DGS’ Desk

I’m very excited about bringing this newsletter to fruition and hopefully you will find it an enjoyable read, a useful resource, and will help to foster unison and collegiality amongst CEEES graduate students in our great department! I wish to thank Ryan Alberdi, David Burney, Fab Sabba, and Mollie Dash for their help and support with this endeavor. It’s your newsletter, so please contact Ryan, David, or Fab with news items that you wish to include in future monthly issues. As a friendly reminder, please make sure that you scan the section below containing The Graduate School’s upcoming deadline dates. For students taking qualifying exams in early January 2016, please make sure that you have met with the four professors providing you with the exams, and returning the completed forms to Mollie Dash ASAP. Lastly, please don’t forget to participate in the monthly “Academic Social Happy Hour” event – please contact either Fab, Theresa Aragon, or Andrew Schrank should you wish to give a 5-10 minute informal research presentation at a future get together!

Warm regards, Tony Simonetti, director of graduate studies

CONGRATULATIONS!

Patrick Conry is one of 8 UND graduate students whose research was featured and highlighted at the “Graduate Research Challenge”, an event sponsored by The Graduate School that promotes graduate student research, and is a part of the Shamrock Series 5k Race, held in Boston this year. Proceeds from the 5k—expected to draw 3,000 runners and numerous spectators—go toward funding graduate fellowships. Graduate student profiles are
highlighted in a **Banner Book** (Patrick’s page is shown above) that were distributed at the 5K event. The Research Challenge seeks to highlight the dynamic work of Notre Dame’s graduate students, to publicize it in a non-traditional venue, and to communicate the ideas and passions of graduate student research to a lay audience.

Patrick is a ND graduate (January 2013), with a BS in Civil Engineering and BA in Classics. He is the recipient of a prestigious Schmidt fellowship that allowed him to pursue graduate studies in Environmental Fluid Mechanics with his advisor **Dr. Joe Fernando** in CEEES. He subsequently also received a three-year prestigious National Defense Science and Engineering Graduate (NDSEG) Fellowship. Patrick recently published a paper as lead author in the *Journal of Applied Meteorology* (one of the most prestigious journals published by the American Meteorological Society) on downscaling of climate models to predict urban climate of cities. His specific application was the urban heat island of Chicago through the down scaling of 250-km resolution climate model outputs to 2-meter scale predictions (that is microclimate in a streets, parks and courtyards) through a chain of meteorological and computational fluid dynamics models.

Great job Patrick – well-deserved recognition!!

**ANNOUNCEMENTS**

**PhD qualifying written exams** are scheduled for **January 6-7, 2016** for the following 15 graduate students:

Teresa Baumer, Alejandra Cartengena, Darren Cheah, Adam Christman, Yingying Ding, Corrine Dorais, Evan Gerbo, Sarah Hickam, Rachel King-Lopez, Haylie Lobeck, Randal Marks, Andrew Schranck, Shuo Wang, Elise Wright, Luo Xihaier

**Samuel Hulett** is defending his MS Thesis on Friday, Dec. 4th, 2015. Title: “*Boron abundances and isotope systematics of carbonatites from worldwide sources*”. (**Advisor**: Dr. Antonio Simonetti)

**Department’s Holiday Open House** is taking place on **Tuesday, December 8 @ 2:30 pm** – please come to enjoy some deserts, hot chocolate and hot cider!!! Tokens for free coffee or tea are available to students.
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 October 14th, 2015 event:

Steven Barbachyn: “Seismic Design, Analysis, and Behavior of RC Coupled Shear Wall Systems with Post-Tensioned Coupling Beams”

The seismic design, analysis, and large-scale experimental evaluation of a novel multi-story coupled shear wall system with post-tensioned coupling beams was presented. In this new system, high-strength unbonded post-tensioning (PT) strands are used to couple (i.e., link) reinforced concrete (RC) shear wall piers for primary lateral load resistance in building structures. Reversed-cyclic quasi-static testing of two 40%-scale coupled wall specimens with the proposed details was conducted to evaluate the system according to the requirements of the American Concrete Institute (ACI). The laboratory specimens represented the most critical bottom three stories of an eight-story prototype structure. The other (less critical) regions of the eight-story structure were simulated analytically. Overall, both test specimens performed well and significantly better than previous tests of conventional RC coupled shear wall structures. (Advisor: Dr. Gino Kurama)

Andrew Schrank: “Solar Photocatalytic Fuel Cell for Treating Wastewater and Generating Clean Electricity”

Advances in wastewater treatment technologies will alleviate environmental, economic, and social aspects related to wastewater treatment. Driven by the fact that water-borne diseases are the second leading cause of death worldwide for children under five and the fact that wastewater treatment possesses potential to produce clean electricity, a state of the art approach to wastewater treatment using a photocatalytic fuel cell (PFC) is being pursued. The fundamental mechanisms of photocatalysis and PFCs were presented. In order to achieve technological advances, photocatalysts that are active in the visible portion of the light spectrum are being tested to increase PFC efficiency. Electrochemical mechanisms of photocatalyst materials are being investigated through thermodynamic and kinetic studies of untested photocatalyst architectures and their interfaces with various wastewater profiles. (Advisor: Dr. Kyle Doudrick)
Presenters for the **November 19th, 2015** event:

**Tomás Aquino:** "Lagrangian Stochastic Methods for Solute Transport"

My research revolves around transport of solutes, such as contaminants or nutrients, in both surface and groundwater flows. Tomás presented a short overview of his work, which may be described as falling under the umbrella of Lagrangian stochastic methods. He describes the basic concepts behind random walk methods, and gave some examples of their application to the problems he is interested in. (*Advisor: Dr. Diogo Bolster*).

