Mechanical Engineering

Department Newsletter

University of New Hampshire, Durham, NH

May 2015 Volume 11, Issue II

Featured this month:

Nuts and Bolts Fundraising:

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

Visit http://ceps.unh.edu/ and select the Donate tab located on the far right menu bar to select a ME fund.

A Word from the Chair

End of the academic year newsletters are an excellent opportunity to celebrate the accomplishments of ME community (especially those students graduating) and are packed with pictures from the Undergraduate Research Conference and Graduation Celebration. Please do check our department website for more pictures, full stories, and other great information about our department. Also be sure to join us on our Linkedin Page. The alumni shorts in this issue date back all the way to the 1940's! Thanks to everyone for sharing (with us here in the ME department and with old classmates) your updates and please keep them coming in.

A question: we are interested in determining ***who was the first female student to graduate from the ME program?*** We hope to honor this pioneer in some way. If you know, please drop us a line. This information has been more elusive than we anticipated leaving us to seek it out simply by searching through the names of our alumni. We want to make sure to accurately identify this person, so any help is much appreciated.

Have a fun, safe, and restful summer! Looking forward to connecting with you all in the 2015-16 academic year! This promises to be another exciting year as we launch our Bachelor of Science in Ocean Engineering degree and welcome a new faculty member and a new lecturer to our department.

Stay tuned!

-Brad Kinsey Professor and Chair, Mechanical Engineering Department

Mechanical Engineering Awards & News

- Mary Sareault (Sophomore) received a Parents Associate Scholarship and was named a UNH Mover and Shaker.
- Sid Nigam (Junior) received a University Community Scholarship for next year. Sid also received a SURF Fellowship and will work over the summer with Prof. Marko Knezevic.
- Joseph Collins (Junior) received the Goldwater Scholarship.
- Gavin Hess (Sophomore-pictured right) participated in the World Junior Cross Country Championships in Kazakhstan.
- Meagan Wengrove (Grad Student, advisor Prof. Diane Foster) received a National Defense Science and Engineering Graduate (NDSEG) Fellowship.
- Toby Dewhurst (Grad Student, advisor: Prof. Rob Swift) and Alireza Ebadi (Grad Student, advisor: Prof. Chris White) received UNH Dissertation Year Fellowships.
- Adnan Eghtesad (incoming grad student, advisor Prof. Marko Knezevic) received a CEPS 1st Year Fellowship.
- Alexandra Padilla (incoming OE grad student, advisor Prof. Tom Weber) received a NSF Graduate Student Fellowships.
- Miroslav Zecevic and Daniel Savage (Grad Students, advisor Prof. Marko Knezevic) will spend six months doing research at Los Alamos, NM National Lab.
- Prof. Yaning Li recently received a grant from the Air Force Office of Scientific Research.
- Teledyne RD Instruments picked UNH as a "success story" for their new "V", which they had lent Prof. Martin Wosnik for the first FloDesign deployments in May 2012.

Undergraduate Research Conference (URC) Awards

There were 27 excellent ME projects presented at the URC. View all these great projects online.

Carolyn Przekaza, Emily Hutchinson, and Stephanie Medicke (pictured left) were awarded first place for their senior design project titled: *The Mechanics, Biomimetics, and 3-D Printing of Cellular Materials.* Project Advised by Profs.: Yaning Li & Yannis Korkolis.

Daniel Valente (pictured right) received the Unsung Hero Award for his work behind the scenes on the ETNavswarm Project.

Also pictured above: Provost and Vice President of Academic Affairs Lisa McFarland and URC Judge and ME Alum Dr. Gerry Sedor.

The Remotely Operated Vehicle (pictured left) received an honorable mention. Project Advised by Prof. May-Win Thein.

The Automated Home Brewery project (pictured left) and the Pneumatic Ski and Snowboard Press (pictured right) both advised by Prof. Kinsey were awarded the ME Student Choice award with a tie vote.

The Wave Energy Conservation Buoy project advised by Prof. Rob Swift was awarded the ME Faculty Choice award.

Congratulations to these winners and all ME students who did such amazing work!

