STRUCTURES CONCENTRATION

The structures group is focusing its efforts at the frontiers of structural engineering; across all application domains including **civil, aerospace, biological**, and **mechanical.** Specifically, the structures group is now concentrating its considerable expertise in materials, computational and probabilistic mechanics, structural health monitoring, and high performance computing to model, analyze, simulate, and design complex systems that are characterized by multi-physics processes that transcend several time and length scales: from picoseconds to decades; from the atomic to the scale of an aircraft carrier.

The group also seeks to establish a reciprocal relationship between experimentation and computing by utilizing physical experiments to observe behavior phenomena, to measure properties and mechanisms, and to validate computational models, and computational simulations to inform experimentation.

WHERE TO APPLY:
www.gradschool.cornell.edu/admissions/applying/apply-now

HOW TO VISIT:
www.cee.cornell.edu/academics/graduate/visit.cfm

CEE GRAD FAQ:
www.cee.cornell.edu/academics/graduate/faq.cfm

Connect with us...

Facebook:
facebook.com/CEECornellUniversity

Twitter:
twitter.com/CEECornellUniv

LinkedIn:
linkedin.com/in/CEECornellUniversity

Instagram:
instagram.com/Cornell_CEE

Contact Information

Civil and Environmental Engineering
220 Hollister Hall
Ithaca, NY 14853
Email: cee_grad@cornell.edu
Phone: (607) 255-7560

www.cee.cornell.edu

CornellEngineering
Civil and Environmental Engineering

STRUCTURAL ENGINEERING

Master of Science/
Doctor of Philosophy

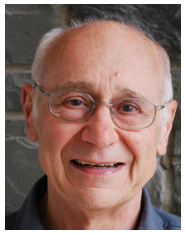
FACULTY RESEARCH

Graduate students collaborate with Structural Engineering faculty on research that pushes the boundaries of our knowledge. Our faculty has always represented the best the field has to offer-engineers and scholars of the highest caliber, internationally recognized for their research and the quality of instruction they offer.

CHRISTOPHER J. EARLS

Earls' research involves the development and application of new computational techniques for the study of important problems involving engineered systems. He also focuses on developing novel approaches for solving deterministic and stochastic inverse problems, and is concerned with developing novel algorithmic and computational approaches that enable new understanding concerning the actual condition, and future performance of complex structural systems.

MIRCEA D. GRIGORIU



Grigoriu's research uses random vibration, stochastic calculus, stochastic differential equations, numerical methods for solving stochastic problems, probabilistic models for microstructures, wind/earthquake engineering, and Monte Carlo simulation. His teaching focuses on engineering applications starting from fundamental concepts of mechanics, probability theory, statistics, and mathematics.

KENNETH C. HOVER

Hover studies the life-cycle of concrete beginning with influence of ingredients, proportions, weather conditions, and temperature on rates of setting, shrinkage, and strength-gain. He explores freeze-thaw durability of concrete and masonry, and investigates enhanced sustainability via supplementary cementitious materials, extended service life, and performance specifications.

DAVID S. KAMMER

Kammer's focus is on the mechanics of dynamic and transient phenomena leading to failure of materials and structures. His research is focused on the effects that small- and meso-scale properties have on the overall response of solids and structures with particular interest in heterogeneous materials and interfaces.

GREG C. MCLASKEY

McLaskey's research uses seismic waves to study the mechanics of friction, earthquakes, fracture, impact and other processes that generate sounds and vibrations in solids. He also specializes in piezoelectric sensors which are used to detect very high frequency but small amplitude vibrations in solid materials; these vibrations are used for monitoring or detecting damage in buildings, bridges, and other civil infrastructure.

DEREK H. WARNER

Warner's interests lie in Solid Mechanics, Deformation and Failure Mechanisms, and Computer Modeling. Warner's research group Combines scientific supercomputing with concurrent multi-scale modeling to bridge length and time scales: from the subatomic to the macroscopic.

STUDENT RESEARCH

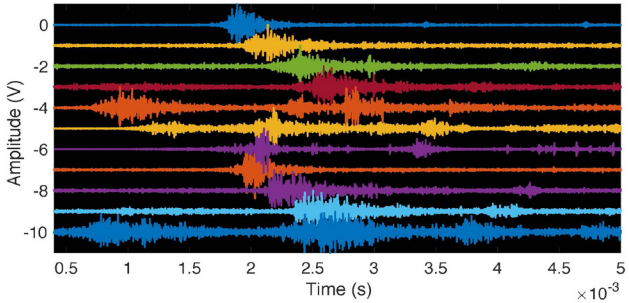
Graduate Students in the M.S. and Ph.D. programs are expected to demonstrate mastery of knowledge in a specific subject area in Civil and Environmental Engineering and to synthesize and create new knowledge, making original and substantial contributions to their discipline.

