Mechanical Engineering

Department Newsletter

University of New Hampshire, Durham NH

October 2016 Volume III, Issue III

Nuts and Bolts Fundraising:

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

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

THANK YOU!

A Word From the Chair

The 2016-17 academic year is in full swing! The campus is beautiful as always with the autumn colors and the smiling faces of our students. It is always wonderful to have them back after the summer break and to welcome the new students onto campus. This is the second year of our BS in Ocean Engineering program and we are happy to welcome 18 students to this program. This is an impressive number considering the infancy of this effort. In addition, the first year students in the Mechanical Engineering program was capped at 120 to assure that we are able to provide a high quality, intimate education to our students. Despite this though, we continue to have record numbers in our department due to transfer students.

Among other information in this issue, you will hear about the summer experiences of just a few of our undergraduate students. Some had internships at companies (either here in the US or abroad) and others conducted research (either here on campus or at national laboratories). We are always extremely proud of our students (and alumni) for all that they accomplish. If you are ever in the Durham area, please stop by and keep the alumni updates coming in! Best wishes!

Brad Kinsey
Professor and Chair, Mechanical Engineering Department

Awards & News

- Sydney Michalak (Junior) and her sister pictured left hiked the John Muir Trail in California. This is a 212 mile trail which starts in Yosemite Valley. See more photos and get the full story on the ME Website.

- The Lunacats Team (pictured right) participated in the Robotic Mining Competition at the NASA Kennedy Space Center in May.

- Zhangxi "Jesse" Feng (Junior) receieved a 2016 Internationl Society of Automation (ISA) Educational Foundation Scholarship.

- Professor Tom Weber received the 2016 Medwin Prize in Acoustical Oceanography from the Acoustical Society of America in recognition of his accomplishments in the development of acoustic techniques for quantifying gas bubble related parameters.

- Professor Brad Kinsey has been elected as a Society of Manufacturing Engineers (SME) Fellow for his demonstrated impact on the social, technological and educational aspects of the manufacturing profession. Professor Kinsey is one of 10 new SME fellows nationwide.

- Professor Marko Knezevic in collabortation with Mark Daymon of Queen's Univeristy and Irene Beyerlein of Los Alamos National Laboratory wrote a journal article titled, "Modeling discrete twin lamellae in a mircostructural framework." This is a special high impact article called Scripta Materialia Viewpoint and is by invitation only.

CAREER & PROFESSIONAL DEVELOPMENT

Fall Semester Events:

CaP Evening Workshop Series
Weekly Topics Include: Introduction to Career Services, Wildcat Careers, Resumes, Grad School Prep, LinkedIn, Career Fair Prep, and more!
Time: 5-6pm
Location: Varies

BAE Information Session (Engineering Leadership Development Program and Operations Leadership Development Program)
Tuesday, 09/27/2016 at 5:00pm
Location: Kingsbury Hall, S145

Resume Review Day (Employers include Sig Sauer, Lonza, Scribe, Systems & Technology Research, Triumvirate, DYN, and more!)
Wednesday, 09/28/2016 at 11:30am to 2:30pm
Event Information: Graduate & Professional School Fair
Location: Granite State Room

SMART Scholarship Presentation
Thursday, 09/29/2016 at 6:00pm to 7:30pm
Location: DeMeritt Hall 112

UNH Career & Internship Fair
Wednesday, 10/05/2016 at 12:00pm to 4:00pm
Location: Whittemore Center Arena
Event Information: Career & Internship Fair
View full information

Graduate & Professional School Fair
Tuesday, 10/11/2016 at 1:00pm to 3:00pm
Location: DeMeritt Hall 112
Event Information: Graduate & Professional School Fair
View full information

Stephanie Whitney
CEPS
Career and Professional Development Director
Stephanie.whitney@unh.edu
603-862-0997

PATHWAYS Mentoring Program

This program is hosted by the UNH Career Center in coordination with the Alumni Association. UNH Pathways brings alumni and undergratuates together for professional growth. Alumni provide valuable insight on navigating through the post-college world. Students build career networks and develop skills to become better professionals and leaders.
The program runs from September to April and is structured around monthly mentor and mentee meetings, and includes two on-campus meetings of the entire Pathways group.
Registration is closed for this academic year. However registration is now open for next academic year. Click here to apply.