News from THE SHOPS

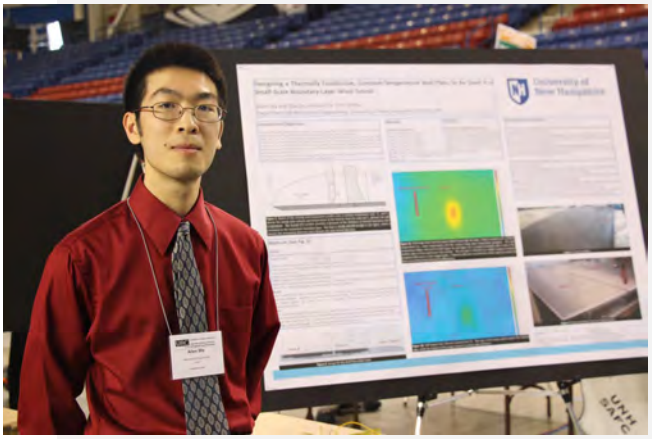
Scott Campbell & Sheldon Parent

ET Navswarm presented a t-shirt and dedicated a NavSwarm robot to Scott Campbell (CEPS Head Machinist) as a thank you for all of his help and insight on their project.

Scott Campbell has taught approximately 155 students (a mix of CEPS grads and undergrads) in the TECH 602 Machine Shop course. The ME Department started this one credit course (TECH 602) in the Fall of 2013.

Sheldon Parent (Information Technologist II) received the Presidential Award of Excellence last year for all his hard work and dedication to the department and college.

Sheldon's vast IT knowledge and expertise with equipment and maintenance is invaluable to the ME department and the CEPS faculty and students.



Allen Ma, Class of '15, next to his URC poster titled: *Designing a Thermally Conductive, Constant Temperature Wall Plate to be used in a Small Scale Boundary-layer Wind Tunnel.*

Renewable Technologies

Allen Ma is a senior interested in heat transfer and fluid mechanics. He holds a passionate interest in sustainability and renewable energy. He has been involved in the Student Environmental Action Coalition (SEAC) since his freshman year, and was formerly SEAC's Business Manager in his sophomore year.

As a participant in the McNair Scholars Program during his junior year, Allen worked closely with Prof. Chris White's team of graduate students to design a "proof-of-concept" constant-temperature wall plate that would be used in a boundary layer wind tunnel to investigate heat transfer in unsteady flows. During the summer of 2014, he expanded on his "proof-of-concept" to design a much larger wall plate.

Allen's current research involves investigating fluid transport behind a hemisphere. Specifically, he is investigating the effects of turbulence (created by the hemisphere) on the heat transfer from a heated wall plate. He presented his findings during the Undergraduate Research Conference.

Allen plans to pursue a Ph.D. in Mechanical Engineering at Tuft University after graduation. His future goals are two-fold: he wants to improve the understanding of the physics behind turbulence, and he wants to apply his knowledge to contribute to renewable energy technologies.

Remotely Operated Vehicle

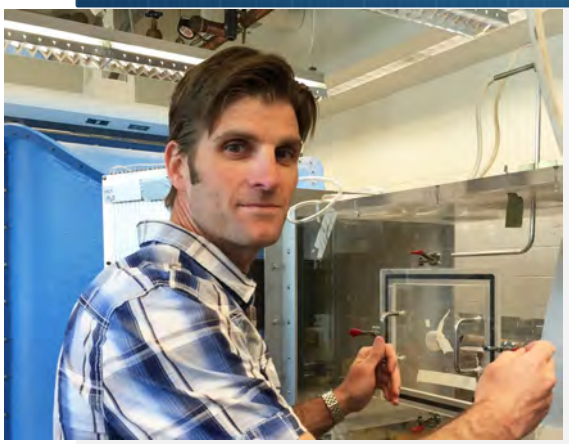
The UNH Remotely Operated Vehicle (ROV) team is an ocean engineering, multi-disciplinary student organization working towards the goal of designing, modeling, fabricating, and testing an underwater ROV robotic system. As a student organization, the team is actively reaching out to new prospective members who have interests in robotics. The team consists of 14 students, 11 ME students, 1 computer engineering student and 2 electrical engineering students.

