



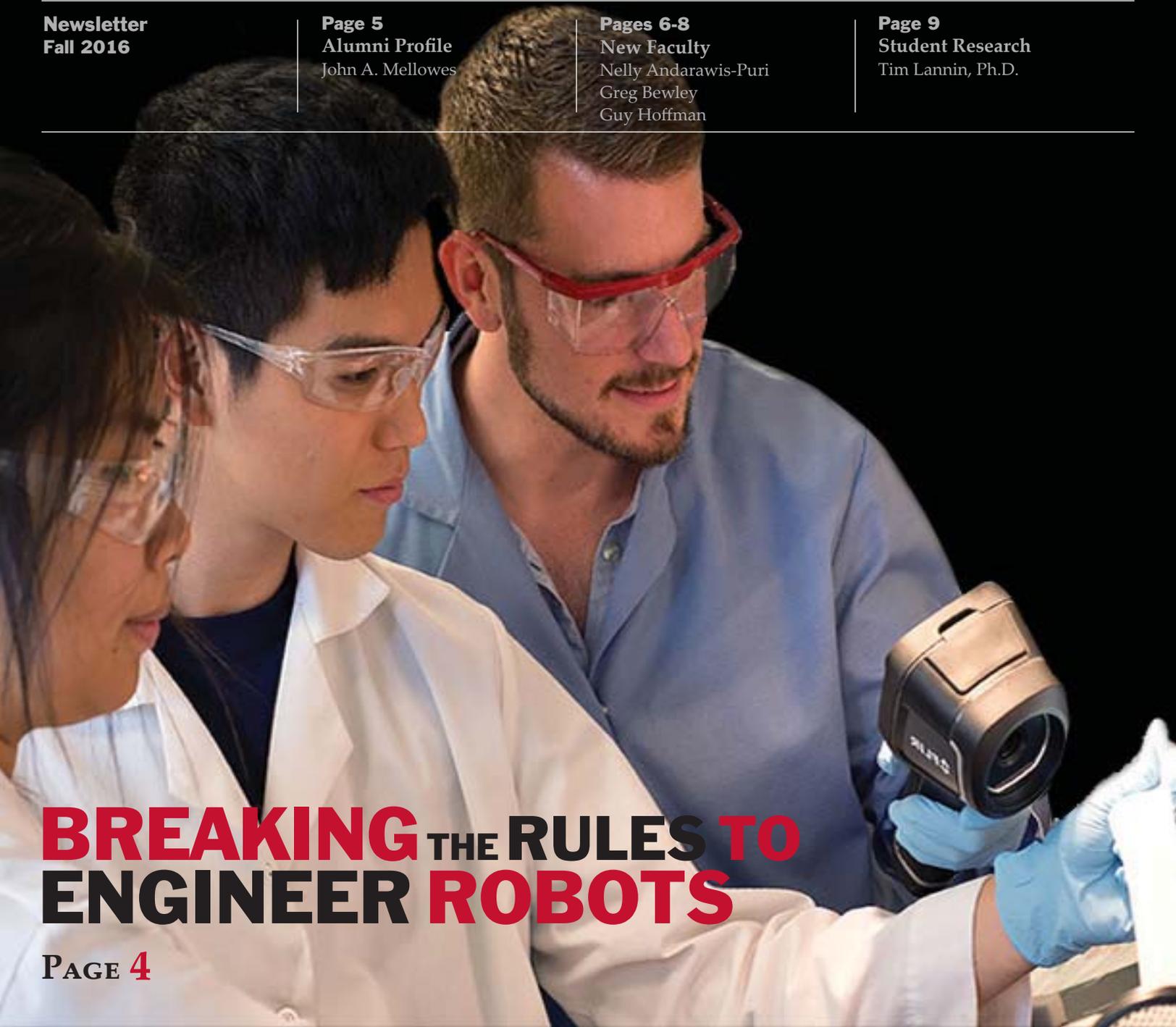
MMAE

**Newsletter
Fall 2016**

Page 5
Alumni Profile
John A. Mellowes

Pages 6-8
New Faculty
Nelly Andarawis-Puri
Greg Bewley
Guy Hoffman

Page 9
Student Research
Tim Lannin, Ph.D.



**BREAKING THE RULES TO
ENGINEER ROBOTS**

PAGE 4

MESSAGE FROM THE DIRECTOR



Dear Sibley School Alumni and Friends:

Welcome to the (almost complete) new home of the Sibley School! After several years of planning, construction started on Upson Hall floors 3-5 in May of 2015, and we have been living in the zone since then. I must say this was not without challenges, since most of the construction was in the floors over our head and some days the dust, fumes or final piping installation led faculty and staff to work elsewhere. We even had our windows boarded up all year. Finally, in August of 2016, most faculty, their research labs, Ph.D. students, M.Eng. students, and a few staff members moved to the upper floors. While there is still work to be done, the new space is tremendous. Not only are the research labs state-of-the-art, but there is a lot of common space at the corner “bump outs” which students are already using for collaborative discussions or simply a coffee.

We have one year left on the project. The MAE administration has moved to the first floor of Rhodes, which will be our temporary headquarters until our final move in August 2017. The construction team is currently cleaning out the lower floors; luckily, most of the electrical and ductwork was installed in its final position and thus this phase should be quicker. In the end, the basement will house the project teams with expanded space, the expanded Rapid Prototyping Lab, and the Emerson Machine Shop. The first floor will house the

MAE administration, a new and improved Upson Lounge (which we could never do without), and a few classrooms. The second floor will house the MAE teaching labs, including the Taylor Design Studio. Overall, we are immensely excited about the new space, and what it means for the students and faculty and future of the Sibley School. You'll find a few pictures and details on pages 17-19. Please stop by as you can to see our progress or keep tabs through this link: <http://www.engineering.cornell.edu/about/upson-hall-renovation.cfm>

While our world-class faculty excel at research in many ways, they also continue to strive to be the best educators. This past year, we have seen many faculty continue to innovate with their teaching. A group of faculty re-thought the Solid Mechanics series to both integrate experiential learning and use modern teaching methodologies; the highlight is the revamped ENGR 2020 course, based partially on the flipped classroom concept by Meredith Silberstein and Hadas Ritz. Mason Peck, Dmitry Savransky, and Dani Selva created a new two-course space systems sequence. Mason also announced at the White House Astronomy night with President Obama, a new CubeSat program for high school students. A number of faculty worked with Engineering Communications to create a novel pilot class which partners with our sophomore design course; the same concepts are then re-emphasized in courses later in the junior and senior years to improve students' ability to take communications directly into their next steps. Rebecca Barthelmie created and delivered a new, hands-on course at the Black Oak Wind Farm Community using an Engaged Cornell award. Rajesh Bhaskaran delivered a MOOC based on the simulation work he leads with the Swanson Lab. With over 25,000 participants, it was the largest MOOC from Cornell. More details on the MOOC and Rajesh are on page 3.

