Doctor of Philosophy
Civil and Environmental Engineering
Student Handbook

2016-2017
September 2016

Also available online
http://www.cee.northwestern.edu/
## Important Dates
### Academic Year 2016-2017

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>CEE Orientation</td>
<td>9/13/2016</td>
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<tr>
<td>TGS Graduate Student Orientation</td>
<td>9/14/2016</td>
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<tr>
<td>CEE Bonfire</td>
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<tr>
<td>Fall Registration</td>
<td>9/15/2016 – 9/26/2016</td>
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<tr>
<td>Fall quarter classes begin</td>
<td>9/20/2016</td>
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<tr>
<td>Last day to drop a class for Fall</td>
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<tr>
<td>Fall CEE Career Fair</td>
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<td>Fall quarter final exam</td>
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<td>Winter quarter break</td>
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<td>Winter quarter classes begin</td>
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<tr>
<td>Last day to add or change a course</td>
<td>1/9/2017</td>
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<tr>
<td>Martin Luther King Day observance</td>
<td>1/16/2017</td>
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<tr>
<td>CEE Career Fair</td>
<td>1/21/2017</td>
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<tr>
<td>Last day to drop a class for Winter</td>
<td>2/10/2017</td>
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<tr>
<td>Spring registration begins</td>
<td>2/20/2017</td>
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<tr>
<td>Winter classes end</td>
<td>3/11/2017</td>
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<tr>
<td>Winter quarter final exam</td>
<td>3/13 – 3/18/2017</td>
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<tr>
<td>Spring break</td>
<td>3/17 – 3/26/2017</td>
</tr>
<tr>
<td>Spring quarter classes begin</td>
<td>3/27/2017</td>
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<tr>
<td>Last Day to add or change a course</td>
<td>3/31/2017</td>
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<tr>
<td>Summer registration begins</td>
<td>4/10/2017</td>
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<tr>
<td>Application for a Degree via CAESAR for spring graduation</td>
<td>4/14/2017</td>
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<tr>
<td>Last day to drop a class for Spring</td>
<td>5/5/2017</td>
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<tr>
<td>Fall registration begins</td>
<td>5/15/2017</td>
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<tr>
<td>Memorial Day observance</td>
<td>5/29/2017</td>
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<tr>
<td>Spring classes end</td>
<td>6/3/2017</td>
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<tr>
<td>Spring quarter final exam</td>
<td>6/5 – 6/10/2017</td>
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<tr>
<td>CEE Graduation Reception for graduates and families – by invitation</td>
<td>6/15/2017</td>
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<tr>
<td>Commencement</td>
<td>6/16/2017</td>
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<tr>
<td>McCormick Ph.D. Hooding Ceremony</td>
<td>6/16/2017</td>
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<tr>
<td>Summer classes begin</td>
<td>6/19/2017</td>
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<tr>
<td>Independence Day observance</td>
<td>7/4/2017</td>
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<tr>
<td>Application for a Degree via CAESAR for summer graduation</td>
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Preface

This handbook is intended to provide you with a comprehensive guide to the Doctor of Philosophy (Ph.D.) degree in Civil and Environmental Engineering (CEE) programs, The Graduate School (TGS) at Northwestern University. We hope this handbook will enhance your experience at Northwestern.

This handbook is prepared as a handy reference guide to the degree requirements, programs, policies, and procedures of the Department and The Graduate School. We hope that you will find the information you need for both planning and understanding your Ph.D. education.

The Department would also like to emphasize the importance of social and ethical implications of an engineer’s work in the betterment of the society. Through student professional organizations, departmental seminars, and many ethics groups, you can interact with world renowned researchers and engineers, and experience diverse cultures. You can also interact with professionals in the greater Chicago area through meetings hosted by various professional groups. We hope you will take full advantage of the opportunities presented to you during your stay with us.

We hope you find this handbook a useful resource for your Ph.D. study. We wish you much success and welcome your suggestions for improvement of the handbook.

