Mechanical Engineering partment Newsletter

University of New Hampshire, Durham NH

SPRING NEWSLETTER

SPOTLIGHTS

e

Undergraduate Student: Seth Andreasson - Page 4

Senior Project: **UNH** AeroCats - Page 4

Faculty: Professor Rob Swift - Page 5

Alumni Alan Jacobson - Page 6

Company: Macy's Industries, Inc - Page 7

FEATURED

Undergraduate Research **Conference Awards** - Pages 2-3

WildCat Tales: - Page 8

Graduate Research Conference (GRC) - Page 9

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!

Awards & News

Undergraduate Student Christin Badylak-Reals was chosen this year as one of only 4 UNH students to be the inaugural class of Innovation Fellows.

Right, several Mechanical and Ocean Engineering graduate students participated in the UNH Graduate Research Conference! See more photos on page 9.

Right, the UNH Chapter of American Society of Engineers (ASME) hosted a Ping Pong Tournament for students to take a break and relax.

It was so relaxing the Chair of the department, Prof. Kinsey, played a game with Tracey Harvey. They tied.





Graduate Students; Alissa Dalpe (Advisor, Prof. Thein), Sital Khatiwada (Advisor, Prof. Thein) and Saeede Ghorbanpour (Advisor, Prof. Knezevic) have been awarded a Summer TA Fellowship.

Graduate Student Miroslav Zecevic (Advisor, Prof. Knezevic) received a Dissertation Fellowship for the academic year 2017-2018.

Pictured left, Graduate Students Drummond Biles (Advisor, Prof. White) and Meagan Wengrove (Advisor, Prof. Foster) came in 1st and 2nd place respectively in the 3-minute Thesis Competition hosted by the UNH Graduate School. Photo Courtesy UNH CPA.

Prof. Marko Knezevic was received a National Science Foundation (NSF) CAREER Award.

Left. Prof. Diane Foster received the Faculty Mentor Award from the Graduate School, which was presented to her at the Graduate Research Conference Poster Session on Monday, April 10th by Dean Cari Moorhead. Photo Courtesy Dr. Alireza Ebadi



URC - ISE Awards Photo Gallery

Undergraduate Research Conference 1st Place Awards:

- I. ME Competition Team: UNH AeroCats
- 2. ME Industrial: Method of Non-Contact Machining by means of Electrochemical Turning
- 3. ME Research: Cyclist Aerodynamic Analysis in Cross Wind
- 4. Ocean Engineering: The Poseidon Project: Portable SONAR Device for Ocean Floor Mapping

Undergraduate Research Honorable Mention:

- 5. ME Competition Team: Mini Baja SAE
- 6. ME Industrial: Determining Intrinsic Residual Stress in 3-D Woven Composites with Electronic Speckle Pattern Interferometry.
- 7. ME Research: Determination of Coupling Coefficients in Magnetic Pulse Systems
- 8. Ocean Engineering: UNH Remotely Operated Vehicle

Faculty Choice Awards:

- I. ME Competition Team: UNH AeroCats
- 6. ME Industrial: Determining Intrinsic Residual Stress in 3-D Woven Composites with Electronic Speckle Pattern Interferometry
- 9. ME Research: Im Scale Research Wind Turbine Rotor
- 10. Ocean Engineering: Wave Energy Conversion Buoy

Awards and Photos continued on Page 3



4

6



URC - ISE Awards Photo Gallery Continued:

Student Choice Awards 1st Place:

- I. ME Competition Team: Mini Baja SAE
- 2. ME Industrial: Manufacturing Automation
- 3. ME Research: Cyclist Aerodynamic Anaylsis in Cross Wind
- 4. Ocean Engineering: UNH Remotely Operated Vehicle (ROV)

Student Honorable Mention:

- 5. ME Competition Team: UNH AeroCats
- 6. ME Industrial: Method of Non-Contact Machining by means of Electrochemical Turning
- 7. ME Research: Im Scale Research Wind Turbine Rotor
- 8. Ocean Engineering: The Living Bridge Project: Environmental and Tidal Energy Resource Instrumentation at the Memorial Bridge in Portsmouth.