On the faculty front, we welcomed three new professors. Their profiles are on pages 6-8. Nelly Andarawis-Puri works on the biomechanics of tendons and ligaments, and she will help enhance our collaborations with the Hospital of Special

Surgery (HSS) in New York. Guy Hoffman designs new robots to collaborate with people. Greg Bewley is an expert in experimental fluid dynamics, and will work with a variety of experiments including the Warhaft wind tunnel. Moreover, speaking of the latter, Professor Zellman Warhaft retired this year after 39 years on the faculty. Zellman provided passion about a wide variety of topics, from fluids to energy to climate to peace studies; we look forward to his continued work with us. And finally, we are sorry to report that Professor Tob de Boer passed away. Tob led an amazingly balanced life between research, education, family, and activities such as cross-country skiing and triathlons. We will miss him.

We also highlight Rob Shepherd and his unique Organic Robotics Laboratory (ORL), which is growing and making broad impact in multiple communities; Rob was also a recent recipient of an AFOSR Young Investigator award. Similarly, Ankur Singh won an NSF CAREER award. Olivier Desjardins led a team that won a new \$7.5M ONR MURI project on multiphysics control of spray formation and dispersion. You will find a list of other notable faculty accomplishments later in the newsletter.

Our alumni spotlight this year is John A. Mellowes, '60, B.M.E. '61, who followed both his father and grandfather in studying at Cornell. John worked most of his life including as CEO, for Charter Manufacturing, a fourth generation, family-owned and operated producer of steel bar, rod, wire, and wire parts in Milwaukee. John and his wife Linda created an endowment for the John A. Mellowes '60 Professorship in Mechanical Engineering, which I am immensely honored to have been named as the first.

The newsletter includes updates from reunion, project teams and a profile of one of our Ph.D. students, Tim Lannin. Please keep in touch with us about your news and successes through the Alumni link off our website or simply a quick email to mae_alum_news@cornell.edu. We look forward to hearing from you.

Warm regards,

Mark Campbell

MASSIVE OPEN ONLINE COURSE ON ENGINEERING SIMULATIONS

In June 2016 the Sibley School offered its first Massive Open Online Course, or MOOC. This free online course was developed and taught by Dr. Rajesh Bhaskaran, senior lecturer and Swanson Director of Engineering Simulation. It was entitled “A hands-on introduction to engineering simulations” and was offered at edX.org, a popular MOOC platform. The course did not offer Cornell credit but interested participants can obtain a verified certificate of

with commercial FEA/CFD software use and industry know-how. This helps students move beyond mere button pushing and connects what they do in the software to fundamental math and physics.” The course was six-weeks long and drew content from five MAE courses, presenting a uniform approach across solid mechanics, fluid dynamics and heat transfer.

Video lectures covered the math and physics background as well as steps in the ANSYS interface. Most videos were around

5 minutes long and were recorded in a self-recording studio which consisted of a computer attached to a camera and tablet.

The camera recorded Dr. Bhaskaran speaking or writing. The tablet served as an electronic chalkboard with which Dr. Bhaskaran was able to write freehand over PowerPoint® and ANSYS. This set-up

overlays the “chalkboard” PowerPoint and ANSYS so that one can seamlessly combine these modalities of instruction. The online lectures were rated as exceeding expectations by nearly 80% of the students. Assessment consisted of “check your understanding” questions (which followed selected lecture videos) and homework assignments where students solved new problems using ANSYS.

One of the modules—analysis of a bolted flange joint—was developed in collaboration with Mr. Andy Sadhwani, an aerospace engineer at SpaceX, who uses ANSYS-based simulations in his design work. In a recorded Skype conver-

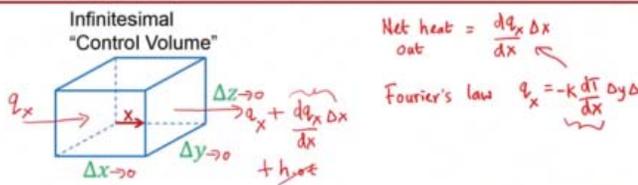


Rajesh Bhaskaran, Sr. Lecturer and Swanson Director of Engineering Simulation

sation with Dr. Bhaskaran, Mr. Sadhwani described how he developed the ANSYS model from the real application by making assumptions and simplifications and how to interpret the ANSYS results. The students greatly appreciated hearing directly from an industry expert as they were working with the tool.

Over 25,000 people from 167 countries registered for the course. Of these, around 9,000 people were active with nearly 1,600 completing the course. The educational background of the participants varied from a high school degree or less to a Ph.D. Due to popular demand, the MOOC will relaunch on edX in the latter part of 2016 as a self-paced course which students can start and end at any time. Dr. Bhaskaran is excited about the future prospects of this initiative. “This will change my teaching by helping me flip the classroom. With lectures online, I can use class time to help students complete homework and apply their knowledge. I see this as an opportunity to move from lecturing to mentoring in the classroom.”

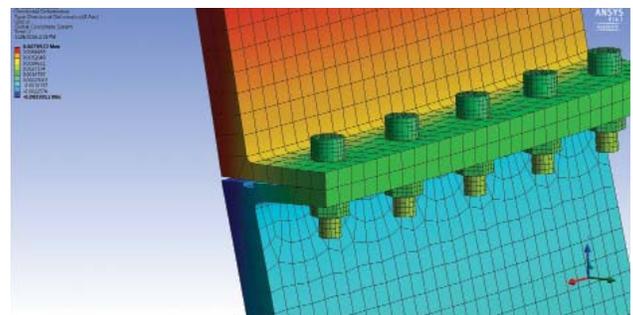
Energy Conservation for an Infinitesimal Control Volume



Using a tablet and stylus, Dr. Bhaskaran writes on a virtual blackboard in a video lecture.

completion for a nominal fee. The MOOC was an initiative of the Swanson Engineering Simulation program which supports the integration of simulation tools into MAE courses. The Swanson program was established through a gift from Dr. John A. Swanson, B.S. '61, M.Eng. '63, ME.

The course taught students the big ideas in finite-element analysis (FEA) and computational fluid dynamics (CFD) as well as how to apply them to solve practical engineering problems using ANSYS®, a commercial software package. All participants had access to a free download of ANSYS Student. Bhaskaran says, “By combining two disruptive technologies—online learning and physics-based simulations—I was able to break the rules and create a new kind of course that seamlessly integrates fundamental math and physics



A sample result from the bolted flange module developed with industry expert Mr. Andy Sadhwani.



Robert Shepherd, Assistant Professor

Professor Robert Shepherd heads the Organic Robotics Laboratory (ORL), where his group of MAE and MSE students are focused on creating new machines, materials, and manufacturing processes with the goal of making robots more lifelike. His primary method for achieving this goal is soft material chemistry: elastomeric polymers that feel like our own skin and muscle.

