-231-3362
E-mail: yamanc@vt.edu

Specialty: Power System Analysis, Design, Operation and Protection

Applications: Applications of statistics; signal processing and optimization methods in power system analysis and operation; integration of large-scale renewables to smart grid; smart fault location in power transmission and distribution systems

Expertise: Power system dynamic/static state estimation and forecasting; wholesale competitive electric energy market analysis; fault location; power system dynamic analysis; time-series analysis; forecasting

Examples of Funding Sources: Department of Defense, Department of Energy, NSF

POWER SYSTEMS PROTECTION AND CONTROL

Name: James S. Thorp
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Office Phone: 540-231-2946
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E-mail: jsthorp@vt.edu

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: NSF, U.S. Department of Energy, California Energy Commission

PRECISION FARMING
see Biomass Harvest, Storage, and Delivery, Grisso

PRESTRESSED CONCRETE
see Bridge Design, Roberts-Wollmann

PRINTING
see Computer-Aided Design and Manufacturing, Bøhn Manufacturing, Williams

PROCESS SYSTEM ENGINEERING
Name: Y.A. Liu
Department: Chemical Engineering
Office Phone: 540-231-7800
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E-mail: design@vt.edu
URL: www.design.che.vt.edu
Applications: Energy and water savings; carbon reduction, solvent selections in drug manufacturing; industrial water reuse and wastewater minimization
Examples of Funding Sources: Alliant Techsystems, Aspen Technology, Inc., China Petroleum and Chemical Corporation, PetroChina Company Limited, Mid-Atlantic Technology, Research and Innovation Center, Milliken Chemical, Novozymes Biological, Universal Fibers, Marathon Petroleum

PRODUCTION PLANNING
see Manufacturing, Camello, Sarin Logistics, Ellis

PRODUCTION SYSTEMS
see Optimization, Sarin

PROGNOSIS
see Damage Science and Mechanics, Duke

PROPAGATION
see Radio Engineering, Ellingson

PROPULSION STRUCTURES
see Aerospace Engineering, Bayandor

PROTEOMICS
see Advanced Materials Manufacturing, Yu

PUBLIC-PRIVATE PARTNERSHIPS
Name: Michael J. Garvin
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Office Phone: 540-231-7255
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E-mail: garvin@vt.edu
Specialty: Capital Planning, Risk Assessment and Allocation, Procurement Methods, Contracts
Applications: Large-scale infrastructure or building projects; program development and management
Expertise: Economic and financial modeling; procurement design and implementation; contract design
Examples of Funding Sources: NSF, Virginia Department of Transportation
RADAR
see Acoustics, Roan
Energy Conversion Systems, Odendaal
Ionospheric and Space Physics, Ruohoniemi

RADIATION
see Nuclear Engineering, Pierson

RADIO ENGINEERING
Name: Steven W. Ellingson
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URL: www.ece.vt.edu/swe/
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: NSF, 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, Scales
Electromagnetics, Manteghi

RAPID PROTOTYPING
see Computer-Aided Design and Manufacturing, Bøhn
Manufacturing, Williams

REACTION FLOWS
see Computational Fluid Dynamics, Battaglia

REINFORCED CONCRETE
see Bridge Design, Roberts-Wollmann

RELIABILITY AND QUALITY CONTROL
Name: Joel A. Nachlas
Department: Industrial and Systems Engineering
Office Phone: 540-231-5357
E-mail: nachlas@vt.edu
SPECIALTY: Reliability Modeling and Analysis, Life Testing, Maintenance Planning, Statistical Analysis, Process Control
APPLICATIONS: Manufacturing; transportation; and communications equipment
EXAMPLES OF FUNDING SOURCES: IBM, Intelsat, NSF, Meridium, Inc.

REMOTE SENSING
see also Advanced Diagnostics, Ma

REMOTE SENSING
Name: Scott Bailey
Department: Electrical and Computer Engineering
Office Phone: 540-231-0459
Fax: 540-231-3362
E-mail: baileys@vt.edu
URL: www.space.vt.edu
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: NSF, U.S. Office of Naval Research

REMOTE SENSING

Name: Joseph B.H. Baker
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Office Phone: 540-231-3355
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Specialty: Atmospheric and Space Science
Applications: High-frequency propagation; environmental radar; space weather
Expertise: Space plasma physics; radiowave propagation; ionosphere physics; magnetosphere
Examples of Funding Sources: NSF, NASA

RENEWABLE ENERGY

see Aerospace Engineering, Bayandor Power Electronics, Lee

RESILIENCE

see Infrastructure Performance, Flint Transportation, Heaslip

RIVER MECHANICS

see Environmental Hydraulics, Strom

ROBOTICS

see also Autonomous Systems, Leonessa Control Theory, Silhwell, Woolsey

Control Theory / Autonomous Systems, Farhood Dynamical Systems, Abaid
Engineering Design, Sturges
Mechanical Engineering, Wicks

ROBOTICS

Name: Bahareh Behkam
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Office Phone: 540-231-7491
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E-mail: behkam@vt.edu
Specialty: Micro-Robotics, Biological Microfluidics, Bacteria-Based Theranostics, Cell Adhesion and Migration
Applications: Harvesting motility, sensing, and control mechanisms of microorganisms towards development of hybrid (biotic/abiotic) micro-robots; micro-robotic applications in minimally invasive diagnosis and localized treatment of diseases, environmental monitoring, and homeland security; biophysics of cell motility and chemotaxis; physical chemistry of cell-surface interaction, 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 cell motility and adhesion; drug delivery for cancer
Examples of Funding Sources: Jeffress Memorial Trust, NSF

ROBOTICS

Name: Pinhas Ben-Tzvi
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E-mail: bentzvi@vt.edu
**Specialty:** Robotics and Autonomous Systems, Mechatronics, Dynamic Systems and Control, Human-Robot Interaction, Mechanism Design and System Integration, Sensors and Actuators

