



# CEEES GRADUATE STUDENT NEWSLETTER

## January 2016



Volume 2, issue 1

### DGS' DESK

Happy New Year to everyone and wishing you all the best for the upcoming academic year!! Hope you all had a restful and peaceful holiday season!

I wish to remind all graduate students that they should be working on updating their respective **Academic iNDEX** profiles, since we will be using the latter for your annual progress reports; this evaluation will be conducted in March.

Lastly, good luck to all of the graduate students taking their qualifying exams in a few days!

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

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### CONGRATULATIONS!



**Corinne Dorais**, PhD candidate, has been awarded a prestigious and lucrative 1-year doctoral fellowship from the **National Nuclear Security Agency (NNSA) Graduate Fellowship Program (NGFP)** (<http://ngp.pnnl.gov/fellowships.stm>). The program provides fellows with specialized training and professional development opportunities, while simultaneously providing support for NNSA's global nuclear mission. NGFP Fellows will assist with programs that involve a variety of national security challenges. Corinne will begin her NNSA fellowship in June 2016.

Corinne began her PhD work during the summer of 2014 with *Dr. Amy Hixon*. Her work with Dr. Hixon focuses on the synthesis of a homogenous surrogate material to be used in the forensic analysis of post-detonation nuclear debris. In February 2015, Corinne joined the research group of *Dr. Antonio Simonetti*, who co-advises her along with Dr. Hixon. Her nuclear forensics work with Dr. Simonetti focuses on the development of natural standards that can be used to determine and validate chemical and isotopic signatures of nuclear materials at high spatial resolution.

During the summer of 2015, Corinne worked at Los Alamos National Laboratory as a Seaborg

Fellow. There she conducted research with Dr. William Kinman, learning trace-level uranium and plutonium column chemistry separations. Since her return from Los Alamos, Corinne has been working to establish these separation techniques at Notre Dame for the analysis of nuclear materials.



Our very own **Fab Sabba** has been *invited* to present a talk at Lublin University of Technology, Poland (4-6<sup>th</sup> January, 2016). The title of his seminar is *“Modelling Greenhouse gas (GHG) emissions from Biofilm Processes in Wastewater Treatment Plants”*

## ANNOUNCEMENTS



**Andrew Schrank** has been working through a course out of the Riley Center entitled, ***“The Social Responsibilities of Researchers (SRR)”***. He has been learning about ethics and science communication, and working on a project through which he planned a 4 part series to meet with a high school chemistry class to talk to them about topics they are learning in class, and how they are related to his research at Notre Dame, including some lab activities. This NSF funded pilot program was solicited to all graduate students in natural and social sciences last year, and our department has two participants in the program. The program is looking for applicants for next year. If you are interested in participating, the pertinent web link for the program is:

<http://reilly.nd.edu/research/research-integrity/social-responsibilities-for-researchers/>



**Andrew Bartolini** is a participant in the ***EL-STEM program***, which selects 16 graduate students in either their third or fourth year of study in STEM fields to participate in a year-long program that is aimed at developing their leadership skills through an ethical framework. There is a substantial time commitment involved but it is spread out over the full year (three or four full day meetings - 8:30 am to 3:30 pm - on Saturdays throughout the year and four-hour meetings every three weeks or so). The participant is also expected to read various materials over the summer session. Each participant receives an additional stipend of \$1,400. The web link below provides more information about the program should you wish to participate:

♥♥♥ **HEARTFELT THANK YOU** for all of their hard work and help provided to graduate students on a daily basis goes out to **MOLLIE, JULIE, BONNIE, TINA, BRENT, and SCOTT!** Your assistance and support is greatly appreciated!

### **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.

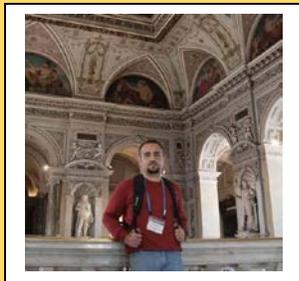
Presenters for the Tuesday, December 15<sup>th</sup>, 2015 event were:

