



CEEES GRADUATE STUDENT NEWSLETTER

May 2016



Volume 2, issue 5

DGS' DESK

As you'll note from this month's issue, CEEES graduate students have been extremely busy and productive in securing prestigious fellowships, awards, and research grants! Please join me in congratulating all of them and hopefully we will continue this productive yield in months/years to come

Also, please join me in congratulating the following graduate students for successfully defending (or soon to) their respective theses in April – May: **Tomas Aquino** (PhD), **Darren Cheah** (MS), **Patrick Conry** (MS), **Kevin Fink** (MSCE), **Tara Weigand** (MSCE)

Lastly, the newsletter will go into summer "hiatus" so we can concentrate all our efforts on conducting our respective ground-breaking research. Any and all news worthy items that occur during the months of June and July will be published in the August issue. Wishing everyone a productive summer and to our next issue in August!

Tony Simonetti, DGS

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CONGRATULATIONS!



Rob Devine was awarded the Department of Energy Integrated University Program (IUP) Fellowship. This is a 3 year fellowship worth up to \$155,000 which will promote his PhD research of "Prefabricated High-Strength Rebar Systems with High-Performance Concrete for Accelerated Construction of Nuclear Concrete Structures" under advisors *Dr. Gino Kurama* and *Dr. Ashley Thrall*. The fellowship also provides funds for conference travel and includes an internship at a DOE facility or national laboratory.

In addition, Rob was also rewarded the American Concrete Institute Stewart C. Watson Memorial Scholarship. Finally, he was recognized as a finalist for multiple American Concrete Institute fellowships and

Honorable Mention for the National Science Foundation Graduate Research Fellowships Program (GRFP).



Kevin Fink

Graduate students **Kevin Fink** and **Evan Gerbo** both won the **Outstanding Graduate Student Teacher Award** from the Kaneb Center. This award recognizes graduate students who demonstrated excellent teaching at Notre Dame. Each recipient received an award certificate presented by Dr. Laura Carlson, Vice President and Associate Provost, Dean of the Graduate School. The awards were presented at



Evan Gerbo

dinner and award ceremony held at Smith Ballroom of the Morris Inn on Evening, April 20 - See more at: <https://ceees.nd.edu/news/kevin-fink-won-an-outstanding-graduate-student-teacher-award#sthash.Sy5QKAdZ.dpuf>

Maria Gibbs does it again as she is also this year's winner of the **Midwestern Association of Graduate Schools 3MT Competition!!**

Congrats again Maria for this accomplishment and very prestigious honor!





Hanyu Ma received a graduate student award in the field of **Environmental Chemistry from the American Chemical Society** for his course work and evidence of research productivity in the field of environmental chemistry during his doctoral work here at Notre Dame. <http://acsenvr.com/awards-recognition/graduate-student-awards/> (Advisor: *Dr. Chongzheng Na*)



Teresa Baumer

Rachel King-Lopez and **Teresa Baumer** were awarded a research grant from the **Reilly Center** (total of \$3441). The grant is to research radionuclide and heavy metal migration stemming from uranium mines within the Navajo Nation Territory. (Advisor: *Dr. Amy Hixon*)



Rachel King-Lopez

Michael Brandes was awarded the **ACI W. Gene Corley Memorial Scholarship**. Dr. Corley was recognized as an industry leader among those in the structural engineering community for several decades and was known for his investigation of the collapse of the World Trade Center towers after the terrorist attacks of Sept. 11, 2001. This scholarship is awarded to graduate students in the field of concrete with an interest in forensic engineering and the behavior and design of concrete structures. (Advisor: *Dr. Gino Kurama*)



ANNOUNCEMENTS

Academic Social Happy Hour

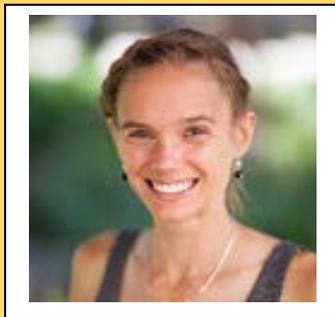
As the end of the semester approached, schedules were getting busy, especially for our peers preparing for their candidacy exam or thesis defense. We were glad to take a break with those who are in the midst of preparations, and enjoyed celebrating **Tori's** defense. We had a great group come out this month to our gathering, certainly dominated by the fluid dynamics students. This may have been due to the impressive line-up of fluid dynamics speakers in **Patrick Conry** from the Fernando group and **Tori Tomiczek Johnson** from the Kennedy group. Abstracts from their talks are below.

