FALL 2013

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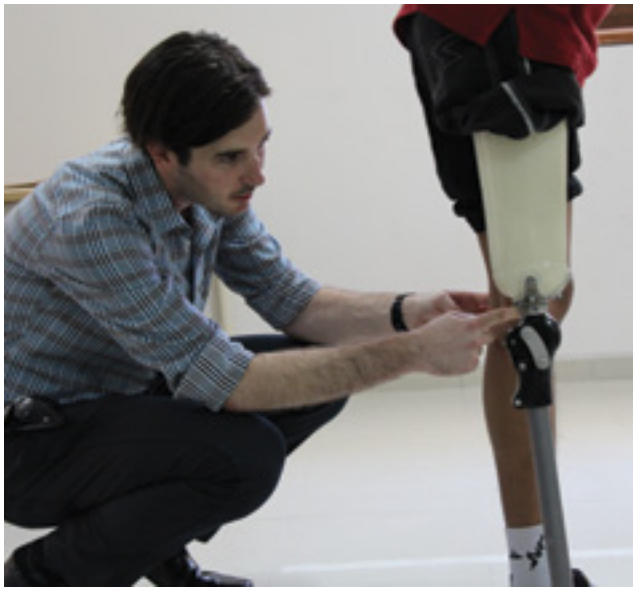
MECHANICAL & AEROSPACE ENGINEERING

UF alumnus takes talents to non-profit



MAE alumnus Samuel Hamner working with new prosthetic design.

When **Samuel Hamner** (BSME, 2006) was a senior engineering student at UF, he volunteered every week at St. Francis House. He's always been passionate about poverty issues, but he wasn't sure how he would be able to turn this passion into a full-time career. Then he started working on biomechanics in Prof. **Scott Banks'** lab, and he learned he could apply engineering skills to improve someone's quality of life.

He stuck with biomechanics and went on to get his Ph.D. at Stanford, where he took a class called Design for Extreme Affordability. The professor taught this class of engineering, medical, education and business students how to address problems with poverty and issues in global health around the world.

"It ultimately led to changing my career from a traditional academic path to a non-profit," Hamner said. "It opened my eyes to how I can use engineering and apply it to a problem I feel passionate about."

In August 2012, he joined D-Rev, a non-profit product development company that uses technology to address problems around the world and provide solutions with a large-scale global impact. His current project involves designing and distributing a prosthetic knee that provides better performance at an affordable price.

"I was able to combine the Extreme Affordability class with biomechanics to provide people with mobility, which is a huge quality of life issue," he said.

At this stage of product development, D-Rev is working to get the ReMotion Knee

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INSIDE

UF UNIVERSITY of FLORIDA

Letter from the CHAIR

David W. Hahn

Welcome to the Fall 2013 issue of the MAE newsletter. We're a little later than usual going to press, but as I will explain below, it was a busy semester for us. Nonetheless, I am pleased to provide an update to our students, alumni, faculty members and friends on the many events and activities in the department. Mechanical and Aerospace Engineering continues to thrive, and I am pleased to report we are well represented in UF's Preeminence campaign with a total of five new faculty lines!

The intellectual diversity of the department is nicely reflected by a sampling of this semester's activities, with notable accomplishments representing both mechanical and aerospace students. NASA astronaut and Air Force Colonel Kevin Ford, a proud Gator and MAE alumnus, was received by a standing-room-only crowd as he talked about his exciting career in the astronaut corps. Kevin piloted space shuttle *Discovery* during STS-128 and spent a total of 157 days in space, including being the commander of Expedition 34 on the International Space Station. Kevin came to campus to accept his **MAE Outstanding Alumnus Award**, and his time spent with students and faculty was a special day for us all.

The theme of space continued this fall with the launch of *SwampSat* on Nov. 19, the first Gator engineering small satellite to reach orbit. For their efforts, we offer congratulations to Prof. Fitz-Coy and his students. UF President Bernie Machen visited our **Design and Manufacturing Lab**, meeting with students and Lecturer Mike Braddock to see firsthand our efforts to provide hands-on engineering education. The can-do spirit created in Mike's lab and other courses helps provide the confidence for our students to tackle complex design and manufacturing problems, as you will read about with MAE doctoral student Tim Elmore and his Filastruder machine. It is truly satisfying to see our students pursue their engineering dreams and represent the best of Gator Engineering.

In addition to instilling confidence in our students and giving them the tools to succeed, we also believe in the importance of international experience and collaboration. Engineering is increasingly a global profession, and we believe it is our obligation to provide MAE students opportunities to **broaden their education beyond our borders**. General Electric, for example, now has global research centers in Brazil, China, Germany and India, and as you have read in previous issues, it is not uncommon for our graduates to spend time working outside of the United States.

