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Mechanical Engineering Department Newsletter

Mechanical Engineering Department, University of New Hampshire, Durham, NH

March 2014

Volume I, Issue I

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A Word from the Chair

Welcome to the inaugural edition of the new UNH Mechanical Engineering Newsletter. We plan on featuring around four short stories in each publication to keep you informed of what is happening in our department throughout the year.

We have strong relationships with our students, and our goal is to create deep connections with all of our alumni and friends of our program as well. This newsletter is our attempt at keeping the contacts up to date. Our vision is that this will be a two-way communication, so please let us know how you are doing and visit when you can.



In this issue, you will get to hear more about Steven

Conlon ('85), who visited us a few weeks ago. Also, if there is a favorite professor, classmate, or focus area that you would be interested in hearing an update about, please let us know. We more than welcome your input to make this newsletter informative and enjoyable for you. A special thanks to Prof. Barbaros Celikkol, Tracey Harvey and Lauren Foxall in our department for taking on the challenge of creating this newsletter. This is not a small undertaking I know. So enjoy this inaugural edition and let us know your thoughts!

Brad Kinsey Professor and Chair, Mechanical Engineering Department

Mechanical Engineering Facts & Information

Number of students: B.S. 450, Master of Engineering (MENGR) 2, M.S. 35, Ph.D. 24

19 Faculty Members, 1 Lecturer

Professor Barry Fussell was awarded the 2014 Jean Brierley award.

Approximately 70% of UNH faculty have received the prestigious NSF CAREER Award since the program's inception.

Check out full length stories and pictures on the Mechanical Engineering website: http://unh.edu/mechanical-engineering/



Newsletter Coordinators: Barbaros Celikkol Tracey Harvey Lauren Foxall

Mechanical Engineering



Paige Balcom, Class of '16

LAST MINUTE NEWS!

Paige has been awarded a RISE scholarship from the German Academic Exchange Service (DAAD) to study Nonholonomic Robots this summer at the University of Hanover.

Life has no boundaries for **Paige Balcom**

Paige Balcom is a New Hampshire native with a passion for international work. As a sophomore mechanical engineering student, she combines academics with campus organizations, an internship, and intramural sports. Paige is a Project Lead for the Engineers Without Borders (EWB) student organization. In January, she and four students traveled to Lukodi, Uganda to test and disinfect wells and train the community in water pump maintenance. The team also assessed a new project to construct school teachers' quarters and latrines. Paige says, "I love EWB's mission to serve people in developing nations." As a student leader in Inter-Varsity Christian Fellowship, Paige started an outreach program to international students. During



Paige in Uganda working with SWB

spring break, she will participate in InterVarsity's service trip to renovate buildings for the underprivileged of Tampa, FL. Paige and five co-inventors recently received a patent for their anti-distracted driving device, the SMARTwheel. They conducted a pilot study at MIT, met with the US Secretary of Transportation, and were featured on the national television show, Shark Tank. Paige's career goal is to work as an engineer in developing countries. Her UNH courses piqued her interest in mechanics and CAD and helped her obtain an internship at HydroComp—a naval architecture firm.

Senior Project: QuadSat C

The NASA QuadSat C Team is working to support the efforts of the NASA Magnetospheric MultiScale (MMS) Mission. The MMS mission, which is scheduled to launch in the fall of 2014, is comprised of four spacecraft flying in a controlled tetrahedral formation. The measurements from this tetrahedral constellation of spacecraft are to be used by scientists to study how the Sun's solar winds react with and are affected by the Earth's magnetosphere. The NASA QuadSat Team aims to develop an experimental test bed to study spacecraft control algorithms developed by ME graduate students in the UNH Advanced Controls Lab. This test bed is to be comprised of four autonomous quadcopters that are capable of flying in a controlled formation to help experimentally simulate NASA's MMS Mission. The NASA QuadSat C Team is an interdisciplinary group of students, consisting of 8 seniors - 5 Mechanical Engineers, 2 Computer Engineers, and I Computer Science major.



Operating with Professor May-Win Thein as their advisor and Tom Fuller and Chris Hashem as their ME graduate student advisors, the NASA QuadSat C project involves a wide range of topics. These topics include: autonomous feedback control, spacecraft dynamics and

> kinematics, the use of on-board micro-controllers, formation control via wireless communication, remote sensing, and the design and implementation of a vision positioning system using image processing techniques (via feedback from a PlayStation Eye or Microsoft Kinect camera). The team has, thus far, established a working flight controller (using 2 different control techniques) and is currently preparing to implement their vision positioning system.