Cheers,

Andrew Schranck, Theresa Aragon (co-organizers)

Presenters for the Friday, April 15th, 2016 event were:

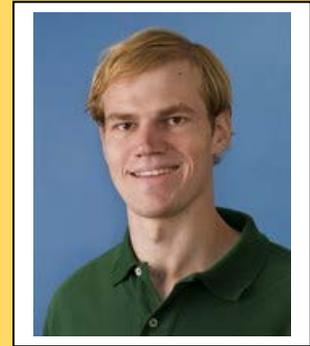
Dr. Tori Tomiczek Johnson: "*Wave and Surge Vulnerability of Coastal Residences*"



Coastlines offer valuable economic, recreational, and environmental resources, and almost half of the world's population lives 150 km or closer to the seashore. However, coastal communities are vulnerable to damage from the hydrodynamic loadings caused by hurricanes and tsunamis. While engineers seek to design coastal structures to resist these wave and surge-induced forces, the interaction of waves with structures is difficult to model, and wave transformation in the presence of large obstacles like coastal buildings or seawalls, termed here macro-roughness, is still not well understood. This research combines post-event reconnaissance surveys and scale model experiments to better understand the relationship between waves and structural vulnerability. Following Hurricane Ike (2008) and Hurricane Sandy (2012), regional and local scale surveys were conducted to assess damage in Bolivar, Texas, and coastal New Jersey, respectively. We derived fragility functions to relate the structural vulnerability of a home to the environmental conditions during the storms. To better understand wave propagation through urban environments, we conducted benchmark scale model experiments at Kyoto University's Hybrid Tsunami Open Flume in Ujigawa (HyTOFU). We measured the water surface elevation, water velocity, and pressure on and around idealized structural elements and arrays of structures. Wave conditions in which waves broke on or just before a specimen caused maximum impulsive pressures. When arrays of obstacles were added to simulate macro-roughness effects, shielded structures exposed to breaking waves experienced pressure reductions of 40-70% compared with unobstructed measurements. Results indicate that shielding elements such as breakwaters and seawalls may effectively mitigate damage caused by hurricanes and tsunamis. Data may be used to validate and improve numerical models for wave propagation through urban environments. (Advisor: *Dr. Andrew Kennedy*)

Patrick Conry (PhD candidate): *“Transports of Heat and Momentum in the Atmosphere: Dynamics in Boundary Layer and Beyond”*

Vertical exchange of momentum, heat, and moisture in the atmosphere influences what we perceive as weather. One aim of the Environmental Fluid Dynamics Group at Notre Dame is to better understand the physical processes that transport these environmental variables through the atmosphere, and particularly within the atmospheric boundary layer (i.e. where humans live). Field experiments address this aim by using sophisticated instrumentation to measure variables like winds, humidity, and temperatures. This presentation will cover field experiments in which Patrick Conry participated, particularly one experiment probing the atmosphere above the Indian Ocean with an example of an observed atmospheric wave and associated instability impacting surface conditions. Learning from such real-world examples helps model and parameterize vertical exchange processes for more accurate numerical prediction of weather and climate. (advisor: *Dr. Joe Fernando*)



GRADUATE STUDENT “SPOTLIGHT”



Alejandra Cartagena-Sierra - Organic molecules from once-living organisms (“biomarkers”) are unique proxies for paleoclimate reconstructions and understanding how ecosystems respond to past climate variations. My research focuses on applying organic geochemical techniques to investigate past climate variability associated with global ecosystem changes. These techniques have the potential to provide a better understanding of how vegetation, temperature, and hydroclimate variability are linked in the past, and how environments have transformed over a range of temporal and spatial scales.

