

# Structural Engineering, Mechanics, and Materials

**CEEatGT**  
2019-2020  
GRADUATE  
STUDIES

## MASTER'S DEGREE REQS\*

## NON-THESIS OPTION

## THESIS OPTION

SPECIALIZATION REQUIREMENT**	18 CREDITS	12 CREDITS
APPROVED ELECTIVES	12 CREDITS	12 CREDITS
THESIS	0 CREDITS	6 CREDITS
<b>TOTAL REQUIRED CREDITS</b>	<b>30 CREDITS</b>	<b>30 CREDITS</b>

\*Degree requirements for the MSCE and MSENVE degrees. Requirements for the MSBIOE, MSCSE, and MSESME degrees differ – please contact gradinfo@ce.gatech.edu for more information. \*\*Specializations include: Construction and Infrastructure Systems Engineering; Environmental Engineering; Geosystems Engineering; Structural Engineering, Mechanics and Materials; Transportation Systems Engineering; Water Resources Engineering.

## PH.D. DEGREE REQS

The Ph.D. program includes research and approximately 50 credits beyond the Bachelor's degree. Doctoral students, in concert with their advisor and thesis committee, construct an individualized program of study tailored to the student's research interests.

Major elements of the program include:

- Comprehensive exam
- Minor
- Research Proposal
- Thesis
- Oral defense

**STRUCTURAL** Engineering, Mechanics and Materials offers graduate instruction and research in structural analysis and design, design optimization, behavior of structural systems, blast-resistant design, earthquake engineering, engineering science and mechanics, high-performance materials, computer-aided engineering, uncertainty modeling and quantification, and modeling and reliability assessment of civil infrastructure systems. The faculty, students and staff are encouraged to form partnerships to create an environment that fosters learning, discovery and creativity. The faculty are leaders in their respective fields and are committed to developing in their students the skills needed to be successful in the structural engineering profession. The program's academic and research activities have earned an international reputation for excellence in areas such as creative use of advanced structural materials and composite systems to improve infrastructure; earthquake engineering; sensing, control and information technologies for smart structural systems; repair and strengthening of structures; quantitative characterization of infrastructure materials via novel imaging approaches; predicting and understanding material properties at various length and time scales; origami; design and construction of horizontally curved bridges; connection design and behavior; and structural reliability and risk assessment. Students can become involved in research activities that promote multidisciplinary solutions to civil engineering problems of global importance.

## RESEARCH AREAS

- Computational Mechanics and Structural Analysis
- Earthquake Engineering and Seismic Hazard Mitigation
- Geometric mechanics of solids
- Nano/Microstructure of Cement-based Materials
- Polymeric Composite Materials
- Rehabilitation of Structural Systems
- Shock and Impact Loadings
- Smart Materials and Structures
- Structural Health Monitoring
- Uncertainty quantification in solid and structural mechanics
- Nanoscience and Multiscale Modeling
- Design and Analysis of Structural Systems
- Structural Optimization
- Structural Risk and Reliability



## FACILITIES

Georgia Tech is equipped with state-of-the-art laboratories and instruments for all aspects of modern structural engineering and structural mechanics and materials research, including an 18,000-square-foot Structural Engineering and Materials Laboratory with an 8,000-square-foot strong floor, an L-shaped reaction wall with capacities of 100 to 300 kips, and two 30-ton-capacity cranes; a broad range of universal testing machines, with capacity to 400 kips; specialized facilities for mechanical testing with infrared thermography and photoelastic stress/strain analysis; a nondestructive evaluation/optics laboratory; a laser scanning confocal microscope; shock loading laboratory with large-scale velocity generator; and numerous high-performance workstations equipped with state-of-the-art software in structural engineering and mechanics.



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**Georgia Tech** School of Civil and Environmental Engineering  
College of Engineering

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## FACULTY

### **NELSON C. BAKER, PH.D.**

*Dean, Professional Education & Professor*

Intelligent learning environments for engineering; applications of artificial intelligence and other computer-based techniques to solve engineering problems; robotic applications to civil engineering.