JUSTYNA KOSIANKA

My research field is computational fluid-structures interaction. I'm currently working on developing a coupling interface between the computational fluid dynamics solver OpenFOAM with the in-house developed CU-BEN finite-element analysis structural dynamics solver. By running a co-simulation, we can use the two computer codes to calculate effectively the effect of fluids on the structure of naval ships. We will eventually use this tool to solve inverse problems and study the effects of slamming on ship structure.

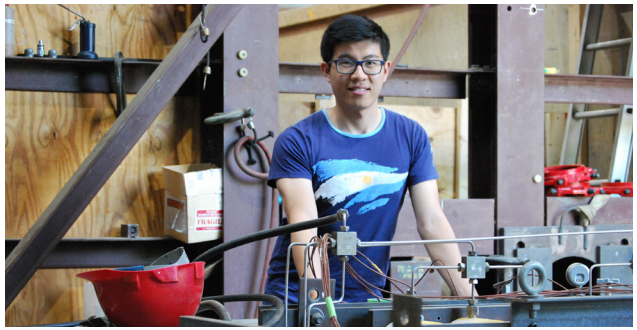
In choosing to go to Cornell, I was most attracted to the Civil and Environmental Engineering School. I was interested in a line of research that was more computational than experimental, and I had that option here at Cornell, where non-traditional degree options are encouraged. I spoke with Professor Earls before making my decision, and he had a project that aligned extremely well with my interests; so I decided Cornell was the best place for me.

SEISMICITY



Waves recorded by piezoelectric sensors are offset by their distance along the fault line to visualize the propagation of the rupture front of a specific earthquake. Instead of sliding as a rigid body, the moving granite block will slide partially at certain locations while remaining locked at others, resembling tectonic plate motion.

BILL WU



One focus of the McLaskey research group is to investigate the mechanisms of earthquakes using a state-of-the-art rock mechanics apparatus. It consists of one stationary granite block and one moving block, each weighing around 4000 pounds. They represent tectonic plates in the earth, whose relative movements create earthquakes.

During a typical experiment, the shear force is slowly increased until the moving block transitions from stick to slip, usually accompanied by a large 'bang'. With a dense array of sensors (measuring slip, seismicity, and strain) scattered near the fault line, we record the propagating waves that originate from each tiny earthquake to learn about the source and nucleation of laboratory-scale earthquakes.

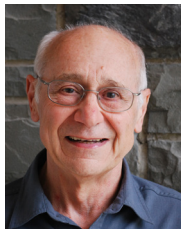
FACULTY RESEARCH

Graduate students collaborate with Structural Engineering faculty on research that pushes the boundaries of our knowledge. Our faculty has always represented the best the field has to offer-engineers and scholars of the highest caliber, internationally recognized for their research and the quality of instruction they offer.

CHRISTOPHER J. EARLS

Earls' research involves the development and application of new computational techniques for the study of important problems involving engineered systems. He also focuses on developing novel approaches for solving deterministic and stochastic inverse problems, and is concerned with developing novel algorithmic and computational approaches that enable new understanding concerning the actual condition, and future performance of complex structural systems.

MIRCEA D. GRIGORIU



Grigoriu's research uses random vibration, stochastic calculus, stochastic differential equations, numerical methods for solving stochastic problems, probabilistic models for microstructures, wind/earthquake engineering, and Monte Carlo simulation. His teaching focuses on engineering applications starting from fundamental concepts of mechanics, probability theory, statistics, and mathematics.

KENNETH C. HOVER

Hover studies the effects of weather and construction operations on the engineering and durability-related properties of concrete and concrete masonry. This includes hot, cold, wet, and dry weather concreting, freeze-thaw durability, use of supplementary cementitious materials, performance specifications, and evaluation of concrete quality.

DAVID KAMMER

Kammer's focus is on the mechanics of dynamic and transient phenomena leading to failure of materials and structures. His research is focused on the effects that small- and meso-scale properties have on the overall response of solids and structures with particular interest in heterogeneous materials and interfaces.