Kimberly Gray, Ph.D.
Professor and Chair
Civil and Environmental Engineering
Introduction

Welcome to the Department of Civil and Environmental Engineering (CEE), McCormick School of Engineering and Applied Science at Northwestern University. CEE offers the Doctor of Philosophy (PhD) degree in four Program Areas:

1. Environmental Engineering and Science (EES)
2. Geotechnics (GEO)
3. Transportation Systems Analysis and Planning (TRN)
4. Mechanics, Materials, and Structures (MMS)

The faculty, staff, and students at CEE look forward to interacting with you so that you can enjoy the maximum learning, social, and cultural experience Northwestern University can offer you. This handbook is part of our effort to help you achieve this goal. We hope you will thoroughly read this handbook at least once to see the types of information included here. We also hope that you will refer to it whenever you have an academic related question. Of course, our faculty and your peers are available to address any issue you may have. Please feel free to contact them.

A new edition of the handbook is published annually to coincide with each academic year. Revisions will be made as needed each quarter. The modification will be denoted by vertical lines at the left hand margins for easy referencing. First revision is denoted by single vertical line. Second revision is denoted by double vertical lines. Third revision is denoted by double vertical lines with one being a heavy thickness line. Revision number and dates are shown on the cover page. The handbook is also available online on the CEE department website.

To assist us in the continuing effort to improve this document, please send your suggestions and comments to Professor David Corr, Director of Graduate Studies and Clinical Associate Professor at d-corr@northwestern.edu.
Degree Requirements

The Department of Civil and Environmental Engineering (CEE) offers The Graduate School (TGS) Doctor of Philosophy (PhD) degree in four (4) Program Areas. The requirements for the PhD degree vary depending on the program area, however each program area shares these common requirements:

1. Coursework. TGS requires a minimum of nine courses to be completed for a letter grade (e.g. A, B, C, etc) with a minimum GPA of 3.0. Transfer credits are not allowed. Individual programs may require more than nine units, and may require a higher GPA to advance to candidacy – see below. Students completing a MS degree in the same program along the way to earning a PhD may be able to use some of the MS coursework to meet the coursework requirement, depending on the guidelines of the individual program and consent of the advisor.

2. Residency. TGS requires students to complete a minimum of eight (8) quarters of full-time study to fulfill the residency requirement for the PhD degree. Full time enrollment is defined as 3 or 4 units of coursework or research in a quarter. No residency will be awarded for study away from Northwestern.

3. Candidacy. The initial offer of admission to the PhD program does not guarantee admission to candidacy. The process for admission to candidacy is:
   a. A PhD student should be considered for Admission to PhD Candidacy no earlier than the end of the first academic year (3 quarters) and no later than the end of the second academic year. PhD students must have a research advisor who has agreed to supervise their PhD studies before consideration.
   b. For each PhD student, the Program Areas conduct a Qualifying Exam that the student must pass before consideration. The Program Areas are free to choose the form of the Qualifying Exam.
   c. Once a quarter, the Program Areas forward a list of the PhD students to be considered for Admission to PhD Candidacy by the CEE Graduate Committee. The Graduate Committee will review the records of all students, and discuss their research potential, and issue approvals. PhD students will be admitted to PhD Candidacy only upon this final approval by the Graduate Committee.

4. Prospectus. The prospectus process typically involves development of a written research proposal that will culminate in the dissertation. This research proposal is also typically delivered in oral form to the prospectus committee.

5. Committee. Typically, the committee for the Prospectus and Dissertation will consist of four members, one of which is from outside of Program Area. PhD students are free to have larger committees if they wish. Individual programs may alter the committee makeup; typically the committee will be determined through discussion between the PhD student and advisor.

6. Dissertation. PhD students must complete a written dissertation that is a significant and original research contribution, based on the research proposal in the Prospectus. PhD students defend the dissertation in a presentation open to the public. The details of the individual dissertation and defense are up to the advisor and PhD student, and subject to the requirements available on the TGS website.
Program-Specific Requirements:
Individual programs may have expansions or alterations to the requirements outlined above. To view the current practices in your program, please consult the CEE website: http://www.mccormick.northwestern.edu/civil-environmental/graduate/index.html

Responsibility for Meeting Degree Requirements
Ultimately, students are responsible for understanding the degree requirements for their specialty area and for planning their courses of study accordingly. CEE, TGS, and the McCormick Assistant Dean of Graduate Study are valuable resources for academic information. Faculty advisors will assist you in course selection and research activities. However, they are not responsible for ensuring that you meet all the degree requirements including grade point average (GPA) requirement - that is the responsibility of the student.
Academic Advising

The Department is using the GSTS (Graduate Students Tracking System) to monitor the academic progress of all graduate students. You will have a 24/7 access to your unofficial academic record (the only official academic record is the transcript issued by the Registrar Office). GSTS is: https://gsts.northwestern.edu/site/login.