Kimia Fereydooni (Freshman), Kevin Cole (Sophomore), Kuldeep Prajapati (Junior), Mary Sareault (Senior) are participating in the 2017 mentoring program.

Riannon Nute
CEPS
Career Counselor
riannon.nute@unh.edu
603-862-4984

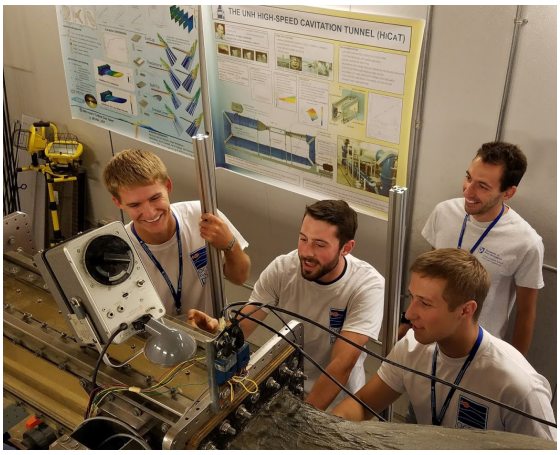
OCEAN ENGINEERING HIGHLIGHTS

Site preparation is underway for the Jere A. Chase Ocean Engineering Laboratory's 12,000 sq. ft. addition, and construction will begin in October. The new wing will house research and teaching laboratories, a classroom, and offices, and is scheduled to open in August 2017.

Prof. Diane Foster (pictured left) is very excited to see this project get underway.
Photo Courtesy: Prof. Martin Wosnik

Mechanical Engineering students (pictured right) were demostrating the High-Speed Cavitation Tunnel (HiCAT) at Ocean Discovery Day.
From left to right Cole Matthews (Senior), Jamison Couture (Senior), Alex Larson (Senior), and lecturer Dr. Ivaylo Nedyalkov.

Photo Courtesy:
Prof. Martin Wosnik

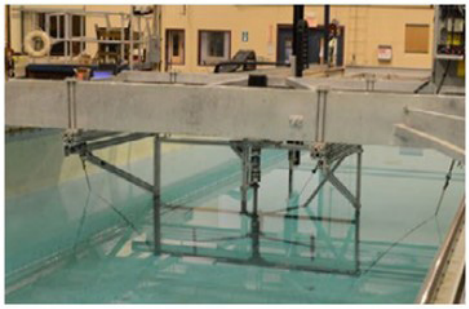


Ocean Discovery Day (pictured above) was a big hit. Over 2,000 people attended the two day event on September 16th and 17th.
Photo Courtesy: Prof. Martin Wosnik

The Freshmen and Sophomore Ocean Engineering students (pictured right). Currently there are 28 students in OE.
Photo Courtesy: Prof. Diane Foster

Two Sandia National Laboratories' projects with UNH were featured in their recent Water Power Technologies, Capabilities and Products brochure: 1) laboratory testing and performance measurements of a 1:6 scale physical model of the "Reference Model 2" (RM2) marine hydrokinetic turbine in the UNH tow tank, and 2) the first-of-its-kind demonstration of using Fiber-Bragg Grating (FBG) techniques to optically measure strain on moving hydrokinetic turbine blades in water. The principal investigator at UNH on both projects was Prof. Martin Wosnik, and the graduate student working on them was Peter Bachant (Ph.D. 2016).
Pictured below are Dr. Budi Gunawan of Sandia and Dr. Bachant (Ph.D. 2016) at the UNH towing tank in the Jere A. Chase Ocean Engineering Laboratory, installing optical fibers for FBG measurements on the UNH Reference vertical Axis Turbine (RVAT).

Photos were taken by Prof. Martin Wosnik



DOE Reference Model 2 turbine performance testing

FACULTY & GRADUATE SPOTLIGHT

The Road To UNH

Before UNH, Prof. Tsukrov was busy earning two degrees, one in Ukraine and one at Tufts after arriving in the US. Ironically, it was only by chance that he applied to university in the Ukraine to earn his PhD simply because his best friends had applied and he wanted to join them. He was never interested in becoming a teacher and had always planned on going into industry. After graduating from Tufts, Prof. Tsukrov worked in industry for one year before realizing his true calling.

Prof. Tsukrov's general area of expertise is in computational mechanics with applications to analysis of composite and additively manufactured materials, modeling flexible structures in oceanic environment, and, recently, bio-mechanical applications. Over the years his research has been supported by multiple grants from the National Science Foundation (NSF), National Oceanic and Atmospheric Administration (NOAA) and New Hampshire Innovation Research Center (NHIRC).