Most organisms have sensory networks that feel their environment and allow them to make intelligent decisions about how to adapt to them for reproduction and survival. One of the most impressive feats of adaptability in nature is seen in an octopus, where their entirely soft bodies dramatically change shape and color for camouflage and display. By setting ORL's

BREAKING THE RULES TO ENGINEER ROBOTS

goals on synthetically mimicking the abilities of an octopus, large leaps can be made in the capabilities of robots in general. Some of the results of this work are highly stretchable displays and very non-octopus like robotic systems like orthotic gloves and heart-like pumps.

In order to achieve this goal, Shepherd and co-workers are cointegrating stretchable networks of sensors, actuators, displays using advanced manufacturing techniques such as replica molding and 3-D printing,

and advanced materials such as transparent and stretchable optoelectronic systems. For example, one of their inventions is a glove that can be worn to assist in tasks such as grasping everyday objects.

Recently, Shepherd was awarded an Air Force Young Investigator Award to use these new sensors and actuators for morphing wings that can change their planform area and angle of attack. As a first

example of a morphing wing, Shepherd and co-workers are molding wings out of elastomeric foam that can change their shape. The next steps are to incorporate optoelectronic sensors for feedback control and sensing of the dynamic pressure states of their local environment.



Ph.D. students Ben Mac Murray (left) and Shuo Li (Right) work on soft actuators, sensors, and displays for biomedical robotic devices like Ventricular Assist Devices for ailing hearts or prosthetic interfaces for human hand replacements.

At Cornell University, Shepherd is enjoying collaborations with many faculty who are bringing this work to the next level: intelligent systems that can process sensory information and use it for advanced mobility and manipulation tasks. Across departments, Shepherd is also improving the material properties and manufacturing of these soft robots with nanoparticle chemistry and new synthetic chemistries.



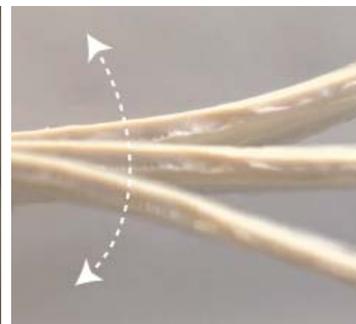
A multicolor stretchable display that can also sense touch.



A wearable orthotic glove that assists in grasping.



A heart shaped pump composed of elastomeric foam actuators.



A morphing wing for microaerial vehicles composed of elastomeric foam actuators.



John A. Mellows graduated from Cornell University with a B.M.E. in Mechanical Engineering. He was named Entrepreneur of the Year in 1987 along with his grandfather—Alfred Mellows (class of 1906), and his father—Charles N. Mellows (class of 1933). Following graduation, he served 3 years in the U.S. Navy as a Lieutenant (jg). In 1965, following in his father's footsteps, Mellows joined Charter Manufacturing. He states, "I had two professors at Cornell that furthered my interest in Materials Science, Jack Moynihan and Joe Jeffries. It was this heightened interest that helped drive me into steel making at Charter."

Charter is a fourth generation, family-owned and operated producer of steel bar, rod, wire, and wire parts. He was named Chairman and Chief Executive of Charter Manufacturing at a time when the American steel industry was in a major meltdown. It was 1980, and the collapse resulted in the closure of mills and the loss of thousands of jobs. Not long after, however, the Mequon, Wisconsin based company regained its footing and continued with growth that has resulted in its becoming one of the nation's largest specialty steel manufacturers with 12 plant locations in the U.S., China and United Kingdom, and

which employs a workforce of over 2,000. Annual sales for Charter Manufacturing are \$1.3 billion. Mr. Mellows served as Chairman and CEO from 1980 to 2013 before passing the leadership to his sons—Charles, M.B.A. JGSM '96, now Chairman of the Board and Executive V.P. of Business Development and John W. who is the Chief Executive Officer.

Mellows also serves as a member of the Board of Directors for the Milwaukee School of Engineering. He was a member of the Metro Milwaukee Association of Commerce and the Greater Milwaukee Committee and is a member of the World Presidents' Organization. He was honored by the Harvard Business School Club of Wisconsin as the 2014 Wisconsin Business Leader of the Year. The award honors business leaders for their impact through their company's performance as well as the impact the company and its leader have had through community and civic involvement.

There are two professorships gifted to Cornell by the Mellows. The Charles N. Mellows Professorship in

Engineering, named in honor of John's late father, established in 1990; and the John A. Mellows '60 Professorship in Mechanical Engineering, established in 2014 in honor of John's 75th birthday.

"I WAS ALWAYS INTERESTED IN MACHINERY AND LIKED BIG MACHINES. MY DAD DID A GOOD JOB, THROUGH OSMOSIS PERHAPS, OF GETTING ME REALLY INTERESTED IN WORKING IN THE FAMILY BUSINESS"

John and his wife Linda reside in Milwaukee, Wisconsin and are very committed to their community. Linda has long been a tireless community volunteer leader and a prodigious fundraiser in the Milwaukee area where her efforts have benefitted countless nonprofits. They have two sons and eight grandchildren. John's special interests include railroads, golf, U.S. History, and European History.



Charles Mellows, John A. Mellows, Linda Mellows, and John W. Mellows

WELCOME NEW FACULTY

Nelly Andarawis-Puri Assistant Professor



By: Chris Dawson, Cornell Engineering

Nelly Andarawis-Puri's work in tendon research is in the sweet spot where basic mechanics and clinical relevance overlap completely. Andarawis-Puri is a Clare Booth Luce Assistant Professor of Mechanical and Aerospace Engineering and a Nancy and Peter Meinig Family Investigator in Life Sciences in the Sibley School of Mechanical and Aerospace Engineering at Cornell, and looks at the role of the extracellular matrix (ECM) of the tendon in injuries and in healing.

Tendons are tough bands of connective tissue that transmit forces from the muscle to the bone. Tendons and muscles work together to move bones. The hamstring and the Achilles tendon are the most well-known, but tendons also help move your eyes (ocular tendons), your jaw (masseter tendons), and your toes (lumbrical tendons). Injuries to tendons are notorious among athletes for both the pain they cause and the tenacity with which they hang on.

For such common injuries, not much is known about some basic questions. Researchers don't know the mechanisms for how ECM damage accumulates in tendons; they don't know how larger ECM deformations are translated into cell signals in tendon healing and degeneration; and they don't know how to promote restoration of tendon and joint function. Andarawis-Puri is working to answer all of these questions.