**Rebecca Carter** (PhD candidate): "*Nuclear Forensics: Pre and Post Detonation Research*"



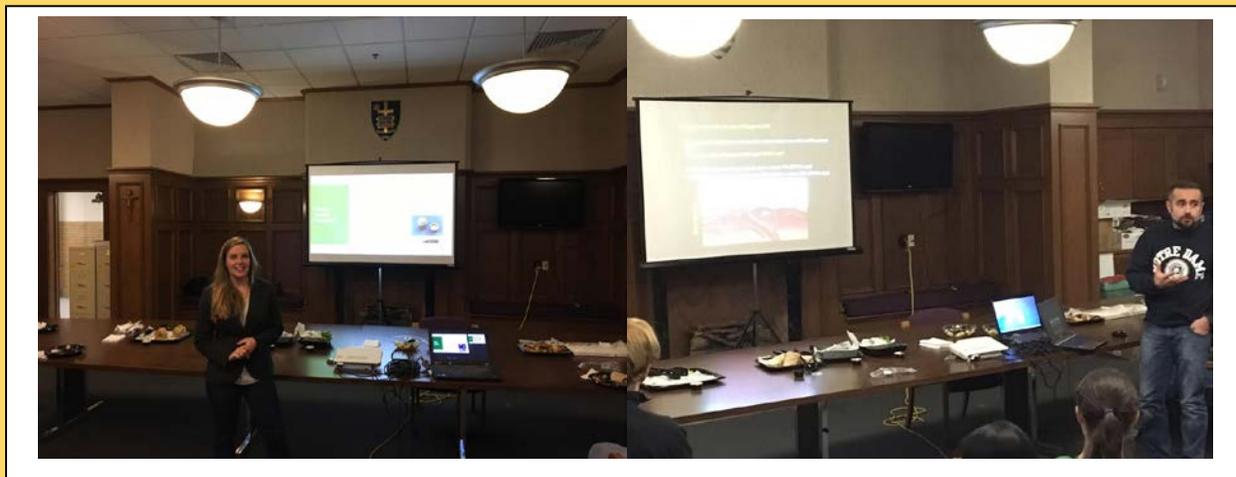
Nuclear forensics provides a way to identify and characterize nuclear material for the production history and provenance. With the abundance of illicitly trafficked nuclear material incidents, the national security sector has turned to nuclear forensics. Forensic investigations can be broken down into two main categories; one focusing on post-detonation of an unlikely radiological dispersal device (RDD), and the other on pre-detonation nuclear material. My research involves determining rare earth element sorption to UO<sub>2</sub> powder and creating a glass analog for standard analyses. (Advisor: *Dr. Amy Hixon*)

**Okay Çimen** (Visiting PhD candidate): "*U-Pb Geochronology of the meta-magmatic rocks from the Çangaldağ Complex (Central Pontides, Turkey)*"



I am a visiting PhD student from the Middle Eastern Technical University, Ankara (Turkey), and have been conducting research in CEEES since May 2015. I am trying to understand the geodynamic evolution of the Central Pontides (Turkey), Intra-Pontide, and Neotethyan Oceans during the Mesozoic time. My research focuses on the petrology of meta-magmatic rocks within the Çangaldağ Complex (Central Pontide, Turkey), which plays an important role in the regional geology of Turkey. In his talk, Okay provided a short overview of his research, with particular reference to the U-Pb geochronological work he has conducted at

Notre Dame. For further information: [www.okaycimen.com](http://www.okaycimen.com). (Notre Dame advisor: *Dr. Antonio Simonetti*)



#### Conference Presentations:

- **Corinne Dorais** presented an abstract entitled, "*Uranyl peroxide cage cluster interactions at mineral interfaces*" at the international PACIFICHEM 2015 Conference in Honolulu, Hawaii (December 15-20<sup>th</sup>, 2015).

- **Philip Smith** presented an abstract entitled, "*Ionothermal synthesis of UO<sub>2</sub><sup>2+</sup> and NpO<sub>2</sub><sup>2+</sup> coordination compounds using task-specific ionic liquids*" at the international PACIFICHEM 2015 Conference in Honolulu, Hawaii (December 15-20<sup>th</sup>, 2015).

- **Tyler Spano** presented a poster entitled, "*Synthesis and structural properties of novel praseodymium uranyl vanadate and praseodymium uranyl hydroxide mineral analogues*" at the PINDU Inorganic Symposium held in Jordan Hall (UND) on December 5<sup>th</sup>, 2015.