MAE is working with Dean Cammy Abernathy on the UF Engineering Global Innovation Network, which is partnering with top universities in Brazil, China and Israel. MAE is leading the way with the University of São Paulo's Mechanical Engineering Department, and I recently visited them with Dean Abernathy to finalize our memorandum of understanding. We are now on track to **send a group of MAE students to Brazil for the Fall 2014 term**. Brazil is Florida's largest trading partner, and we are working with UF's Brazil Linkage Institute to promote a number of collaborative activities. The graphic on the back cover shows a representative snapshot of MAE's international activities; it is indeed an impressive array covering all corners of the globe. For example, we are working with Cape Peninsula University of Technology on astronautics and want to expand our collaboration to areas such as energy, while numerous faculty members are working with ETH Zürich, a world-renowned institution, in several different areas. The Gator Engineering Nation is truly everywhere!

Our primary mission is to train the next generation of technical innovators and leaders within and beyond the engineering community–a community that is increasingly global in scope. I hope you share our pride in the success of our students as they continue to add to the international reputation of our Gator engineers!

MAE professor leads international, collaborative research endeavor

Prof. **Gloria Wiens'** teaching and professional endeavors aren't confined to one classroom, one university or even one country.

Wiens has been working in the MAE department at the University of Florida for more than 18 years, and she's done impressive work in robotics, MEMS, small satellites and other areas.

But most recently, Wiens has been working on strengthening the International Research Collaboration program she developed two years ago. Her main partnership is with Irene Fassi from the National Research Council of Italy, who serves as the European Team Lead for the program.

Faculty, senior researchers and graduate students who are involved are from UF, the University of Texas at Arlington, the Istituto di Tecnologie Industriali e Automazione (ITIA) in Italy and the Université De Franche-Comté in France.

With a 4-year research collaboration agreement between the participating universities and organizations, the researchers are able to work on subjects including micro-manufacturing, assembly and robotics, and nanomanufacturing.

Wiens said the program's main goal is to build collaboration around the world, which allows for different perspectives, different resources and different facilities to be accessible.

"Much of the work is international these days," Wiens said, "and the university strongly encourages the global collaboration. This program gives graduate students the opportunity to see more than just their own labs."

Students are often sent overseas to work on their projects in progress. Overall, the program currently consists of nine ongoing projects involving a variety of UF collaborators from MAE, ECE and Shands.

For example, MAE faculty member Prof. **Curtis Taylor** is working on a project involving nano-identification with

Paul Moore (UF-PhD student) uses a dual axis Sarix 200 3D µEDM/µ-milling machine for fabricating a prototype middle ear prosthesis, working with Francesco Modica (ITIA-researcher).

Claudia Pagano, a researcher from the Italian branch of the program. Wiens is involved in projects related to a range of topics, from middle ear prosthetics and Adaptively Tuned microManipulators (ATµM) to wireless sensing platforms for micromanufacturing.

In addition to this, she, Taylor, William Eisenstadt and Hiukai Xie already have newly proposed projects on the table. While the program has made a lot of progress in the last couple of years, Wiens is working toward several goals, which include continuing to build teams and research initiatives.

In August, a mid-project workshop was held, in which participants disseminated research and a panel discussed the challenges of building an international program. "I'm building this umbrella of educational research exchange through these collaborations," Wiens said. ▲

We'll miss you, Becky!

Becky Hoover has worked at the University of Florida for 30 years and is now getting ready to retire. During her last seven years at UF, she's worked in the MAE department doing outreach and development and has made countless contributions. "It's been a joy to work with such wonderful, intelligent people," she said. "I have particularly enjoyed working with David Hahn and the MAE faculty and staff. It's a great department doing great work. I wish everyone the very best in their endeavors."

New center helps launch UF into forefront of predictive simulation

The College of Engineering's new Center for Compressible Multiphase Turbulence (CCMT) will be launched this spring and will serve as an impressive addition to the UF engineering community.

The center was created as a result of the Predictive Science Academic Alliance Program (PSAAP II), which strives to promote and advance the methods of "predictive science." The CCMT is specifically tasked with developing accurate, verifiable predictive simulations for compressible multiphase turbulence.

With $8 million support from the Department of Energy and additional matching funds from the university, this will be one of the largest centers of excellence to be funded by a federal agency in the College of Engineering. The center will help put UF at the forefront of predictive simulation science alongside other top universities.

Of the seven principal investigators involved at UF, three are MAE faculty, including Prof. **Rafi Hafka**, Prof. **Nam-Ho Kim** and Prof. **S. "Bala" Balachandar**, who will serve as the director of the center. The other team members include faculty from Electrical & Computer Engineering and Computer and Information Sciences and Engineering departments.

"Our job is to get the right people on board who are as excited as I am and to solve some science questions that can't be solved without the help of the world's largest supercomputers," Balachandar said.

While he and his group have been studying compressible multiphase turbulence for almost a decade, the center will provide some major advantages.

"What we plan on trying to accomplish at the center is unique," he said. "We could not have hoped to achieve that just individually as single investigators and students. It needs a center — a unified effort. It will allow us to come together and solve a unified problem."

The center will allow the team to take their small-scale research and scale it a thousand-fold.