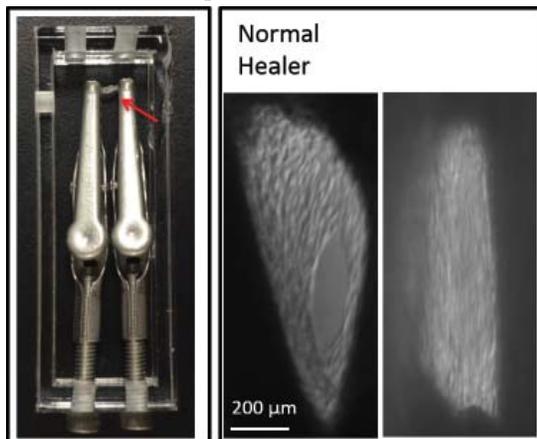
Andarawis-Puri moved from Cairo, Egypt to the United States when she was nine years old. She picked up English very quickly and became enamored with languages—so much so that through high school she assumed she would major in linguistics once she got to college. "But then I got to Columbia and discovered biomedical engineering," says Andarawis-Puri. "My undergrad experience with biomedical engineering was eye-opening and I went all in. I knew early on I wanted to continue and get a Ph.D. and go into academia."

For Andarawis-Puri, the subject matter of biomedical engineering was fully engaging, but there was also the quality of the people she met and worked with. "It always comes back to the people for me," she says, "People are what make the experience." Professor Clark Hung at Columbia, Dr. Louis Soslowsky at the University of Pennsylvania, and Dr. Evan Flatow at the Icahn School of Medicine at Mount Sinai Hospital have all served as mentors and inspiration to Andarawis-Puri.

After Columbia, Andarawis-Puri earned her Ph.D. with Soslowsky at the University of Pennsylvania. "He is a giant in the field of tendon bio-mechanics and he has been a great mentor to me. My Ph.D. was focused very much on the mechanics of tendons in the rotator cuff of the shoulder." This work positioned her well to then move into clinical applications of what she had learned. Andarawis-Puri landed a postdoctoral position with Flatow at Mount Sinai. "He is one of the top shoulder surgeons in the world and I learned a lot from working with him. My time with Dr. Flatow provided the basis for my current research at Cornell."

Tendon injuries and tendon surgery both leave scar tissue that is mechanically inferior to tendon tissue. Andarawis-Puri hopes her work will have immediate applications in the treatment of tendon injuries. Left to its own devices, an injured tendon will repair itself, but when it does, the repaired area is just not as good as it was before the injury. One focus of Andarawis-Puri's research is how to promote regenerative healing—healing that is scar-free and restores original tissue properties.

Andarawis-Puri is an assistant professor in a school of engineering rather than in a university research hospital because, at heart, she takes an engineering approach to the problem of tendon injury and pathogenesis. She has adopted a multidisciplinary approach that incorporates biomechanics, biology, imaging, and mathematical modeling and Cornell Engineering provides the ideal setting for this approach. "When I was invited to visit and check out the department I honestly wasn't really looking to move," says Andarawis-Puri. "But then I got here and met the people and I was really taken with the department. It is full of impressive, accomplished people who are also really nice. This is a perfect place for me to continue my work."



(A) Organ culture system to investigate defect fill-in outside of the systemic environment. The red Arrow shows a cultured tendon. (B) After 28 days in culture, normal healer tendons do not fill in the defect, but regenerative healers fill in the defect with well organized and aligned matrix.

Gregory Bewley Assistant Professor

Greg Bewley joins the same Sibley School from which he graduated in the year 2000. As an undergraduate he designed and built composite acoustic guitars and composite wings for a sailboat among other things, all the while developing an interest in fluid mechanics. He carried this interest to Yale University, where he was awarded a Ph.D. for discovering how to observe experimentally the quantized vortex dynamics of turbulent superfluid helium. He continued his work on superfluid turbulence at the University of Maryland, until an opportunity to return to classical fluid mechanics research carried him across the ocean to the Max Planck Institute for Dynamics and Self-Organization in Göttingen, Germany. In Germany, Bewley developed methods to reveal the basic structure and dynamics of turbulence, and also learned to appreciate the life that arises in the interaction between turbulence and bodies that tumble through it.

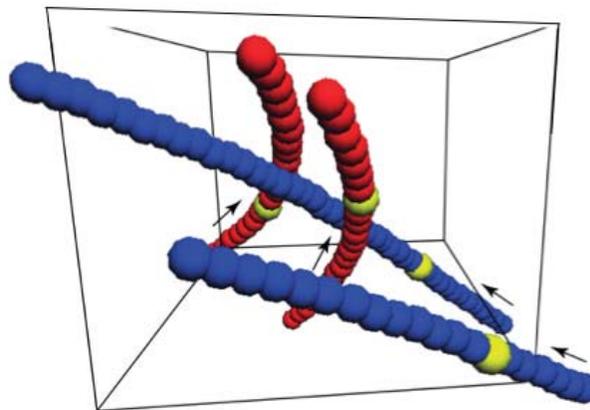
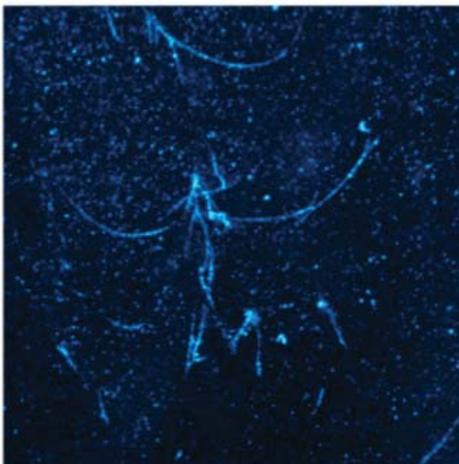
The intrigue of turbulence is that it is ubiquitous and essential, and yet seems resistant to explanation. Consider the unsteady wake produced by drawing a spoon through coffee in a cup. After removing the

spoon, for how long does the chaos in the cup persist? If we model the initial perturbation as a sinusoidal variation in the velocity of the fluid, we find from the equations of the motion that its amplitude decays exponentially. This is in some sense fast, but the time constant is typically long—much longer than what we observe. In the case of the coffee, the prediction is some minutes—too long. What happens is that the perturbation is usually not stable. The flow breaks up and complicated, evolving spatial structures emerge. This is turbulence, and it is very effective at draining energy from the disturbances. The coffee quiets down in seconds, not minutes. However, we are still unable to predict how quickly turbulence in a fluid decays, even in the idealized case where the motions are statistically homogeneous and isotropic. This is startling and calls for careful investigation. While the specific question of how quickly turbulence decays may seem specialized, it invites the mind into the world of inquiry that makes up turbulence research.

At the Sibley School, Bewley's work continues to focus on turbulence, on its intrinsic properties as well as its role in various environmental settings. In clouds, turbulence causes droplets to collide, but how often, and how violently? In superfluid helium, it causes quantized vortices to reconnect, but under what conditions? Left to itself, the turbulence quickly dissi-



pates and disappears, but how quickly and can we regulate it? In large part, Bewley's work is to make phenomena such as these accessible to controlled experimentation through the invention of new devices and techniques. What underlies his work is a search for simple, innovative designs leading to new perspectives on fundamental questions.