#### GRADUATE STUDENT "SPOTLIGHT"

**Tyler Spano** - My PhD research includes diverse topics in the realms of actinide mineralogy, geochemistry, and nuclear forensics. I am currently studying the crystal chemistry and materials properties of uranyl vanadate minerals and synthetic phases using spectroscopic techniques and powder and single crystal X-ray diffraction. Investigating the structural and materials properties of these synthetic minerals provides insight into the behavior and stability of uranium in natural systems where vanadium is present. Other current research investigates the paragenesis and mineralogy of a suite of uranium-rich opals from Mexico. For this project, I use X-ray fluorescence mapping to determine areas of interest on my samples;



single crystal X-ray diffraction to identify mineral species; and electron microprobe analysis to quantify uranium concentrations within opal. These techniques elucidate sequences of mineralization and help me to understand how uranium is incorporated and retained by the opal. My newest project involves the trace element analysis of uranium-rich materials for source attribution. For this work, I use inductively coupled plasma mass spectrometry (ICP-MS) to analyze materials from the nuclear fuel cycle for their trace element signatures. These signatures contain information about the origin and processing history of the material I am analyzing. Information gained from this research can be used to identify sources of nuclear materials for forensic purposes. (Co-advisors: Drs. *Peter C. Burns and Antonio Simonetti*)

## RESEARCH GROUP “SPOTLIGHT”

**Dr. Rob Nerenberg** - The Nerenberg research group focuses on environmental biotechnology, especially biofilm processes for water and wastewater treatment. The research group includes PhD students **Fabrizio Sabba**, **Jared Johnson**, **Marcelo Aybar**, **Patricia Perez**, and **Marcela Vega**, MS student **Andrew DeVries**, and undergraduate students Tessa Clarizio and Monica McFadden. Marcelo and Marcela are conducting their respective research work under the dual PhD program with PUC in Chile. Patricia is obtaining her PhD from the University of Cantabria in Spain, but is co-advised by Dr. Nerenberg and carrying out her research in his lab. Examples of the research work being conducted include: 1- GE Water and Process Technologies to develop an energy-efficient treatment process based on membrane-supported biofilms; 2- Hampton Roads Sanitary District in Virginia to develop a novel water denitrification processes using inexpensive sulfur compounds as electron donors; and 3- the City of South Bend to study a novel disinfectant for combined sewer overflows (CSOs). At a more fundamental level, we are using advanced tools to determine the mechanical properties of biofilms, and using multidimensional models, combining biofilm viscoelastic properties and computational fluid dynamics to predict biofilm deformation and detachment in fluid flow, and studying greenhouse gas emissions from biofilm processes for wastewater treatment. Research being conducted within the Nerenberg group is funded with support from the National Science Foundation, GE, the Water Environment Research Foundation, and the Waste Reuse Foundation.



More information on the Nerenberg research group can be found at the following web site: <https://engineering.nd.edu/profiles/rnerenberg>

## 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

- **Air and Waste Management Association Scholarships** (Deadline: January 11, 2016)  
<http://ace2016.awma.org/wp-content/uploads/2015/10/Scholarship-Application-2-LINK-Information-Page.pdf>
- **The American Water Works Association Scholarships** (Deadline: January 11, 2016)  
<http://www.awwa.org/membership/get-involved/student-center/awwa-scholarships.aspx#4216362-indiana>
- **The American Society of Civil Engineers Fellowships** (Deadline: February 10, Deadline).  
[http://www.asce.org/ASCE\\_Fellowships/](http://www.asce.org/ASCE_Fellowships/)
- **Evolving Earth Student Grant Program** (Deadline: March 1<sup>st</sup>, 2016)  
<http://www.evolvingearth.org/evolvingearthgrants/grantsmain.htm>
- **Harriet Evelyn Wallace Scholarship**  
<http://www.americangeosciences.org/workforce/harriet-evelyn-wallace-scholarship>
- **The Geological Society of America Graduate Student Grants** (Deadline: February 1<sup>st</sup>, 2016)  
<http://www.geosociety.org/grants/gradgrants.htm>
- **L'ORÉAL USA FOR WOMEN IN SCIENCE PROGRAM**  
[http://www.lorealusa.com/Foundation/Article.aspx?topcode=Foundation\\_AccessibleScience\\_Fellowships](http://www.lorealusa.com/Foundation/Article.aspx?topcode=Foundation_AccessibleScience_Fellowships)
- **The Smithsonian Institution Fellowship Program** (Deadline: September 1<sup>st</sup>, 2016)  
<http://www.smithsonianofi.com/fellowship-opportunities/smithsonian-institution-fellowship-program/>

## NEWSLETTER CONTACTS

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