**Applications:** Autonomous field robots for search and rescue, hazardous environment sensing/monitoring, surveillance, reconnaissance; bio-inspired flexible robots for agile maneuvering of legged/mobile robots; autonomous UAV launch and recovery from naval vessels; upper-extremity robotic exoskeletons and haptics devices for teleoperation and rehabilitation; novel sensors and actuators for biomedical applications

**Expertise:** Design, development, implementation and testing of autonomous dexterous manipulation and locomotion systems; design of flexible/modular/articulated robots with intrinsic actuation, distributed position/force sensing and estimation; optimal design of high-precision mechanisms for parallel and serial robot architectures using flexible/modular/articulated links and joints; algorithms for kinematic and actuation redundancy resolution and task planning for optimal robot locomotion and manipulation

**Examples of Funding Sources:** NSF, DARPA, Office of Naval Research, U.S. Navy

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**ROBOTICS**

**Name:** Pratap Tokekar  
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**E-mail:** tokekar@vt.edu

**Specialty:** Planning, Coordination, and Decision-Making Algorithms for Robots; Aerial, Ground, Marine Robots

**Applications:** Robots in precision agriculture; environmental monitoring; service robots; autonomous systems; surveillance; search and rescue; infrastructure inspection; robotic cameras

**Expertise:** Multi-robot coordination; robotic sensor networks; robotic data collection; target tracking; sensor placement; robotic vision; communication-aware planning; energy optimization and solar energy harvesting; Bayesian filters; combinatorial optimization; computational geometry; indoor and outdoor ground robots, robotic boats, and UAVs; theoretical analysis and field deployments

**Examples of Funding Sources:** NSF, U.S. Department of Agriculture, Office of Naval Research, Air Force Office of Scientific Research, DARPA, Intelligence Advanced Research Projects Agency

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**ROTOR DYNAMICS**

see Machine Health Monitoring, Kasarda

**SCIENTIFIC COMPUTING**

see Data Analytics, Ramakrishnan

**SECURITY**

see Control System Security, Patterson

**SEDIMENT TRANSPORT**

see Coastal Engineering, Xiao  
**Environmental Hydraulics, Strom**

**SEMICONDUCTOR**

see also Optoelectronics, Asryan

**SEMICONDUCTOR MATERIALS AND DEVICES**

**Name:** Louis J. Guido  
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**Specialty:** Semiconductor Materials Synthesis and Characterization, Semiconductor Device Fabrication and Testing

**Applications:** Solid-state light sources (III-V semiconductor quantum well lasers and LEDs), photovoltaics and thermophotovoltaics (group-III nitride semiconductors), power electronics (group-III nitride semiconductors)

**Expertise:** Synthesis of III-V semiconductor alloys, heterostructures, and quantum wells via organo-metallic vapor phase epitaxy (OMVPE), physics of electronic and optoelectronic devices operating under extreme conditions (high power, high temperature, radiation damage, light emission/detection at UV or FIR wavelengths)

**Examples of Funding Sources:** NSF, Air Force Office of Scientific Research, Army Research Office, Advanced Research Projects Agency – Energy, NASA, Commonwealth of Virginia (Center for Innovative Technology)

### SEMICONDUCTOR MATERIALS AND DEVICES

**Name:** Mantu K. Hudait
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**Specialty:** Strain and Bandgap Engineering Compound Semiconductors and Germanium Materials and Device Structures using Molecular Beam Epitaxy, Perovskites and Oxide Materials Integration on Epitaxial Ge, Heterostructure Tunnel and Quantum Well Transistors, Multijunction III-V Photovoltaics and Thermophotovoltaics, Heterogeneous Integration of Materials and Devices on Silicon

**Applications:** Low power and high-speed computing; sustainable energy; multifunctional devices for health care; sensing; detection; communication

**Expertise:** Design; growth and device fabrication of low power and high-speed transistors using molecular beam epitaxy for alternative CMOS on Si; heterogeneous integration of semiconductor materials and electronic/optoelectronic devices on silicon; tunnel and quantum well transistors; multijunction solar cells; germanium epitaxy and mismatch epitaxy

**Examples of Funding Sources:** NSF, Intel Corporation, Virginia Space Grant Consortium

### SEMICONDUCTOR TECHNOLOGY

**Name:** Marius Orłowski
**Department:** Electrical and Computer Engineering
**Office Phone:** 540-231-3297
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**Specialty:** Complementary Metal-Oxide Semiconductor Technology

**Applications:** MOSFET and floating gate transistors; non-volatile memory; DRAM; SRAM; resistive RAM memory; nanowire; and nanoribbon processing and characterization; Si and Ge processing technology; dopant diffusion in silicon and germanium

**Expertise:** Process development and integration; thin film deposition; device and process modeling

**Examples of Funding Sources:** Air Force, Virginia Microelectronics Consortium, Sematech

### SENSORS

see Energy, Diller Robotics, Ben-Tzvi Theoretical and Experimental Solid Mechanics, Al-Haik
SHIP DESIGN
see also Optimization, Watson
Semiconductor Materials and Devices, Hudait

SHIP DESIGN
Naval Architecture, Marine Safety, Ship Dynamics

Name: Alan J. Brown
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E-mail: brown@aoe.vt.edu

Specially: 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, Society of Naval Architects and Marine Engineers, Newport News Shipyard

SIGNAL PROCESSING
see Acoustics, Roan
Advanced Diagnostics, Ma
Computer and Communications Engineering, Athanas
Digital Signal Processing, Beex
Dynamics and Control, Southward
Smart Grids Signal Processing, Mili

SIMULATION
see also Software Engineering, Balci

SIMULATION, OPTIMIZATION

Name: Xi Chen
Department: Industrial and Systems Engineering
Office Phone: 540-231-4695
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E-mail: xchen6@vt.edu