### **LAURENCE J. JACOBS, PH.D.** *College of Engineering Associate Dean for Academic Affairs & Professor*

Quantitative nondestructive evaluation of civil engineering materials; wave propagation in solids, emphasizing guided waves; nonlinear methods and heterogeneous materials; optical techniques; acoustic sensors for condition monitoring of structural components.

### **KIMBERLY E. KURTIS, PH.D.** *College of Engineering Associate Dean for Faculty Development and Scholarship & Professor*

Multi-scale structure and performance (i.e., early age through durability) of cement-based materials, cement and admixture chemistry, characterization of cement-based materials, fiber-cement composites, sustainable construction materials, forensics.

### **RAFI L. MUHANNA, PH.D.** *Associate Professor*

Computational solid and structural mechanics; uncertainty modeling; reliable engineering computing; structural reliability; finite elements.

### **GLAUCIO H. PAULINO, PH.D.**

*Raymond Allen Jones Chair & Professor*

Computational mechanics, functionally graded materials, experimental methods, constitutive modeling of engineering materials, multiscale phenomena, high-order continuum, fracture and damage mechanics, solution adaptive techniques, inverse problems in mechanics, sensitivity analysis and optimization, and topology design of structures.

### **RYAN J. SHERMAN, PH.D., P.E.** *Assistant Professor*

Behavior and performance of steel structures, fatigue and fracture, additive manufacturing, large-scale structural testing, field monitoring and testing, retrofit design and verification, fitness-for-service evaluation, redundancy of structural systems

### **LAUREN STEWART, PH.D., P.E.** *Associate Professor*

Experimental study of the mechanical behavior of structures subjected to various loading, including shock and impact; computational modeling to study the effects of blast, earthquakes and their impacts on structures made of a variety of materials.

### **PHANISH SURYANARAYANA, PH.D.** *Associate Professor*

Ab-initio methods; multiscale modeling; symmetry in structures; ferroelectricity and ferromagnetism; computational mechanics; high-performance computing; efficient numerical methods for solving problems arising in a variety of fields.

### **IRIS TIEN, PH.D.** *Assistant Professor*

Probabilistic methods for modeling and reliability assessment of civil infrastructure systems, stochastic processes, risk analysis, structural and infrastructure health monitoring, signal processing and machine learning, and decision making under uncertainty.

### **YANG WANG, PH.D.** *Associate Professor*

Structural health monitoring, vibration testing, system identification, finite element model updating, feedback structural control, structural dynamics, and earthquake engineering.

### **DONALD W. WHITE, PH.D.** *Professor*

Computational mechanics, numerical methods, structural stability, steel structures, computer-aided engineering of building and bridge structures.

### **ARASH YAVARI, PH.D.** *Professor & Group Coordinator*

Nonlinear elasticity and anelasticity, nonlinear mechanics of defects, geometric mechanics, computational mechanics, mechanics of bulk and surface growth (accretion)

### **ABDUL-HAMID ZUREICK, PH.D.** *Professor*

High-performance fiber-reinforced composite and stainless steel structures, strengthening of building and bridge structures, steel structures, structural stability, bridge structures, anisotropic elasticity.



## RESEARCH FACULTY

### **CHUANG-SHENG (WALTER) YANG, PH.D., P.E.**

*Research Engineer II & Instructor*

**JIN YEON KIM, PH.D.** *Senior Research Engineer*

**NAN GAO, PH.D.** *Research Engineer & Instructor*

## ADJUNCT FACULTY

**REGINALD DESROCHES, PH.D.**

**T. RUSSELL GENTRY, PH.D., P.E.**

**ROBERTO T. LEON, PH.D.**

## EMERITUS FACULTY

**BRUCE R. ELLINGWOOD, PH.D.**

**BARRY J. GOODNO, PH.D.**

**LAWRENCE F. KAHN, PH.D.**

**GERALD WEMPNER, PH.D.**

**KENNETH M. WILL, PH.D.**