Mechanical Engineering

Department Newsletter

University of New Hampshire, Durham, NH

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Featured this month:

Nuts and Bolts Fundraising:

Please consider giving a tax deductible donation to the ME General Fund.

To donate, visit the CEPS homepage, http://ceps.unh.edu/ and select the Donate tab located on the far right menu bar to select an ME fund.

Newsletter Coordinators:
Lauren Foxall
Tracey Harvey
Barbaros Celikkol

A Word from the Chair

What a crazy start to the Spring semester! Within a short time span of three weeks, there were four curtailed operation days due to snow storms. But the resilience and flexibility of our students and faculty members are getting us back on schedule for the semester. Hopefully everyone is enjoying the snow, and spring will come soon!

I am excited about this issue as we had several alumni provide us with updates on their lives, from every decade since the 1950's! One of the updates we received is from Karl Leinsing, class of '88. who is featured in this issue's alumni spotlight. Please continue to send us your alumni news. We like to hear what you are up to and so do your old classmates! Also in this issue, you will get to know Sital Khatiwada ('16), Martin Wosnik (Associate Professor), and Martin's graduate student, Peter Bachant. Finally, the Formula SAE senior design team is highlighted as they prepare for their competition in May.

I hope people have been checking the Flashback Thursdays on Facebook. We started off strong having one every week and will get back into this habit. Later in the year we will feature baby pictures along with a competition to see if you can guess who the baby is. The first person to correctly identify the person will receive a prize! To view these photos click on UNH Mechanical Engineering Alumni. Also be sure to check out our Linkedin Page. Best of luck and wishes to all!

Brad Kinsey
Professor and Chair, Mechanical Engineering Department

Mechanical Engineering Upcoming Events

- The Undergraduate Research Conference (URC) Interdisciplinary Science & Engineering Symposium (ISE) will be held at the Whittemore Center on April 22nd. Presentations will be made by all ME & OE senior design teams and other undergraduate researchers. An open house is scheduled from 2-4pm.
- The annual Graduate Research Conference (GRC) will be held for two days April 14-15th. Poster presentations will be held in the Whittemore Center on April 14 from 4-8pm. Over 200 UNH graduate students, from all academic disciplines, will present at the GRC.
- The Aerocats team will be competing in the SAE AERO East competition in Lakeland, FL on March 13th-15th.
- The Fire Fighting Robot team will be competing at the Trinity College Robot Contest. This will be held during the last week of March at Trinity College in Connecticut.
- The Baja team competition will be held on May 7-10th in Mechanicsville, MD.
- The Formula SAE team will be competing in the FASE Michigan competition which will be held on May 13-16th at the Michigan International Speedway.
- The Lunacats team will be competing in the 2015 NASA Robotic Mining Competition at the Kennedy Space Center on May 18th-22nd.
- Remotely Operated Vehicle (ROV), will compete in the 2015 MATE Competition: Science and Industry in the Arctic which will be held on June 25th-27th at St. John's Newfoundland and Labrador, Canada.

Always Lending A Helping Hand

Sital Khatiwada Class of '16

Sital Khatiwada is a junior in Mechanical Engineering and is pursuing a minor in Physics. Sital's interests currently lie in thermodynamics, fluid mechanics, and their applications in the aerospace field. He's had a deep fascination with space since childhood, and is planning on pursuing a M.S. and Ph.D. in Aerospace Engineering after graduation.

Sital enjoys helping and teaching people. During his free time he works at the UNH Programming Assistance Center in Kingsbury where he tutors students in computer programming. In Engelhardt Hall dormitory, Sital is a part of an in -hall tutoring program where he helps residents with their coursework on topics familiar to him. He's also the vice-president of the hall council there, where he works with the residents to create an enjoyable community. Sital is involved with the underwater ROV Team, where he has been a member since freshman year and plans on making it his senior capstone project. He is a co-founder and co-president of Do It Yourself (DIY) Engineering, an organization founded in order to expose everyone at UNH to science and engineering by having the members work on various design projects throughout the year. They are currently collaborating with Project SMART's Space Science program in order to design a High-Altitude Balloon and a control system that can eliminate the payload's rotation during the balloon's flight. This will allow for stable video feed to be captured by the onboard camera. They plan on launching the balloon around mid-March

For other kinds of fun, Sital enjoys playing and watching soccer and tennis; swimming; travelling; and playing guitar.