GREG MCLASKEY

McLaskey's research uses seismic waves to study the mechanics of friction, earthquakes, fracture, impact and other processes that generate sounds and vibrations in solids. He also specializes in piezoelectric sensors which are used to detect very high frequency but small amplitude vibrations in solid materials; these vibrations are used for monitoring or detecting damage in buildings, bridges, and other civil infrastructure.

DEREK H. WARNER

Warner's interests lie in Solid Mechanics, Deformation and Failure Mechanisms, and Computer Modeling. Warner's research group Combines scientific supercomputing with concurrent multi-scale modeling to bridge length and time scales: from the subatomic to the macroscopic.

HIVE CLUSTER

"Supercomputers are the bread and butter of every computational science research group these days, and the hive cluster is ours. It enables us to conduct large-scale atomistic simulations that are infeasible with desktop computers. The cluster has about 700 processors which is eye-catching for a group of our size." - Sepehr Saroukhani, Ph.D.

Visit: http://bit.ly/hivecluster
for CEE Hive Cluster daily grid reports and cluster load percentages.

STUDENT RESEARCH

Graduate Students in the M.S. and Ph.D. programs are expected to demonstrate mastery of knowledge in a specific subject area in Civil and Environmental Engineering and to synthesize and create new knowledge, making original and substantial contributions to their discipline.

JUSTYNA KOSIANKA

My research field is computational fluid-structures interaction. I'm currently working on developing a coupling interface between the computational fluid dynamics solver OpenFOAM with the in-house developed CU-BEN finite-element analysis structural dynamics solver. By running a co-simulation, we can use the two computer codes to calculate effectively the effect of fluids on the structure of naval ships. We will eventually use this tool to solve inverse problems and study the effects of slamming on ship structure.

In choosing to go to Cornell, I was most attracted to the Civil and Environmental Engineering School. I was interested in a line of research that was more computational than experimental, and I had that option here at Cornell, where non-traditional degree options are encouraged. I spoke with Professor Earls before making my decision, and he had a project that aligned extremely well with my interests; so I decided Cornell was the best place for me.

BILL WU

I am working with my advisor Dr. Derek Warner on understanding fracture and deformation of structural materials using atomistic simulations. At small length scales, we focus on atomistic simulations of defects, phase transformations and mechanical properties of materials, using empirical-based and physics-based tools such as classical molecular dynamics simulation and density-functional theoretical calculations. Currently, I'm investigating dopant and environmental effects on the fracture toughness of silicon carbide, utilizing these computational techniques.

I chose Cornell because I was most interested in the cutting-edge structural engineering research program available here. The resources at Cornell provide an intellectually and culturally rich environment for study and research in structural engineering. I particularly enjoy working with Dr. Warner, studying deformation of materials at the atomistic level using the supercomputing resources on campus. During my leisure time, I enjoy playing badminton with friends, skiing in the winter, and kayaking on Cayuga Lake in the summer.

STRUCTURES CONCENTRATION

The structures group is focusing its efforts at the frontiers of structural engineering; across all application domains including **civil, aerospace, biological**, and **mechanical.** Specifically, the structures group is now concentrating its considerable expertise in materials, computational and probabilistic mechanics, structural health monitoring, and high performance computing to model, analyze, simulate, and design complex systems that are characterized by multi-physics processes that transcend several time and length scales: from picoseconds to decades; from the atomic to the scale of an aircraft carrier.

The group also seeks to establish a reciprocal relationship between experimentation and computing by utilizing physical experiments to observe behavior phenomena, to measure properties and mechanisms, and to validate computational models, and computational simulations to inform experimentation.

WHERE TO APPLY:
www.gradschool.cornell.edu/admissions/applying/apply-now

HOW TO VISIT:
www.cee.cornell.edu/academics/graduate/visit.cfm

CEE GRAD FAQ:
www.cee.cornell.edu/academics/graduate/faq.cfm

Connect with us...

Facebook:
facebook.com/CEECornellUniversity

Twitter:
twitter.com/CEECornellUniv

LinkedIn:
linkedin.com/in/CEECornellUniversity

Contact Information

Civil and Environmental Engineering
220 Hollister Hall
Ithaca, NY 14853
Email: cee_grad@cornell.edu
Phone: (607) 255-7560

www.cee.cornell.edu

Cornell Engineering
Civil and Environmental Engineering

STRUCTURAL ENGINEERING

Master of Science/
Doctor of Philosophy

CEE STRUCTURAL ENGINEERING

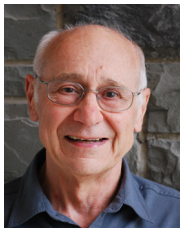
FACULTY RESEARCH

Graduate students collaborate with Structural Engineering faculty on research that pushes the boundaries of our knowledge. Our faculty has always represented the best the field has to offer-engineers and scholars of the highest caliber, internationally recognized for their research and the quality of instruction they offer.