Specially: Stochastic Modeling and Simulation, Computer Experiment Design and Analysis, Simulation Optimization
Applications: Simulation-based control and optimization questions arising in a wide variety of contexts such as vehicular traffic networks, telecommunication systems, epidemic modeling, toxicology and defense

Expertise: General Monte Carlo methodology for input modeling and output analysis; computer experimental design and response surface methodology and techniques for stochastic simulation; metamodel-assisted derivative-free algorithms for solving stochastic optimization problems

Examples of Funding Sources: NSF, Office of Naval Research

SIX SIGMA
see Computer-Aided Design and Manufacturing, Bahn
Manufacturing, Williams

SMART GRIDS
see Smart Grids Signal Processing, Mili
Energy, Rahman
Power Electronics, Lee

SMART GRIDS SIGNAL PROCESSING

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E-mail: lmili@vt.edu  
Specialty: Electric Power, Smart Grids, Communications Systems, Signal Processing, Radar Systems  
Applications: Applications of robust statistics to power and communications systems; power system reliability analysis; power systems planning; power systems dynamics and control; risk management of blackouts; load forecasting; clutter mitigation in radar systems; speech processing; image processing  
Expertise: Reliability analysis; risk assessment; robust statistics; time series analysis; bifurcation theory  
Examples of Funding Sources: NSF, Electric Power Research Institute

SMART INFRASTRUCTURE  
see Vibration, Tarazaga

SMART MATERIALS  
see Transportation, Rakha  
Vehicle Dynamics, Ahmadian  
Vibration, Tarazaga

SMART MATERIALS AND STRUCTURES  
see also Vibration, Tarazaga

SMART MATERIALS AND STRUCTURES  
Name: Michael Philen  
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E-mail: mphilen@vt.edu  
URL: www.aoe.vt.edu/people/faculty/philen.html  
Specialty: Smart Materials, Structural Dynamics, Structural Health Monitoring, Energy Harvesting, Bio-Inspired Technologies  
Applications: Adaptive and Morphing Structures; Biomimetic Systems  
Expertise: Developing adaptive structures through integration of smart materials and control algorithms; active and passive vibration control; implementation of guided-wave and impedance based structural health monitoring strategies  
Examples of Funding Sources: NSF, Office of Naval Research, Airbus, NASA

SMART STRUCTURES  
see Finite Element Method / Computational Mechanics, Batra

SOFTWARE ENGINEERING  
see also Computer-Aided Design and Manufacturing, Bahn

SOFTWARE ENGINEERING  
Name: Osman Balci  
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E-mail: balci@vt.edu  
Specialty: Software Engineering, Modeling and Simulation, Digital Game-Based Learning  
Applications: Solving complex problems by way of developing iOS mobile software applications and cloud-based, internet-based, web-based software systems; digital game-based learning; solving complex problems by way of modeling and simulation in many application areas such as air traffic control, biological systems, computer systems, manufacturing systems, military systems, network-centric systems, and transportation systems  
Expertise: iOS (iPhone, iPad, iPod touch) mobile software en-
gineering; network-centric software engineering; architecting network-centric software-based system of systems; software/ system independent verification and validation; digital edu-
cational game development methodology; digital educational game quality assessment; modeling and simulation (M&S) methodologies; conceptual modeling; M&S development environments; visual object-oriented M&S; web-based M&S; verification, validation, testing, quality assurance, and certification of M&S applications

Examples of Funding Sources: Defense Modeling and Simulation Office, NASA Langley Research Center, NSF, Naval Research Laboratory, Naval Sea Systems Command, Naval Surface Warfare Center Dahlgren Division, Office of Naval Research

SOFTWARE ENGINEERING

Name: Barbara G. Ryder
Department: Computer Science
Office Phone: 540-231-8452
Fax: 540-231-4420
E-mail: ryder@cs.vt.edu
URL: people.cs.vt.edu/~ryder

Specialty: Program Analysis, Testing, Application-level Security, Programming Languages and Compilers, Software Mainte-
nance, Debugging, Object-Oriented Languages and Systems

Applications: Tool support for software development in Java and JavaScript; emphasis on testing, security, and program understanding for evolving complex systems. Specific tools from the group include: (i) (analyses enabling performance diagnosis for framework-based software systems, especially Web applications (ii) tool support for understanding program behaviors and dependences due to dynamic constructs in Ja-
vaScript (iii) techniques for information flow on webpage codes (iv) tool support for software developers to estimate the impact of changes to a codebase during team development, e.g., to allow early check-in of changes

Expertise: Static and dynamic program analyses; pointer/reference and side-effect analyses, especially for object-oriented systems and scripting languages; blended static/dynamic analysis techniques

Examples of Funding Sources: NSF, IBM Research, Hewlett-Packard Labs

SOFTWARE SYSTEMS

Name: Dennis Kafura
Department: Computer Science
Office Phone: 540-231-5568
Fax: 540-231-6075
E-mail: kafura@vt.edu
URL: www.cs.vt.edu/~kafura/

Specialty: Computer Security and Privacy, Access Control and Information Flow Control, Concurrent and Distributed Systems, Object-Oriented Software, Software Engineering

Applications: Secure collaboration among communities of indi-
viduals; interfaces for community privacy; e-mail systems for controlled dissemination of information; active-object models of computation; synchronization mechanisms in object-oriented systems

Expertise: User interfaces for e-mail and other collaboration tools that relate to privacy and security; authentication and authori-
ization in distributed computing environments; privilege man-
agement models; access control enforcement mechanisms; object-oriented languages and systems

Examples of Funding Sources: NSF, Fermi National Labs, Com-
monwealth Information Security Center, IBM Shared University Research
SOFTWARE SYSTEMS