The ROV, currently being built and tested in the Jere A. Chase Ocean Engineering Laboratory, is operated using a controller on the surface and a tethered connection to the system below the surface. The team is split into 2 primary engineering roles of chassis design and control system design. Currently the fabrication and assembly phase of the project is nearly completed, and the underwater robotic system will be tested in the OE engineering tank. The chassis is built utilizing polycarbonate, acrylic, and aluminum, producing a slightly positively buoyant and modular frame. The system is controlled using an Arduino Mega microcontroller, an Xbox 360 controller, and a LEAP Motion controller allowing for precise driving and manipulation of the environment. The ROV will be entered as a team will be completing in the MATE international ROV competition in St. Johns, Newfoundland, Canada on the 24th of June.

Top: The ROV

Middle: The team testing the ROV in the OE Lab.

Below: ROV Team



Investigating Flow Systems

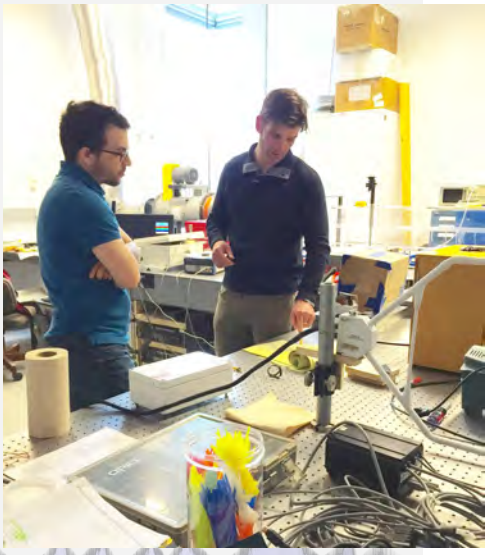
Associate Professor Christopher White's research expertise is experimental fluid dynamics. His research is of both fundamental and applied nature in the areas of turbulent drag reduction, combustion, piston engines, flow-induced erosion, cellulosic ethanol, and particle suspension flows.

"By definition, when you are investigating the unknown, you do not know what you will find or even when you have found it." — Bassagordian's Basic Principle and Ultimate Axiom

Experimental research is a difficult and often frustrating endeavor, perhaps best summed up by the statement above. However, when successful, the thrill of scientific discovery is unmatched. The approach employed by Professor White and his students to increase the probability for successful discovery is to couple a strong fundamental understanding of fluid dynamics with advanced experimental diagnostics to identify relevant measurements that will make an incomplete understanding of a phenomenon more complete.

Prof. White and his students are presently working on research projects to improve the predictive engineering modeling of complex flow systems such as heat transfer in piston engines, rapid flow-induced erosion of materials, the flow behaviors of liquefied biomass, and the atmospheric transport of volcanic ash. In these efforts, Prof. White's research group has developed a unique set of experimental facilities such as a still-air particle drop facility and a thermal boundary layer wind tunnel. They have also developed unique experimental diagnostics such as echo particle image velocimetry (EPIV) to obtain two-dimensional flow measurements in opaque fluids.

Prof. White has received funding from the National Science Foundation (NSF) and the Department of Energy. In 2009, he received an NSF CAREER award on his work related to the rheology and flow behaviors of liquefied biomass. A collaborative NSF funded research project in which Prof. White was a co-Principal Investigator (along with Prof. Klewicki) was featured in an NSF special report video that can be viewed at the link below. The video was filmed in the UNH Flow Physics Facility. ME graduate students Mike Allard, Pat Vincenti, and Nicholas DeMarchi also appear in the video.



Measuring Ultrasound Waves

Nick DeMarchi graduated with his BSME degree from UNH in May 2011. He is presently a Ph.D. student at UNH working with Prof. Christopher White. Nick's interest in fluid dynamics began during his undergraduate studies while taking Introduction to Fluid Dynamics with Prof. Chini.

