

# Graduate Study in Civil & Environmental Engineering

University of South Florida, Tampa, Florida

Revised Summer 2011



# Overview

- Introduction
- Useful information for new students
- Degree requirements
  - Masters programs
  - PhD programs
- Research Faculty
- Funding
- Staying in the program
- Forms



# A Few Introductions

- Graduate Program Coordinator:
  - Sarina Ergas ([sergas@usf.edu](mailto:sergas@usf.edu))
  - ENC 3212, 974-1119
- Student Affairs/Academic Specialist:
  - Paula MacGeorge, ([pnmacgeorge@usf.edu](mailto:pnmacgeorge@usf.edu))
  - ENC 3301, 974-2275
- Department Chairman:
  - Manjriker Gunaratne ([gunaratn@usf.edu](mailto:gunaratn@usf.edu))
  - ENC 3300, 974-5822



# CEE Staff

- Department office ENC 3300
- Academic Services Administrator
  - Barbara Johnson ([barbaraj@eng.usf.edu](mailto:barbaraj@eng.usf.edu))
  - ENC 3300, 974-5596
- Staff Assistant
  - Ingrid Hall ([ihall@eng.usf.edu](mailto:ihall@eng.usf.edu))
  - ENC 3300, 974-5595
- Technician
  - Tim Fawcett ([tfawcett@usf.edu](mailto:tfawcett@usf.edu))

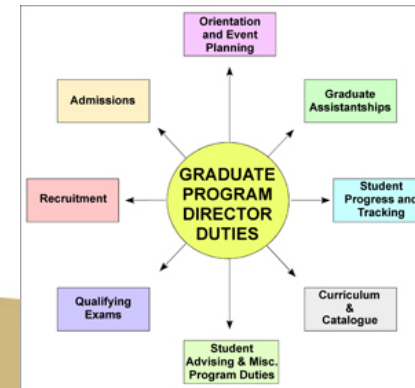


## Graduate Program Committee

- Structures & Materials:
  - Dr. Daniel Simkins ([dsimkins@eng.usf.edu](mailto:dsimkins@eng.usf.edu))
- Geotechnical:
  - Dr. Manjriker Gunaratne ([gunaratn@eng.usf.edu](mailto:gunaratn@eng.usf.edu))
- Transportation:
  - Dr. Yu Zhang ([yuzhang@eng.usf.edu](mailto:yuzhang@eng.usf.edu))
- Water Resources:
  - Dr. Mahmood Nachabe ([nachabe@eng.usf.edu](mailto:nachabe@eng.usf.edu))
- Environmental:
  - Dr. Jeff Cunningham ([cunning@eng.usf.edu](mailto:cunning@eng.usf.edu))



## Things the GPC can help with:



## Useful info for new students

- Lab Safety Training – <http://usfweb2.usf.edu/eh&s/>
- Responsible Conduct of Research Training - <http://www.research.usf.edu/cs/home.asp>
- FERPA training for new TAs: [http://www.registrar.usf.edu/presentation/ferpa\\_quiz/68](http://www.registrar.usf.edu/presentation/ferpa_quiz/68)
- Keys/Late Access to Buildings – see Ingrid Hall
- Office space – Barbara Johnson (priority to PhD students and TAs)
- Domain Accounts – see Barbara Johnson
- Ordering Supplies – see your advisor
- Machine shop – Tom Gage [tgage@usf.edu](mailto:tgage@usf.edu)
- Computer questions – [help@usf.edu](mailto:help@usf.edu)
- See [www.usf.edu/Campus-Life/](http://www.usf.edu/Campus-Life/) for info on ID cards, housing, transportation, child care, etc., etc.



## Why Graduate School?

- Improve your marketability
- Improve your long-term earning potential
- Will be required for PE registration in the future
- Recommended by the American Society of Civil Engineers (ASCE) and the National Academy of Engineering (NAE)
- PhD required for most careers in research and academia
- *Love of learning*



## Why CEE at USF?

- A strong commitment to the education of future scholars, researchers and leaders in the CEE profession.
- An exciting place to study and a great place to live.
- Many challenging local infrastructure and environmental problems.
- A strong commitment to finding solutions to global problems.
- Flexibility in degree offerings, areas of study and schedule (some web and evening courses available).
- Faculty, staff, and administration care about you and your success.