Name: Eli Tilevich  
Department: Computer Science  
Office Phone: 540-231-3475  
Fax: 540-231-9218  
E-mail: tilevich@cs.vt.edu  
URL: people.cs.vt.edu/~tilevich/

Specialty: Systems End of Software Engineering; Distributed Systems and Middleware; Automated Software Transformation; Mobile Applications; Energy Efficient software; Computer Science Education; Music Informatics

Applications: Novel software solutions for mobile, cloud-based, and high-end systems; software maintenance and evolution; program refactoring and enhancement

Expertise: Software engineering; mobile applications; automated software adaptation; distributed and cloud-based systems; middleware

Examples of Funding Sources: NSF, Office of Naval Research, IBM Shared University Research

SOIL

see Civil Engineering, Mitchell

SOLAR AND RENEWABLES

see Energy, Rahman

SOLAR ENERGY

see Energy, Rahman

Energy and Materials, Pitchumani

SOLID MECHANICS

see Mechanics of Materials, Dowling, Case

SPACE

see Atmospheric and Radio Science, Scales

Plasma Physics, Srinivasan  
Remote Sensing, Bailey

SPACE PHYSICS

see Aerospace Engineering, Bayandor

SPACE PLASMA PHYSICS

see Plasma Physics, Srinivasan

SPACE STRUCTURES ANALYSIS

see Aircraft, Kapania

SPACE WEATHER

see Ionospheric and Space Physics, Ruohoniemi

SPACECRAFT HARDWARE AND INSTRUMENTATION

see also Systems Engineering, Salado

SPACECRAFT HARDWARE AND INSTRUMENTATION

Name: Gregory D. Earle  
Department: Electrical and Computer Engineering  
Office Phone: 540-231-2294  
Fax: 540-231-3362  
E-mail: earle@vt.edu  
Specialty: Circuits and Electromagnetics

Applications: U.S. Department of Defense communications and space situational awareness

Expertise: Spacecraft hardware and instrumentation

Examples of Funding Sources: NASA, USAF, NSF
SPORTS BIOMECHANICS
see Injury Biomechanics, Duma

STATISTICAL SIGNAL PROCESSING
see Advanced Manufacturing, Kong

STEEL
see Structural Engineering, Hebdon
Structural Engineering and Design, Easterling
Thin-Walled Structures, Moen

STREAMS
see Ecological Engineering, Thompson
Environment and Fluvial Hydraulics, Hession

STRUCTURAL AND SYSTEM HEALTH MONITORING
Name: Mahendra P. Singh
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-4572
Fax: 540-321-4574
E-mail: mpsingh@vt.edu
Specialty: Structural Health Monitoring, Smart Structures and Infrastructure Systems, Uncertainty Analysis, Structural Identification, Structural Dynamics, Optimization, Vibration Engineering, Structural Reliability, Earthquake Engineering
Applications: Bridges structures; buildings; transportation systems; aircraft structures; evacuation in emergencies; health monitoring of dispersed and networked systems
Expertise: Health monitoring of structures like bridges, buildings, towers, rotating machines, aircraft structures; bridge engineering; design of structural systems for dynamic loads; life-cycle cost analysis and structural optimization
Examples of Funding Sources: NSF, National Institute of Standards and Technology, U.S. Army and U.S. Army Corps of Engineers, NASA

STRUCTURAL DYNAMICS AND CONTROL
see Aerospace Engineering, Bayandor
Smart Materials and Structures, Philen
Vibration, Tarazaga

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

STRUCTURAL ENGINEERING
Name: Matthew R. Eatherton
Department: Civil and Environmental Engineering
Office Phone: 540-231-4559
Fax: 540-231-7532
E-mail: meather@vt.edu
Professor Matthew H. Hebdon

**Department**: Civil and Environmental Engineering  
**Office Phone**: 540-231-6753  
**Fax**: 540-231-7532  
**E-mail**: mhebdon@vt.edu

**Specialty**: Steel Bridges and Structures, Fatigue and Fracture  
**Applications**: Evaluation, design, and retrofit of steel structures; structural forensics  
**Examples of Funding Sources**: American Institute of Steel Construction, American Iron and Steel Institute, Departments of Transportation, Federal Highway Association, National Cooperative Highway Research Program, NSF, Virginia Center for Transportation Innovation and Research

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Professor W. Samuel Easterling

**Department**: Civil and Environmental Engineering  
**Office Phone**: 540-231-5143  
**Home**: 540-864-5135  
**Fax**: 540-231-7532  
**E-mail**: seaster@vt.edu

**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, NSF, American Iron and Steel Institute, Virginia Center for Innovative Technology, Consolidated Systems, Inc.

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Professor Richard Benson

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**Office Phone**: 540-231-6641  
**Fax**: 540-231-3031  
**E-mail**: benson@vt.edu

**URL**: www.eng.vt.edu/overview/benson_bio.php
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
Department: Civil and Environmental Engineering
Office Phone: 540-231-7150
Fax: 540-231-7532
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: NSF, National Cooperative Highway Research Program

STRUCTURAL STABILITY
see Thin-Walled Structures, Moen

STRUCTURES AND MATERIALS
Name: John J. "Jack" Lesko
Department: Biomedical Engineering and Mechanics
Office Phone: 540-231-9171
E-mail: jlesko@vt.edu
Applications: Design, testing, installation, and monitoring of composite 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; lean startup; NSF Innovation Corps
Examples of Funding Sources: Strongwell Corporation, Dow Chemicals, UTC Fuel Cells, NSF, Federal Highway Administration, Office of Naval Research, Venturewell

SUPERCritical FLUIDS
Name: Erdogan Kiran
Department: Chemical Engineering
Office Phone: 540-231-1375
Fax: 540-231-5022
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 Logistics, Ellis

SURFACE CHEMISTRY AND ENGINEERING
Name: William Ducker
Department: Chemical Engineering
Office Phone: 540-231-7869
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E-mail: wducker@vt.edu
URL: http://www.che.vt.edu/Ducker-2013/Faculty-Home.php