On the Track with FSAE

With each new school year there is a new group of students on the UNH Precision Racing Team. This year's team is comprised of 13 MEs, one student from Computer Science, and one Electrical and Computer Engineering student from UNH Manchester. The team has been extremely busy since the start of the school year and set a goal to finish the best in school history. With the help of previous members, new software and ever increasing sponsorship from local companies, this is an attainable goal! This year, in addition to SolidWorks, the team has access to Ricardo Wave©, and StarCCM+©, which will enable the team to perform computational fluid dynamics simulations on their engine. These programs will allow the team to implement some new aspects, which include certain aerodynamic features, the use of composite suspension components, and optimization of the powertrain.

There are six sub groups: Frame, Suspension, Aerodynamics, Controls, Electrical, and Power Train. Currently the team has finished the design and is building the frame. The suspension components are being manufacturing by Tucker Engineering free of charge, and if all the parts come in on time, the car will be assembled and testing will begin at the end of March! At this point in the year, they are right on track and are very excited to see the car come together for the competition scheduled at the Michigan International Speedway during the week of May 13 – 16th.

The Fluid Dynamics of Renewable Energy Conversion

Martin Wosnik (in foreground) and former graduate student Matt Rowell tending to a traversing system on a tidal energy test platform in Muskeget Channel, MA.

Martin Wosnik's research is focused in the area of "fluid dynamics of renewable energy conversion". This currently includes marine renewable energy, such as tidal energy conversion, as well as wind energy, both offshore and onshore.

The research projects Wosnik and his graduate students have undertaken span various scales, levels of complexity and environments: for example, for tidal energy conversion, they range from fundamental studies of hydrofoil sections in a high speed water tunnel, to tests of marine turbines with inflow and wake studies in a large cross-section tow tank, to deployments of highly instrumented process models at tidal energy test sites in New Hampshire and Massachusetts. Laboratory studies are typically accompanied by theoretical and numerical components.

For wind energy, Wosnik has been making use of the UNH Flow Physics Facility (FPF), the world's largest flow-physics quality boundary layer wind tunnel, where his research group is combining theoretical studies on how axisymmetric turbulent wakes with rotation should behave with physical model studies of wind turbines and large wind farms.

"Energy has been called the 'space-race' of the 21st century" says Wosnik, in reference to the complexity and scale of effort that was required to put a human being on the moon in the 1960s. "Except it is much broader and with a higher impact on all aspects of society."

"I have been lucky to have an outstanding group of graduate students who have helped me build up an array of first-rate facilities to do this kind of work, building on what was already available at UNH."

Wosnik's research has been funded by the National Science Foundation, US Department of Energy, Sandia National Laboratories, Massachusetts Clean Energy Center, New England Marine Renewable Energy Center and Industry. He received an NSF CAREER award in 2012 for his work on turbulent flows relevant to marine hydrokinetic energy conversion.

It's All about the Turbines

Peter Bachant graduated with his BSME degree from the University of Massachusetts, Dartmouth in 2008. After a short stint in industry designing oceanographic instrumentation he came to UNH as a graduate student in 2009 studying renewable energy-related topics with Prof. Martin Wosnik. Peter has been involved in many activities since arriving at UNH and some of his accomplishments are listed below:

- Redesigned and rebuilt the UNH tow tank's linear motion, control, and data acquisition systems.
- Created the UNH-CORE turbine test bed for measuring the performance and wakes of vertical-axis, cross-flow (hydrokinetic or wind) turbines in the UNH tow tank.
- Produced two open datasets with the Reference Vertical Axis Turbine (RVAT) for numerical model validation.
- Recently published an article in the Journal of Turbulence investigating the enhanced wake recovery rates of cross-flow turbines versus conventional axial-flow or horizontal-axis turbines.

