



**A. JAMES CLARK**  
SCHOOL OF ENGINEERING

**Department of Mechanical Engineering**

**Graduate Handbook**

**2019-2020**

Department of Mechanical Engineering  
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[www.enme.umd.edu](http://www.enme.umd.edu)  
[megrad.umd.edu](http://megrad.umd.edu)

**Divisions:**

**Design and System Reliability (DSR)  
Mechanics, Materials, and Manufacturing (MMM)  
Thermal, Fluids, and Energy Sciences (TFES)**

**Anand, Dave K.      DSR**

Professor Emeritus

3120 Glenn L. Martin Hall

301-405-5294

[dkanand@umd.edu](mailto:dkanand@umd.edu)

Control systems; automation; manufacturing and energy

**Azarm, Shapour      DSR**

Professor

2155 Glenn L. Martin Hall

301-405-5250

[azarm@umd.edu](mailto:azarm@umd.edu)

Multi-objective; multi-disciplinary design optimization; and multi-attribute design decision making for product and process design

**Balachandran, Balakumar      MMM**

Professor and Chair

2181 Glenn L. Martin Hall

301-405-5309

[balab@umd.edu](mailto:balab@umd.edu)

Nonlinear dynamics; vibration and acoustics control; signal analyses; system identification

**Bar-Cohen, Avram      DSR**

Distinguished University Professor

2106B Glenn L. Martin Hall

301-405-3173

[abc@umd.edu](mailto:abc@umd.edu)

Thermal design and optimization of micro- and nano- systems, thermofluid modeling and analysis of boiling and two-phase flow; thermal manufacturing processes; technology foresight and management

**Baz, Amr      MMM**

Professor

2137 Glenn L. Martin Hall

301-405-5216

[baz@umd.edu](mailto:baz@umd.edu)

Active and passive control of vibration and noise; control of intelligent structures and continuous systems

**Bigio, David DSR**

Associate Professor  
3129 Glenn L. Martin Hall  
301-405-5258

[dbigio@umd.edu](mailto:dbigio@umd.edu)

Polymer processing and manufacturing; special interest in mixing of fluid systems and chaos theory on mixing; controls of polymer processes; special applications to extrusion, electronic packaging, and injection molding

**Bruck, Hugh MMM**

Professor and Associate Dean  
2110 Glenn L. Martin Hall  
301-405-8711

[bruck@umd.edu](mailto:bruck@umd.edu)

Processing, characterization, and modeling for the design of functionally graded, multifunctional, and nanostructured materials; experimental methods for dynamic and static materials characterization at the microscale and nanoscale

**Chopra, Nikhil MMM**

Associate Professor  
2149 Glenn L. Martin Hall  
301-405-7011

[nchopra@umd.edu](mailto:nchopra@umd.edu)

Cyber-robotic systems, cooperative control of multiagent systems, telerobotics

**Christou, Aris DSR**

Professor  
2141 Chemical and Nuclear Engineering Building  
301-405-5208

[christou@umd.edu](mailto:christou@umd.edu)

Electronic packaging materials; thin film semiconductors; reliability of electronic systems

**Chung, Peter MMM**

Associate Professor  
2135 Glenn L. Martin Hall  
301-405-4543

[pchung15@umd.edu](mailto:pchung15@umd.edu)

Computational focus in fields of mechanics, materials, physics, and chemistry; multiscale modeling and simulation; classical and quantum modeling of atomic scale solids; computational methods; high performance computing; mesoscale and microstructure effects on materials

**Cukier, Michel DSR**

Associate Professor  
3419 A.V. Williams Building

301-314-2804

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Reliability engineering, security evaluation, intrusion tolerance, distributed system evaluation

**Das, Siddhartha TFES**

Assistant Professor

3163 Glenn L. Martin Hall

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[sidd@umd.edu](mailto:sidd@umd.edu)

Soft Capillarity and Wetting; Soft Electrokinetics; Micro-nanoscale transport; Drops and Bubbles; Energy applications; Asphaltene; 3-D Printing; Water-2-D Material Interactions; Water transport in trees

**Dasgupta, Abhijit DSR**

Professor and Graduate Director

2174 Glenn L. Martin Hall

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[dasgupta@umd.edu](mailto:dasgupta@umd.edu)

Analysis and experimental characterization of fiber-reinforced composite materials; damage mechanics of heterogeneous materials; thermomechanical and vibrational fatigue damage in micro-electronic components

**DeVoe, Don MMM**

Professor

3125 Glenn L. Martin Hall

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[ddev@eng.umd.edu](mailto:ddev@eng.umd.edu)

Micro-electromechanical Systems (MEMS); micro-fluidics for bio-molecular analysis; biosensors.