Specialty: Surface Chemistry, Adsorption, Bacterial Adsorption, Surface Forces, Surfactants, Polymers, Lubrication, Peptides, Colloidal Stability, Rheology

Applications: Use of polymers and surfactants to control the stability of colloidal particles and the friction between surfaces; inhibiting bacterial colony formation; controlling wall loses in the flow of liquids and gases; separation and purification of materials based on surface properties or charging; atomic force microscopy imaging of surfaces

Examples of Funding Sources: NSF, American Chemical Society, Petroleum Research Fund

SURFACE SCIENCE
see Catalysis, Cox

SUSTAINABILITY
see Infrastructure Performance, Flint

SUSTAINABLE AND RESILIENT WATER INFRASTRUCTURE SYSTEMS
Name: Sunil Sinha
Department: Civil and Environmental Engineering
Office Phone: 540-231-9420
Fax: 540-231-7532
E-mail: ssinha@vt.edu
URL: www.waterid.org

Specialty: Sustainable and Resilient Water Infrastructure Management

Applications: Drinking water; wastewater; storm water; levees and dams; and pipelines

Expertise: Sensor technologies; data analytic; numerical modeling; predictive modeling; artificial intelligence; and risk analysis and management


SYNTHETIC BIOLOGY
Name: Warren C. Ruder
Department: Biological Systems Engineering
Office Phone: 540-231-0035
Fax: 540-231-3199
E-mail: wruder@vt.edu
Specialty: Engineered Gene Circuits, bioMEMS, Cell Biomechanics
Applications: Control of gene expression and bioproduct synthesis; tissue engineering; pharmacological interventions
Expertise: Reprogramming cell behavior with synthetic biological circuits; engineering cell microenvironments using microfabrication techniques; integrating engineered systems with microscopy
Examples of Funding Sources: Air Force Office of Scientific Research

SYSTEM HEALTH MONITORING (SHM)
see Damage Science and Mechanics, Duke

SYSTEMS AND SIGNAL PROCESSING
see Bioinformatics, Wang

SYSTEMS BIOLOGY
see Computational Biology, Murali
Control Systems, Baumann

SYSTEMS ENGINEERING
Name: Alejandro Salado
Department: Industrial and Systems Engineering
Office Phone: 540-231-6656
Fax: 540-231-3322
E-mail: asalado@vt.edu
Applications: Large-scale systems, space systems (earth observation, navigation, communications, space weather, science), organizational systems, defense systems
Expertise: Translation of systems science to industrial applications, elicitation of value, measurement and modeling of ilities, concept and architectural decisions based on targeted methods, elicitation of requirements, definition of effective verification and validation strategies, development and integration of space systems, supplier negotiation, definition of space weather monitoring systems of systems, team modeling and design
Examples of Funding Sources: DARPA, NASA Ames Research Center, Institute of International Education, European Space Agency

THEORETICAL AND EXPERIMENTAL SOLID MECHANICS
see also Mechanics of Materials, Case

THEORETICAL AND EXPERIMENTAL SOLID MECHANICS
Name: Marwan Al-Haik
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URL: www.esm.vt.edu/~alhaik
Specialty: Solid Mechanics, Engineering Materials, Nanotechnology
Applications: Structural; defense; sensors; radiation detection; bio application; energy absorption; energy harvesting, thermal and electrical transport; space; military
Expertise: Mechanics; solid mechanics; nanotechnology; engineering materials; composite materials; polymer based composites; fiber reinforced composites; carbon nanotubes;
graphene; inorganic nanotubes; metals; alloys; synthesis; nanoparticles; mechanical testing; nanomechanics; radiation sensors; impact and high rate deformation; radiation damage; XRD; microscopy; nanoindentation; surface engineering; time dependent behavior; smart materials; thin films; thermal coatings; neural networks; system identification

Examples of Funding Sources: NSF, Office of Naval Research, Army Research Office, Air Force Research Lab, Toyota North America, Sandia National Labs, Defense Threat Reduction Agency

THERMAL MANAGEMENT
see also Transport and Interfacial Phenomena, Qiao

THERMAL MANAGEMENT
Gas Turbine, Propulsion, Turbomachinery, Energy

Name: Srinath V. Ekkad
Department: Mechanical Engineering
Office Phone: 540-231-7192
Fax: 540-231-9991
E-mail: sekkad@vt.edu


Applications: Gas turbine systems; propulsion; energy systems; electronic cooling and thermal management; energy harvesting

Expertise: Heat transfer testing using infrared thermography; liquid crystal thermography; high temperature testing; accurate 2-D measurements

Examples of Funding Sources: Department of Energy, Air Force, Rolls-Royce, Siemens, General Electric, NSF

THIN-WALLED STRUCTURES AND COMPUTATIONAL MECHANICS

Name: Christopher D. Moen
Department: Civil and Environmental Engineering
Office Phone: 540-231-6072
Fax: 540-231-7532
E-mail: cmoen@vt.edu
URL: www.moen.cee.vt.edu/

Specialty: Cold-Formed Steel Structural Members and Building Systems; Computer Vision Applied to Infrastructure Assessment; Earthquake Engineering; Bridge Engineering; Cement-Based Composites

Applications: Design of cold-formed steel building systems; computational modeling of buildings and bridges; automated measurement and infrastructure assessment; analysis of thin-walled structures

Expertise: Structural stability; structural mechanics; computational modeling to collapse; experimental facility for testing thin-walled structural components; material characterization

Examples of Funding Sources: NSF, National Institute of Standards and Technology, American Iron and Steel Institute, Institute for Critical Technology and Applied Science, Metal Building Manufacturers Association, Qatar National Research Fund

