



CEEES GRADUATE STUDENT NEWSLETTER May 2017



Volume 4, issue 5

FROM THE EDITORS

Summer is finally here! Finals are done, grades have been submitted, and the undergrads are off campus. It's time to relax a little bit, enjoy the good weather, and possibly get some work done. If you feel like you're stuck in your office all day, find some work that you can take outside. Print off some papers to read, or take your laptop and sit under a tree to make those edits your advisor gave you on your manuscript. Soak up the sun now, because before you know it the undergrads will be back on campus and the leaves will be changing color as fall begins. As for the CEEES graduate student newsletter, this will be the final issue for this school year and we will start back up again this coming fall semester. Enjoy your summer, and don't let it fly by while you sit in your office!

TABLE OF CONTENTS

From the Editors.....	1
Announcements.....	2
Student Spotlight.....	6
GSU Update.....	7
Group Spotlight.....	8
Deadlines.....	9
Opportunities.....	9
Contacts.....	10

ANNOUNCEMENTS

Congratulations

Congratulations to **Steven Brus** (Advisor: Joannes Westerink), **Hanyu Ma** (Advisor: Peter Burns and Chongzheng Na), **Tong Wu** (Advisor: Peter Burns and Chongzheng Na), **Christian Hunter** (Advisor: Diogo Bolster) who will be graduating this weekend. Further congratulations go out to **Ryan Alberdi, Yenan Cao, Brian Joyce, Haylie Lobeck, Zach Hanson**, and any other students who defended their oral candidacy this semester that did not get listed here.

Congratulations to **Monica Arul** for being selected as one of only two students to be a Kaneb Center Graduate Associate for the 2017-2018 academic year. Each year the Kaneb Center for Teaching and Learning seeks graduate students with teaching experience to serve as Kaneb Center Graduate Associates. Kaneb Graduate Associates facilitate workshops on effective teaching (like TA orientation, Foundation of Teaching in STEM series and other workshops), develop teaching resources, and contribute to other activities on campus to help graduate students and postdocs develop as teachers.

Ryan Alberdi has been selected for the First Year Teaching Apprentice Program (FYTAP) for the 2017-2018 academic year, which will include teaching a section of the first year engineering curriculum. FYETAP is a mentored teaching experience for graduate students that are nearing the completion of their program in preparation for starting as faculty members post-graduation. The program has anywhere from 2-5 graduate students per semester that help to develop course materials, teach 1-2 sections of the first year engineering course, and attend regular meetings with faculty (both weekly for planning and monthly on engineering education topics). See the FYETAP website for more info (<https://engineering.nd.edu/resources/prospective/fyetapinstructors>).

Tianze Peng, Monica Arul, and Andrew Schranck are among sixteen graduate students who have been selected to participate in the NSF-funded Ethical Leaders in Science Technology Engineering and Mathematics (EL-STEM) program for the 2017-18 academic year. The program is focused on developing the participants' ethical perspectives and leadership skills including self-awareness, communication skills, and people and project management through small and group practical experiences. Students will be engaging with a variety of educational mediums, from discussions on books about leadership, to guest speakers from academia and industry, to experiential learning in the form of peer taught exercises and their own personally designed practicum. You can learn more about the program at the Graduate School's website (http://graduateschool.nd.edu/professional_development/ethics/ethical-leaders/).

Congratulations to **Mike Torcivia** on receiving the NASA Earth Space and Science Fellowship (NESSF). Along with a stipend, Mike will continue to conduct his research in a joint partnership with a NASA scientist, and have the opportunity to use NASA lab facilities.

Lei Li is a recipient of 2017 CRC (Center for Research Computing) award for Computational Sciences and Visualization. This award recognizes outstanding contributions in the areas of computational sciences and visualization. Such contributions may include, but are not limited to: 1) applications of high performance computation and/or visualization technology; 2) development of algorithms, codes, software environments or other tools for better using high performance computing and/or visualization. The nominated work need not have been done using CRC hardware or software. Up to three awards may be presented, and awardees will receive a \$1000 cash award and a plaque. For more information on this award, visit the award website (<http://graduateschool.nd.edu/about-the-graduate-school/gs-awards/crc-award/>).

Congratulations to **David Burney** and his wife Laura. They had their second child at the very end of April, a happy healthy boy named Charlie.



Conferences

The following students from the Kareem group have been selected to present their work at the **13th Americas Conference on Wind Engineering (ACWE)**, which will be held at University of Florida from May 21-24,2017:

“Generalized wind loading chain: A time frequency perspective”

A. Kareem, Y. Guo, L. Hu **by Liang Hu**

“Tailoring of Long-span Bridge Decks to Improve their Aerodynamic Performance Using CFD Based Optimization Method”

Y. Fang, A. Kareem **by Yan Fang**

“3D Performance-Based Topology Optimization of Uncertain Dynamic Tall Building Systems”

X. Luo, S. Spence; A. Kareem **by Xihaier Luo**

“CFD-based Multi-objective Aerodynamic Shape Optimization of Twisted Tall Buildings”

F. Ding, A. Kareem, S. Spence **by Fei Ding**

“Wind-induced fatigue behavior of rooftop pinnacles and masts on tall buildings: A Machine Learning approach”

