



CEEES GRADUATE STUDENT NEWSLETTER

February 2016



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DGS' DESK

The month of January went by in a flash, and hence time for another issue of our very informative newsletter! From a personal perspective, this past month, I have been busy replying to numerous emails and telephone calls on a daily basis from prospective graduate student applicants and faculty colleagues. I am very happy to report that as of February 1st, our department has received a total of **163** graduate student applications! Therefore, your respective advisors may be asking you for help with hosting prospective graduate students during recruitment visits to our department and university.

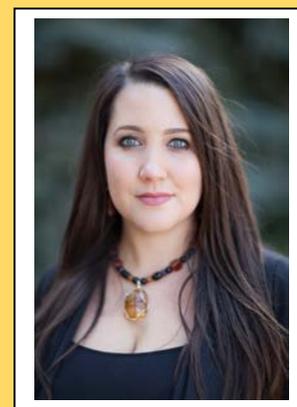
Lastly, a friendly reminder that all graduate students should have their respective **Academic iNdex** profiles up to date since we will be using the latter for your annual progress reports.

Warm regards, Tony Simonetti, *director of graduate studies*

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CONGRATULATIONS!

Congrats to **Tyler Spano** who received the *Patrick and Jana Eilers Graduate Student Fellowship* for proposing to conduct energy-related research. The fellowship comes with a \$6,500 award. Tyler will be working on a project entitled, "*Materials Properties of Synthetic Uranyl Vanadate Mineral Analogues*". Representing a fulfillment of basic science needs, Tyler's project will be carried out by synthesizing and characterizing chemically pure uranyl vanadate mineral analogues of varying composition. She will quantify structural and vibrational attributes of obtained mineral analogues and relate these parameters to the chemical composition of synthesized materials. Observing the relationship between structure, composition, and materials properties will serve to elucidate the geochemical stability of uranyl vanadate minerals in natural settings. The overarching goal of Tyler's project is to increase the body of knowledge relating to the long



term behavior and environmental impacts of used nuclear fuel, uranium mine and mill tailings, and legacy uranium waste. (co-advisors: *Drs. Peter C. Burns and Antonio Simonetti*)



Congratulations to **Patrick Conry**, who won an Outstanding Student Presentation award at the American Meteorological Society (AMS) 96th Annual Meeting (10–14 January, 2016 New Orleans, LA). His work entitled “*Observing Atmospheric Waves’ Impacts on Troposphere down to the Surface during ASIRI-RAWI Campaign*” dealt with the instabilities of planetary waves that form the sub-seasonal oscillations in the Indian Ocean such as the Madden Julian Oscillation. The award consists of a \$100 prize and a reference book from the AMS. (advisor: *Dr. Joe Fernando*)

ANNOUNCEMENTS

Please give a warm welcome to two new graduate students in our department – **Duy Nguyen** (PhD candidate), who is advised by *Dr. David Richter*, and **Marcela Vega-Munoz** (PhD candidate), who is advised by *Dr. Rob Nerenberg*.

Academic Social Happy Hour

Graduate students **Theresa Aragon**, **Andrew Schrank**, and **Fab Sabba** are co-organizers of a graduate student monthly social event, “*Academic Social Happy Hour*”, which combines a ‘happy hour’ with a very friendly seminar series where graduate students present and share their research projects with colleagues and learn about the work being done within our department. Graduate student presentations are brief and informal (5-10 min), just long enough to let other graduate students know what you do all day.

Presenters for the Wednesday, January 20th, 2016 event were:

Sarah Hickam (PhD candidate): *"Solubility of uranium phases in uranyl peroxide cluster-forming conditions"*



A family of more than 100 uranyl peroxide clusters has been developed over the past decade, and a fascinating property of these clusters is that they are highly soluble in aqueous solution. We hypothesize that uranium phases in contact with solutions containing hydrogen peroxide and a base, both of which are necessary components in uranyl peroxide cluster syntheses, will be more soluble relative to their solubility in water alone. We have examined the solubility of several uranium minerals and uranium nitride, a possible fuel form for future-generation nuclear reactors, in these conditions.