TIRES
see Vehicle Dynamics, Taheri

TISSUE ENGINEERING
see also Bioinformatics, Wang
Computational Biology, Murali
Materials, Nain
Neuroengineering, VandeVord

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TISSUE ENGINEERING
Biomaterials, Controlled Drug Delivery

Name: Abby R. Whittington
Department: Materials Science and Engineering and Chemical Engineering
Office Phone: 540-231-0665
Fax: 540-231-8919
E-mail: awhit@mse.vt.edu

Specially: Tissue Engineering Interfaces by Polymeric Scaffolds with Gradient Properties (Chemistry, Drug Release, or Mechanical)

Applications: Design of new anterior cruciate ligament (ACL); regeneration of bony defects caused by trauma or disease; delivery of proteins for tissue regeneration

Expertise: Materials characterization; in vitro evaluation of biomaterials; design of in vivo models for tissue regeneration

Examples of Funding Sources: NSF

TOXICOLOGY
see Environment, Boardman

TRANSPORT AND INTERFACIAL PHENOMENA

Name: Rui Qiao
Department: Mechanical Engineering
Office Phone: 540-231-7199
Fax: 540-231-9100
E-mail: ruiqiao@vt.edu

Specially: Transport and Interfacial Phenomena including Multiphase Fluid Flows, Thermal Transport, Ionic Transport, Particulate Transport, Molecular Transport

Applications: Thermal management, bioelectrochemical energy conversion and storage, micro- and nanofluidics, materials processing

Expertise: Quantum, molecular, mesoscale, and continuum simulation of transport and interfacial phenomena

Examples of Funding Sources: NSF

TRANSPORTATION

see also Air Transportation, Trani

Automotive Powertrains / Energy Systems, Nelson
Computer Science, Lu
Geospatial Decision Making, Hancock
Vehicle Dynamics, Ahmadian

TRANSPORTATION

Name: Kathleen L. Hancock
Department: Civil and Environmental Engineering
Office Phone: 703-538-3760
E-mail: hancockk@vt.edu
URL: www.cee.vt.edu/people/hancock.html


Applications: Transportation systems; infrastructure management; asset management; information technology, data analytics and visualization

Expertise: Transportation engineering and planning; freight planning and operations; transportation safety; application of geospatial information to decision making and problem solving

Examples of Funding Sources: NSF, Federal Highway Administration, Transportation Research Board, National Cooperative Highway Research Program, Virginia Department of Motor Vehicles, Virginia Department of Transportation, Massachusetts State Police, City of Alexandria, Arlington County
TRANSPORTATION

Name: Kevin Heaslip
Department: Civil and Environmental Engineering
Office Phone: 571-858-3070
Fax: 703-538-8450
E-mail: kheaslip@vt.edu
Specialty: Transportation Systems and Operations, Infrastructure Resilience, and Transportation Economics, Emerging Technology in Transportation
Applications: Decision support tools for investment in transportation; infrastructure systems modeling for measurements of resilience; modeling of transportation capacity; modeling of transit operation; modeling of electric vehicles and automated vehicles; economic analysis of emerging technologies
Expertise: Infrastructure system resiliency (system of systems methodology, cascading effects, and transportation system resilience) and transportation operations (roadway, public transit, maintenance, and asset management); electric vehicles; automated vehicles; economic analyses
Examples of Funding Sources: NSF, U.S. Department of Transportation, U.S. Department of Energy, National Park Service, U.S. Forest Service, Utah Department of Transportation, Washington State Department of Transportation, District of Columbia Department of Transportation, Northern Virginia Transportation Commission

TRANSPORTATION

Name: Pamela Murray-Tuite
Department: Civil and Environmental Engineering
Office Phone: 703-538-3764
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E-mail: murraytu@vt.edu
Specialty: Transportation Systems
Applications: Evacuation modeling and analysis; transportation modeling; demand estimation; risk and resilience assessment and modeling; disruptive event modeling and analysis; estimating reliability under extreme conditions and with security policies; travel time estimation
Expertise: Evacuation modeling and analysis; behavior modeling; path prediction; transportation engineering; transportation networks analysis; resilience; risk; reliability; transportation planning
Examples of Funding Sources: NSF, Virginia Center for Transportation Innovation and Research Council, University Transportation Centers, Advance VT

TRANSPORTATION

Name: Hesham A. Rakha
Department: Civil and Environmental Engineering, Electrical and Computer Engineering, and Virginia Tech Transportation Institute
Office Phone: 540-231-1505
Fax: 540-231-1555
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URL: https://sites.google.com/a/vt.edu/hrakha/
Applications: Intelligent transportation systems; in-vehicle systems; traffic signal control; advanced traveler information systems; eco-drive systems; eco-routing systems; artificial intelligence
intelligence; machine learning techniques

**Expertise:** Traveler and driver behavior modeling; traffic flow theory; transportation network control; congestion mitigation; transportation system modeling; vehicle energy consumption modeling; transportation environmental modeling; transportation safety modeling; traffic signal control; alternative isolated intersection control; roundabouts; intelligent transportation systems; vehicle-to-vehicle communication; vehicle-to-infrastructure communication; optimization; artificial intelligence; agent-based modeling

**Examples of Funding Sources:** NSF, Leidos, Parsons Brinkerhoff, NAVTEQ Inc., Virginia Department of Transportation, National Park Service, Virginia Center for Transportation Innovation and Research, Virginia Department for Environmental Quality, Federal Highway Administration, National Highway Traffic Safety Administration, ENERCON, Harmonia, Inc., Federal Highway Administration, Assistant Secretary for Research and Technology, Federal Transit Association, District of Columbia Department of Transportation

### TRANSPORTATION

**Pavements and Materials**

**Name:** Linbing Wang  
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**E-mail:** lbwang@vt.edu  
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**Specialty:** Transportation Engineering with Focus on Pavements and Materials  