## Degrees Offered

Degree	Background	Requirement
<b>Non-Thesis Options</b>		
MCE	BS Engineering	30 cr coursework
MEVE	BS Engineering	30 cr coursework
<b>Thesis Options</b>		
MSCE	BS Engineering	24 cr coursework + 6 cr thesis
MSEV	BS Engineering	24 cr coursework + 6 cr thesis
MSES	Undergrad science or related degree	Prerequisites + 24 cr coursework + 6 cr thesis
<b>Doctoral Degrees</b>		
PhD	BS Engineering*	48 cr coursework + 20 cr dissertation + 10 cr additional coursework or research
PhD	BS Engineering* + MS (can receive credit for up to 30 hr coursework)	

\*PhD in Engineering Science offered through College of Engineering; Students are hosted in CEE and must meet host department degree requirements



## CEE Sub-disciplines

- Structures & Materials
- Geotechnical & Geoenvironmental Systems
- Transportation Systems
- Environmental
- Water Resources
- Interdisciplinary



## Options for Working Students

- A number of graduate courses offered in evenings
- Department offering 2 to 3 graduate courses online every semester as part of Ecampus ([www.ecampus.usf.edu](http://www.ecampus.usf.edu))
  - You must be flexible with respect to courses
  - You may need to come into class for exams or presentations
  - Additional fees required (see [www.ecampus.usf.edu](http://www.ecampus.usf.edu) for current costs)



## Thesis or Coursework Masters?

- One is not “better” - depends on interests and goals
- Non-thesis Master’s degree (MCE, MEVE)
  - Coursework only
  - Can accelerate pace (1 year) or take 1-2 classes per semester
- Thesis Master’s degrees (MSCE, MSEV, MSES)
  - Allows you to work closely with a faculty member on research
  - Usually takes longer (1.5-2 years)
  - Better chance for financial aid during your Master’s study (RA or TA)
  - Prepares you if you are interested in a PhD or research-based career



## MCE Requirements

- Most Flexible Program
  - 30 credits of regular coursework (~10 courses)
  - Recommended that 6 courses be in one CEE sub-discipline
  - Maximum four courses (12 cr) outside CEE
  - Maximum two 4000 level courses (6 credits)
  - Maximum 6 credits of independent study applied toward coursework requirements
  - Can finish all coursework in 1 year (e.g. 4 classes fall, 4 spring, 2 summer) or take 1-2 classes per semester while working.



## MEVE Requirements

- Four required “principles” classes
  - Physical/Chemical Principles (ENV 6002)
  - Biological Principles (CGN 6933)
  - Aquatic Chemistry (ENV 6666)
  - Sustainability class (Green Engineering, Green Infrastructure, or Sustainable Development)
- At least two from a menu of “processes” classes
  - Physical/Chemical Processes (ENV 6519)
  - Environmental Biotechnology (ENV 6667)
  - Air Pollution (CGN 6933)
  - Air Quality for Env/Transportation Engineers
  - Capstone Environmental/WR Design
- Four Additional Classes



## MCE/MEVE Portfolios

- Must be submitted during semester of graduation.
- Outcome 1: Written and Oral Communication Skills

### Component A: Written

The student has written a report that demonstrates an ability to plan, compose and integrate written and graphical communication of a project.

### Component B: Oral

The student has provided documentation that they have given an oral presentation in a public forum (e.g. class, graduate seminar, public meeting).



## MCE/MEVE Portfolios

- Outcome 2: Formulate and solve complex Problems

### Component A: Background

Background information and related research is drawn from acceptable journals, reports, textbooks, etc., presents a clear understanding of the problem and provides a rationale for the project objectives.

### Component B: Methods

The project design follows logically from the objectives. The process by which the data was generated, gathered, recorded and analyzed is appropriate and clearly described. For theoretical projects, a sound analysis including model development, calibration and verification is provided.

### Component C: Findings and Conclusions

The findings build logically from the problem statement, objectives and methods. All data and/or results are accounted for. The interpretations and conclusions are justified.