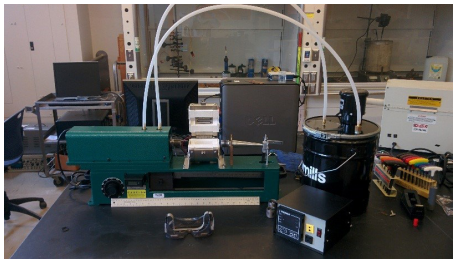
Prior to UNH, Prof. Tsukrov's research area was concentrated in micro-mechanics of composites. He has been able to continue and expand these studies at UNH through collaboration with Prof. Todd Gross, who is an excellent experimentalist. He also soon discovered his passion for ocean engineering when he started to interact with the team of ocean engineering researchers at UNH: Profs. Celikkol, Swift and Baldwin. Prof. Tsukrov even took two of Prof. Swift's courses where he sat in the class alongside some of the students from his own classes. This led to his involvement in more ocean engineering projects such as open ocean aquaculture engineering.

Prof. Tsukrov received two Fullbright Awards and was a recipient of the UNH Excellence in International Engagement Award. He is most proud of the awards he received from the students as he was selected for the CEPS Outstanding Faculty Teacher Award and for the Outstanding Teacher Award by the Tau Beta Pi Chapter.

Prof. Tsukrov loves living in New Hampshire with skiing in the winter, swimming in the summer, hiking in the fall and walking his dog Oscar all year round. He truly cherishes the rural environment around him because the first 25 years of his life was spent living in the large industrial city of Ukraine. He joyfully recalls that life started at UNH!

Stressed and Fatigued

Sean Gribbin is a second year Master's degree student working under Professor Igor Tsukrov. His thesis work is focused on experimental fatigue studies of structural materials. Under the support of the New Hampshire Innovation Research Center and TURBOCAM International, his work aims to compare the fatigue performance of an additively manufactured Inconel 718 with a forged Inconel 718 and relate it to microstructural features. The fatigue studies are a component of a project with UNH Professor Marko Knezevic and a TURBOCAM team. The goal of the project is to predict the feasibility of replacing forged and casted components with additively manufactured components.



This additive manufacturing technique, called Direct Metal Laser Sintering (DMLS), can create parts with complex geometries and has the potential to reduce energy use and material costs compared to traditional manufacturing. As part of his graduate research, he has also characterized the fatigue performance of a fiberglass reinforced vinylester composite for use in marine environments for HALO Maritime Defense Systems, located in Newton, NH. Impressed with his work, HALO invited Sean for an interview, and he was recently hired as a Mechanical

Engineer working under Jud DeCew, Ph.D. 2011 in Ocean Engineering from UNH. He will be finishing his thesis part-time this fall as he starts his new career. Sean also received his undergraduate degree from UNH in 2014.

When not in Kingsbury Hall, he can most likely be found riding his bike around the seacoast, or training for road and mountain bike races throughout the year.

UNDERGRADUATE SPOTLIGHT

Michael Locke

Michael Locke is a junior in Mechanical Engineering. Michael began his story with "Three… Two... One… Firing!" Those were the words said at the start of every test this summer at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland. As a part of a NIST Summer Undergraduate Research Fellowship (SURF) grant, Michael had the opportunity to perform research at a national laboratory for eleven weeks. His task was to characterize the material behavior of three specific materials under very high strain rates. To create those large strain rates in testing, a projectile was fired inside the experimental setup and the materials were deformed rapidly. Numerous sensors including strain gauges and thermocouples were used to capture data, and further analysis was performed to accurately characterize how material behaved.