Nick's research project is to study and quantify the rheology and flow behaviors of liquefied lignocellulosic biomass. The work is important for the production of ethanol from non-food biomass resources or so-called waste agriculture. A primary component of Nick's research is to develop and validate a new measurement technique that uses ultrasound waves to measure two-dimensional fields of fluid velocity through opaque boundaries or in opaque fluids (see Fig. 1 online). In 2012, DeMarchi and White published an article entitled "EPIV" in the Journal of Visualized Experiments (JoCVE) detailing the EPIV method: DeMarchi N. & White C.M. Echo Particle Image Velocimetry. J. Vis. Exp. 2012.70:e4265. DOI:10.3791/4265. The accompanying online tutorial video to the article has been viewed over 4000 times from national and international institutions with subscriptions to JoVE.

Nick is especially looking forward to the summer months. In particular, in addition to a productive summer of research, he is looking forward to many games of disc golf, grilling, playing music, working on cars, and spending time with friends and family.

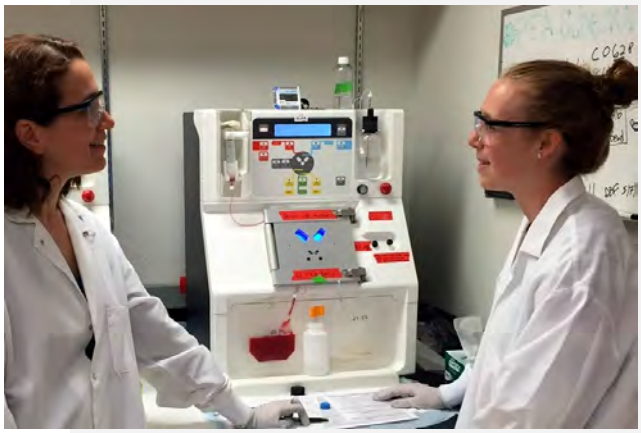
ALMUNI SPOTLIGHT

Leading the Way to Wellness

Shannon Stott, Class of '97

Shannon Stott received her BSME degree from UNH in 1997, where she received two invaluable pieces of advice. First, Prof. Robert Jerard told her that there was no better foundation to receive than a Mechanical Engineering degree. Shannon still agrees wholeheartedly and passes on this wisdom to her students. Next, in her senior year at UNH, Prof. Todd Gross suggested that she explore graduate school, an option that she never even considered. She is forever grateful for his advice, because she went on to receive her MSME from the University of Illinois, Urbana-Champaign and her Ph.D. in ME from the Georgia Institute of Technology.

Shannon is now an Assistant Professor in the Department of Medicine at Harvard Medical School and an Assistant Geneticist at the Center for Cancer Research at Massachusetts General Hospital. Her laboratory is focused using microfluidics and microfabrication to create devices and biomaterials that increase our understanding of cancer biology. She is the co-inventor of the CTC-Chip, a device that can isolate extraordinary rare circulating tumor cells from the blood of cancer patients. Her hope is that through a simple blood draw, doctors can identify these cancer cells quickly, and subsequently use their 'molecular cargo' to monitor and guide patient treatment. The latest version of the CTC-Chip is now being prepared for large scale distribution through a partnership with Johnson and Johnson. In 2014, Shannon received the American Cancer Society's Women Leading the Way to Wellness Award.



Pictured Above: Shannon (left) with Katie Broderick (right), a research technician, in the lab looking at the CTC-Chip processing machine.

The Stott laboratory is currently working on new technologies that expand on the concept of a 'liquid biopsy', hoping to push towards earlier detection of cancer. High content, molecular level imaging is another focus of her research, an interest that originated from her honors senior thesis at UNH. Under the advisement of Profs. Baldwin and Swift, Shannon learned an incredible amount about image processing, wave motion, and hockey. This work really set off a lifelong love of research, but sadly, the hockey interest did not carry past UNH!

Pictured Right: Shannon is married with two small children. Based on the amount of legos and tinker toys in her home, there is a good chance that there may be another UNH ME alum in the future.