Peter received his MSME degree in September 2011 and is now working towards his doctoral degree with Prof. Martin Wosnik on the following projects:

- High fidelity Reynolds-averaged Navier--Stokes (RANS) simulations of the RVAT using Sandia National Labs' Red Mesa supercomputer.
- Tow tank testing of the US Department of Energy/Sandia National Labs' Reference Model 2 cross-flow turbine (pictured to the top right).
- Collaborating with Sandia to evaluate the effectiveness of Fiber-Bragg Grating sensors for optical strain measurements on turbine blades.
- A turbine force parameterization library, turbinesFoam, for studying turbine arrays using RANS or large eddy simulation (LES) with the OpenFOAM open source computational fluid dynamics library.

Alumni Spotlight

Propelling to New Heights
Karl Leinsing, Class of '88

Karl R. Leinsing graduated from UNH with his BSME degree in 1988. He went on to receive his PE License and his MSME degree from North Carolina A&T State University in 1995. He lived in Raleigh, North Carolina from 1990 to 2002 and founded his own medical device product development and consulting company called Innovative Engineering, Inc. (now known as ATech Designs, Inc., http://www.atechdesigns.com/) in 1998. He subsequently returned to New Hampshire in 2002, moving his company with him.

ATech is a seven-time award winning company (including receiving 5 design awards and being named one of the "20 Fastest Growing Family Businesses" in NH) and has received 21 patents with additional patents pending. Karl was listed as one of "100 notable people in the Medical Device Industry" by Medical Device and Diagnostic Industry (MDDI) and was inducted into the Product Design & Development Engineer Hall of Fame. While ATech's core business area is medical product device design and development, they have also developed an array of other products from manufacturing/automation equipment to knitting machines and LED lights for bicycles! One of their devices, the SmartSite Needle-Free Valve for disposable IV sets, is mass-produced at a volume of approximately 350 million per year and helps to save the lives of people around the globe. This device was featured on the cover of Life Magazine in May 2000 for helping to save the life of premature babies.

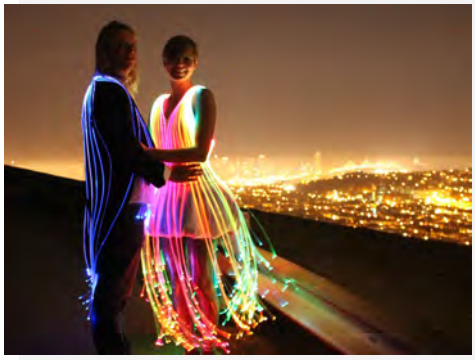
Karl currently has two UNH ME students working for him part-time and is enjoying passing on the knowledge he has acquired over the years. He has fond memories of UNH and is reminiscent of his younger days as an eager student at UNH where it all began. Karl recognizes that the strong engineering background he received as an undergraduate enabled him to be successful in graduate school and in his career as a mechanical engineer.

On a more personal note, Karl received his helicopter pilot's license last year and has recently purchased a Robinson R44 Raven II helicopter. Karl is pictured (above) by a helicopter that he rented while in Las Vegas so he could see Lake Mead, the Hoover Dam and the Valley of Fire.

ME Class Notes:

Nick Landry, Class of '14

Is a Product Development Intern at Turbocam International and lives in Dover, NH.



Melissa Minuti, Class of '09

Has been promoted to Production Supervisor at TRM Microwave in Bedford, NH. She said that she never dreamed she would love a job this much!

Jennifer Mann ('07) & Zachary Morriss ('08)

Live in San Francisco where they make creations that incorporate 3D printed parts, LEDs, and wearable electronics. Pictured to the left are their latest pieces: Zach in his fiber-optic illuminated tailcoat, and Jenn in her fiber optic dress. When not cavorting in costumes, Jenn manages an HHMI lab researching disease genomics at UCSF, and Zach works on laser systems for self-driving cars at Google.