I recently spent two months as a sedimentologist on a research vessel assisting with ocean core drilling in the SW Indian Ocean. My current research focuses on how sea surface temperatures in the southern Agulhas Plateau (SW Indian Ocean) have changed during the Mid-Pleistocene epoch (1.2–0.5 million years ago). The location of the Agulhas Plateau is ideal for studying how changes in the temperature and dynamics of this system relate to variability in Atlantic Ocean circulation and global climate. To do so, I will be using biomarkers from sea-surface dwelling algae and archaea that have been preserved in sediments to reconstruct the temperature of the uppermost water column at the Agulhas Plateau. I aim to use my research for reconstruction of how Antarctic and tropical water ocean fronts migrated through time in this region and study how that might have impacted global ocean circulation during this time period. (Advisor: *Dr. Melissa Berke*)

RESEARCH GROUP “SPOTLIGHT”



Ewa Dzik



Yi Liu



Mateusz Dembowski



Sarah Hickam



Travis Olds



Tyler Spano



Melika Sharifionizi



Mengyu Xu



Haylie Lobeck



Rachel King-Lopez



Philip Smith

The Actinide Research Laboratory at Notre Dame, piloted by **Dr. Peter C. Burns**, investigates the material science, mineralogy, geochemistry, and nanoscale control of radioactive materials. The larger goal of our research seeks to increase knowledge relating to actinide materials and to understand, predict, and control their behavior in the environment as a means by which to increase the accessibility and safety of nuclear power generation. To complete such a daunting task, graduate students **Ewa Dzik, Yi Liu, Mateusz Dembowski, Travis Olds, Philip Smith, Tyler Spano, Melika Sharifionizi, Sarah Hickam, Rachel King-Lopez, Haylie Lobeck, and Mengyu Xu** rely on their diverse backgrounds and research interests to investigate various aspects of actinide science. The Burns group studies both natural uranium minerals and synthetic materials which contain uranium, thorium, neptunium or plutonium. Using various diffraction, scattering, and spectroscopic techniques allows us to study the crystal chemistry of actinide materials. Calorimetry and solubility studies are also employed to investigate the thermodynamic properties of both natural and synthetic actinide phases.

Research in Dr. Burn’s group is funded by the Department of Energy and is the home institution for the Materials Science of Actinides Energy Frontier Research Center. The MSA EFRC involves collaborations between researchers and graduate students at the University of Notre Dame, Stanford University, University of California (Davis), Oregon State University, University of Minnesota, University of Tennessee, The George Washington University, The University of Akron, and Los Alamos National Lab. Our labs and offices are located on the third floor of Stinson-Remick Hall.

More information on the Dr. Peter Burns Research Group and a list of publications can be found at the following websites:

<https://engineering.nd.edu/profiles/pburns> ;

<http://www.petercburns.com/>

THE GRADUATE SCHOOL – SCHEDULE OF DEADLINES

	Fall 2015	Spring 2016	Summer 2016
Teaching assistant list submitted to Graduate School	Aug. 14	Dec. 4	—
First class day	Aug. 25	Jan. 12	Jun. 13
All course changes	Sept. 1	Jan. 19	—
Initial graduation list available in GradAdmin (Registrar)	Sept. 8	Jan. 26	June 21
Fall/Spring break begins	Oct. 17	Mar. 5	—
Course discontinuance	Oct. 30	Mar. 18	—
Preliminary theses/dissertations submitted for formatting check*	Nov. 9	Mar. 14	Jun. 20
Thanksgiving break begins (Wed. – Sun.)	Nov. 25	—	—
Easter break begins (Fri. – Mon.)	—	Mar. 25	—
Master's comprehensive examinations & PhD dissertation defenses**	Nov. 30	Apr. 8	Jul. 11
All admission to candidacy forms submitted to Graduate School	Dec. 7	Apr. 15	Jul. 18
Final theses/dissertations submitted to Graduate School	Dec. 7	Apr. 15	Jul. 18
Last class day	Dec. 10	Apr. 27	Jul. 22
Final exams begin	Dec. 14	May 2	—
Graduation date (official degree conferral)	Jan. 3	May 14	Jul. 31

**Formatting checks should be submitted to the Graduate School when the document is given to readers, at least two to four weeks prior to the defense.*

FELLOWSHIP/SCHOLARSHIP/EMPLOYMENT OPPORTUNITIES

- **Harriet Evelyn Wallace Scholarship**

<http://www.americangeosciences.org/workforce/harriet-evelyn-wallace-scholarship>

- **L'ORÉAL USA FOR WOMEN IN SCIENCE PROGRAM**

http://www.lorealusa.com/Foundation/Article.aspx?topcode=Foundation_AccessibleScience_Fellowships

- **The Smithsonian Institution Fellowship Program** (Deadline: September 1st, 2016)

<http://www.smithsonianofi.com/fellowship-opportunities/smithsonian-institution-fellowship-program/>

NEWSLETTER CONTACTS

If you wish to include or contribute news items for the next issue of the newsletter, please contact one of the editorial members below:

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