On the left is a picture of quantized vortices decorated with frozen hydrogen particles a few microns in diameter. The dynamics of such vortices might explain the glitches observed in the rotation of neutron stars. On the right is a reconstruction of the trajectories of 20 micron water droplets that underwent slinging motions in a turbulent flow. These types of motions can lead to violent collisions between the droplets, and to rain.

WELCOME NEW FACULTY

Guy Hoffman Assistant Professor



By: Chris Dawson, Cornell Engineering

If Guy Hoffman is successful in his research, he just might redefine the word “robotic.” Hoffman, Assistant Professor and a Mills Family Faculty Fellow in the Sibley School of Mechanical and Aerospace Engineering, works in the field of human-robot interaction. During his popular TED Talk, Hoffman said to the audience, “Somewhere in your future there will be robots in your life. And those robots should be more fluent, more engaging, more graceful” than the robots of today.

Hoffman has studied computer animation and acting in addition to computer science and human-robot interaction. Robots that interact closely with humans should be “less like chess players and more like stage actors or musicians,” he says. “They should know how to closely mesh with humans, be able to take chances and improvise. Maybe they even need to be able to make mistakes.” Given that for many years the big selling point for robots has been their ability to perform tasks quickly, correctly, and predictably, robot improvisa-

tion and imperfection is a radical idea.

Hoffman has joined the faculty at Cornell because, in his words, “My work is very interdisciplinary and Cornell has hired some amazing robotics people across a wide range of fields. In fact, there is no other university I can think of that has this many researchers specifically working on human-robot interaction. Importantly to me, Cornell is also not just an engineering school. It is a great liberal arts university with a strong intellectual environment in the humanities, social sciences, and design.” It helps that the newly renovated Upson Hall has a dedicated Robotics Center on the top floor.

Hoffman grew up in Germany and Israel and then came to the United States after earning his master’s degree in computer science from Tel Aviv University in 2000. After stints in film production, cell phone network technology, data visualization, and animation, Hoffman applied to a Ph.D. program in Cynthia Breazeal’s Personal Robots group at the MIT Media Lab. He was accepted and began to focus on robot movement and robot-human interactions. “After working on a humanoid robot, I felt strongly that a robot does not have to look like a human to make a good companion,” says Hoffman. “Merely the way a robot moves can make humans develop strong emotions toward it.”

The robots Hoffman is most interested in are the ones that will be in our houses and offices rather than the sort currently found on factory floors. His list of research

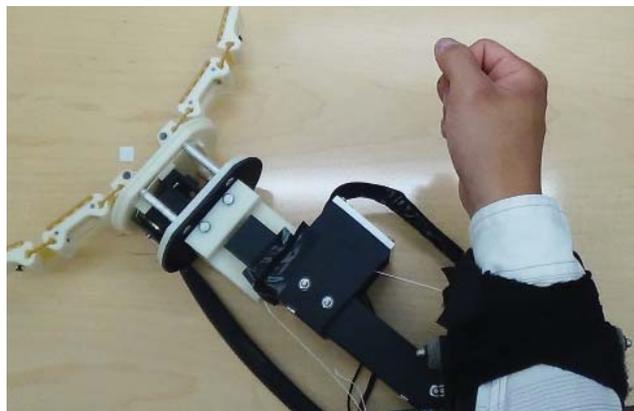
interests includes the structure of joint activities between humans and robots; human-robot teamwork and collaboration; robotic personal companions; non-anthropomorphic robot design; computational models for embodied cognition; robot music and theater performance; and robot improvisation.

Hoffman sees a future where humans and robots will find themselves working together on tasks that require cooperation. He has been working with psychologists, among others, to create a behavioral model of what humans would look for in a good robotic companion. “Surprisingly, people are not always happy with a robotic teammate who is entirely rigid and predictable,” says Hoffman. “People value flexibility, even in a robot. It can be delightful to be surprised.” One major question Hoffman will need to answer is ‘how does a robot balance initiative and flexibility with reliability?’

When describing the type of graduate student he would like in his lab, Hoffman says that there is no single profile he is looking for. “I see myself as an educator as much as I am a researcher. You can teach any skill, but you can’t teach curiosity and passion—these are the essential ingredients for any grad student. I am looking for students who always strive to push their own boundaries of comfort.”

When Hoffman is not thinking about human-robot interactions he enjoys running, drawing and cooking.

A wearable robotic forearm developed by graduate student Vignesh Vatsal to evaluate how people interact with robots that are attached to and controlled by their body.



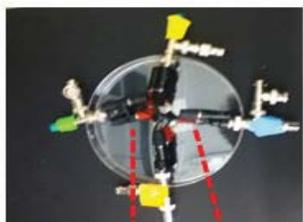
Tim Lannin MAE Ph.D. Student

Cancer can devastate lives, and pancreatic cancer is particularly problematic because it is often detected only after it has spread from the primary tumor site. Cancer cells often appear in the bloodstream of cancer patients when their cancer is in the process of spreading. It is unknown if these circulating tumor cells are the cells that form the secondary tumors, but regardless, building devices to capture these cells can aid doctors and researchers. For example, capture and analysis of the cells can help measure the severity of a patient's disease, assess effectiveness of the patient's chemotherapy, and personalize chemotherapy treatment.

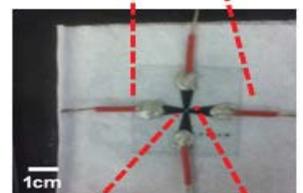
These circulating cancer cells are exceedingly rare, numbering about 1-100 per milliliter of blood, compared to 1 billion blood cells. If even a small fraction of blood cells are accidentally captured, then the analysis of the captured cells could be compromised. Thus, capturing a large enough sample of cancer cells to do an analysis, but reducing the accidental capture of contaminating blood cells to acceptable levels is a huge engineering challenge. I am working to improve these circulating tumor cell capture devices.



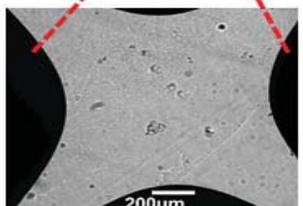
Function Generator



Top-Down of Device



Close-Up



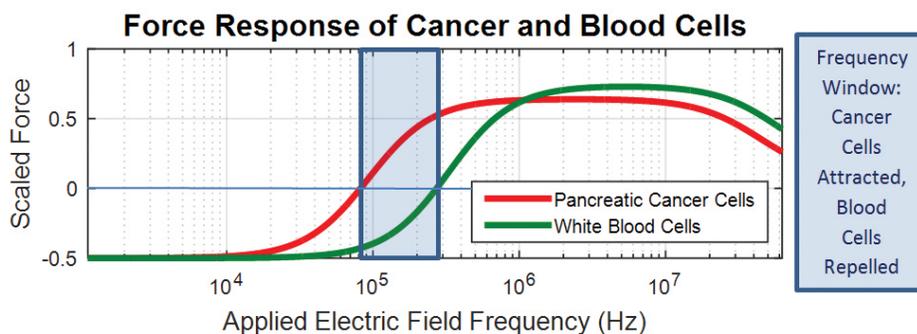
Cells Near Electrodes

Device used to measure cancer cell electrical properties.