"We will get access to the world's largest computers for the next five years," he said. "We will be able to do things we couldn't even dream of doing just a few months ago."

The work in compressible multiphase turbulence will address a variety of phenomena involving particle flows occurring at extreme speeds.

Take, for example, volcanic eruptions, which involve rocks, dust particles and other substances blowing miles away. Balachandar and his team hope to create accurate computer simulations to recreate events like this that are difficult to study as they're actually happening.

Compressible multiphase turbulence research is applicable to countless other situations, as well, including needleless drug delivery, in which medicine can be injected using high-pressure instead of needles.

While the center will help develop these simulations, that's only the start of their work.

"When you do these simulations, the first question someone is going to ask is, 'Why should I believe the simulation results?" Balachandar said.

When they perform large-scale simulations of very complex problems, they need to develop sophisticated ways to verify and validate the simulation results step-by-step.

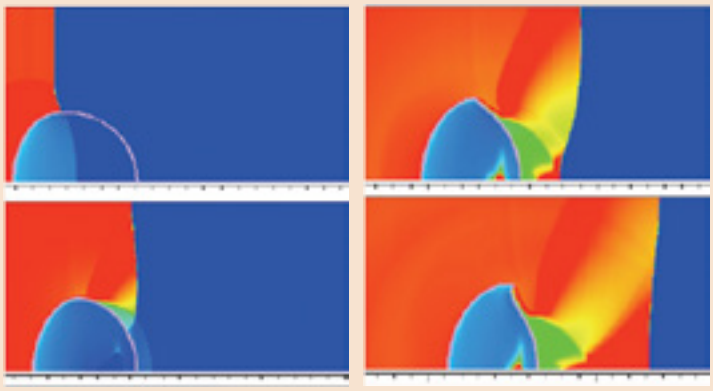
Models at several scales ranging from microns to meters will be developed, and the demands on computational resources are beyond those available on today's computers. This will call for two complementary thrusts.

First, algorithms that will take maximum advantage of computer architectures expected for next generation's computers need to be developed. Second, uncertainty management techniques must be applied to allocate resources to the different scale models and to experiments to allow validation of the models by those experiments.

Once validated, these models will be highly beneficial, as they could serve as virtual experiments.

The center will allow close collaboration with Sandia, Los-Alamos and Lawrence Livermore National laboratories and with the Munitions Directorate of the Air Force Research Laboratory at Eglin Air Force Base.

"We have a great team," Balachandar said. "Everything is clear — we just need to do the job and do what we proposed to do." ▲



Simulations of intense shock propagation over an aluminum particle performed in collaboration with Lawrence Livermore National Laboratory. Frames are temperature contours over the first few nanoseconds.

In Memoriam

Professor Emeritus **Edward Walsh** passed away on Oct. 29 at the age of 82. He was a valued member of the University of Florida community.

He began working at the university as an engineering professor in 1984. It was there he met Prof. **John Abbitt** working together on a Flight Test Engineering course. Abbitt said he knew Walsh well for about 15 years.

"He really liked being part of UF, I can tell you that," Abbitt said. "Even after he retired, he came here every single day. He really loved being a part of this place."

Some of Walsh's primary research topics involved wave propagation, visco-elasticity and bioengineering. For example, one project involved using a general mixture theory for multiphase materials (that was created in conjunction with Sandia National Laboratories) and applying it to the issue of shock wave propagation in concrete. Walsh also conducted pioneering studies characterizing brain mechanical properties and creating devices to perform those measurements.

Outside of his love for researching and teaching, Walsh had a variety of interests, from flying planes to fixing up old cars. His papers appeared in impressive publications from Neurological Research to the Journal of Applied Physiology.

"He was an intellectual, an athlete, a pilot and a great friend," Abbitt said. "I was in awe of all the things that he could do."

Walsh, who introduced Abbitt to LivingWellUF, loved exercising and running. He ran marathons and completed a total of 13 races.

"He just never stopped going," Abbitt said. "From the time I knew him right until the end."

Walsh's life was full of accomplishments, and he was admired by many. He will be missed. ▲

CONGRATULATIONS TO:

Prof. Anil Rao for receiving the 2012 Pramod Khargonekar Junior Faculty Award.

Prof. Richard Lind for being accepted onto the AIAA Student Activities Committee, being elected to head the AIAA Atmospheric Flight Mechanics Technical Committee and being asked to serve as an associate editor for the AIAA Journal of Guidance, Control and Dynamics.

Prof. David Hahn for being named a Fellow of the American Society of Mechanical Engineers.

Prof. Subrata Roy for being awarded the Distinguished Visiting Fellowship by the Royal Academy of Engineering.

Prof. Warren Dixon, along with **Profs. John Shea** and **L. Navaravong** from Electrical and Computer Engineering and E. Pasiliao from Eglin Air Force Base, for being awarded the Fred Ellersick Award for the Best Overall Paper in the Unclassified Technical Program of the 2013 IEEE Military Communications Conference for their paper entitled, "Graph Matching-Based Topology Reconfiguration Algorithm for Systems of Networked Autonomous Vehicles."