You can login with your NETid and password.

While GSTS is a useful tool for academic progress, your advisor is your primary resource for academic and professional advices. As experts in their fields, you should take the opportunity to interact with your advisors as often as possible.

1. Academic Advisor
With some exceptions, each new PhD student is automatically assigned to be advised by the area coordinator of the program area they join:
   - Environmental Engineering and Science: J-F Gaillard
   - Geotechnics: Richard Finno
   - Transportation Systems Analysis and Planning: Marco Nie
   - Mechanics, Materials and Structures: Gianluca Cusatis

This initial assignment is for orientation purposes and to ensure you have a contact to select courses for your first quarter of study. As the fall quarter begins, you should begin the process of identifying a faculty member who will serve as your PhD advisor for the duration of your studies. CEE does not have a formal matching process by which students are assigned to advisors. We allow the process to happen organically, and in order for this to work properly, students must reach out to faculty to identify mutual interest. The program area coordinator can help you to get this process started – speak to this person if you are unsure of how to proceed. Your goal should be to identify a thesis advisor no later than the end of your third quarter of study.

Once you have selected an advisor, please contact the academic program coordinator (Melissa Koelling), the director of graduate studies (David Corr), and your area coordinator with this information. Please log your advisor selection in GSTS as well.

2. Curriculum Plan
The curriculum plan is highly dependent on the program you are in, the research topic you intend to pursue, and the opinions of you and your advisor. Please consult with your advisor to select appropriate coursework. Once you select a curriculum plan, it may be entered in GSTS.

3. Satisfactory Progress
According to The Graduate School (TGS) requirements http://www.tgs.northwestern.edu/about/policies/satisfactory-academic-progress.html, a GPA of 3.0 is required for graduation. A GPA below 3.0 in any quarter will place a student on probation. Probation is intended as a notice of unsatisfactory academic performance and constitutes a warning that improvement must be made in subsequent work to demonstrate progress toward the PhD degree. TGS allows a student up to two (2) consecutive quarters to return to satisfactory progress (quarter and cumulative GPA ≥ 3.0). Lack of improvement or evidence of inability to complete the work successfully in a given curriculum may provide reason for exclusion (dismissal).
Departmental Policies

1. Academic Integrity
CEE holds all members of the department to high standards of Academic Integrity. It is expected that new graduate students become familiar with the policies of academic integrity as outlined by TGS and the Office of the Provost:

http://www.tgs.northwestern.edu/about/policies/academic-integrity.html
http://www.northwestern.edu/provost/policies/academic-integrity/principles.html

Please note that per TGS’s Academic Integrity policy, we do not handle violations within our department – these matters are forwarded to the Associate Dean of Student Services at TGS, and are handled by the TGS protocol.

2. English Proficiency
The faculty of CEE view proficiency in the English language as one of the primary educational components of PhD study at Northwestern University. As outlined in the Degree Requirements students must pass the TGS English Proficiency requirements before admission to candidacy. English Proficiency is also a requirement to serve as a teaching assistant in the department. The options available for passing the English Proficiency requirement are available on the Assistantships page of the TGS website:

http://www.tgs.northwestern.edu/funding/assistantships/graduate-and-teaching.html

3. Responsible Conduct of Research (RCR)
All CEE PhD students are required to complete RCR training as soon as possible after entering the program, and no later than the end of the third quarter of study. RCR training consists of two parts: (1) online training provided by CITI, and (2) an in-person course offered by McCormick. PhD students must complete BOTH of these courses to be in compliance with RCR. The RCR policy is outlined at the following webpage:

http://www.research.northwestern.edu/ori/training/rcr/

4. Computer Policies
It is incumbent on any person who uses University resources, such as computers and associated networks, to ensure that they are not using illegal software. Downloading and using software that was obtained illegally is against University policy. Obtaining software legally means that either you personally, or your advisor through NU, has paid for the correct number of copies of the software for the number of computers you have installed the software on.