## MSCE Requirements

- Twenty-four credits of regular coursework (~8 courses) approved by thesis advisor and committee
- Max 3 classes (9 credits) outside department
- Max 6 credits of independent study counted towards coursework requirements
- Max 2 courses (6 credits) of 4000 level coursework
- 6 credits of thesis and defense



## MSEV Requirements

- Four required “principles” classes
  - Physical/Chemical Principles (ENV 6002)
  - Biological Principles (CGN 6933)
  - Aquatic Chemistry (ENV 6666)
  - Sustainability class (Green Engineering, Green Infrastructure, or Sustainable Development)
- Four courses of student’s choosing
  - Subject to approval from thesis advisor and committee
- 6 credits of thesis and defense



## MSES Requirements

- Prerequisite courses determined in consultation with thesis advisor
- 24 credits of regular coursework (~8 courses) approved by advisor
- Max 3 classes (9 credits) outside department
- Max 6 credits of independent study counted towards coursework requirements
- Max 2 courses (6 credits) of 4000 level coursework
- 6 credits of thesis and defense



## Master's thesis

- A contribution through research and publication to the field of study:
  - Environmental Engineering
  - Water Resources Structures & Materials
  - Transportation Geotechnical Engineering
  - Interdisciplinary
- Research guided by committee of three or more faculty members
- Thesis may be derived from work done as an RA
- Written thesis and oral defence required
- Be sure to sign up for 2 credits of thesis during final semester.



## Accelerated Program

- Enroll in the graduate program in your senior year
- Finish both BS and master's requirements efficiently
- Receive both degrees at the end of program
- All standard entrance and graduation requirements apply
  - If GPA is maintained at 3.3 or above, than you may DOUBLE-COUNT SIX CREDITS (a “discount” on your course requirements).
- Bright Future Scholarship students should discuss their situation with a financial aid advisor.



## Master's International (MI) Program

- Cooperative program between USF and Peace Corps
- $1 + 2 = 3$
- One year on campus
  - Plus two years in Peace Corps
  - = MSCE, MSEV or MSES degree
  - MI placements include Mexico, Uganda, Zambia, Panama, Mali, Peru, Dominican Republic



## MI Program Requirements

- Follow guidelines for MSEV, MSCE or MSES degree depending on your interests
- Three core subject courses:
  - Research methods in applied anthropology (ANT 6766)
  - Global Health Assessment Strategies (PHC 6112)
  - Sustainable Development Engineering (CGN 6933)
- Six credits thesis (done during Peace Corps service)
- For more information contact Dr. James Mihelcic, MI program director



## Options for non-Engineers

- Welcome to the greatest profession in the world!
- Master of Science in Engineering Science degree (MSES)
- PhD in Engineering Science hosted by CEE
- Options for professional registration as an engineer:
  - Prerequisites + MCE, MEVE, MSCE or MSEV degree
  - Students seeking PE registration in Florida who do not have an ABET accredited engineering degree should consult the Florida Board of Professional Engineers Chapter 61G15-20: Application for Licensure, Education Requirements and Experience



## What is a licensed engineer?

- The professional engineer (PE) license grants you the opportunity to perform engineering services for the public, take responsibility for your designs, reports, professional opinions, plans, etc., and have the privilege of applying your State-authorized engineering “seal” to your engineering work (from ASCE guidance for Civil Engineering Students [www.asce.org](http://www.asce.org))



## “Typical” Licensure Requirements for CEE

- ABET-accredited degree (BS or Masters plus prereqs)
- NCEES Fundamentals of Engineering (FE) Exam
- Engineer-in-Training Internship (4 yrs, 3 yrs for MCE or MSCE students)
- Application for Licensure - Character References & Experience
- NCEES Principles and Practices of Engineering (PE) Exam
- Licensure!
- For more information: [www.flpe.org](http://www.flpe.org), 850-521-0500



## Non-engineers who want to earn PE:

- 32 cr Math & Science; 48 cr Engineering
  - includes courses taken for master’s degree
- Many students complete some pre-reqs before coming to USF or as non-degree seeking students at USF



## Pre-reqs: Non Engineers who wish to become PE Eligible

Basic Math and Sciences: 32 credits required	
MAC 2281 Calculus I	4
MAC 2282 Calculus II	4
MAP 2302 Differential Equations	3
A Course in Statistics	3
PHY 2048 General Physics I	3
CHM 2045 General Chemistry I	3
CHM 2046 General Chemistry II or PHY 2049 General Physics II	3
Biological or Earth Science Course	3
Additional Science and Math and demonstration of laboratory experience.	6