Prof. Scott Banks for being elected to the Knee Society and becoming the ninth engineer elected to membership.

Prof. Saeed Moghaddam, who will be the MAE George N. Sandor Faculty Fellow.

Prof. Henry Sodano, who will be the MAE Daniel C. Drucker Faculty Fellow.

Prof. Subrata Roy, for his feature article, which can be seen in the AIAA Daily Launch – an AIAA daily newsletter. http://www.insidescience.org/content/snakelike-zaps-flowing-air-can-improve-vehicle-aerodynamics/1477

Prof. Conklin optimistic about UNP team's progress

For the first time, UF has been selected to participate in the U.S. Air Force's University Nanosatellite Program (UNP). The competition involves designing and building a nanosat that has the potential to be chosen for a launch opportunity.

UF's proposal was "Precision Time Transfer with CubeSats." The mission is to fly a Chip Scale Atomic Clock on a CubeSat and use laser pulses to track the timing discrepancy of the orbiting clock and a clock on the ground.

Prof. **John Conklin**, the PI of the project, said their approach will improve orbiting timing systems and thus enhance the performance of future satellite navigation systems like GPS. His team of 21 students, most of whom are MAE students, spend anywhere from five to 30 hours a week developing the project.

"I try to stand back and let the students to the bulk of the decision making," Conklin said. "Our team has come a long way in the past nine months. Many of them knew very little about satellite engineering or about timing and navigation systems when they started."

They're making impressive progress and had a successful run at the at the SHOT workshop last summer. [Read more about SHOT in the newsletter's Student Section on page 9.] Conklin is optimistic — he said he looks forward to winning and seeing their mission go to space.

At the recent Critical Design Review that took place on campus on Feb. 18, AFRL personnel reviewed the UF team's progress. Conklin said that the feedback overall was very positive.

"The team leads have worked very hard to get up to speed in both the technical areas and in the management of a satellite program," Conklin said. "They've also done a great job communicating their work to Air Force experts and dealing with the stress associated with that."

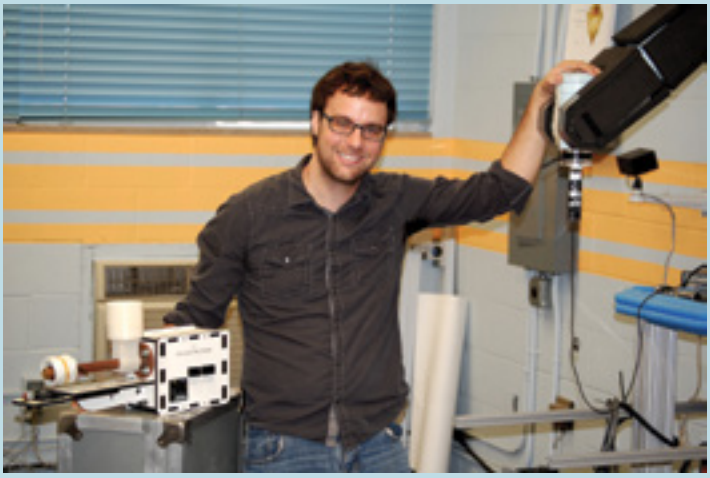
He said that in addition to gaining technical skills, the team is learning how to manage and organize themselves effectively.

"For those who wish to pursue a career in space science and technology, this will very likely be the most important item on their resumes and be their tickets to a fruitful aerospace career," he said. ▲

President Machen visits MAE

Prof. **Michael Braddock** explains to President Machen and Dean Abernathy how the Design and Manufacturing Laboratory fits into the MAE curriculum. The student designed and built Formula SAE race car is in the foreground.

Successful Kickstarter funds MAE student's ambition



Tim Elmore poses with a Filastruder.

When MAE Ph.D. student **Tim Elmore** launched his Kickstarter campaign, he set a $5,000 funding goal. If he was able to reach this target, he could keep the money for his project.

What happened in the first 61 minutes of the campaign blew him away.

His Kickstarter project was entirely funded in just over an hour. This rapid support forecasted the rest of the campaign, which garnered a total of $212,278 — more than forty times his goal amount — over the span of 30 days.

"Panic set in, mixed with excitement," Elmore said, "because I went from having to source and purchase 20 of an item to 500 of an item."

The item was the Filastruder, a machine that allows people with 3D printers to save money by making filament at home. Filament is the "ink" for 3D printers, and the Filastruder allows users flexibility by giving them control over how large the filament is or what color it will be.

Of the backers, 775 people chose pledges that received either a fully assembled Filastruder or a Filastruder kit. His customers are already starting to build upon the Filastruder concept. They're experimenting with different plastics and color gradients and creating things that have never been possible before.

"As a Ph.D. student and a person who is passionate about academia, it's always neat to see technology being carried forward," Elmore said.

He said the Filastruder is a cost-effective way to execute smaller-scale projects that even larger companies can benefit from. A variety of people and organizations have shown interest in the product: hobbyists, engineering companies, universities and even NASA.