Current devices used to capture cancer cells rely on protein chemistry. Cancer cells originating from a tumor are coated with different types of surface proteins than those that coat blood cells. Taking advantage of this difference we can design devices whose surfaces are coated with proteins that are very sticky to the cancer cells, but not very sticky to blood cells. These devices work well for some patients, but recent research has shown that the circulating tumor cells of some patients have lost high levels of their sticky surface proteins, making them harder to capture for analysis.

My work is in applying electric fields in order to enhance the capture of these hard-to-get cancer cells. A cell's membrane acts like a capacitor and the cytoplasm inside the cell acts like a resistor so if AC electric fields are applied to cells, the resulting forces depend on the frequency. It turns out that blood cells and cancer cells have different electrical properties, so there is a window of frequencies in which cancer cells are attracted to the electrodes in a device, whereas blood cells are pushed away from the electrodes. I measured cancer cell and blood cell electrical properties with my device, confirming that a window exists to enhance separation of cancer cells from blood cells based on cells' electrical properties.

Lannin was part of Professor Brian Kirby's research group at Cornell and has now joined the Mechanical Engineering faculty at Lafayette College.



Passing of Cornell Professor and cycling record-holder, P.C. Tobias de Boer [1930-2016]

By: Francis Moon, Professor Emeritus, M.S. '64, Ph.D. '67

Professor de Boer was born in Leiden, Netherlands in 1930 and arrived at Cornell in 1964 in the Graduate School of Aeronautical Engineering [GSAE] as an assistant professor. Bill Sears had just finished his directorship and Ed Resler had taken over as head of GSAE. Tob's area of interest was the physics of shock waves in fluids. His first course was Advanced Kinetic Theory of Fluids. The 1960's were exciting times in fluid mechanics especially since President Kennedy had put the U.S. on a path to the Moon and space sciences was all the



rage. In the 1966 Aero School log book 30 students and researchers are listed. In 1966 Professor de Boer was assigned advisor to students, William Condit, N. Hubbard, P.R. Grimwood, R. Kinsinger, and researchers Arnold Frohn and R.A. Johnson, with whom Tob would co-author his first Cornell research papers.

He was also involved with student projects such as designing the world's fastest bicycle with Professor Al George in a Cornell project to break the human powered vehicles land speed record. A 1979 photo shows Tob huddled over an aerodynamically shaped canopy on a bicycle. [*Engineering Quarterly* 1979 No.2] In 1978 Tob had set a national cycling record at the age of 48 by riding 448 miles in 24 hours. In sports Tob was very competitive and he envisioned extending his endurance record with clever engineering design. As former Director Al George has said, "his research was way ahead of its time." His interests broadened to combustion and engine physics, including the study of ion propulsion and hydrogen fuel automobiles.

Tob de Boer served as Associate Director of the Undergraduate Program most of 1982-1991, taking time out for a sabbatical in 1985-86 and to serve as Acting Director of the Sibley School in Fall '88. He was also the school parliamentarian and he knew 'Robert's Rules' cold.

In later years his research encompassed hydrogen engines, cryocoolers and Stirling engines, but always approaching these machines from thermodynamic and mathematical modeling and basic principles of physics.

Outside Upson Hall, Tob had many interests especially in sports, including long distance running, cycling, cross-country skiing, rowing and swimming. He and his wife Joan, as well as their daughters, were outstanding athletes. Tob was active in the Cascadilla Rowing Club. He personally groomed many of the cross-country skiing trails in Hammond Hill State Forest and headed the Nordic Ski Club.

Many former Sibley School students will remember his lectures in introductory Thermodynamics and in his retirement he taught freshman mathematics. Professor de Boer died on May 2 after an extended illness. In June there was a memorial service for Tob de Boer where many of his friends and colleagues paid tribute to his memory.



Chih-Kung Lee: TAM; Ph.D. 1987

From Cornell to Economic Minister Taiwan

Chih-Kung Lee, otherwise known as "CK" to fellow graduates from Theoretical and Applied Mechanics in the late 1980's, has been appointed Minister of Economic Affairs of the Republic of China in Taiwan. He was born in Taipei in 1959 and came to study engineering mechanics at Cornell after receiving his B.S. degree in Civil Engineering at National Taiwan University [NTU]. In 1983 CK studied dynamics in the "Moon Lab" under Professor Emeritus Francis Moon. CK earned both an M.S. and Ph.D. in Theoretical and Applied Mechanics. Fellow graduates of the time will remember CK as a friendly engaging student with an infectious laugh, interested in mechanics, physics and chaos theory. He was awarded a U.S. patent along with advisor Moon for his Cornell research work in electromechanical sensors. He held a prestigious IBM Fellowship while a student at Cornell.

In 1987, Dr. Lee was hired by the IBM Almaden Research Center in San Jose and worked on magnetic disc drives and optoelectronic devices. He received an IBM Outstanding Achievement award for his work. In 1994 CK returned to his alma mater in Taipei as a faculty member in the National Taiwan University, Institute of Applied Mechanics, founded by Cornell TAM faculty Yih-Hsing Pao. Dr. Lee, along with another TAM grad Pei-Zen Chang, founded the Nano-Bio-MEMS research group at NTU. Chih-Kung Lee has had a very distinguished career in Taiwan and served as Executive Vice President of the Industrial Technology Research Institute in Taiwan and other governmental advisory positions. He received many awards for his research including a Gold Medal Prize in 2012 from the World Genius Convention. Dr. Lee serves as Minister of Economic Affairs under Taiwan President Tsai Ing-Wen, M.S. Law '80, who is also a Cornell Graduate.

FACULTY



Assistant Professor
Nelly Andarawis-
Puri

Recognized as the Clare Boothe Luce
Assistant Professor of Mechanical and Aerospace Engineering, Cornell University.



Professor Rebecca
Barthelmie

Atkinson Center's 2016 Academic Venture Fund Award for the *Power in the Wind* proposal. Barthelmie was also awarded an Engaged Cornell Curriculum Grant to develop a new course.

She holds the title Affiliate Professor in the Wind Energy Department of the Danish Technical University.



Professor Mark
Campbell

Reappointed as the S.C. Thomas Sze Director of the Sibley School of Mechanical and Aerospace Engineering for a two-year term starting July 1, 2016.