## Pre-reqs: Non Engineers who wish to become PE Eligible

Engineering Science and Design: 48 credits required			
Civil Engineering Students		Environmental Engineering Students	
EGN 3311 Statics	3	EGN 3311 Statics	3
EGN 3343 Thermodynamics I	3	EGN 3343 Thermodynamics I	3
EGN 3353 Fluid Mechanics	3	EGN 3353 Fluid Mechanics	3
EGN 3615 Engineering Economy	3	EGN 3615 Engineering Economy	3
EGN 3321 Dynamics	3	ENV 4001 Environmental Engineering I	3
EGN 3331 Mechanics of Materials	3	CWR 4202 Hydraulics	3
EGN 3365 Materials Engineering I	3	CWR 4812 Capstone Water Res/Environ	3/6
EGN 3373 Electrical Systems	3	CGN 4122 Prof/Ethical Issues	1
Engineering course outside major discipline		3	
Additional Undergraduate and Graduate Level Engineering Science and Design Courses (includes graduate courses and up to 6 credits of thesis)			
<b>Total Engineering Science and Design</b>			<b>48</b>



## PhD Requirements

- **Total Minimum Hours: 78**
- **Coursework Requirement:** 48 credits (includes up to 30 cr of courses taken for master's):
  - $\geq 15$  credits in the area of concentration.
  - $\leq 9$  credits of independent study.
  - $\leq 6$  credits of master's thesis
  - No credits of directed research or graduate instruction methods may be used toward the coursework requirement.
- **Additional requirements:** 10 cr of additional coursework, dissertation or directed research.



## Ph.D. Dissertation

- A major contribution to the field of study through research and publication
  - $\geq 20$  credits dissertation required
  - Written Proposal + Oral Candidacy Exam normally taken within 3-4 semesters of entering program
  - You may not register for dissertation credits until advanced to candidacy
  - Publication requirement: one article accepted to peer reviewed journal (with letter of acceptance provided)
  - Doctoral Dissertation Defense



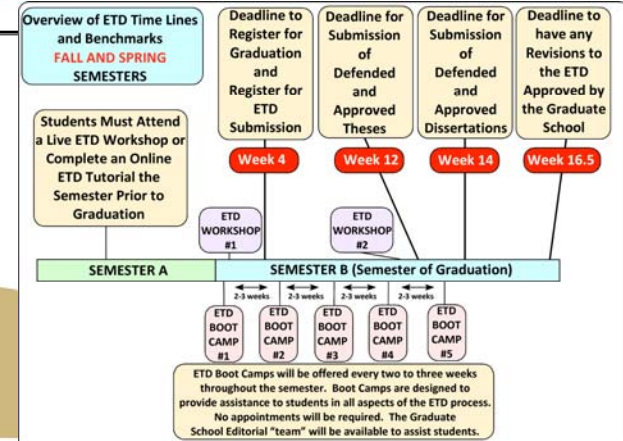


## Academic Committees

- Masters Degrees
  - MCE, MEVE: Grad Program Committee reviews portfolio
  - MSCE, MSEV, MSES: Min 3 faculty members
- Ph.D.
  - Min 5 faculty members
  - Min 2 members from CEE
  - Min 1 member from Engineering outside Civil
  - Min 1 member from outside Engineering
- Two faculty may serve as Co-chairs



## Electronic Thesis/Dissertation Filing:



## Finding a thesis/dissertation advisor

- Close collaboration between faculty advisor and student so choose wisely:
  - Read their profiles on the department website
  - Read their publications
  - Talk to them about your common research interests
  - Talk to them about funding opportunities in their research groups
  - Talk to their students
  - Look for a good fit between their mentoring style and the way you work best.