But success didn't come overnight.

The original idea struck him when he was using his personal 3D printer for educational research. When he first started 3D printing, he made prototype parts for robots, test parts and animal figurines for his girlfriend, like ducks and giraffes. The technology fascinated him.

"It's pretty great as an engineer to have an idea, draw it out and have it in your hands that same day," he said. "That wasn't always possible."

It was during this time he realized how expensive this hobby was becoming.

He developed the first prototype in December 2012, which is now sitting on a workbench at his house. Since then, he's worked on perfecting the model, sending it out to 16 beta testers to get valuable feedback.

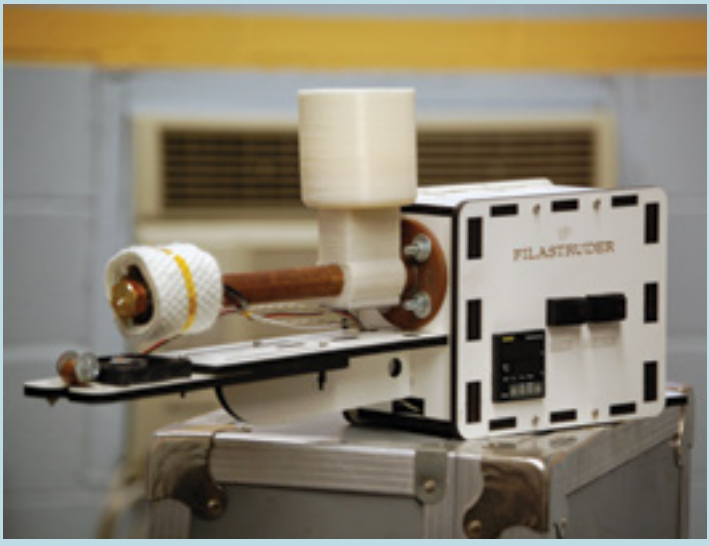
He launched the Kickstarter in March, and it's been a whirlwind ever since.

He said UF faculty members and students have encouraged him along the way, particularly his mentor Prof. **Scott Banks**.

"The University of Florida has been a huge blessing," Elmore said. "I have had countless opportunities to be challenged and to expand my toolbox during both undergraduate and graduate studies."

As Elmore worked to finish up his Ph.D. for December graduation, he saved time on weekends to ship Filastruder orders. So far, he's made sure all of his shipments have been on time, and it's a source of pride.

"The project certainly cut into my free time," he said, "but it's a fun adventure so far." ▲



STUDENTS

SwampSat, the satellite created by the Space Systems Group, launched on Nov. 19. Congratulations to Prof. **Norman Fitz-Coy**, his colleagues and his students! Credit: NASA/Allison Stancil

CONGRATULATIONS TO:

Mohammad Malakooti and **Sayan Banerjee** for receiving the UF Outstanding International Student Award.

Small Satellite Design Club for placing second in Community Outreach competition at the 2013 AIAA regional student conference.

The following 2013-2014 Gator Engineering Attribute Award Recipients: **Kyle Ham** (Integrity), **Tim Elmore** (Creativity), **Phillip A. Jannotti** (Integrity) and **Alison Dunn** (Professional Excellence).

Greg Parsard for placing second and **Phillip Jannotti** for placing third at the Society of Experimental Mechanics Conference's student competition.

Arthur Graziano for being awarded second place for the Best Poster Award at the Student Symposium on Health Professions.

Angela Diggs for winning a 2013 University Women's Club graduate scholarship.

Kyle Steiner and **Meghan Ferrall** for being named Tau Beta Pi Fellows.

Kathleen Hencke for being named the president of the Society of Women Engineers, UF Chapter.

Weian Sheng for being recognized as one of two IMECE MEMS Division "Best Paper" awards at the ASME conference.

Kyle Rowe for winning the second annual Layman Research Highlight competition, which was founded and run by Prof. **Rafi Haftka** and asks graduate students to write one page on their research that would be accessible and interesting to a layman without assuming more than an eighth-grade education.

UF UNP team on the right track for competition

The University Nanosatellite Program team at UF had a successful run at the Student Hands-on Training (SHOT) workshop in June.

The workshop, which was funded by the U.S. Air Force for those participating in the UNP, involved building a small satellite and launching it on a high-altitude balloon in order to collect data. Teams discovered what it takes to build a satellite to prepare for future steps in the competition.

"I learned a lot of things you don't get to learn until your upper-level classes," MAE junior **Seth Nydam** said. "It was a really good learning and team-bonding experience. I think it really helped us in the competition."

The overall competition involves two years of designing satellites in order to educate the next generation of satellite builders. The most recent competition review occurred on Feb. 18 when reviewers came to campus to assess the UF team's prepared presentations. Prof. **John Conklin** said the team was told the UF nanosatellite mission would make a strong candidate for this round of the UNP.

The competition will end in 2015, and if accepted, the UF team's satellite will be tested and launched.