**Diaz-Mercado, Yancy MMM**

Assistant Professor

2104A Glenn L. Martin Hall

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Control and coordination of multi-agent systems using control theory, optimization, and graph theory. In particular, he is interested in developing theoretically-sound, scalable control solutions that enable effective control of large networked systems, and applying these to facilitate robot swarm manipulation.

**diMarzo, Marino TFES**

Professor

3104E J. M. Patterson Building

301-405-5257

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Fire protection agents Fire sprinklers Large-scale test instrumentation and data analysis Nuclear reactor safety thermal hydraulics

**Duncan, James**      **TFES**

Professor

3118 Glenn L. Martin Hall

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[duncan@umd.edu](mailto:duncan@umd.edu)

Fluid mechanics: breaking waves, bubble dynamics and solid/fluid interactions.

**Fathy, Hosam**

Professor

[hfathy@umd.edu](mailto:hfathy@umd.edu)

**Fuge, Mark**      **DSR**

Assistant Professor

2172 Glenn L. Martin Hall

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[fuge@umd.edu](mailto:fuge@umd.edu)

Developing machine learning algorithms that learn from and subsequently aid human design and creativity; a mixture of topics that he calls Design Informatics. This involves using a combination of artificial intelligence, machine learning, computational linguistics, ethnography, human-computer interaction, social science, and crowdsourcing techniques to analyze and build web-based software tools for designers on top of scalable machine learning systems.

**Gabriel, Steven**      **DSR**

Professor

0151D Glenn L. Martin Hall

301-405-3242

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Optimization and equilibrium modeling in energy and the environment Algorithm development for solving complementarity and two-level problems in engineering-economic applications

**Groth, Katrina**      **DSR**

Assistant Professor

0151C Glenn L. Martin Hall

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[kgroth@umd.edu](mailto:kgroth@umd.edu)

Risk analysis, system safety, failure analysis, Human Reliability Analysis, human-machine interaction, decision making under uncertainty, Bayesian Networks, Bayesian methods, complex systems. Applications in: nuclear power plants, hydrogen fueling stations, oil and gas, energy, transportation, and infrastructure

**Gupta, Ashwani**      **TFES**

Distinguished University Professor

2159 Glenn L. Martin Hall

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Swirl flows; combustion in micro-engines, gas turbines and furnaces; high temperature air Combustion; fuel sprays; fuels; air pollution; flowfield modeling and laser diagnostics; alternative fuels; thermal destruction of solid and liquid wastes

**Hahn, Jin-Oh**      **MMM**

Associate Professor

2104C Glenn L. Martin Hall

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[jhahn12@umd.edu](mailto:jhahn12@umd.edu)

Mathematical Modeling, System Identification, Closed-Loop Control, Health Monitoring, Fault Diagnostics and Accommodation in Dynamic Systems with Emphasis on Challenges in Health and Medicine; Physiological Monitoring and Closed-Loop Control; Medical Cyber-Physical Systems

**Han, Bongtae**      **DSR**

Professor

3147 Glenn L. Martin Hall

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[bthan@umd.edu](mailto:bthan@umd.edu)

Experimental stress analysis; nanomechanics; mechanical design of micro-electronic devices; mechanics of composite materials; optical methods

**Herrmann, Jeffrey**      **DSR**

Associate Professor

0151B Glenn L. Martin Hall

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[jwh2@umd.edu](mailto:jwh2@umd.edu)

Design, decision-making, and control systems in product development organizations and manufacturing systems

**Kiger, Kenneth**      **TFES**

Professor and Associate Dean

1131U Glenn L. Martin Hall

301-405-5245

[kkiger@glue.umd.edu](mailto:kkiger@glue.umd.edu)

Fluid mechanics; turbulence and multi-phase flows; experimental instrumentation

**Kim, Jungho**      **TFES**

Professor and Director of Undergraduate Programs

2170 Glenn L. Martin Hall

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Phase change heat transfer; microgravity; electronic cooling; MEMS; heat transfer in turbomachinery

**Krieger, Axel** MMM

Assistant Professor

2151 Glenn L. Martin Hall

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[axel@umd.edu](mailto:axel@umd.edu)

Development of novel tools, image guidance, and robot control techniques for medical robotics. Specifically, Professor Krieger investigates methodologies that increase the intelligence and autonomy of medical robots to perform previously impossible tasks and improve both efficiency and patient outcomes.