## CEE faculty: Structures & Materials

<b>William Carpenter, Dept. Chair</b> <a href="mailto:carpente@eng.usf.edu">carpente@eng.usf.edu</a>	Engineering Education; Structural engineering; Optimization; Viscoelasticity; Fracture mechanics; Adhesive bonding
<b>Gray Mullins</b> <a href="mailto:gmullins@usf.edu">gmullins@usf.edu</a>	Large Scale Testing, Field Instrumentation, Subsurface Sensing and Characterization, Full-scale testing of bridges and foundations; StatNamic testing; Alternative load testing techniques.
<b>Alberto Sagues</b> <a href="mailto:sagues@usf.edu">sagues@usf.edu</a>	Materials engineering; Corrosion performance of materials for construction and energy applications; Failure analysis and prevention; Physical metallurgy
<b>Daniel Simkins</b> <a href="mailto:dsimkins@usf.edu">dsimkins@usf.edu</a>	Computational Mechanics, Numerical Analysis, Composite Materials, Computational Engineering
<b>Rajan Sen</b> <a href="mailto:sen@usf.edu">sen@usf.edu</a>	Bridge design; Dynamic response of structures; Dynamic behavior of piles; Pre-stressed concrete.
<b>Abla Zayed</b> <a href="mailto:zayed@usf.edu">zayed@usf.edu</a>	Materials engineering; Mechanical performance of concrete, metals, and composites



## CEE Faculty: Transportation/Geotechnical

<b>Jian (John) Lu</b> <a href="mailto:jl2@usf.edu">jl2@usf.edu</a>	Traffic operations, intelligent transportation systems, systems design, safety, data acquisition, and pavement performance modeling.
<b>Abdul Pinjari</b> <a href="mailto:apinjari@usf.edu">apinjari@usf.edu</a>	Transportation Planning and Travel Demand Modeling, Econometric Modeling of Travel Behavior, Integrated Land-use Travel Demand Modeling, Sustainable Transportation, Freight Transportation, Travel Data Collection, Safety
<b>Qing Lu</b> <a href="mailto:qlu@usf.edu">qlu@usf.edu</a>	Pavement design – analysis and preservation, asphalt and asphalt mixes; transportation infrastructure system management; and surface technologies for orthotropic steel deck bridges.
<b>Yu Zhang</b> <a href="mailto:yuzhang@usf.edu">yuzhang@usf.edu</a>	Air Transportation, Transportation Network Modeling and Operations, Transportation Economics and Planning, Freight Transportation and Transportation Sustainability
<b>Manjriker Gunaratne</b> <a href="mailto:gunaratn@usf.edu">gunaratn@usf.edu</a>	Pavement Management Systems, Pavement Design, Probabilistic and Numerical Methods in Pavement and Geotechnical Engineering



## CEE Faculty: Water Resources

<b>Mahmood Nachabe</b> <a href="mailto:nachabe@usf.edu">nachabe@usf.edu</a>	Subsurface hydrology; fate and transport of chemicals in the vadose zone; stochastic hydrology; uncertainty in distributed models.
<b>Mark Ross</b> <a href="mailto:maross@usf.edu">maross@usf.edu</a>	Hydrologic, hydraulic, and water quality modeling; surface and groundwater interaction, GIS applications in hydrology; lake and estuary water quality management; estuary sediment dynamics
<b>Andres Tejada-Martinez</b> <a href="mailto:aetejada@usf.edu">aetejada@usf.edu</a>	Finite element methods for fluids, Subgrid-scale parameterizations for large-eddy simulation (LES) of turbulent flows, Novel LES methodologies, Numerical simulations of ocean turbulence.
<b>Kalanithy Vairavamoorthy</b> <a href="mailto:vairavk@grad.usf.edu">vairavk@grad.usf.edu</a>	Design of urban water supply systems operating under uncertainties associated with global change; Optimization, risk assessment and life-cycle management of urban water systems.