**Applications:** Green and smart transportation infrastructure; smart materials and sensor network; asphalt mix design optimization; development of pavement management system; materials characterization and modeling; pavement rehabilitation; pavement testing; impact and penetration and high strain rate behavior

**Expertise:** Smart and sustainable technologies; energy harvest; health monitoring; innovative infrastructure assessment and performance predictions; high performance materials; multi-scale characterization, modeling, and simulation; pavement testing and mechanistic pavement design; infrastructure preservation and management; application of remote sensing and imaging techniques

**Examples of Funding Sources:** NSF, Department of Transportation, Department of Defense, National Cooperative Highway Research Program, U.S. Department of Agriculture, Virginia Department of Transportation

### TURBULENCE

**see** Parallel Computing, Tafti

**Turbulence and Turbulent Flows**

**see** Aerodynamics and Aeroacoustics, Devenport  
**Fluid Dynamics and Diagnostics,** Lowe

**Turbulence Modeling and Simulation**

**see** Computational Fluid Dynamics, Roy

### TWO-PHASE FLOW

**Name:** Yang Liu  
**Department:** Mechanical Engineering  
**Office Phone:** 540-231-8068  
**E-mail:** liu130@vt.edu

**Specialty:** Two-phase Flow, Bubble Dynamics, Boiling Heat Transfer, Reactor Thermal Hydraulics, Reactor Safety Analysis

**Applications:** Nuclear power; nuclear propulsion system; gas and oil transportation; chemical processing
Expertise: Two-phase flow instrumentation; flow regime identification; two-fluid model and interfacial area transport; multi-phase flow CFD

Examples of Funding Sources: Department of Energy, Nuclear Regulatory Commission, Bettis Atomic Power Laboratory

UNCERTAINTY QUANTIFICATION
see Computational Fluid Dynamics, Roy

UNDERWATER ACOUSTICS
see Acoustics, Roan, Fuller

UNDERWATER VEHICLE DESIGN
see Hydrodynamics, Neu

UNMANNED SYSTEMS
see Automotive Powertrains / Energy Systems, Nelson
Autonomous Systems, Kochersberger, Leonessa
Control Theory, Woolsey
Multiphysics Modeling and Computation, Wang

URANIUM
see Mining, Karmis

USER-CENTERED DESIGN
see Augmented Reality, Gabbard

USER EXPERIENCE (UX)
see Augmented Reality, Gabbard

VEHICLE DESIGN
see Automotive Powertrains / Energy Systems, Nelson

VEHICLE DYNAMICS
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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


VEHICLE DYNAMICS
Name: John B. Ferris
Department: Mechanical Engineering
Office Phone: 540-231-4797
E-mail: jbferris@vt.edu
College of Engineering Faculty Expertise Listing 2016-2018

URL: www.me.vt.edu/VTPL
Specialty: Vehicle Dynamics, Vehicle Terrain Interaction, Virtual Proving Grounds, Autonomous Vehicles
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; multibody 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, Chrysler, Volkswagen, John Deere

VEHICLE DYNAMICS
Name: Corina Sandu
Department: Mechanical Engineering
Office Phone: 540-231-7467
Fax: 540-231-9100
E-mail: csandu@vt.edu
URL: www.me.vt.edu/MENewSite/Faculty/sandu/sandu
Specialty: Multibody Dynamic Systems, Vehicle Dynamics, Terramechanics
Applications: Incorporation of uncertain parameters in multibody dynamics models; real-time parameter estimation for preventing rollover and improving vehicle stability; performance optimization for mechanical systems; on-road and off-road vehicle performance and mobility studies; vehicle modeling and control; vehicle-terrain interaction for military and commercial applications; tire and track modeling; earth robotic and planetary exploration vehicles mobility and performance analysis studies; railway systems modeling
Expertise: Multibody dynamic systems (modeling, simulation, uncertainty quantification, parameter estimation, optimization); vehicle dynamics (ride, handling, stability); terramechanics (experimental wheels and tire testing, tire and track modeling, vehicle-terrain interaction, soil and terrain modeling)
Examples of Funding Sources: NSF, NASA, Association of American Railroads, CentiRe, Advance VT, VT ASPIRES, Goodyear Rubber and Tire Company, Caterpillar Inc.

VEHICLE DYNAMICS
Tire Dynamics, Intelligent Transportation, Automotive Engineering
Name: Saied Taheri
Department: Mechanical Engineering
Office Phone: 540-231-0032
E-mail: staheri@vt.edu
Specialty: Transportation
Applications: Cars; trucks; trains
Expertise: Vehicle dynamics; tire mechanics; control systems; signal processing; intelligent transportation
Examples of Funding Sources: NSF, Department of Transportation, Department of Defense

VERIFICATION AND VALIDATION OF COMPUTER SIMULATIONS
see Computational Fluid Dynamics, Roy

VIBRATION
see also Dynamics, Hendricks
Dynamics and Control, Southward

VIBRATION
Name: Pablo A. Tarazaga
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URL: www.cimss.vt.edu/, vastlab.weebly.com

**Specialty:** Vibrations, Vibration Suppression, Intelligent Material Applications, Adaptive Structures, Structure Acoustic Interaction, Modal Analysis, Model Updating, Structural Health Monitoring and Energy Harvesting, Smart Infrastructure

**Applications:** Model validation and modal testing of large structures; efficient test strategies for model validation in an industrial setting; modeling and control of gossamer space structures; vibro-acoustics of optical membranes for satellite applications; structural health monitoring; energy harvesting of tires; infrastructure instrumentation

**Expertise:** Vibration analysis and testing; applied active and passive control techniques; application of smart structures for solving engineering problems; biological sensors; bio-inspired design

**Examples of Funding Sources:** U.S. Air Force Office of Scientific Research, NASA, U.S. Army Engineer Research and Development Centers, AAR