In all cases, we identify a trend of increasing solubility with increasing pH and hydrogen peroxide concentrations of the contacting solution, and we also observe uranyl peroxide clusters in solution. (Advisor: *Dr. Peter C. Burns*)

Haylie Lobeck (PhD candidate): *"Solving a Problem for Uranium One"*

Uranium One is a uranium mining company that has locations across the globe, including Kazakhstan, Australia, and the US. Within the past year, Uranium One contacted the University of Notre Dame to help solve a problem they have been having with packaging and shipping their yellowcake. In some instances, the barrels of yellowcake would pressurize and explode, causing the Nuclear Regulatory Commission to shut down shipments until the problem was resolved. A team of graduate students, under the direction of Dr. Peter Burns, worked to investigate the yellowcake and processing techniques Uranium One used to pinpoint the source of pressurization. Once the problem was identified, the company was able to adjust and resume shipments. (Advisor: *Dr. Peter C. Burns*)



Conference Presentations:

- **David Burney** presented a talk entitled, “*Developing a method for measuring moderately volatile elements in lunar basalt using solution mode ICP-MS*”, at the Center for Lunar Science and Exploration Team Workshop in Houston TX (January 25-26, 2016).

GRADUATE STUDENT “SPOTLIGHT”



Brian Joyce - The western coastline of Alaska spans over 10,000 km of diverse topography ranging from low lying tundra in the north to sharp volcanic relief in the south. Included in this range are areas highly susceptible to powerful storms, which can cause coastal flooding, erosion and have many other negative effects on the environment and commercial efforts in the region. In order to better understand the multi-scale and interactive physics of the deep ocean, continental shelf, near shore, and coast, I am developing a large unstructured domain hydrodynamic model using the finite element, free surface circulation code ADCIRC. This model is a high resolution, accurate, and robust computational model of Alaska’s coastal

environment capable of simulating tides and storm surges. The geographic and topographical complexity of the Alaskan coastline can only be captured with very high model resolution.

Historical wind and pressure fields are used within the model to simulate storm events and the resulting storm surge. With a high resolution grid, this storm surge can be modeled in coastal areas and estuarine and deltaic systems where coastal erosion and flooding are significant problems. Accurate knowledge of tidal and storm surge response in water elevation and currents is vital to providing preventative measures against the coastal erosion and flooding problems occurring along the Alaskan coast. This is especially important in remote Alaskan communities where the environment may greatly decrease the ability to provide assistance to victims of coastal hazards. Both the tidal and surge model have an extensive number of observed data points collected by NOAA to be used for validation. The next step in my work is to include the effects that ice coverage may have on the storm surge resulting from large winter storms in the region. At certain concentrations, the ice may have an amplifying effect on the storm surge. This is a very important topic to understand, especially within the context of climate change. (advisor: *Dr. Joannes Westerink*)

RESEARCH GROUP “SPOTLIGHT”



The **Kurama Research Group** includes PhD students **Theresa Aragon, Steven Barbachyn, Robert Devine, Kevin Mueller,** and **Andrew O'Donnell,** MS student **Michael Brandes,** undergraduate students Max Ducey, Chris Garcia, Allison Griffiths, Michael Hogan, Bo Plogmann, and Madalyn Sower, and lab technician, Brent Bach. This lab group focuses on the experimental and analytical investigation of a variety of different topics concerning reinforced concrete structures. One of these focuses is on the behavior and design of concrete building structures under extreme loading. For example, current projects include the investigation of diagonally reinforced concrete coupling beams and grouted seismic rebar connections for precast concrete buildings under earthquake

loading. They have also recently worked on the structural behavior and design of reinforced concrete structures under fire loading. Another research focus has been the use of recycled concrete aggregates in structural concrete applications. Replacing significant amounts of coarse aggregate with recycled aggregates in reinforced concrete structures could substantially improve the resource productivity of the concrete industry, which consumes vast amounts of energy and negatively impacts the ecology of forested areas and riverbeds. The most recent focus area for Kurama's research group has been the development of advanced reinforced concrete technologies to accelerate construction schedules, reduce costs, and build safer nuclear power plants. Research being conducted within the Kurama lab group is currently funded with support from the Precast Concrete Institute (PCI), the Department of Energy, and the National Science Foundation.

More information on the Kurama Research Group and a list of publications can be obtained at the following web site: <https://engineering.nd.edu/profiles/ykurama>

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

- **The American Society of Civil Engineers Fellowships** (Deadline: February 10, Deadline).

http://www.asce.org/ASCE_Fellowships/

- **Evolving Earth Student Grant Program** (Deadline: March 1st, 2016)

<http://www.evolvingearth.org/evolvingearthgrants/grantsmain.htm>

- **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

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