## CEE Faculty: Environmental

<b>Jeff Cunningham</b> <a href="mailto:cunning@usf.edu">cunning@usf.edu</a>	Contaminant fate and transport; physical, chemical and biological processes for water treatment; water resources and re-use; remediation of contaminated soil and groundwater.
<b>Sarina Ergas</b> <a href="mailto:sergas@usf.edu">sergas@usf.edu</a>	Biological treatment, biological air pollution control, membrane bioreactors, nutrient removal and bioremediation.
<b>James Mihelcic</b> <a href="mailto:jm41@usf.edu">jm41@usf.edu</a>	Sustainable development, Green engineering, Global water and sanitation, Engineering education reform.
<b>Amy Stuart</b> <a href="mailto:astuart@health.usf.edu">astuart@health.usf.edu</a>	Transport and transformation of pollutants in the atmosphere; computational modeling; human exposures to air pollutants.
<b>Maya Trotz</b> <a href="mailto:matrotz@usf.edu">matrotz@usf.edu</a>	Application of chemical principles to understand pollutant behavior (e.g. arsenic) in natural and engineered systems.
<b>Daniel Yeh</b> <a href="mailto:dhveh@usf.edu">dhveh@usf.edu</a>	Membrane and biological processes for water and wastewater, industrial waste minimization, soil and sediment remediation.
<b>Qiong (Jane) Zhang</b> <a href="mailto:qiongzhang@usf.edu">qiongzhang@usf.edu</a>	Green engineering, water treatment, and environmental assessment for sustainability.



## Financing Your Graduate Education

- Graduate scholarships/fellowships available from many agencies around the country (check department, college and graduate school websites for more information)
- Graduate RAs and TAs available in department
- Full-time students may be employed half (20 hrs/wk) or quarter-time (10 hrs/wk) to assist faculty with research
- Assistantships carry a monthly stipend and come with a tuition waiver and health insurance
- Travel grants are available to attend conferences and professional meetings



## Assistantships and Payroll

- Departmental TAs assigned by Department Chair with priority given to doctoral students
- Research assistantships awarded at discretion of individual faculty members
- Minimum payroll (0.5 FTE 20 hr/week):
  - Master's: \$1,348/month (minimum)
  - PhD: \$1,483/month (minimum)



## Scholarships & Fellowships

- Graduate School Fellowships
- NSF S-STEM– sustainable Water, Energy, Transportation infrastructure
- Graduate Assistants in Areas of National Need (GANN) – Water, Materials and Energy Nexus
- NSF Students, Teachers and Resources in the Sciences (STARS) – integrates science & engineering into elementary curriculum
- Programs for Underrepresented Minority Students:
  - Alfred P. Sloan Foundation Minority PhD Program
  - Latin American Caribbean Scholarships (LACS)
  - Bridges to Doctorate Program



## Transferring courses

- Transfer up to 12 credits of coursework taken:
  - During undergraduate degree and not used to meet BS requirements.
  - Taken as a non-degree seeing student at USF
  - Taken in another USF program and not used to meet degree requirements
  - Taken as a graduate student at another university and not used to meet degree requirements



## Staying in the Graduate Program

- Stay registered during Fall and Spring semesters
- File leave of absence form if you are not taking classes (MI students have zero credit course option)
- Remain in good standing (GPA  $\geq$  3.0) throughout program
- Only one C or C+ grade can be used for meeting graduation requirements (no C- grades counted)
- GPA below 3.0  $\rightarrow$  Probation 1 (warning)  $\rightarrow$  Probation 2 (need to meet with GPC to discuss)  $\rightarrow$  Academic Dismissal



## Time Limits

- Doctoral programs
  - Degrees must be completed within 8 years from date of admission.
  - All courses applied to the degree must be completed 8 years.
- Masters programs
  - Degrees must be completed within 5 years from date of admission.
  - All courses applied to the degree must be completed 7 years.



## Some departmental forms

- Program of study forms
  - PhD, MSCE, MSEV, MSES degrees – sign off by your advisor
  - MEVE degrees – sign off by Dr. Cunningham
  - MCE degrees – sign off by Dr. Ergas
  - You will need to update with ACTUAL courses taken at graduation!
- Proposal, thesis and dissertation defense
- Sign up for independent study, dissertation, thesis, directed research or dissertation hours



## Some Grad School Forms

([www.grad.usf.edu/student-forms](http://www.grad.usf.edu/student-forms))

- Accelerated program application
- Admission to doctoral candidacy
- Application for graduation
- Change of hours (grad school petition)
- Change of program application
- Committee appointment form
- Dual degree application
- Graduation forms
- Leave of absence request
- Time limit extension request
- Transfer of courses



## On Being a Graduate Student

- Qualities that will make you successful:
  - Hard work!
  - Thirst for knowledge
  - Self-motivation, self-initiative
  - Performing above and beyond assigned duties
  - Being a team-player and contributor
- USF Civil Engineering graduate alumni well placed in academia, government agencies and industry.