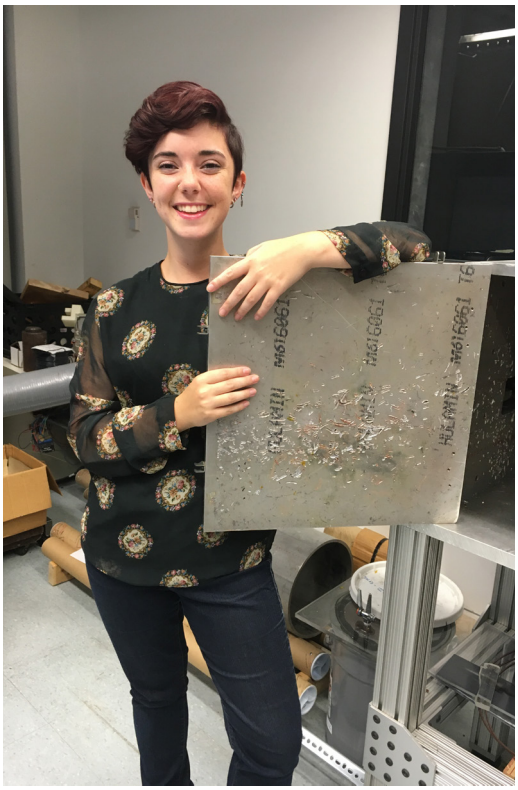
"A huge thing for me was that I was directly applying everything I had just learned in Material Science and Thermodynamics this past semester. I guess the things we're learning are pretty important after all; who would've thought?"

Naomie Clark

Naomie Clark is a senior in Mechanical Engineering. This summer she had the opportunity of going to Romania with five other students from around the country for an engineering internship experience as well as a missions trip. Naomie had interned at a local engineering company called TURBOCAM during the summers after her freshman and sophomore year of college and was able to work at the Romanian branch of TURBOCAM. Naomie said "I was able to learn a lot about how an international shop floor works as well as the engineering side of the part production process. My project was to write code to make the quality control process for each individual part more efficient. I hope to work in an international company at some point after graduation so this was a fantastic experience to prepare me for that." She was also able to spend a lot of time on missions, playing with children in orphanages and passing out food at gypsy villages. Naomie's experience as a whole was completely invaluable and she said that she is excited to visit Romania again soon.

UNDERGRADUATE SPOTLIGHT

Cassandra MacKinnon



Cassie MacKinnon is a senior in Mechanical Engineering with an interest in manufacturing. Over the summer she worked with Professor Kinsey on a magnetic pulse welding project. The goal of the project was to determine the coupling coefficients of the system, with the hopes of using them analytically to determine the pressure and velocity in the forming process.

Magnetic pulse welding is a cold weld using electromagnetic forces. The process involves a capacitor bank discharging into a main coil creating a magnetic field. Eddy currents are generated in a workpiece also creating a magnetic field. The force from the opposing magnetic fields deform the workpiece. A field shaper can also be used in the process to concentrate the force in a particular way. Electrical loses between the coil, field shaper, and workpiece are the coupling coefficients required for the analytical modeling.

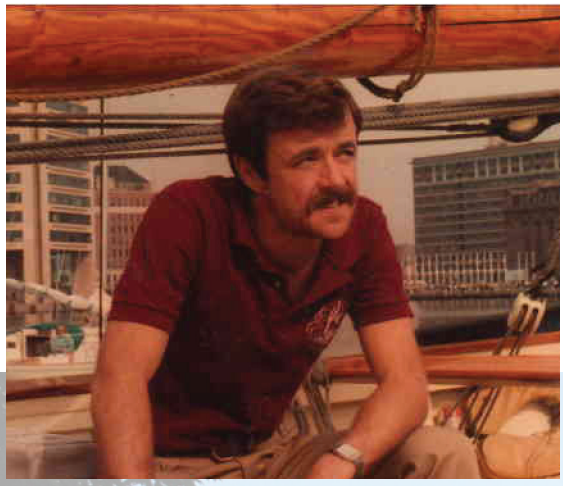
Cassie worked with graduate student Shunyi Zhang performing experiments to determine the electrical parameters. They ran current traces of the process using different configurations of the system. She also designed a new field shaper to use in the process with a unique geometry. Along with a specially designed workpiece, it allows current traces to be captured for the workpiece itself.

When Cassie wasn't working this summer, she spent her time visiting family on the coast in Friendship, Maine. Cassie and her five dogs split their time between going for walks in their field and going for rides with the windows down. She didn't want summer to end, but she's excited for what senior year has to throw at her.