Associate Professor
Olivier Desjardins

Junior Award of the International Conference on Multiphase Flows. The Department of Defense (DoD) will support a spray project led by Desjardins with a grant of up to \$7.5 million over five years.



Professor David
Erickson

Named Sibley College Professor of Mechanical Engineering effective November 1, 2015. Erickson also received a 2016 Academic Venture Fund Award

for the *From CO₂ to Fuel* proposal from the Atkinson Center. Cornell received \$611k for Erikson's 'FeverPhone' research.



Professor Emeritus
Albert George

Atkinson Center's 2016 Academic Venture Fund Award for the *Imagining Energy Transitions* proposal.



Assistant Professor
Guy Hoffmann

Named Mills Family Faculty Fellow of Mechanical and Aerospace Engineering, Cornell University.



Professor Brian
Kirby

Promoted to Full Professor effective July 1, 2016. He also received the Cornell College of Engineering Advising Award and the 2015 Research Award.



Associate Professor
Mason Peck

Awarded the John Swanson '61 ME Excellence in Teaching Award in honor of his mother, Dorothy G. Swanson, Cornell University.



Professor Andy
Ruina

Named John F. Carr Professor of Mechanical Engineering effective November 1, 2015.



Assistant Professor
Robert Shepherd

Engineering Learning & Research Faculty Fellow; 3M Non-Tenured Faculty Award; 2016 Academic Venture Fund Award for the *New Tech for an Ancient*

Food proposal from the Atkinson Center; and winner of a campus-wide faculty philosophical debate (*Liferaft*) sponsored by *Logos*, the Undergraduate Journal of Philosophy.



Assistant Professor
Meredith Silberstein

Hetényi Award for best research paper published in *Experimental Mechanics*.



Assistant Professor
Ankur Singh

National Science Foundation CAREER Award. Singh received the 2015 Biomaterials Outstanding Paper Award at the 10th World Biomaterials Congress in Montreal.



Associate Professor
Max Zhang

Scientific and Technological Achievement Award from the Environmental Protection Agency.

STUDENTS

The Sibley School congratulates the 2016 graduates and those who contributed to the Mechanical and Aerospace Engineering community.



2016 Senior Class

Speaker: Lauren Tweel, B.S. ME '16

"I was truly honored to have been chosen to represent the senior class at the Mechanical Engineering graduation ceremony. I was thrilled to be able to shed light on what a tight-knit, supportive, and fostering class we had become and to be able to thank everyone who created such an unforgettable four years—advisors, professors, and above all, classmates. My fellow classmates inspired me, challenged me, and supported me throughout my four years at Cornell Engineering and I honestly know I would not have been able to come this far without them."

Outstanding Achievement Award: This award is presented to a graduating student who has achieved the highest academic standing in the Master of Engineering Program.

Award Recipient: Jesse Miller, M.Eng. ME '16



"Long lasting friendships, a desire to keep learning, took some classes too"

The Sibley Prizes: The Sibley Prizes were established in 1884 for the two seniors with the highest scholastic averages.
Award Recipients: Do Hyun Chung, B.S. ME '16; Kellen McCormick, B.S. ME '16



Kellen McCormick:

"To me, Cornell was a place where I could learn from the bright, passionate faculty and students, and also get a chance to pass that on as a teaching assistant. Cornell was a place where I could work hard without it ever feeling like work. Cornell was filming a joke commercial for a class at 3 a.m. and not regretting a moment, or assembling a car at 4 a.m. with a smile on my face from the Baja banter. Five years ago, Cornell was just a dream, and today, I still can't believe it wasn't."

Thomas J. and Joan T. Kelly Prize:

Awarded to a graduate student displaying excellence in aerospace engineering, as demonstrated through coursework or an innovative design project.

Award Recipient: Jesse Miller, M.Eng. ME '16: "A Directionally Stable Robotic Sailboat: Concept and Simulations." Research with Professor Andy Ruina.

Outstanding Senior Award: This award is presented to two undergraduate students who have exemplified strong leadership skills, raising awareness of the Cornell chapter of ASME through outreach, social and professional activities.

Award Recipients: Leslie Cheng, B.S. ME '16; Jason Flahie, B.S. ME '16

Walter Werring Excellence Prize:

Recognizes talented and dedicated undergraduates who have enhanced the Cornell community, excelling in a manner befitting the reputation of the Sibley School.

Award Recipients: Corinne Elizabeth Lippe, B.S. ME '16; Adam Matrab, B.S. ME '16; Emma Clair Thomson, B.S. ME '16



Cornell Chapter of the American Society of Mechanical Engineers Executive Board Members 2015-16. Adam Matrab is fifth from the right.

Adam Matrab:

"During my time at Cornell I've had the privilege to work with amazing students and faculty on interesting projects. I've also had the opportunity to grow and develop my skills as an engineer and as a person, which I'll carry for the rest of my life."



Emma Clair Thomson:

"My time at Cornell provided me with an immeasurably valuable experience in the mechanical engineering discipline both in and out of the classroom. Only at Cornell is one able to join and excel in an impressive variety of project teams, allowing one to apply what is taught in class in addition to gaining exposure to new material. Being able to lead a project team also provides hands-on experience in managing a multi-disciplinary group of students, which is something that I carry with me after graduating."

Bart Conta Prize in Energy and the Environment: Awarded for best work on a research or design project dealing with energy and the environment.

Award Recipients: Sean Hidaka, M.Eng. ME '16: "Operating Solar PV and Ice Storage in Post-Net-Metering Hawaii." Research with Professor K. Max Zhang.

Alexandra N. Thompson, B.S. ME '16; Daniel Wilentz, B.S. ME '16: "Passive Acoustic Detection of Bird Strikes on Wind Turbine Blades." Research with Professor Rebecca Barthelme.

Alexandra N. Thompson: "Cornell provided me with the incredible opportunity to become part of a world of amazing, driven, and gifted professors, lecturers, and fellow students. Through electives and research, I was able to explore and deepen my interest in wind energy, from the underlying physics to its impact on its surroundings. The research fostered an even broader passion about energy production. I am very thankful to have received the Bart Conta Prize in Energy and the Environment."

H.D. Block Teaching Prize: Awarded to a Ph.D. candidate, recognizing their dedication and excellence as a teaching assistant in Engineering Mathematics and Engineering Mechanics
Award Recipient: Lauren Lazarus, Ph.D. TAM '16



"My time at Cornell has allowed me to grow in both research and teaching, and to better understand my strengths and interests moving forward. To me, the H.D. Block Teaching Prize represents an appreciation of the connections between engineering and mathematics, and of the need to communicate clearly to various levels of expertise. I feel fortunate to be recognized for this important aspect of my time at Cornell."

Sibley School Excellence in Graduate Teaching Assistant Prize: Awarded to a Ph.D. candidate, recognizing dedication and excellence as a teaching assistant for Sibley School courses.