ME Class Notes:

Joe Henderson, Class of '14

Joe just took a position as the Product Manager/Design Engineer for the 'Mantis' at a company called Formulatrix. Check out some videos here! http://www.formulatrix.com/liquid-handling/products/mantis/index.html#tabbed-nav=tab1

Tim Patterson, Class of '14

Tim was hired at Unitil as a Gas Engineering intern after graduating last May and this past January was promoted/hired on to a salaried position as an Associate Engineer. He also got engaged in March!

David Hawk, Class of '13

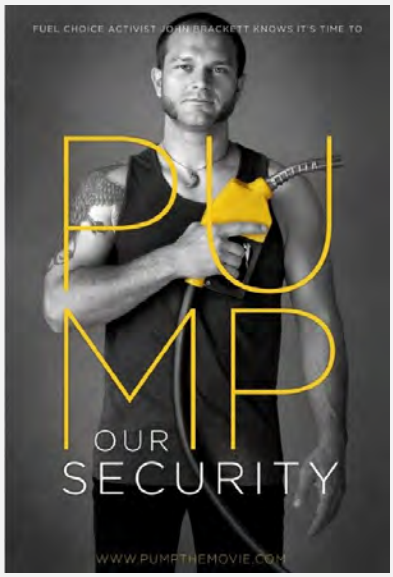
David Hawk was interviewed in an article about the UNH Chapter Engineers of Without Boarders. Read the full article: http://www.unionleader.com/article/20150315/NEWS0206/150319405

Dan Enos, Class of '12

Dan (pictured right) is a 1st Lieutenant in the USAF. He is a helicopter pilot and teaches low level helicopter flying tactics during the day and with night vision goggles at night.

In July 2014 Dan got married to Katie Lemay (a fellow Wildcat and graduate of 2012). They live in Alabama, where he is stationed for a couple more years. Katie is a High School US History and World History teacher.

Dan is beginning a Masters Degree in Biomedical Engineering at the end of this summer! Both Katie and Dan reminisce about UNH all the time, and they miss Durham and all the amazing things around the seacoast area.



Graham Dowie, Class of '07

Graham and his wife Mary Undercoffler were both UNH graduates of the Class of 2007. They had their first child in January: Sonia Cyrena. Graham also had a job change in December 2013 and is now the Senior Development Engineer at New Hampshire Ball Bearings.

John Brackett, Class of '06

John Brackett (pictured left) has used skills derived from his time in the UNH ME department and senior project, Formula SAE, to move to the forefront of alternative fuel conversions. He believes that simple software updates to our vehicles could set us free from foreign oil interests such as OPEC. His research is prominently discussed in the new documentary Pump, which is now available on Netflix, iTunes and Amazon. To bring real world solutions, he is currently working with the Environmental Protection Agency on providing more vehicles with fuel choice to the masses. His employer, Pioneer Energy, also developed solutions for making better use of wasted resources at fracking sites around the world. John asks "How would you feel knowing you could be driving on domestically produced, cleaner burning, renewable fuels for $0.30/ gallon right now?"

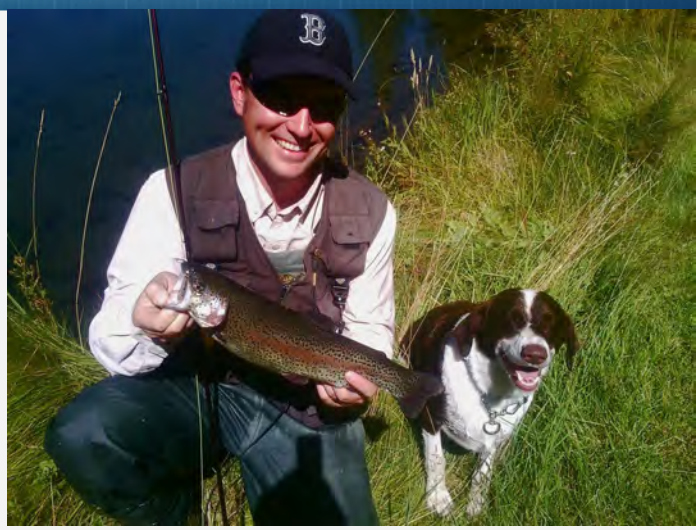
Daniel Zube, Class of '05

Daniel first wrote: "I'm writing to you as I sit on the water in the French port city of Toulon on the Mediterranean coast. It is sunny, clear blue skies, about 60-70 degrees, light breeze - beautiful!"