8

UNDERGRADUATE SPOTLIGHT



Seth Andreasson is a senior mechanical engineering student from Harwich, Massachusetts, a small town on the peninsula of Cape Cod. Over the past two summers, Seth has been able to implement his engineering education through two internships at BAE Systems in Nashua, New Hampshire. After graduation, Seth will be working at BAE Systems as a member of the ELDP Program. To practice his leadership skills as well as his proficiency with electronic systems, Seth became the Team Leader and Project Manager of UNH ET-NavSwarm, a robotics team under the advisement of Professor May-Win Thein. ET-NavSwarm is also being used as a platform for Seth's senior capstone project. During his time with the ELDP Program, Seth will be pursuing a master's

degree in mechanical engineering with the hope of specializing in shocks and vibrations, lasers and thermal imaging, or aerospace and electronic systems. Aside from school, Seth has been playing guitar for 10 years, and currently uses that and his love for sports and staying active to keep him sane during the push to graduation.



SENIOR PROJECT SPOTLIGHT UNH AeroCats Take Flight



UNH Aero Cats Take Flight

The UNH AeroCats team had the task of designing and building a remotecontrolled airplane. This year's team of 6 ME students followed the rules and

guidelines provided by the SAE Aero Design East competition for the "regular" class, which aimed to simulate a passenger airliner. This required the plane to carry both passengers, simulated as tennis balls, and their cargo weight, while minimizing the weight of the plane itself and being powered by an electric motor. Important design features incorporated into the final plane included a circular shaped fuselage, large side door, removable wings, and building the plane in sections for easier crash recovery. The plane was able to fly successfully during both the test flights and the mock competition flight, all held at the New England Dragway in Epping, NH. The AeroCats team was also successful at the URC, winning Ist place overall in the ME Competition Team Division.



Picture from inside the plane at the URC.

FACULTY SPOTLIGHT



Prof. Swift grew up with an interest in the ocean, boats and making things. Many hours were spent in his family's basement work shop putting together small boats of his own design, as well as patching up derelicts given to him for sailing on NH lakes and coastal waters.

Appointed in 1976, Prof. Swift was fortunate enough to continue pursuing his ocean interests as a Mechanical Engineering faculty member. Classroom teaching included all the courses in the fundamentals of mechanics sequence, applied mathematics courses, ocean waves and tides, as well as special topics courses in marine related areas. He has served as course director for Ocean Projects, the senior projects course for topics related to the ocean.

His teaching was recognized with the 2007 CEPS Outstanding Teacher Award. His research activities as a faculty member began with the computer modeling of the seakeeping dynamics of air cushion vehicles for the Office of Naval Research. Early work also included the study of tidal dynamics in the Great Bay Estuarine System. Early finite element codes were applied and validated by field measurements. There were many 16 hour days spent on the water, with collaborators Profs. Barbaros Celikkol and Wendell Brown, to record flow regimes over a tidal cycle. Bottom stress, Reynolds shear stress and tidal energy dissipation were of particular interest. Experience with tidal currents led to investigations of how to contain and recover floating oil from oil spills in fast water. Effective

use of oil booms and the development of new devices to hold oil in fast currents were the objectives of this work. Field trials took place in the Great Bay System (using oil substitutes) and the large outdoor tank in New Jersey (using real oil). A special recirculating flume for oil containment studies was built in Chase and used for laboratory experiments. Design work included the development of a collision tolerant pile structure for deploying aids to navigation alongside channels where wayward barges often hit and destroyed fixed structures. Using a spring-loaded hinge at the base, model and full scale design, analysis and field studies were carried out in collaboration with Prof. Ken Baldwin.

Presently, Prof. Swift is active in marine renewable energy research and aquaculture engineering. Wave energy buoys used for converting wave motion to electricity are of special interest. Activities include computer modeling, wave tank testing in Chase, and ocean experiments at UNH's research site south of the Isles of Shoals. The Isles of Shoals research site was first established as an open ocean research and demonstration aquaculture farm and has operated as such for over a decade. A large interdisciplinary effort, Prof. Swift's contributions included computer modeling of net-pens and moorings, flow through bio-fouled nets, and the development of an automatic feed buoy linked to submerged cages. Two ongoing projects are the study of the dynamics of submerged mussel rafts and the design of aquaculture rafts to support simultaneous grow-out of steelhead trout, blue mussels and sugar kelp. In this multi-trophic aquaculture approach, nutrients released by the finfish are cancelled by uptake by the mussels and kelp. Thus the net environmental impact is neutral. Working with biologist Dr. Michael Chambers, a new raft was recently designed, built and tested at UNH's nearshore farm off New Castle, NH (see photo below). Products have been commercially available at local fish markets and restaurants. A local brewer has even used kelp for

making beer.