Based on the SHOT results, the team appears to be on the right track. While other teams' satellites experienced difficulties like a loss of power or structural issues, the UF team's satellite acquired data throughout its flight.

"We got really good data," Nydam said. "Everything was exactly as you'd expect it to be." ▲

MAE participants in the SHOT workshop (from left to right) Seth Nydam, Paul Serra, Leopoldo Carro, Nathan Barnwell and Maria Carrasquilla, pose for a photo.

Students win RoboBoat competition

At the fall recruitment meeting for the Machine Intelligence Lab (MIL), students flooded the room. They sat in desks, stood in aisles and listened and watched from outside the door. They all wanted to hear what the MIL had to offer.

According to ECE Prof. **Eric Schwartz**, the associate director of the lab, students who participate gain skills not precisely available anywhere else at the university. They participate in major projects by joining the PropaGator, SubjuGator or CongreGators teams and learning how to design and develop robots.

A previous project, the InstiGator, was an award-wining autonomous lawn mower. However, when the students discovered the Annual ION Robotic Lawn Mower Competition would no longer take place, they didn't let that slow them down. They found a new competition to enter: the International RoboBoat competition.

Thus the PropaGator was born, but it didn't happen overnight. It took a little more than nine months and about 15 UF students to create this robotic boat. MAE participants included **Daniel Frank**, **John Phillips**, **Cory Penuel**, **Daniel Nowery**, **Mitchel Rabsatt** and **Laura Smith**.

The MAE students worked with participants from other departments to design mechanical, electrical and computer systems simultaneously to be ready for system testing in April. They used the skills they'd developed in their MAE courses and working on other MIL projects, and they were ready to compete in July 2013.

Their hard work turned their first year entering the RoboBoat Competition into a winning year.

"I was very proud that all of their hard work paid off in an immediately tangible way," Schwartz said. "Of course, whether we won or not, it will pay off again when they start looking for jobs and have the greatly expanded skills due to their design, construction, debugging and deployment of this very complex system."

For those interested in broadening their knowledge and robotics experience, visit www.mil.ufl.edu/propagator for more information. ▲

UF alumnus teaches importance of engineering analytical skills

During MAE alumnus **Erik Sander's** (BSME, 1984) career, he realized the skills engineering students learn aren't only productive within their research areas.

"A big part of engineering education is the development of analytical skills," he said, "and in my experiences in companies and entrepreneurial ventures, I really learned the power of those analytical skills."

He said these capabilities translate well to other professional areas, particularly in business.

"Most of business is about identifying problems, understanding problems, and solving problems," he said. "In my mind, there's no substitute for an engineering education for developing the analytical skills that allow you to do that."

He tells this to his current students every day — students who are participating in the UF Engineering Innovation Institute. Sander has been the founding director of the institute since 2011, and he currently teaches one if its four courses: Engineering Entrepreneurship.

He enjoys helping students equip themselves for a workforce that better understands the power of engineers as innovators. He said students today can have an almost instantaneous effect on markets that they couldn't have when he graduated from the university.

The institute was created to build a culture of innovation among the faculty and to prepare students to be innovative leaders. There are currently 730 students enrolled, and their classes focus on providing education in a real-world context. Part of this involves bringing in more than 30 guest lecturers per semester, from CEOs of start-up companies to presidents at large, established corporations.

"The only way we could really serve our students is to bring experience into the classroom," Sander said. "What we try to do is get the students to understand that they're really competing in a whole new world. Being a leader, being an innovator, involves a set of skills that are learnable that they can exercise."

On the faculty level, the institute works to help professors develop and execute proposals for research opportunities that have innovative components to them. The institute does whatever's possible to create ways students can participate and explore their innovative drives.

And on an even bigger level, the institute contributes to the state's economic development by building up the innovation economy. Florida has always relied on tourism and agriculture, Sander said, and while they continue to be important, Florida is also diversifying and becoming a technology pioneer.

Before helping others develop their innovative pursuits, Sander explored his own. He's worked on a variety of projects for several different organizations, including NASA, General Electric, Pratt & Whitney and Lockheed Martin. He also began and grew several companies, gaining extensive entrepreneurial experience.

But when he heard about an opening at UF, he had to go for it.

"I always had this passion in my heart for the university," he said. "That's part of being a Gator."

Before becoming involved with the UF Engineering Innovation Institute, he held other positions related to promoting entrepreneurial endeavors. He's enjoyed working at his alma mater, where he earned a bachelor's degree in mechanical engineering in 1984.

"There's a tremendous feeling of satisfaction, because I owe the college of engineering a lot for what it did for me," Sander said. "There's a lot of satisfaction knowing I have the opportunity to give back to the next generation."

Soon, the dean of the college decided there was a need for the work Sander was doing on a college-level, which is what sparked the creation of the institute.

"I literally come to work every day, and I get to deal with some of the brightest people in the world, both faculty and students, and that gives you a level of satisfaction you can't get anywhere else," he said.

To him, there's nothing better than teaching at the school that taught him so much.