Daniel will be riding his bicycle around Europe for the next two months until June 1st. He arrived there two days ago after riding his bicycle from Nice, France and he wishes he could say the weather has been this *nice* the whole time...excuse the pun. He departed Nice on March 21st after celebrating the wedding of his friends Jason and Erin. If it wasn't for them, he would not have had the inspiration to go on this journey. He sends a big THANK YOU to the newlyweds!

If you are interested in seeing photos and videos of his travels, he's started a travel blog here: http://www.travelpod.com/members/danielzube

ME Class Notes Continued:



Ben Nichols, Class of '05

Ben (pictured right with his dog, Wilbur) works for Keith Manufacturing in Central Oregon. He started there 2-1/2 years ago as a Design Engineer and was recently promoted to Bunker Value Stream Group Manager. Keith Manufacturing designs and builds "walking floor" systems for mobile and stationary applications worldwide (see: www.keithwalkingfloor.com). Ben's current position involves managing the production of custom-engineered stationary walking floor systems.

Dale Delisle, Class of '02

Dale was promoted to group leader of the Physics Based Systems Modeling and Analysis group, in the new Emerging Systems Technologies Department of the new Systems Engineering Technical Center at The MITRE Corporation.

John Holt, Class of '98

John recently found out that the Macauliffe-Shepard Discovery Center in Concord, NH will display the CATSAT (97-98 senior project) in their main hall. The Discovery Center is working on a reunion of the CATSAT team. They are hoping people can attend on the Discovery Center's Aerospacefest that is held on June 13th.

Alan Jacobson, Class of '91

Alan has currently taken on new responsibilities at Ford, and he is now the Global Director of Analytics for the company. Alan has two children who are growing up fast Oliver, 7 and Micah, 9.

Eric Achtmann (pictured left), Class of '90

A couple of Eric's highlights include a machine he architected, developed and built to redefine the fresh, hot beverage vending industry ("Project Marlow") for Costa Coffee, which has won some awards and went on to center stage at the National Retail Federation "Big Show" in New York (the World's largest retail show) 2 years in a row. Attached are some links to the project:

-Costa Website: http://www.costa.co.uk/business/marlow/

-Intel video: https://www.youtube.com/watch?v=Ye6A6EieQGo

-London Business School case studies: https://www.dropbox.com/sh/et1cmcvqnnr9uc9/AADEvAh4zWRy9qi5mYB_dPZ6a?dl=0

Eric says, "it was a lot of fun and Profs. Wilson and Savage would have been proud. UNH learning put to direct use."

At present, he is working with an old friend and classmate to redefine how video is encoded and compressed to offer >3x improvements over the state of the art. They have been in "stealth mode" for 5 years and have quietly grown the company to >50 people. They unveiled the company and products to the world. (v-nova.com)

-NscreenMedia:http://www.nscreenmedia.com/v-nova-driving-disruptive-change-in-video-compression/

-BBC: http://www.bbc.com/news/technology-32140732

-Financial Times: http://video.ft.com/4146780508001/Video-compression-inspired-by-nature/Companies

ME Class Notes Continued:

Scott Hendrickson, Class of '89

Scott started at Olympus Controls (www.olympus-controls.com) in Portland, Oregon in 1998. Olympus Controls is an engineering firm focusing on robotics and automation solutions for the semiconductor, medical, and packaging industries. They were just recognized by Universal Robots as the top collaborative robot partner on the West Coast and by Cognex as their top machine vision channel partner in the US. They are always looking for talented ME, EE, and CS candidates who want to move out to the Pacific NW!

Greg Hunter, Class of '84

After many years of mechanical engineering/product development, Greg had acquired a metal fabrication job shop called Sousa & Demayo. Located in Attleboro Falls, MA, the company has been serving the metal fabrication needs of the Northeast for over 60 years. He acquired the company from second generation owners. Sales have picked up, employees have been added, and they are upgrading some of the equipment.