It is also against University policy to illegally download copyrighted material, such as movies, videos, mp3’s, scientific papers, magazine articles, etc. Any person who has violated this policy is subject to the disciplinary action determined by the university.

There are many alternatives to using illegally obtained software. The University provides a limited number of software titles available for students on the IT website at:

http://www.it.northwestern.edu
located under the “Students” tab. Also, many software titles are available either free, or at a reduced cost, for educational purposes. In addition, there are many free alternatives to standard software titles, such as Open Office, that can be used freely and are very robust.
Any questions or concerns about this matter should be directed to your advisor or the CEE IT Coordinator (Craig Neumann).

5. Laboratory Safety Training and Policies

All PhD students must be on the official Office for Research Safety lab roster, and must complete all ORS and CEE required lab safety training and preparation, before he or she can begin any lab work. The required training can be taken on-line. The first step is discussing with the Lab Coordinator (LC) what you intend to do in the lab, and what hazards may be involved. The LC will also explain the lab rules of etiquette and cleanup. Then, the LC will add you to the lab roster. Once you are on the roster, you will receive email notification from NSIS, the automated training web site. The email will provide links to take the on-line ORS training. They can be taken from any NU computer, or off campus (requires VPN). The LC will be notified when you have successfully completed the ORS training.

All lab workers must complete the CEE on-line training:

http://www.mccormick.northwestern.edu/civil-environmental/research/lab-safety.html.

Applicants should read the Safety Guide, then take the Safety Quiz. Submit the quiz as an attached file (pdf, doc, txt, etc) to Dave Ventre at d-ventre@northwestern.edu

Upon successful completion of the Safety Quiz, the LC will give you your lab access code and you can begin lab work. Please note that our labs and workshops contain certain specialty machines and tools that require individual, hands-on training to operate safely. This includes MTS machines, the Hobart mixers, saws, grinders, drills, hand tools, welding equipment and others. Most are kept locked. Using any such machines without proper training and LC approval is strictly forbidden. Anyone working in a lab without the required training, failing to follow lab safety and hygiene rules, or operating equipment without proper training and authorization, will have their lab access and privileges suspended.
Missions

Northwestern University
Northwestern is committed to excellent teaching, innovative research, and the personal and intellectual growth of its students in a diverse academic community.

The Graduate School
The mission of The Graduate School (TGS) of Northwestern University is to be a trusted, responsive, visionary leader and partner in order to maintain and promote the highest quality master’s and doctoral education. TGS collaborates with a number of schools to guide and sustain an institutional culture that facilitates excellence in teaching, innovation and rigor in research, and the personal and intellectual growth of its diverse student population.

Department of Civil and Environmental Engineering
We empower our students to gain technical, design, and management skills needed for leadership. We emphasize fundamental principles and design methods that apply to many career paths. We conduct research that advances our ability to:
1. Plan, design, construct, and operate society’s infrastructure
2. Design and control behavior of materials
3. Sustain natural and engineered environmental systems
We achieve this through basic and applied projects in which students and faculty work together in cutting-edge facilities.

The above mission statements can be found on the websites:
University – http://www.northwestern.edu/provost/about/index.html
The Graduate School – http://www.tgs.northwestern.edu/about/index.html
CEE Department - http://www.mccormick.northwestern.edu/civil-environmental/about/mission-vision-statement.html
Student and Professional Organizations

Student and professional organizations provide networking opportunity and seminars on the state of the art research and design in the civil and environmental engineering profession. The Department of Civil and Environmental Engineering is home to the Student Chapter of American Society of Civil Engineers (NU ASCE). Professional organizations of all branches of civil and environmental engineering have local section in Chicago area which hosts monthly meetings. You are encouraged to attend some of these meetings to interact and network with the engineering profession. Following is a list of organizations you may consider participating.

### Northwestern University American Society of Civil Engineers
Founded in 1852, the American Society of Civil Engineers represents more than 140,000 members of the civil engineering profession worldwide and is America's oldest national engineering society. ASCE’s mission is to provide essential value to our members and partners, advance civil engineering, and serve the public good.