Off campus, Prof. Swift also enjoys winter sports such as ice hockey, skiing and snowshoeing. During the warmer months, he is often on the water sailing, kayaking, canoeing, and stand-up paddle boarding. Finally responding to a life-long appreciation of music, he is now taking ballroom dance lessons. The most fun recently has been doing triple-time swing to "The Wanderer" and other rock classics.

Right: Launching of the multi-species raft structure at the UNH Pier Facility, New Castle (Photo Courtesy Becky Zeiber).



ALUMNI SPOTLIGHT

Alan Jacobson Class of 1991 B.S.M.E

Alan was a Mechanical Engineering undergraduate and soccer player at the University of New Hampshire from 1987-1991. Upon graduation, Alan went to Virginia Tech to both obtain a Master's Degree in Mechanical Engineering, and also to explore non-engineering options. After several years of solid engineering workload, Alan explored the medical field



(completing his pre-med courses and becoming an Advanced Emergency Medical provider in Virginia). After graduating from Virginia Tech, and while deciding whether to go to medical school, Alan joined Ford Motor Company in Dearborn, Michigan.The career journey at Ford took many fun turns, including assignments designing suspensions, advanced lighting technologies, and launching new products at manufacturing facilities.



After nearly a decade of engineering jobs, Alan was tapped to deliver new startups for Ford. These startups included a team dedicated to improving product durability and reliability, a team to reduce prototype and tooling expenditures, and three allnew companies (2 of which were spun-off and still exist today).

During the journey, Alan was recognized with several distinctions, including Engineering of the Year (by the Engineering Society of Detroit) and the Young Leader & Excellence Award from the Automotive Hall of Fame. The foundation developed at the University of New Hampshire served him well!



Currently, Alan is helping to create an all new Data Science function at Ford. The team is currently made up of approximately 800 data scientists that support all areas of the company, and is expected to grow to nearly 1500 over the next two years.

I guess Alan is still exploring what profession he wants to go into, and Ford has made that easy, allowing a wide range of jobs without having to change companies for over 20 years. And the job has allowed the flexibility to continue to pursue interests outside of what Ford could provide. Still today, Alan works as a medic and firefighter on the local fire department, and coaches his kid's soccer teams. If you're ever in the Dearborn, Michigan area, look him up on LinkedIn and connect with him.



COMPANY SPOTLIGHT





Macy Industries, located in Hooksett, New Hampshire (<u>www.macyind.com</u>), has been growing since 1975. Founded by Marcel Mercier and now run by CEO Nick Mercier, UNH Class of 2002, Macy has always sought to bring together a team of experienced engineers and highly talented metal fabricators to provide all of their New England customers with a wide range of metal products. From industrial fabrications such as platforms and dust collectors, to more architectural items such as copper

countertops and custom artwork, Macy has become known as a one-stop-shop for any metal need.

Like all successful companies, Macy has had to evolve

significantly over time. Seven years ago, for example, Macy embarked on an exciting journey into the world of advanced composites and additive manufacturing (also known as 3D printing). At the time, the engineering team at Macy, which also includes Matt Bravar, UNH Class of 2002, was approached by the United States Special Forces to develop a highly specialized new product. The "LAL-18 Project" as it was called began in 2010, in response to a USSOCOM requirement for a long-reach, lightweight, compact, transportable ladder for use in "extreme environmental and strategic conditions". After extensive R&D, field, and lab testing, the final product was approved and has been fielded to USSOCOM units since early 2016. Macy's solution was a retractable carbon fiber ladder that extends to 18 feet but weighs only 18 pounds, with its ultimate load capacity at over 1000 pounds!