Geoff Sparrow, Class of '03

Visited UNH and gave a presentation in Electrical and Computer Engineering class of Professor Mike Carter. He is the Director of Engineering for ReVision Energy, which has become a major provider of Photovoltaic (PV) systems at all scales throughout New England. The company designed and installed the PV system on the roof of the Jackson Landing skating rink in Durham as well as on some smaller town facilities.

Rick Miller, Class of '94

Was fortunate enough to be granted his second patent mid last year, along with his co-inventor Edward Gormley, for the Force Decay Release Mechanism. This invention provides a force decay triggered release of a device. The mechanism is comprised of a rotating disk and catch paw that can be triggered by a higher initial linear force. As the force decays, a spring attached to the rotating disk acts to disengage retaining rods and release a housing or some other payload.

Ron Moore, BSME Class '71, MSME Class '72

Has written several books, including his latest "Where Do We Start Our Improvement Program?" His company, The RM Group, Inc., provides Operational Excellence Seminars, Consulting, Cultural Change Management, and Benchmarking services for manufacturing companies.

John Brougher, Class of '65

John says, "It's a beautiful day in Dallas, PA. We have six inches of snow that reminds me of Durham, NH." At 83 years old and retired twice he looks back on a great life. He remembers several friends he made at UNH, but he also remembers those times they had to study on the weekends for their exams. He wrote, "Jack Baker almost gave up on me a couple of times, but I have that second BS. One in agriculture, one in engineering and I married a Beverly Slocum, so now I have three BS's. HA!"

Scotty Greene, Class of '57

After his Junior year Scott got married to his high school girlfriend, and went off to a summer job. Dotty (his wife) likes to point out that his only 4.0 semester was after they married. After graduation he took a job offer from Joy Manufacturing where he had worked between his Junior and Senior years. He had a satisfying career engineering underground mining machinery there and retired after 41 years. He is sure such a career would be difficult to duplicate today.

His major activity since retirement has been at the DeBence museum where he works as a restoration mechanic on old mechanical music devices, and is also President of the Board of Directors for this non-profit corporation which owns the building and collection. For his contribution there, and also as a Trustee at the local Methodist Church he was given the Man of the Year award by the local Chamber of Commerce. DeBence is one of the few places in the USA where you can see and listen to self playing music machines. A curator from the Smithsonian visited a few years ago and was shocked that they were actually playing these machines for the general public. His thought was that the DeBence museum should record them and play the tapes while looking at the machines. That simply does not have the same result, but if they want to keep playing them they require continued maintenance. You can see and hear some of their machines at http://www.debencemusicworld.com Franklin is only about 20 minutes north of I80 if you exit about 30 miles east of the Ohio state line. Stop in and see the museum if you are going past.

ME Class Notes Continued:

Richard Onyancha, PhD, Class of '08

Is an Associate Professor of Mechanical Engineering at Rose-Hulman Institute of Technology in Indiana. Currently he is on sabbatical as a Visiting Fulbright Scholar at the Copperbelt University (CBU) in Zambia for the 2014-15 academic year. Many of the programs in the School of Engineering at CBU are relatively new therefore part of the work he is doing includes conducting faculty development workshops for junior faculty, curriculum review and also carrying out some spatial visualization skills research.

Pictured to the right is Dr. Onyancha and in the background is the Victoria Falls Bridge (connecting Zambia and Zimbabwe) that carries vehicular, rail and pedestrian traffic. It was designed by George Anthony Hobson and constructed by Cleveland Bridge & Engineering Company. It was completed in 1905. If interested in bungee jumping this is the place to do it because there is some history here!

Pictured to the left is the statue of Dr. David Livingstone who was the first Caucasian to see the falls in 1855.

Pictured to the left is an aerial view of Victoria Falls.

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 Michelle Mancini, Kirin DeSmith, and Alyssa Bailey for all of their help!

Check out full length stories, pictures, and previous newsletters on the Mechanical Engineering website:

http://unh.edu/mechanical-engineering/