The Mission of NUASCE is to create a more informed and involved Civil Engineering community by providing opportunities to apply and further refine technical skills, increasing student and faculty interactions, and preparing students to enter the professional engineering industry. Through NUASCE you will have the opportunity to meet other students with similar interests, network with professionals, and participate in exciting design competitions such as concrete canoe and steel bridge. Most importantly, the student chapter prides itself on creating a strong community of engineers, and they would love for you to join!!! For more information, visit their website: [http://asce.mccormick.northwestern.edu](http://asce.mccormick.northwestern.edu).

### Other student organizations:
- **Civil and Environmental Engineering Graduate Association (CEEGA)** — see Prof. David Corr, faculty advisor.
- **McCormick Graduate Leadership Council (MGLC)** Founded in 2006, the MGLC fosters community among all McCormick graduate students. [http://mglc.mccormick.northwestern.edu/](http://mglc.mccormick.northwestern.edu/)
- **Graduate Student Association (NUGSA)** at Northwestern enhances graduate students’ experiences in and out of the classroom and strives to create resources and programs to improve the quality of students’ lives. [https://nugsa.wordpress.com/](https://nugsa.wordpress.com/)
- **Graduate Leadership and Advocacy Council (GLAC)** is the voice of graduate students in academic and administrative matters at Northwestern University and a forum for graduate student leaders. [http://groups.northwestern.edu/glc/#GLC](http://groups.northwestern.edu/glc/#GLC)

### Chicago Area Professional Organizations
- **Illinois Section American Society of Civil Engineers** represents Civil Engineers in Northern Illinois. The Section has five technical groups and the Younger Member Group (YMG). The technical groups are Environmental and Water Resources Institute (EWRI), Geo Institute (GEO), Structural Engineering Institute (SEI), Transportation and Development Institute (T&DI), and Urban Planning and Development (UBD). All groups hold monthly lunch or dinner meeting. YMG usually hosts social event for younger engineers of all disciplines to network and they also sponsor a number of outreach events to pre-college students. For more information, visit [http://www.isasce.org/](http://www.isasce.org/).
American Concrete Institute (ACI)  https://www.concrete.org/
American Institute of Steel Construction (AISC)  http://www.aisc.org/
Institute of Transportation Engineers (ITE)  http://www.ite.org/
Structural Engineers Association of Illinois (SEAOI) advances and advocates excellence in structural engineering and to aid in safeguarding the public.  http://www.seaoi.org/index.html
Transportation Research Board (TRB)  http://www.trb.org/AboutTRB/AboutTRB.aspx
Internship and Career Development

Civil and Environmental Engineering Career Fair
Through the joint effort of NUASCE and EnvEUS, the inaugural CEE Career Fair was held in 2013. Starting in 2015, the CEEGA (CEE Graduate Association) joined the Career Fair as a new sponsor. CEE Career Fair focus on interaction between firms that hire civil and environmental engineering graduates for full time engineering positions and for internships. Watch for the announcement of this annual event in November and December. The event is held annually in January. The Department also maintains a web page http://www.mccormick.northwestern.edu/civil-environmental/current-students/index.html where internships and graduate engineer positions are posted when the information is sent to the Department. We suggest you check on the site periodically to see what is being posted.

McCormick Office of Career Development (MCD)
MCD http://www.mccormick.northwestern.edu/career-development/index.html provides career preparation and employment assistance through a variety of work-integrated learning programs including co-op engineering education, internships, research experience, and service learning. Register with McCormickConnect (http://www.mccormick.northwestern.edu/career-development/mccormickconnect.html) to receive information on job postings, resume submissions, interview schedules, career events, or meet with a MCD advisor. MCD is located in Room 2.350 in Ford Building.

Northwestern Career Advancement (NCA)
The mission of Northwestern Career Advancement is to foster excellence in career development, preparation, and professional opportunities for undergraduate and graduate students and alumni by providing comprehensive services and programming and by promoting strong partnerships with employers, academic departments, and the university community. http://www.northwestern.edu/careers/
Department of Civil and Environmental Faculty

Jan Achenbach (Emeritus Professor)  
Mechanics, Materials, and Structures  
Oluwaseyi Balogun  
Mechanics of Materials & Structures

Zdeněk Bažant  
Mechanics, Materials, and Structures  
Neil Blair  
Environmental Engineering & Science