**Larsson, Johan** TFES

Associate Professor

3149 Glenn L. Martin Hall

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Enabling large eddy simulation to be applied at realistic (high) Reynolds numbers through approximate wall-modeling; developing grid-adaptation techniques for turbulence simulations; developing models for transcritical combustion; and developing physics-based uncertainty quantification approaches for complex multi-physics systems.

**Li, Teng** MMM

Professor

2141 Glenn L. Martin Hall

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Mechanics of sustainable materials; mechanics of energy storage materials; mechanics of soft and active materials; mechanics of nanoelectronics; mechanics of low-dimensional nanomaterials; mechanics of flexible electronics

**McCluskey, F. Patrick** DSR

Professor

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Electronics packaging for extreme temperature environments; power electronics packaging; computer-aided risk assessment of micro-electronic devices; electronic materials and semiconductor manufacturing

**Modarres, Mohammad      DSR**

Professor

0151F Glenn L. Martin Hall

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Nuclear engineering, reliability engineering, expert system applications in reliability and safety; probabilistic risk assessment

**Mote Jr., Clayton Daniel      MMM**

Professor and Former President of the University of Maryland

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Dynamic systems; vibration; biomechanics

**Ohadi, Michael      TFES**

Professor

4164C Glenn L. Martin Hall

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Heat and mass transfer; smart heat exchangers; micro and nano thermal systems

**Pecht, Michael      DSR**

Professor

S1103 Engineering Lab Building

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Reliability assessment of electronic products; electronic product design and manufacture; supply chain management

**Pertmer, Gary      TFES**

Associate Professor and Co-Director of Undergraduate Programs

2178 Glenn L. Martin Hall

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Nuclear reactor systems design and analysis; reactor safety; and thermalhydraulics (heat transfer and fluid mechanics)

**Radermacher, Reinhard      TFES**

Professor

3137 Glenn L. Martin Hall

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Energy conversion; combined cooling heating and power systems; refrigeration and air-conditioning; alternative refrigerants; thermal system optimization

**Riaz, Amir      TFES**



Associate Professor  
3127 Glenn L. Martin Hall  
301-405-0707

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Numerical methods for multiphase flow Multiscale modeling and simulation of multiphase flow in porous media, microchannels and heat exchangers Multiphase transport of mixtures in porous media Perturbation analysis of interfacial instability Carbon dioxide sequestration Enhanced oil recovery

**Sandborn, Peter**     **DSR**

Professor  
2106A Glenn L. Martin Hall  
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Inter-disciplinary technology tradeoff analysis; computer aided design and virtual prototyping tools; design-to-cost for system assembly substrate fabrication and die preparation; known good die and design-for-environment.

**Schmidt, Linda**     **DSR**

Professor  
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System and product design theory and methodology Developing designer assistance tools for system and product design Engineering student team training Preservation of proprietary design knowledge conceptual design processes

**Smela, Elisabeth**     **MMM**

Professor  
2112 Glenn L. Martin Hall  
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Micro-electro-mechanical systems (MEMS); combining organic materials with silicon to make new devices; conjugated polymer micro-actuators

**Sochol, Ryan**     **MMM**

Assistant Professor  
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Micro/Nanoscale 3D printing; advanced manufacturing; cell mechanobiology & physicobiology; soft robotics; integrated microfluidic circuitry; 3D microelectronics; energetics

**Srebric, Jelena**     **TFES**

Professor

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Multi-scale Modeling of Urban Neighborhoods Computational Fluid Dynamics and Energy Simulations Simulations and Measurements of Indoor and Outdoor Environments Ventilation Indoor Air Quality (IAQ) and Building Energy Analysis Sustainable Buildings and Climate Change

**Vaughn-Cooke, Monifa DSR**

Assistant Professor  
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Human factors Systems engineering Healthcare system and medical device design Design decision making Psychometric tool development Bio-behavioral risk assessment Decision support systems

**Yang, Bao TFES**

Associate Professor  
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Micro/nanoscale thermal transport and energy conversion; thermal science and its applications in electrical engineering and material science; micro/nano devices; MEMS and nanotechnology.

**Yu, Miao MM**

Assistant Professor  
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optical sensors, sensor mechanics and material behavior at multiple spatial scales, micro-scale and nano-scale sensor systems, sensors for civil, mechanical, electrical, biochemical, biomechanics, biology, medical, and environmental applications, and sensor networks; adaptive optics, wavefront sensing and control, imaging through turbulence; smart materials and structures; and theoretical and experimental mechanics.