Jamison Couture

Jamison Couture is a senior in Mechanical Engineering. His interests are in fluid systems and green energy. During his junior year Jamison worked with Professor Wosnik as an Undergraduate Research Assistant with the Living Bridge Project. He helped design and fabricate a length scaled model of a bridge to test a scale model of an underwater turbine. The project involved a tidal energy conversion, scale modeling, and data acquisition. During the summer Jamison interned at Brayton Energy in Hampton, New Hampshire where he researched solar troughs and high power turbine systems through physical test setups and 3-D finite element analysis. As if this wasn't enough, Jamison also spent the summer with Engineer's Without Borders. They designed and implemented a Spring Box in Uganda as a clean water resource for a local village. "It was amazing to experience the Ugandan culture." Jamison is a member of Tau Beta Pi and a Mechanical Engineering Department tutor. This will be his second year as the President of the Hepcats Swing Dance Club where he teaches swing lessons and organizes events for fellow students, faculty, and community members. Outside of college Jamison has a passion for outdoor adventures and dancing.

ALUMNI/COMPANY SPOTLIGHT

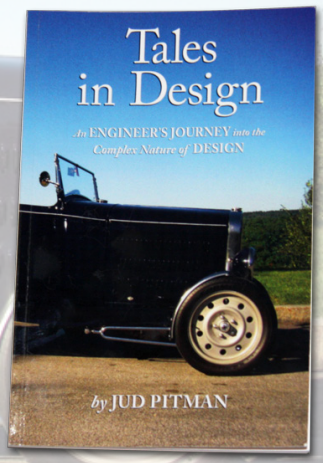


An Author's Adventure

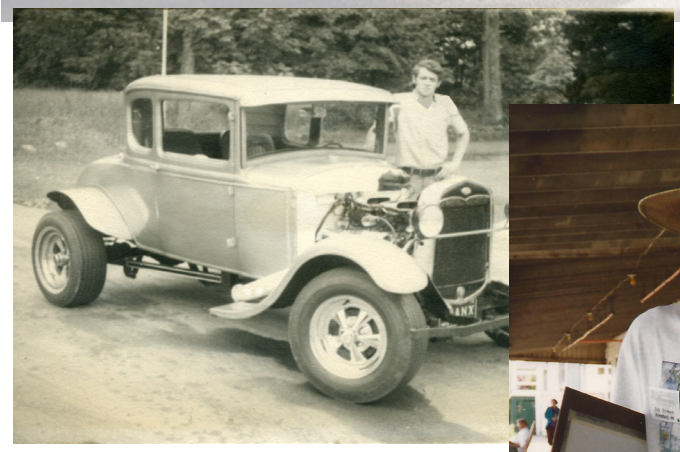
Jud Pitman, B.S.M.E. '75

"One day a great ship appeared off Star Island. An aircraft carrier named Wasp drew up and anchored off Wallis Sands in Rye."
Jud's father, a WWII Navy Vet, said "we should sail out and look her over."
Jud then describes his experience seeing the ship, "At 872 feet the Wasp was nearly three football fields in length. Her flight deck towered over our wooden sloop. We sailed round her waterline nudged by a light summer breeze. The Wasp dwarfed my childhood sense of scale. In months to follow she inspired sketches of ships, sailboats, and cars."
Jud went on to say "Mom and Dad were UNH Outing Club members. They regaled us five kids with their stories of Franconia Cabin and Mt. Washington hikes." His family history began at Durham College with Aunt Mildred Sanderson, a 1923 graduate in Arts & Science. Seven of the Pitman family are pictured below with five cousins whom attended UNH.

Jud completed a BSME in '75, his brother Steve a BA in Business in '77. Both of them being mechanically inclined, kept a hand, and their hearts in building hot rods in the family barn. Jud gave his friends rumble seat rides out to Adams Point in his old Ford Coupe. Upon graduation Jud worked as a design engineer in Portsmouth, NH. A Nike contract allowed them to build a shoe wear tester machine, which was awarded a patent. Curriculum development work then opened at NHTI in Concord, NH and Jud taught MET courses and advised the Solar Electric Car team – who were able to field three entries simultaneously. The Art of Mechanical Fabrication now filled his pallet – he returned to Portsmouth for work in equipment development.

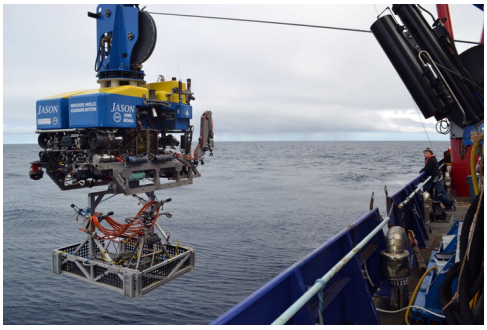


After years of initiation and a rogues gallery of car crafters, it slowly dawned on him how their stories filled the gaps in his learning. This reconciled "Why we design, and why we build" things, which led Jud to write Tales in Design, stories for new crafters who enter the trade. Professors Valentine, Wilson, Azzi, Taft and Celikkol challenged students to rise from their perch, gave them tools, and wings. Gratitude to them he now feels.