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**VIBRATION AND DYNAMICS**

**see also** Autonomous Systems, Kochersberger

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**VIBRATION AND DYNAMICS**

**Name:** Robert Parker
**Department:** Mechanical Engineering
**Office Phone:** 540-231-9894
**Fax:** 540-231-9364
**E-mail:** r.parker@vt.edu

**Specialty:** Analytical, Computational, and Experimental Methods to Understand and Reduce Vibrations in Engineering Systems

**Applications:** Automobiles; helicopters; wind turbines; aircraft engines; noise reduction; gear vibration; transmission systems

**Expertise:** Vibration and dynamics of mechanical systems with special interest in spinning systems; reduction of vibration-induced noise and mechanical failures from dynamic loads

**Examples of Funding Sources:** U.S. Army, NASA, General Motors, Ford, NSF, National Rotorcraft Technology Center, General Electric Aircraft Engines

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**VIRTUAL REALITY**

**see also** Augmented Reality, Gabbard

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**VIRTUAL REALITY**

**Name:** Doug A. Bowman
**Department:** Computer Science
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**URL:** people.cs.vt.edu/~bowman/

**Specialty:** 3-D User Interface Design, Virtual Environments, Augmented Reality, Human-computer Interaction, 3-D Computer Graphics

**Applications:** 3-D gaming interfaces; 3-D architectural design and visualization; virtual and augmented reality for education and training; 3-D visualization of scientific and engineering data; virtual reality phobia therapy; 3-D modeling interfaces

**Expertise:** Design and evaluation of user interfaces for immersive virtual environments; 3-D interaction techniques; comparison of 3-D display devices; comparison of 3-D 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: NSF, Office of Naval Research, DARPA

VISCOELASTICITY  
see Mechanics of Materials, Dillard

VISUALIZATION  
see Computer Science, Lu, Shaffer  
Human Computer Interaction, North

VLSI  
see Computer Engineering, Hsiao  
Computers, Tront

WASTE DISPOSAL  
see Environment, Knorke

WATER  
see also Computer Science, Lu  
Corrosion Control, Edwards  
Groundwater, Widdowson  
Hydrology, Easton  
Sustainable Water, Sinha

WATER
Urban Stormwater Management, Geographic Information Systems

Name: Randy Dymond  
Department: Civil and Environmental Engineering  
Office Phone: 540-231-9023  
Fax: 540-231-7532  
E-mail: dymond@vt.edu  
URL: www.cee.vt.edu/people/dymond.html

Applications: Stormwater best management practices; MS4 permit regulations; hydrologic assessment of land use change; floodplain modeling and delineation  
Expertise: Urban hydrology; stormwater control; Geographic Information Systems; land development design; water resources management; low impact development; real-time water monitoring  

WATER

Name: Glenn E. Moglen  
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Office Phone: 703-361-5606 (x142)  
Fax: 703-361-7793  
E-mail: moglen@vt.edu  
URL: https://sites.google.com/a/vt.edu/moglen/  
Specialty: Geographic Information Systems (GIS), Watershed Hydrology, Urban Hydrology, Climate Change  
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 Admin-
**WATER AND WASTEWATER TREATMENT**
see Environment, Boardman

**WATER QUALITY**
see also Corrosion Control, Edwards
- Environment, Dietrich
- Environmental Engineering, Pruden
- Hydrology, Easton

**WATER QUALITY**
Name: Brian L. Benham
Department: Biological Systems Engineering
Office Phone: 540-231-5705
Fax: 540-231-3199
E-mail: benham@vt.edu
Applications: Perform watershed assessments for the purpose of reducing primarily nonpoint source pollution; educate private water supply users about their water quality; and make recommendations to address water quality issues
Expertise: Development and execution of watershed-scale water quality models; private water supply systems
Examples of Funding Sources: U.S. Department of Agriculture, Environmental Protection Agency, Virginia Departments of Environmental Quality and Conservation and Recreation

**WATERSHED MANAGEMENT**
see Ecological Engineering, Thompson
- Engineering Education, Lohani
- Environment, Hession
- Hydrology, Easton

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

**WIND LOADS**
see Nonlinear Dynamics, Hajj

**WIND POWER**
see Energy Systems, Tam

**WIND TUNNEL TESTING**
see Aerodynamics and Aeroacoustics, Devenport

**WIND TURBINES**
see Aerodynamics and Aeroacoustics, Devenport

**WIRELESS COMMUNICATION**
see Communications, Reed

**WIRELESS COMMUNICATIONS AND NETWORKING**
Name: Allen B. MacKenzie
Department: Electrical and Computer Engineering
Office Phone: 540-231-3565
Fax: 540-231-3362
E-mail: mackenab@vt.edu
URL: mackenab.ece.vt.edu
Specialty: Wireless Networks, Cognitive Radio, Cognitive Networks, Cross-Layer Optimization, Game Theory
Applications: Artificial intelligence to control communication and
network parameters; resource allocation in wireless networks; dynamic spectrum sharing; analysis of networks using game theory; interoperability in public safety communications

**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:** NSF, National Institute of Justice, DARPA, Science Foundation Ireland

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**Wireless Networks**

*see Computer Science, Feng*

*Network and Information Security, Lou*

---

**Work Place Design**

*see Ergonomics, Nussbaum*

---

**Wood Products in Construction**

**Name:** Daniel Hindman

**Department:** Myers-Lawson School of Construction

**Office Phone:** 540-231-9442

**Fax:** 540-231-8868

**E-mail:** dhindman@vt.edu

**Specialty:** Wood Structural Design, Wood Connections, Green Building, Construction Safety, Mechanical Testing, Analysis

**Applications:** New building structures; truss construction; flooring installation

**Expertise:** Design of wooden structures; design of safety methods for placing trusses; wood-flooring inspection

**Examples of Funding Sources:** National Institute of Occupational Safety and Health, U.S. Department of Agriculture
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