**Erik Jensen:** "Vulnerability Evaluation of RC Frame in Informally Built Environments"

Each year, natural disasters devastate landscapes and lives, with a regrettable culprit of widespread human and economic loss being the build environment itself - homes. Unfortunately in the developing world, homes built without top-down oversight introduce various vulnerabilities at multi-staged points, dependent on means and mode of construction. Erik’s talk focused on the evaluation of a newly adopted housing typology, as well as a human-centered design approach to creating an environment of construction quality control in the developing world. (*Advisors: Drs. Alex Taflanidis & Tracy Kijewski-Correa*)
Conference Presentations:

- **Ewa Dzik** presented a talk at the recent Geological Society of America (GSA) Meeting in Baltimore (Nov. 1-4th, 2015): “Enthalpies of formation of uranyl phosphates: Metatorbernite, Metaankoleite, and Metauranocircite”

- **Travis Olds** presented a talk at the recent Geological Society of America (GSA) Meeting in Baltimore (Nov. 1-4th, 2015): “Stability and cation exchange dynamics of γ-irradiated U60”

- **Fab Sabba** presented at Indiana Water Environment Association (IWEA) in Indianapolis (November 20th, 2015): “Minimizing Nitrous Oxide (N2O) Emissions from Wastewater Treatment Plants”

- **Melika Sharifironizi** presented a talk at the recent Geological Society of America (GSA) Meeting in Baltimore (Nov. 1-4th, 2015): “Solubility and calorimetry studies of K-zippeite: determination of standard state thermodynamic properties”

- **Tyler Spano** presented both a talk and a poster at the recent Geological Society of America (GSA) Meeting in Baltimore (Nov. 1-4th, 2015): “Materials properties of synthetic vanadate mineral analogues possessing the Francevillite anion topology (talk)” and “Trace element analysis of uranium ore concentrates: source attribution, provenance indicator, and proof of concept (poster)”

Miscellaneous:

- **Nunzia Pirro** was elected as a representative on the student committee of The Oceanography Society (TOS) Council!

**GRADUATE STUDENT “SPOTLIGHT”**

This will be a monthly feature of the newsletter in order to promote graduate student awareness in our department. In this first issue, we feature **Ryan Alberdi**’s research.

My research work focuses on developing computational design frameworks based on optimization techniques and finite element analyses of nonlinear solid and structural mechanics. Specifically, my thesis work focuses on finding material layouts at the microscale that produce desirable nonlinear macroscopic wave propagation properties. This is done by developing numerical analysis tools to capture the physics of linear and nonlinear wave propagation in material microstructures as well as developing design tools based on nonlinear programming methods. The aim of this research is to exploit physical principles that will enable the design of novel materials and new devices with higher functionality, such as acoustic transducers for ultrasonic imaging, sonars, noise absorbing or enhancing devices, and material systems for impact and blast protection. (Advisor: Dr. Kapil Khandelwal)
RESEARCH GROUP “SPOTLIGHT”

This will be a monthly feature of the newsletter in order to promote general research awareness in our department. In this first issue, we feature the work being conducted by Dr. Clive Neal’s research group.

Dr. Clive Neal - The Neal research group consists of PhD students Karl Cronberger and David Burney, and undergraduate students Aleks Gawronska and Hannah O’Brien. The main goals are to investigate the evolution of the Moon using modern petrologic and geochemical techniques applied to samples gathered during the Apollo Missions. Investigations focus on detailed chemical characterization of mineral phases within lunar rocks (basalts), and applying a petrologic textural quantification technique referred to as crystal size distributions (CSD’s), which record the fundamental crystallization processes of a cooling magma. As the Chair of the Lunar Exploration Analysis Group (LEAP), Dr. Neal and his research group collaborate with NASA scientists and those from other research institutions to plan future missions to the Moon; as our closest planetary neighbor, Moon-related research and consequent developments will serve as the foundation for deep space missions to Mars and beyond. Dr. Neal’s research also uses fieldwork and scientific ocean drilling to investigate Large Igneous Provinces (LIPS). The latter represent vast outpourings of lava at an unprecedented rate that is not known at present. Models have been constructed to explain such magmatic events that include a surfacing plume head, an upper mantle origin, and origin through meteoroid impact. Distinguishing among these different hypotheses requires careful investigation.

More information on the Neal Research Group and a list of publications can be obtained at the following web sites: https://engineering.nd.edu/profiles/cneal ; http://www3.nd.edu/~cneal/
### Fellowsip/Scholarship/Employment Opportunities

This section is intended to list opportunities for graduate students in all disciplines present within our department. Therefore, please contact any of the newsletter editors regarding posting of any upcoming openings or funding opportunities in future newsletter issues.

---

### Table of Deadlines

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

*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.*
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:

Ryan Alberdi, PhD candidate, Ryan.A.Alberdi.1@nd.edu
David Burney, PhD candidate, David.C.Burney.2@nd.edu
Fab Sabba, PhD candidate, sabba.1@nd.edu
Mollie Dash, Department Administrator, dash.1@nd.edu
Antonio Simonetti, Associate Professor & DGS, simonetti.3@nd.edu