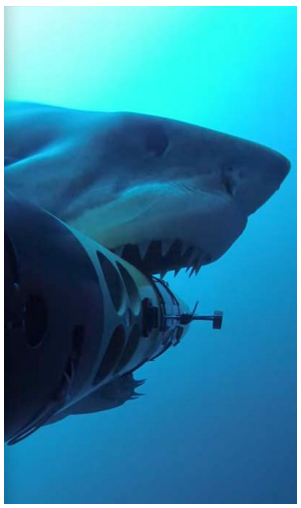
WILDCAT TALES

Molly Curran, B.S.M.E. 2015



For over a year now Molly has been working at Woods Hole Oceanographic Institution. She is a design engineer in the Deep Submergence Lab, doing both design and hands on technical work with ROV Jason, HROV Nereid Hybrid Tether, HROV Nereid Under Ice, and AUV Sentry. On August 21st Molly went on a several week cruise at sea with AUV Sentry operations, searching for coral off the coast of the Carolinas with Biologists Martha Nizinski aboard the NOAA R/V Pisces. Molly said, "Some of my largest projects include designing a science elevator that attaches beneath ROV Jason to be lowered to the seafloor filled with science equipment, at which point Jason then detachs from the elevator can work out of it with its two manipulator arms." Molly is also a co designer of the hydraulic power unit (HPU) for the Nereid family of vehicles, which was just tested to 2000 meters in the summer of 2016 and was successful!! Molly said, "I absolutely love my job and have the Ocean Engineering program to thank for guiding me down the path I have taken! I am soon to be promoted to an Engineer II and I couldn't be happier here at WHOI!"

The photo above is the "elevator" or basket that Molly designed being lowered into the Pacific ocean below ROV Jason. Molly added "I wish everyone at UNH a great year!"



'Shark Cam' being attacked by a Great White Shark.
(From Discovery Shark Week).

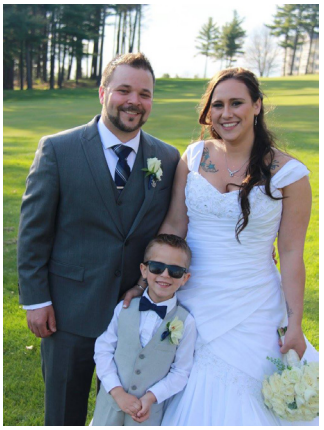
Brendan Martin, B.S.M.E. 2014

After spending two years post graduation at McLane Research Labs in Falmouth, Ma working on ocean research vehicles, Brendan decided to take a position with Hydroid, Inc. in Pocasset Ma to work on the REMUS, their line of autonomous underwater vehicles (AUV's). Some people may be familiar with the REMUS from it's appearance on Discovery Channel as the 'Shark Cam' that was attacked by a Great White (it survived!). AUV's are an exciting field that has really been exploding in the past few years. Brendan said, "I'm proud to say that I've been able to leverage my academic and research experience at UNH's advanced controls lab (with Prof. May-Win) in the professional world." Brendan would also like to share that he is nearing the completion of his MS in Systems and Controls Engineering through Case Western Reserve University. Brendan then said, "I really gained a love for systems engineering and control theory while working on my senior project at UNH -- Quadsat, so much so that I decided to pursue a Master's degree in it!"

A REMUS 600 being recovered after a mission.

Nick Dusza, B.S.M.E. 2012

After graduating in 2012, Nick started his role as an Applications Engineer at New Hampshire Ball Bearings in Peterborough NH. However, recently much has changed. On April 30th 2016, Nick got married to Jerilyn, and in July of 2016, they moved to Ludlow, Massachusetts where he took a Technical Sales Engineering role with Captive-Aire Systems, the nations leading commercial kitchen ventilation company. Also, Nick and his wife are expecting a baby boy, estimated arrival for late December 2016! (Pictured right are Nick, Jerilyn and Nick's step-son Bryson).