"I start every semester telling the students, 'Now, I've done a lot of things in my life, but most importantly, I'm a Gator,'" he said. "I'm a Gator engineer." ▲

Astronaut **Kevin Ford** (left) and Prof. **David Hahn** (right) pose with Ford's 2010 Outstanding Alumnus Award. Ford gave a guest lecture to a standing-room-only crowd on Nov. 7, 2013.

Kevin Ford speaks with MAE students following guest lecture (above) and presenting mission patch from ISS Expedition 34, where he served as mission commander.

CONGRATULATIONS TO:

Mauricio Guadamuz (BSAE 1999), who's been selected to receive two national awards: the Mexican American Engineers and Scientists Virtuoso Award for 2013 and the Latinos in Information Sciences and Technology Association Rising Star Award for 2013.

Recent MAE graduates contribute to key lab courses

The lesson began with a smartphone.

Ira Hill (MAE B.S. & Ph.D.) took a cell phone and downloaded its accelerometer data onto a computer. He planned to use the accelerometer — the part of a smartphone that detects tilt and movement — to help explain the concept of filtering to his students in the Controls Lab.

With the accelerometer information on his computer and the phone on his desk, he slammed down his fist near the phone. The accelerometer identified the noise and determined the phone was in motion, even when it was sitting still on the desk.

This is where the filtering comes in — the class coded a filtering method to reject the noise, so when Hill's fist hit the desk this time, the accelerometer didn't register any phone movement.

Exercises like this one demonstrate the way Hill incorporates hands-on experiments in the classroom, hoping to physically implement concepts students have learned in previous courses.

The classes also require students to implement experiments on their own, according to MAE Lecturer **Shannon Ridgeway**, who oversees the Controls Lab and the Mechanicals of Materials lab.

"Both labs reinforce the concepts the students bring to the class from their course work," he said.

Both labs are also currently instructed by MAE Postdoctoral Teaching Scholars, both training to pursue academic careers.

Hill is in his second semester instructing the lab. His next step is to find a post-doc opportunity. He said with the teaching experience he's gained at UF and the research experience he'll gain through a post-doc, he'll be prepared to become a professor.

"Teaching is not easy," Hill said. "My respect for teachers

MAE Postdoctoral Teaching Scholars Alison Dunn (left) and Ira Hill (right) pose for a picture in a lab.

has grown exponentially. I have my favorite textbooks in my office, and that stuff is great, but it can be hard for students to digest."

That's why he tries to make lessons engaging and accessible. Every semester, the lab involves a final project, and he said there are three unwritten rules for determining the assignment: It has to be hard, it has to be a little bit "dangerous," and it has to be fun.

One semester, students created Lego segways that could balance themselves and drive around using Bluetooth control. Often times, Hill's projects involve elements students have physically seen before but may not have given much thought to.

"It's about finding creative ways to communicate the information," Hill said, "because a lot of time it makes sense in your head but not for 155 students."

Alison Dunn (MAE B.S. & Ph.D.), who teaches the Mechanics of Materials Laboratory, said the hands-on nature of these labs is highly beneficial for students, as they can use the practical experience they gain in these classes as examples when interviewing for jobs and internships.

"Students feel a lot more confident that they'll get a job and succeed and be an engineer," she said. "Some of the best rewards are when students come back and say, 'I used this knowledge in my internship.'"

The MoM lab involves executing an engineering measurement and presenting the results in a professional format. It has countless practical applications within mechanical and aerospace engineering.

In her 168-person lab, she's noticed that good questions arise every time the class meets.

"I've learned that the students are smart, and they'll keep you on your toes," Dunn said. "It helps me to solidify my knowledge of the material, as well, and I like that aspect of it. It's going to help me in everything that I try to teach in the future — that I have to prepare really well because I'm teaching smart people new things."

Dunn discovered her passion for teaching when she was overseas with the Peace Corps. She taught English to Chinese college students, and the experience inspired her to pursue a professional field in conjunction with education when she returned to the U.S.

Her next step is to become an assistant professor so she can continue empowering future engineers. Her hope is to teach labs similar to Mechanics of Materials while also teaching background theory classes so she can help students build a complete set of skills.

"The experience teaching the lab has been invaluable to me," she said. "The combination of teaching and research has given me a glimpse of the great opportunities in academia." ▲

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on the market so it can be purchased by clinics around the world. Before starting final production of the knee, D-Rev will send representatives to four countries and conduct trials of the product. D-Rev makes the users its highest priority, Hamner said, and the goal is to see if the knee would be effective for them.

Hamner loves the opportunity to work with patients in the field.

"It's so inspiring to see people's motivation and their willingness to keep going and figure things out and celebrate their lives no matter what the circumstances," he said. "It's inspiring to meet folks and be reminded face-to-face why I'm doing this work."

Being able to see the influence of D-Rev's accomplishments is part of the reason he moved into the non-profit sector.

"Within years, we're going to see the effect of the work," he said.

However, the work isn't easy. He learned his career would be much different from addressing the straightforward problems he encountered in engineering school.