Preparing to deploy a remotely operated vehicle (ROV) robot

The Ocean Calls For Tom Weber

Assistant professor Tom Weber joined the ME department in the fall engineer and then on to Penn of 2012, and has been a member of the Center for Coastal and Ocean Mapping and the Center for Ocean Engineering since arriving at UNH in 2006. Prof. Weber's primary research focus is in underwater acoustics, a subject in which he regularly lectures at the senior undergraduate and graduate lev-

el. Prof. Weber's interest in acoustics began as an undergraduate at the University of Rhode Island (B.S., includes developing sonar systems 1997, M.S. 2000), where he had the and techniques as well as underopportunity to work on highfrequency sonar systems and discovered the joys of doing research at sea. These interests took him to

Raytheon where he was a systems

State where he received his Ph.D. in Acoustics (2006). His research has taken him around much of the world including research cruises in the Atlantic and Pacific oceans, the Mediterranean Sea, the Bering Sea, the Norwegian Sea, the Gulf of Maine, the Gulf of Mexico, and the Gulf of Alaska. One of Prof. Weber's main research focuses is the acoustics of bubbles. This research standing the physics of sound scattering from both individual and collections of bubbles. In addition to being of interest for many natural ocean processes (e.g., breaking wind-driven oceanic waves), this research has important implications for man-made systems. The latter is perhaps best highlighted in the work Weber did in close collaboration with the National Oceanic and Atmospheric Administration during the response to the 2010 Deepwater Horizon oil spill where he and colleagues used acoustics to map and quantify oil droplets and gas seeps. Research by Weber, his students and colleagues on methane seeps has recently led to an NSF CAREER award to develop a new acoustic sonar system aimed at quantifying methane gas flux in natural systems.

The Buzz About Kevin Jerram

After graduating from the UNH B.S. Mechanical Engineering program in 2007, Kevin combined his interests in engineering and the marine environment for positions with Shoals Marine Laboratory and the Ocean Classroom Foundation. It was during a voyage on SSV Westward that Kevin decided to return to graduate school for research in underwater acoustics, an area that had piqued his curiosity while taking Ocean Engineering classes as an undergraduate.

Kevin returned to UNH to start the M.S. Ocean Engineering (Ocean Mapping option) program in early 2011 and has since been working with Dr. Thomas Weber to improve acoustic techniques for detecting, locating, and characterizing midwater plumes of bubbles from natural marine gas seeps. There is widespread interest in these capabilities because marine gas seeps often support diverse biological communities on the seafloor and occasionally provide direct pathways to the atmosphere for greenhouse gases, such as methane.



The distribution of seeps over the planet's seafloor and the behaviors of those seeps are not completely understood, especially with regard to the temporal variability of gas flow. Many seeps have been observed turning 'on' and 'off' or appearing to change their vent locations on the seafloor.

In 2011 and 2012, Kevin and Dr. Weber took part in two research cruises in the northern Gulf of Mexico aboard the NOAA Ship Okeanos Explorer to collect acoustic data for seeps using an echosounder system traditionally employed for fishery research.

The echosounder enabled estimates of gas flow based on calibrated measurements of the acoustic scattering strengths of bubbles, a metric typically applied to the gas-filled swim bladders of fish for species identification and density calculation.

During his graduate program, Kevin has thoroughly enjoyed opportunities for field research in the Atlantic, Pacific, and Arctic Oceans. After graduation this May, he intends to remain connected with Dr. Weber's ongoing seep mapping efforts at UNH Center for Coastal and Ocean Mapping Joint Hydrographic Center and already has plans to join a research cruise for similar work along the Siberian continental shelf this fall.

"Man cannot discover new oceans unless he has the courage to lose sight of the shore." - André Gide

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A Long Road Home Dr. Stephen C. Conlon, Class of '85



Twenty nine years have passed since I left UNH after receiving my bachelor's degree in Mechanical Engineering. Having spent the better part of twenty of these years on the west coast, it was not just the years, but also the miles that seemed to distance me from my time at UNH. It is never too late though to reconnect with one's alma mater, and in February of this year I had the pleasure of visiting UNH, spending a day with the Mechanical Engineering faculty, and giving a graduate seminar. It was a very warm homecoming, touring the wonderful (most new to me) facilities. I also had the opportunity to reconnect with my three favorite professors from my days at UNH: Barbaros Celikkol, Robinson Swift, and Kenneth Baldwin. They seemed ageless, just as enthusiastic and engaging as I remember.

Working now at Penn State University has brought me closer to "home," so I look forward to more opportunities to stay in touch with my alma mater. Teaching and advising students has also shown me the value of stay-

ing connected with former students. These interactions are mutually rewarding for all involved. My parting words are simply, "Do as I say, not as I do." Don't wait twenty nine years to reconnect with UNH, the Mechanical Engineering Department Chair, Professor Brad Kinsey, is waiting to hear from you.

Best wishes,

Stephen C. Conlon, PhD. Head, Noise Control and Hydroacoustic Division, Applied Research Laboratory, Associate Professor, Aerospace Engineering The Pennsylvania State University

Stay Connected to ME!

We would like to stay connected with our alumni and friends and would welcome your newsletter contributions and suggestions. Please send your news items, e.g. awards, promotions, personal updates, memories of UNH, and suggestions by email to: lauren.foxall@unh.edu

If you would like to make a financial contribution to the ME Department, please go to: https://giving.unh.edu/cepsme

A special thanks to Martin Wosnik, Michelle Mancini, and Kirin DeSmith for all of their help!

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