Christine (Gainty) Lipa, Class of '82

Christine was recently reassigned to a new division within the U.S. Nuclear Regulatory Commission's Region III office in Lisle, IL, a suburb of Chicago. She is now the Branch Chief for Engineering Branch 2 in the Division of Reactor Safety. She provides oversight for in-depth engineering inspections at 15 nuclear power stations in the Midwest, to ensure the plants are being operated safely and according to their approved design.

She makes it back to New Hampshire once or twice per year, where she enjoys visiting with family and hiking in the White Mountains. She is also planning to participate in the Mount Washington Road Race in June, an event she has completed 3 times in the past 5 years (pictured left). She and her husband, John, have 3 daughters; 1 in high school and 2 studying Mechanical Engineering at the University of Illinois. Christine and her daughter (pictured right) were enjoying a Patriots game.

John Loughlin, Class of '81

John just launched his second crowd funding project on Kickstarter.com. Their first project was to raise money for their super light, super strong TiGr Titanium bike lock. It was launched in April 2011, and they successfully raised $108k. Their new project is for a more compact version of the original, which they call the TiGr mini. The Kickstarter campaign went live on April 24, 2015 and will run until May 31. They've already exceeded their funding goal. Here is the link to the project: http://kck.st/1Jl0dWM.

Leroy Lewis, Class of '80

Leroy is presently part of Boeing Test and Evaluation (BT&E), Instrumentation and Data Systems (I&DS) Capability and is the Senior Manger for the Enterprises Development and Technology (ED&T) organization. He recently visited UNH and gave a presentation about Boeing.

William Lenharth, MSME Class of '74, & Ph.D. Class of '78

William retired in 2008, but continues to teach a Human Factors (Ergonomics) course in the fall semester for UNH.'s Electrical & Computer Engineering department. He first came to the ME department as Bob Corell's student, who he still works with on clean energy power plant designs.

ME Class Notes Continued:

George Kesler, Class of '67

George feels that he just graduated and started a new job, Retirement. George has many of the same limitations that everyone has who has had an active life plus a kicker macular degeneration. He is an optimist. He says "we need to look forward and choose a good course for the next 20 years." George hasn't been an engineer since 1972. But he does own a floral business called *The Blushing Rose*. George looks forward to hearing from others on how they are planning to attack retirement as a positive contributor. George has been married for 44 years and is a father of six.

William Berry, Class of '55

Bill and Bea Berry sold their home in Staunton, VA last summer and moved into a retirement home. Their new address is 21 Woodlee Road Apt. 334, Staunton, VA 24401. Bill still enjoys painting in their apartment and going for walks around Gypsy Hill Park in the center of town. He was responsible for designing and building the Unitarian Universalist Fellowship in Waynesboro, VA. Bill's 25 years as an engineer with the DuPont Company and his training in engineering at UNH stood him in good stead for the aforementioned task. He is still able to get around quite well but limits his traveling to short trips. Bill turns 89 on May 29th.

Robert Safier, Class of '45

Received a BSME in 1945 after four 3-month terms at UNH under the US Army's ASTP program. He then returned back to the Army for short, fortunately non-combat tours in France and the Philippines. The engineering firms he worked for in New York and Madrid: include Ebasco Services, Gibbs & Hill and Dravo, that no longer exist, and the Spanish affiliate, Gibbs & Hill Española, now called GHESA and surprisingly still thriving. After retiring, Robert and his wife, who is from Spain, Felisa spent several years on the Mediterranean coast and are now living quietly in Madrid. He would be quite happy to know of other survivors of his UNH class especially his ASTP comrades-in-arms.

Congratulations to the Class of 2015!

View the Mechanical Engineering Graduation pictures!

We would like to thank everyone for a great year!

The Mechanical Engineering department

wishes you a happy summer!

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, pictures, 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

Newsletter Coordinators: Lauren Foxall, Tracey Harvey, Barbaros Celikkol

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/