M. Jayachandran, A. Kareem, D. Kwon **by Monica Arul**

Nicole Moore, Teresa Baumer, and Meena Said of the Hixon group recently presented research findings to the Blue Gap-Tachee Chapter of the Navajo Nation, the US EPA, and the Navajo Nation EPA on legacy uranium and trace metal contamination from an abandoned uranium mine on their land. This work was done in a collaboration with the University of New Mexico, the Southwest Research Information Center (SRIC), and the Blue Gap-Tachee Chapter of the Navajo Nation. **Nicole Moore** and **Meena Said** were also awarded a GLOBES Mini-Grant through the Reilly Center to present a poster on this research at the **Goldschmidt 2017 Conference** this August in Paris, France.

Academic Social Happy Hour

The CEEES Graduate Student Organization (GSO) sought to ring in summertime with a Saturday picnic in April, but Spring had its way with the plans and rain sent the party indoors. No worries though, because a little rain was not enough to stop the CEEES GSO from throwing a successful event. Food and fellowship reigned supreme as the students gathered to reminisce on the academic year (almost entirely behind them) and catch up on everyone's plans for a successful summer dedicated to research. Prior to the weekend gathering, **Teresa Baumer** graced us with a talk on Friday, April 28 in Cushing 217 about her research to produce models for actinide sorption to aluminum hydroxide minerals to better predict their fate in the environment. See her abstract below.



Teresa Baumer: *“Actinide sorption to aluminum (hydr)oxide minerals”*

Anthropogenic sources of actinides have been introduced into the environment through nuclear weapons testing and improper disposal at legacy waste sites. Furthermore, deep geologic disposal is generally accepted as the best long-term solution for disposing of high-level nuclear waste. The high toxicities and long half-lives of several radionuclides found in high-level nuclear waste pose a long term environmental concern. Therefore, for the purpose of risk management, it is necessary to accurately predict the mobility of these materials in the subsurface.

Actinide mobility is partially controlled by surface interactions, such as sorption and desorption. Previous studies investigating actinide behavior at the mineral-water interface relied on empirical models to describe surface interactions. These approaches are insufficient because they lack specificity and are only valid for the particular conditions of the experiments. Most notably, a K_d approach is unable to predict metal sorption under the changing conditions of solution concentration, ionic strength, or pH. My research focuses on developing surface complexation models that take into consideration the molecular level

interactions controlling actinide sorption and desorption to aluminum (hydr)oxide minerals under varying conditions.

Lab Link: <http://www.amyehixon.com/home.html>

The CEEES GSO planners are looking to transition from the usual monthly presentations and gatherings to seasonal or quarterly events. The organizers are working to roll out a tentative plan of events for the 2017-2018 academic year, hopefully in the next newsletter. Keep an eye out for this, and have a great summer. If you have questions or concerns regarding the academic social events, please contact any of the organizers: **Andrew Schranck** (aschranc@nd.edu), **Theresa Aragon** (aragon.10@nd.edu), **Lara Grotz** (sisman.1@nd.edu), **Stefanie Lewis** (Lewis.184@nd.edu), or **Keith O'Connor** (Keith.F.O'Connor.211@nd.edu). They would love to hear from you.

GRADUATE STUDENT SPOTLIGHT



Zachary Hanson (Zach) is now a fourth-year PhD Candidate after successfully passing his oral exam this spring semester. His overarching research interest is the interaction of groundwater and surface waters, and he has been able to focus on this topic through various methods and research questions under the guidance of advisors Dr. Diogo Bolster and Dr. Alan Hamlet. Some research that Zach is currently working on is comparing high-frequency observed groundwater elevation data collected from a field site located nearby at The Notre Dame Linked Experimental Ecosystem (ND-LEEF) facility in St. Patrick's Park

(<https://environmentalchange.nd.edu/resources/nd-leef/>) to simulated groundwater recharge (water infiltrating through the soil

and into the groundwater aquifer). This work helps to validate the use of simulated groundwater recharge produced by land surface hydrology models for regional groundwater modeling. Additionally, much of Zach's research has been focused on the development of a spatially-explicit lake hydrologic budget model that couples surface water and groundwater models in order to estimate hydrologic fluxes of thousands of lakes located in Northern Wisconsin and Michigan. This research is in collaboration with lake ecologists within Notre Dame's Department and Biological Sciences (Dr. Stuart Jones and PhD Candidate Jake Zwart). The simulated hydrological fluxes facilitate the modeling of carbon fluxes of the thousands of individual lakes in order to help advance the knowledge of the role that inland waters play within the global carbon cycle.

To complete his PhD, Zach will continue to use and assess groundwater and surface water modeling methods to address best approaches for hydrologic modeling moving forward under future climate projections. He has presented his work via poster and oral presentations at several scientific conferences, including: The International Association of Great Lake Research (IAGLR, May 2015), The American Geophysical Union (AGU, December 2015 and 2016), and The Association for the Sciences of Limnology and Oceanography (ASLO, June 2016). Zach has several journal articles detailing his research that will be submitted for review throughout this summer and fall – so if you see him in the hallway or office, ask him how they are going! Additionally, Zach and his wife Katherine are expecting their second child in late September.