WILDCAT TALES

Derek St. Gelais, B.S.M.E. 2006
Derek along with two other former ME grads, Jesse Bodwell and Jon Cooper, entered in the Redbull Flugtag competition in Boston on August 20th and placed 17th.

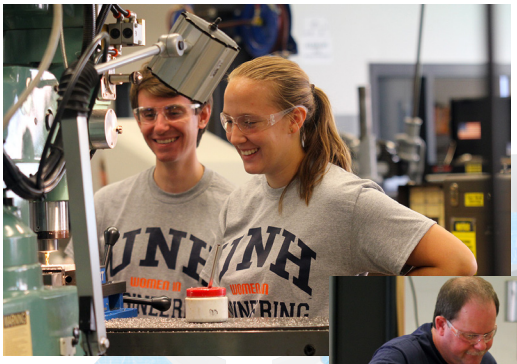
Paul Damiano, B.S.M.E. 1974
Damiano Elected President of the American Bonanza Society:
Industry veteran Paul Damiano has been elected to become the next President of the American Bonanza Society (ABS). Damiano worked at Kaman Music for 34 years and currently is the Executive VP and COO of St Louis Music. The Beech Bonanza is one of the most recognizable general aviation aircrafts ever built!! Production of Bonanzas began 70 years ago on Beech Field in Wichita, KS. Today, there are over 14,000 Bonanzas and (the twin engine version) Barons flying around the world. The ABS is the largest type club in all of general aviation, boasting just over 9000 members! The ABS is dedicated to preserving the aging fleet, providing highly structured recurrent training to Beech pilots, standardizing flight instructor training, providing mechanics with type specific training on the maintenance of Beech products, and maintaining the highest level of Beech specific technical documents. Visit their website to learn more about the ABS at www.bonanza.org.

Damiano holds an Airline Transport Pilot certificate and maintains his Certified Flight instructor certificate with instrument flight rules rating. Damiano learned to fly in 1989, and has since logged more than 4500 hours of flight time, mostly in his V tail Bonanza. He and his wife Janet have flown to 13 countries, and continue to regularly fly their Bonanza between their summer home in NH and their winter home in FL. The industry veteran refers to almost 40 years in the musical instrument business. *This was a press release for a trade magazine so he didn't mention what industry!*

Peter Connelly, B.S.M.E. 1970
Peter retired 5 years ago after working years with Xerox and Nestle worldwide. Peter and his wife Cheryl opened a food pantry and shelter ministry in northern Maine and recently had a visit from Professor Fred Hochgraf (Professor Emertius Material Science) and his wife Sally. It was Fred who encouraged Peter to go to the campus interview of a small unknown company with a new product, Xerox... and copiers... the rest is history. Peter said, "Thank you Fred and UNH for setting my course for life."

Robert E. Shea, B.S.M.E. 1961
Robert, fully retired now after 26 years in the US Army, is living in Alexandria, Virginia and enjoying the good life and traveling world wide. He has been on all 7 continents as a tourist. This summer, he went on a small cruise around the Brisith Isles (UK, Wales, Ireland, and Scotland). Robert stated, "If I win the lottery, I'll never be home."

Kimball Union Academy: Women in Engineering



Tim Roemer '13 (center), who graduated with a degree in mechanical engineering, spent a week back at UNH coordinating the Women in Engineering program, which included KUA students Coreen Carley, Caitlin Kuzma, Grace Griggs and Brittany Kainen.

Kimball Union Academy's STEM Program Coordinator, Timothy Roemer B.S.M.E. '13 & M.S. '16, brought four female students to do a five-day 'Women in Engineering' program in the labs of Kingsbury Hall. They worked with graduate and undergraduate ME students, as well as professors from across the various engineering departments. This program introduced different engineering software such as Matlab and Solidworks and gave the students hands on experience in the Kingsbury machine shop. The week ended with a design project where the students designed a cantilever beam in Solidworks. They received feedback from graduate students on their designs and refined them further with finite element analysis. The beams were then tested in a fixture to measure their deflextion under a static load. At the end of the week, the students were exposed to a large range of engineering disciplines, had hands-on experience with college level projects, and gained experience in a college environment.

Stay CONNECTED

We would like to stay connected with our alumni and friends and would welcome newsletter contributions and suggestions.

Please send your news items, e.g. awards, promotions, personal updates, memories of UNH, and suggestions to Lauren Foxall at 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

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

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