CHRISTOPHER J. EARLS

Earls' research involves the development and application of new computational techniques for the study of important problems involving engineered systems. He also focuses on developing novel approaches for solving deterministic and stochastic inverse problems, and is concerned with developing novel algorithmic and computational approaches that enable new understanding concerning the actual condition, and future performance of complex structural systems.

MIRCEA D. GRIGORIU



Grigoriu's research uses random vibration, stochastic calculus, stochastic differential equations, numerical methods for solving stochastic problems, probabilistic models for microstructures, wind/earthquake engineering, and Monte Carlo simulation. His teaching focuses on engineering applications starting from fundamental concepts of mechanics, probability theory, statistics, and mathematics.

KENNETH C. HOVER

Hover studies the effects of weather and construction operations on the engineering and durability-related properties of concrete and concrete masonry. This includes hot, cold, wet, and dry weather concreting, freeze-thaw durability, use of supplementary cementitious materials, performance specifications, and evaluation of concrete quality.

DAVID KAMMER

Kammer's focus is on the mechanics of dynamic and transient phenomena leading to failure of materials and structures. His research is focused on the effects that small- and meso-scale properties have on the overall response of solids and structures with particular interest in heterogeneous materials and interfaces.

GREG MCLASKEY

McLaskey's research uses seismic waves to study the mechanics of friction, earthquakes, fracture, impact and other processes that generate sounds and vibrations in solids. He also specializes in piezoelectric sensors which are used to detect very high frequency but small amplitude vibrations in solid materials; these vibrations are used for monitoring or detecting damage in buildings, bridges, and other civil infrastructure.

DEREK H. WARNER

Warner's interests lie in Solid Mechanics, Deformation and Failure Mechanisms, and Computer Modeling. Warner's research group Combines scientific supercomputing with concurrent multi-scale modeling to bridge length and time scales: from the subatomic to the macroscopic.

HIVE CLUSTER

"Supercomputers are the bread and butter of every computational science research group these days, and the hive cluster is ours. It enables us to conduct large-scale atomistic simulations that are infeasible with desktop computers. The cluster has about 700 processors which is eye-catching for a group of our size." - Sepehr Saroukhani, Ph.D.

Visit: http://bit.ly/hivecluster

for CEE Hive Cluster daily grid reports and cluster load percentages.

STUDENT RESEARCH

Graduate Students in the M.S. and Ph.D. programs are expected to demonstrate mastery of knowledge in a specific subject area in Civil and Environmental Engineering and to synthesize and create new knowledge, making original and substantial contributions to their discipline.

JUSTYNA KOSIANKA

My research field is computational fluid-structures interaction. I'm currently working on developing a coupling interface between the computational fluid dynamics solver OpenFOAM with the in-house developed CU-BEN finite-element analysis structural dynamics solver. By running a co-simulation, we can use the two computer codes to calculate effectively the effect of fluids on the structure of naval ships. We will eventually use this tool to solve inverse problems and study the effects of slamming on ship structure.

In choosing to go to Cornell, I was most attracted to the Civil and Environmental Engineering School. I was interested in a line of research that was more computational than experimental, and I had that option here at Cornell, where non-traditional degree options are encouraged. I spoke with Professor Earls before making my decision, and he had a project that aligned extremely well with my interests; so I decided Cornell was the best place for me.

KELVIN LEUNG

I am working with my advisor Dr. Derek Warner on understanding fracture and deformation of structural materials

using atomistic simulations. At small length scales, we focus on atomistic simulations of defects, phase transformations and mechanical properties of materials, using empirical-based and physics-based tools such as classical molecular dynamics simulation and density-functional theoretical calculations. Currently, I'm investigating dopant and environmental effects on the fracture toughness of silicon carbide, utilizing these computational techniques.

I chose Cornell because I was most interested in the cutting-edge structural engineering research program available here. The resources at Cornell provide an intellectually and culturally rich environment for study and research in structural engineering. I particularly enjoy working with Dr. Warner, studying deformation of materials at the atomistic level using the supercomputing resources on campus. During my leisure time, I enjoy playing badminton with friends, skiing in the winter, and kayaking on Cayuga Lake in the summer.