ND-LEEF Groundwater Site: <https://www3.nd.edu/~zhanson/LEEF.html>

GRADUATE STUDENT UNION UPDATE

Please make sure to cast a vote for the CEEES Department Representative to the GSU at this link (<https://goo.gl/forms/jLni0VntHse10e6T2>). Andrew Schranck is the only one on the ballot currently, but the GSU needs proof that everyone had the opportunity to vote. If you would like to be added to the ballot, a revote can be arranged. The CEEES Department is allowed two Representatives.

The final meeting of the GSU for the 2016-17 academic year took place on Thursday April 20. The council concluded the semester with reports delivered by the Chairs of each committee (Academic Affairs, Health Care, Professional Development, Quality of Life, and Social). If you are interested in learning about what these reports covered, please contact Andrew Schranck (aschranc@nd.edu) and he can provide you with the written reports.

The new Executive Board for the 2017-2018 academic cycle was announced at the meeting (President: Niraja Suresh, co-Vice Presidents: John Nelson and Margie Housely). They are currently reviewing applications for the Chair positions for next year, and new programming will likely begin mid to late summer. Be on the lookout for announcements in the next issue of the CEEES Newsletter for opportunities and events to get the most out of your graduate school experience.

Don't forget, all graduate students can receive conference funding once per year from the GSU Conference Presentation Grants based on a competitive application process. Applications are reviewed every month, are due on the first of the month, and must be submitted one to three months prior to your conference. See the Conference Presentation Grants website (<http://gsu.nd.edu/about/cpg/>) for more details.

RESEARCH GROUP SPOTLIGHT

Hixon Group

The Hixon group research interests revolve around actinides present in the environment as a consequence of nuclear weapon production and nuclear fuel activities. The group is also involved in research pertaining to nuclear forensics. Understanding the long-term behavior of these radioactive elements is essential to predicting mobility in the environment, ultimately contributing to the risk management and clean-up of contaminated sites or potential geological repository. **Teresa** seeks to understand the behavior of actinides in soil components and develop a model describing their mobility. **Luke** works with uranium clusters to define their behavior when exposed to various minerals in the aqueous environment. **Rebecca's** research involves the synthesis of nuclear melt glass for use as a homogeneous standard for nuclear forensic analysis. She also is looking at the interaction of rare earth elements and uranium oxide to understand their behavior in an aqueous environment. **Nicole's** research focuses on post detonation nuclear forensics and synthesis of materials containing plutonium. She is developing a method to produce a laser ablation standard for nuclear melt glass and is also developing methods to synthesize plutonium peroxide nanoclusters and plutonium metal organic frameworks, both of which could potentially be used in the nuclear fuel cycle or nuclear waste disposal. **Meena's** research focuses on pre-detonation nuclear forensics and the aging effects of nuclear material. She is studying how the introduction of a specific ion into a controlled aqueous system affects the mineral surface of uraninite. Meena is also conducting experiments with UO₂ and PuO₂ to understand the effects that controlled environments of constant temperature and relative humidity have on a sample's macroscopic appearance and microstructure. Corinne is currently at Lawrence Livermore National Lab for a fellowship.

Lab Link: <https://engineering.nd.edu/profiles/ahixon>



Teresa Baumer



Rebecca Carter



Corinne Dorais



Nicole Moore



Luke Sadergaski



Meena Said

THE GRADUATE SCHOOL – SCHEDULE OF DEADLINES

	Fall 2016	Spring 2017	Summer 2017
Teaching assistant list submitted to Graduate School	Aug. 15	Jan. 5	—
First class day	Aug. 23	Jan. 17	—
All course changes	Aug. 30	Jan. 24	—
Initial graduation list available in GradAdmin (Registrar)	Sept. 6	Jan. 31	June 27
Fall/Spring break begins	Oct. 15	Mar. 11	—
Course discontinuance	Oct. 28	Mar. 24	—
Preliminary theses/dissertations submitted for formatting check*	Nov. 7	Mar. 13	Jun. 19
Thanksgiving break begins (Wed. – Sun.)	Nov. 23	—	—
Easter break begins (Fri. – Mon.)	—	Apr. 14	—
Master's comprehensive examinations & PhD dissertation defenses**	Nov. 28	Apr. 7	Jul. 11
All admission to candidacy forms submitted to Graduate School	Dec. 5	Apr. 13	Jul. 17
Final theses/dissertations submitted to Graduate School	Dec. 5	Apr. 13	Jul. 17
Last class day	Dec. 8	May 3	Jul. 28
Final exams begin	Dec. 12	May 8	—
Graduation date (official degree conferral)	Jan. 8	May 20	Aug. 6

FELLOWSHIP/SCHOLARSHIP/EMPLOYMENT OPPORTUNITIES

- Graduate Student Union Conference Presentation Grants (Rolling basis)

(<http://gsu.nd.edu/about/cpg/>)

- Graduate School Professional Development Awards (Rolling basis)

(http://graduateschool.nd.edu/professional_development/professional-development-award-application/)

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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