"A lot of the big challenges in the world are not well-defined, and there are a lot of different stakeholders, so it can get pretty complex," he said.

But challenges don't keep him from loving his position, as it's an intersection of his educational specialty and his personal passions. For current students who may have similar ambitions, he recommends they look into organizations like Engineers Without Borders. He's thankful he was able to explore so many different topics at UF and credits the college with helping him launch his career.

"Finding ways to see how you can use your engineering skills to do what you're passionate about is so important," he said. ▲

ACKNOWLEDGEMENTS

MAE Annual Honor Roll 2012 – 2013

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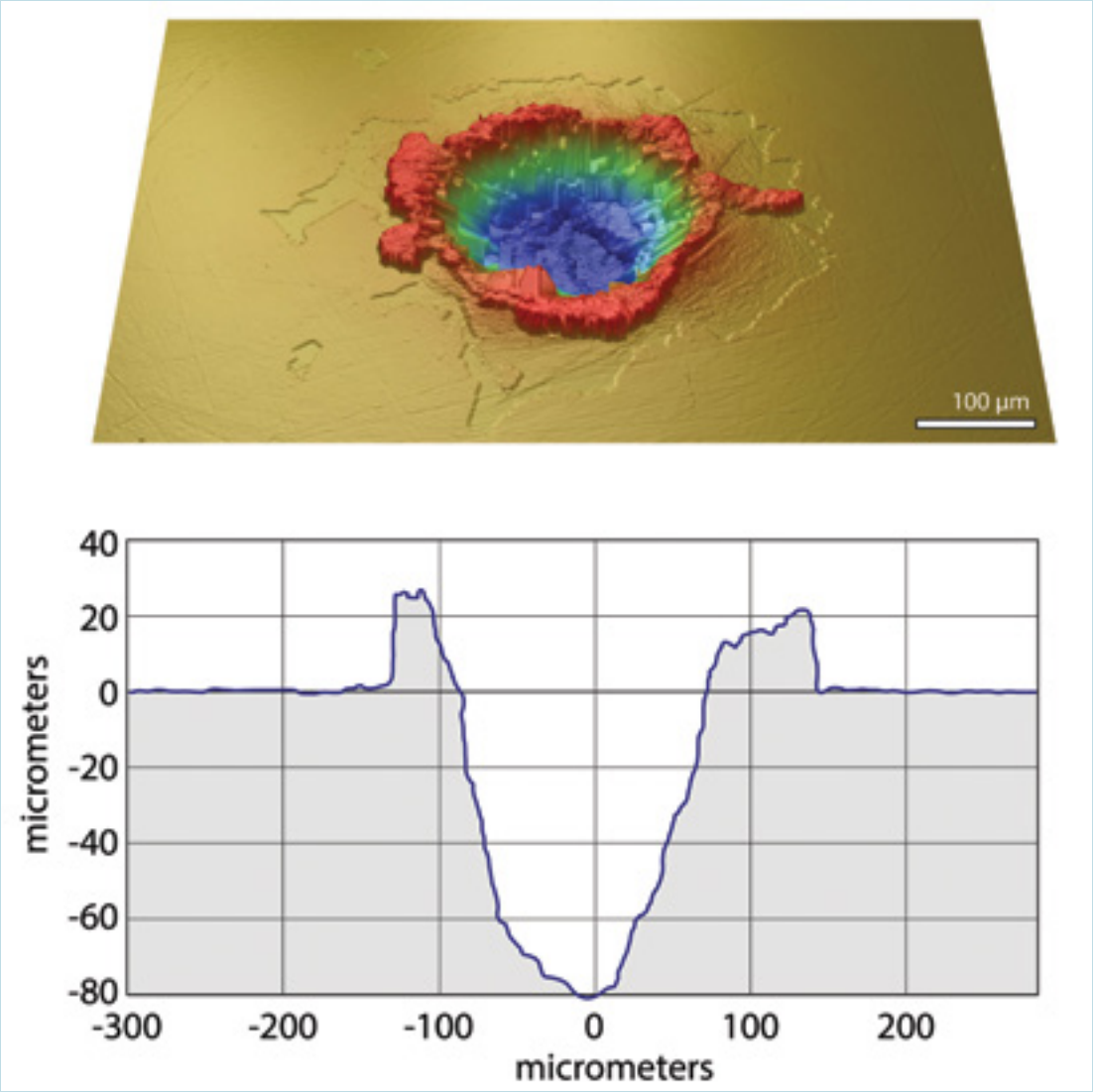

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Scott Banks
Faculty Coordinator

Amanda Milligan
Managing Editor

David Hahn
Department Chair
dwhahn@ufl.edu

Department of Mechanical
& Aerospace Engineering
University of Florida
231 MAE-A, P. O. Box 116250
Gainesville, FL 32611-6250
352.392.0961

www.mae.ufl.edu

UF UNIVERSITY of FLORIDA

Department of Mechanical & Aerospace Engineering
231 MAE-A, P. O. Box 116250
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