Nick Mercier B.S.M.E. Class of 2002

Now an established advanced composites manufacturer, Macy created a high-tech spin off called Pilot Innovations (www. pilotinnovations.com). Pilot's passion is solutions, or as Nick would say, "Unique solutions for unique clients." He goes on to explain,"We solve problems for our customers with a combination of innovative design, rapid prototyping and quick-turn production. We're agile, realistic, and solution oriented. With the understanding of and access to numerous materials and technologies, we welcome the challenge to partner with elite individuals and organizations to help take ideas from concept to field."



Matt Bravar M.S.M.E Class of 2003 B.S.M.E. Class of 2002



Caleigh MacPherson, B.S.M.E. 2012, M.S.M.E. 2014

Caleigh was the Keynote Speaker for the <u>Young Inventor's Regional Invention Convention</u>. Once again she will be putting on <u>Space Apps</u> Durham Challenges for another year!



Dan Enos, B.S.M.E. 2012

Dan is transitioning from his current assignment as an Air Force Instructor Pilot to a Special Tactics Officer. After a year and a half of training, he will be leading special operations forces involved air traffic control, fire support, command and control, direct action, counter-terrorism, foreign internal defense, humanitarian assistance, and special reconnaissance. Dan and his wife will be moving from Alabama to Hurlburt Field, which is just outside Fort Walton Beach in Florida. Dan is about half way through a Biomedical Engineering Master's Degree Colorado State University. Dan hopes to finish his BME degree in about a year and eventually attend medical school, when he finishes his military career.

Dan and his wife, pictured left, have two furry, four legged kids named Boston and Libby (named after a famous UNH social establishment). Their free time is spent as foster parents, trainers, and kennel managers at a local dog rescue in Alabama. They transport puppies to the North so let Dan know if you are looking for a new adopted best friend.

Chris Famolare, B.S.M.E. 2008

At the 40th World Energy Engineering Congress hosted by the Association of Energy Engineers, Chris was recognized as the 2016 Young Energy Professional of the year. This is one of the highest honors in the energy industry.

Michael Tamasi, B.S.M.E. 1983

Michael Tamasi was featured on NBC Nightly News on March 10th.

UNH Grad talks skills gap on NBC Nightly News

NBC Nightly News reported on the skills gap, highlighting how U.S. manufacturers are struggling to fill skilled positions. The segment featured a UNH Alumnus. Mike Tamasi, and President and CEO of AccuRounds in Avon, MA. said, "We'd love to hire people with experience, but there are no people with experience walking the streets. Anyone that has that technical experience already has a job," Watch the clip here.

Bob Shea, B.S.M.E. 1961

Bob wrote; "A beautiful spring in Washington, DC with the cherry blossoms around the Tidal Basin in full bloom. Being fully retired, its time to enjoy all the things that life has to offer." The Shea family left in April to go on a small ship crusie that accomadates 98 passengers, from Barcelona, Spain to Lisbon, Portugal with many ports of call between to include the British Colony at Gibraltar. Bob said, "I have been on all seven continents, but Gilbraltar has been on my bucket list." Bob then stated that his health and life is good.

Prescott Greene B.S.M.E. 1957

Scotty is working as a volunteer Executive Director at DeBence Antique Music World. That put Scotty at 17 years into his second career there after he retired from Joy, a mining equipment manufacturer, not the "dog food" people.

Graduate Research Conference

I. Calculation of Intragranular Misorientation Distributions in Polycrystals Miroslav Zecevic, PhD Student

4. Polycrystal Plasticity Modeling of Tensile, Compressive, and Cyclic behavior of Direct Metal Laser Sintered IN718 Superalloy Saeede Ghorbanpour, PhD Student

Mechanical Engineering

2. Development of N.E.A.T Boundary Layer Wind Tunnel Drummond Biles, PhD Student

3 Properties of ARB and PVD Zr-Nb Nanolaminates Daniel Savage, PhD Student

General Stag Constant of the star connected with our alumni and friends and

Professor Brad Kinsey Chair

Lauren Foxall Graphic Designer Editor

Tracey Harvey Editor Public Relations

Barbaros Celikkol Editor-in-chief 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/

Mention of trade names or commerical products in this publication does not constitute endorsement or recommendation for use.