Larry Booth  
Architectural Engineering & Design  
Giuseppe Buscarnera  
Geotechnical Engineering

Karen Chou (Assistant Chair, DGS M.S., M.S. in STR Coordinator)  
Mechanics, Materials, and Structures  
Mark Clark  
Environmental Engineering & Science

David Corr (Director of Graduate Study)  
Mechanics, Materials, and Structures  
Gianluca Cusatis (Ph.D. in MMS Coordinator)  
Mechanics, Materials, and Structures

Isaac Daniel  
Mechanics, Materials, and Structures  
Charles Dowding (Associate Chair)  
Geotechnical Engineering

Pablo Durango-Cohen  
Transportation Systems Analysis & Planning  
Richard Finno (GEO Coordinator)  
Geotechnical Engineering

Jean-François Gaillard (EES Coordinator)  
Environmental Engineering & Science  
Kimberly Gray (Department Chair)  
Environmental Engineering & Science

Ahmad Hadavi  
Project Management  
Erica Hartmann  
Environmental Engineering & Science

James Hambleton  
Geotechnical Engineering  
Yonggang Huang  
Mechanics, Materials, and Structures

Leon Keer (Emeritus Professor)  
Mechanics, Materials, and Structures  
Sinan Keten  
Mechanics, Materials, and Structures

Raymond Krizek (MPM Director)  
Geotechnical Engineering; Project Management  
Luisa Marcelino (Research Professor)  
Environmental Engineering & Science

Hani Mahmassani (Transportation Center Director)  
Transportation Systems Analysis & Planning  
Yu (Marco) Nie (TRN Coordinator)  
Transportation Systems Analysis & Planning
Department of Civil and Environmental Faculty

Harish Rao (Adjunct Professor)  Aaron Packman
Environmental Engineering & Science  Environmental Engineering & Science

John Rudnicki  Joseph Schofer
Mechanics, Materials, and Structures  Transportation Systems Analysis & Planning

Surendra Shah (Emeritus Professor)  Amanda Stathopoulous
Mechanics, Materials, and Structures  Transportation System Analysis & Planning

George Wells  Yun Wang
Environmental Engineering & Science  Environmental Engineering & Science
Questions

Students should consult with their academic advisors regarding academic and professional issues such as course selections and career guidance. The Director of Graduate Studies (DGS) will assist the academic coordinator when procedural issues arise.

Staff Contact Information

<table>
<thead>
<tr>
<th>Academic Coordinator</th>
<th>Melissa Koelling</th>
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<tr>
<td>CEE IT</td>
<td>Craig Neumann</td>
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<tr>
<td>Laboratory (dry) coordinator &amp; Lab safety coordinator</td>
<td>Dave Ventre</td>
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<tr>
<td>Environmental laboratory &amp; safety coordinator</td>
<td>Richard Warta</td>
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<tr>
<td>Finance</td>
<td>George Homsy</td>
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<tr>
<td>Access to AG 51 and locker key (deposit required)</td>
<td>CEE staff (Tech A236)</td>
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Catalog of Helpful Notes and Websites

1. **Academic Questions?** People to contact:
   a. Melissa Koelling – Academic Program Coordinator
   b. Area coordinator of your program
   c. Your advisor

2. **CAESAR** – Course registration, transcripts, etc.
   http://www.northwestern.edu/caesar/

3. **CEE Course schedule/ Listings 2015-2016**
   http://www.mccormick.northwestern.edu/civil-environmental/courses/index.html

4. **Academic Calendar**
   http://planitpurple.northwestern.edu/calendar/academic_calendar

5. **WildCard**
   http://www.northwestern.edu/uservices/wildcard/

6. **Parking**
   http://www.northwestern.edu/up/parking/

7. **Campus buses and Shuttles**
   http://www.northwestern.edu/uservices/transportation/shuttles/

8. **Health Service**
   http://www.northwestern.edu/health/

9. **History of NU**
   http://www.northwestern.edu/about/history/

10. **History of McCormick School of Engineering**
    http://www.mccormick.northwestern.edu/about/history.html

11. **Transportation Center & Library**
    http://www.transportation.northwestern.edu/
    http://www.library.northwestern.edu/libraries-collections/evanston-campus/transportation-library

12. **International Office**
    http://www.northwestern.edu/international/