Award Recipient: Edward Bonnevie, M.S. ME '16

Frank O. Ellenwood Prize: Awarded to undergraduate students with the highest GPA in heat and power courses.

Award Recipients: Peter Chen, B.S. ME '16; Do Hyun Chung B.S. ME '16; Corinne Elizabeth Lippe, B.S. ME '16

Sibley School Class of 2016 Senior Video and Slide Creators: Chelsea Sidrane, B.S. ME '16; Alexandra N. Thompson, B.S. ME '16



7 engineering seniors honored as 2016 Merrill Presidential Scholars: Seven Cornell Engineering students spent a portion of Senior Week celebrating not only their own accomplishments, but also celebrating the educators who inspired them to be the scholars they are today. (http://www.mae.cornell.edu/news/index.cfm?news_id=95136&news_back=)



MAE student Robert Chiodi awarded a ND-SEG fellowship, for his demonstrated ability and special aptitude for advanced training in science and engineering. (https://ndseg.asee.org/ndseg_fellows/2016_awardees)



Elise Yang, B.S. ME '16, received the Co-op Student of the year award—others receive Distinguished Honors. (http://auth.cenr.commonspotcloud.com/mae/upload/Coop-awards2014_2015.pdf)



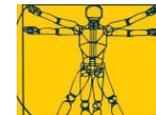
MAE student Paula Doubrava has been selected for a 2016 Geophysical Fluid Dynamics Fellow at Woods Hole Oceanographic Institution this summer. Congratulations Paula! (<http://www.whoi.edu/main/summer-student-fellowship>)



CUAIR takes 2nd place in the 14th Annual Association of Unmanned Vehicle Systems International (AUVSI) Student Unmanned Air Systems Competition held in Patuxent River, MD on June 15-20, 2016. (http://www.mae.cornell.edu/news/spotlights.cfm?s_id=628&page=1)



Blast off! 4-H youth program attendees launch rockets from Cornell slope: The 4-H Youth Development program brought together teens from across New York State to explore STEM on Cornell's campus. (<http://ithacavoices.com/2016/06/bird-plane-no-rocket/>)



"An End-To-End System for Accomplishing Tasks with Modular Robots" by Gangyuan (Jim) Jing, Tarik Tosun, Mark Yim, and Professor Hadas Kress-Gazit won best systems paper, best student paper, and was a finalist for best paper at Robotics: Science and Systems 2016. It was the only paper nominated in all three award categories. (<http://www.roboticsconference.org/awards.html>)



Ithaca High CubeSat team's concept to get a shot at space along with Professor Mason Peck. A team from Ithaca High School is among three winners in the recent Cornell CubeSat satellite contest. (<http://www.news.cornell.edu/stories/2016/06/ithaca-high-cubesat-teams-concept-get-shot-space>)



Professors Mason Peck and Rob Shepherd along with their team join NASA 360 to discuss and design a bio-inspired soft robotic rover. (<https://www.nasa.gov/multimedia/podcasting/nasa360/index.html>)



2016 Academic Venture Fund Awards given to 4 MAE faculty announced by the Atkinson

Center for a Sustainable Future. (<http://www.acsf.cornell.edu/Assets/ACSF/docs/grants/2016 AVF Selections-Final.pdf>)



Cornell, ADC tackling a rescue ropes issue for U.S. Navy copters:

Researchers from Cornell and Advanced Design Consulting, Inc. of Lansing are partnering to develop a new system, replacing the current steel cables. (<http://www.news.cornell.edu/stories/2016/09/cornell-adc-tackling-rescue-ropes-issue-us-navy-copters>)



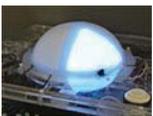
A fascinating and unique take on social domestic robots—Vyo:

Vyo is “a personal assistant serving as a centralized interface for smart home devices.” (<http://spectrum.ieee.org/automaton/robotics/home-robots/vyo-robotic-smart-home-assistant>)



Tiny “chipsat” spacecraft set for first flight:

Nature details a set of micro spacecrafts developed by Mason Peck, Associate Professor. (<http://www.nature.com/news/tiny-chipsat-spacecraft-set-for-first-flight-1.20006>)



6 Ph.D. students learn to commercialize their research:

Six doctoral students will spend the summer and fall semesters exploring the potential to turn their research into a business. (<http://www.news.cornell.edu/stories/2016/05/6-phd-students-learn-commercialize-their-research>)



Tompkins County Energy Roadmap accepted by the County Legislature:

Professor Max Zhang was hired in 2014

by the Steering Committee to complete the project. (http://www.mae.cornell.edu/news/index.cfm?news_id=94971&news_back=)



Cornellians to advise Starshot exploring Alpha Centauri:

Cornell faculty and alumni are helping to advise Breakthrough Starshot—a \$100 million research and engineering project. (<http://www.news.cornell.edu/stories/2016/04/cornellians-advise-starshot-exploring-alpha-centauri>)



Max Zhang helps sustainable communities grow greener:

From studying smog along Beijing’s streets to improving how U.S. interstate highways clear the exhaust, to electrifying New York City parking spaces, engineer Max Zhang literally adds verdancy to vibrant communities. (<http://www.news.cornell.edu/stories/2016/04/max-zhang-helps-sustainable-communities-grow-greener>)



Engineering Simulation MOOC teaches pro skills:

Cornell’s newest MOOC (Massive Open Online Course) will give thousands of students worldwide an opportunity to learn skills regularly taught to the university’s engineering students on campus. (<http://www.news.cornell.edu/stories/2016/03/engineering-simulation-mooc-teaches-pro-skills>)



Light-up skin stretches boundaries of robotics:

A Cornell team led by Assistant Professor Rob Shepherd and graduate student Bryan Peele has developed an electroluminescent “skin” that stretches to more than six times its original size while still emitting light. (<http://www.news.cornell.edu/stories/2016/03/light-skin-stretches-boundaries-robotics>)



On the cover of *Advanced Materials*, Prof. Shepherd and lab members present a metal-elastomer-foam

composite that can be formed in three dimensions. (http://www.mae.cornell.edu/news/index.cfm?news_id=94929&news_back=)



‘Function after failure’ in bone translates to engineering strategy:

A study reveals that the material heterogeneity of cancellous bone prevents cracks from propagating. (<http://www.news.cornell.edu/stories/2016/02/function-after-failure-bone-translates-engineering-strategy>)



Singh Lab’s research on immune organs makes top 100 stories of 2015’s “The Year in Science”

issue of *Discover Magazine*! Check out #63. (<http://discovermagazine.com/2016/janfeb?page=2>)



Professor Zhang quoted

by *Bloomberg News*. Brazil Olympics Misses First Deadline for Clean Energy. (<http://www.bloomberg.com/news/articles/2015-12-09/brazil-olympics-misses-first-deadline-for-clean-energy>)

Anton van Zanten, Ph.D. '73 (MAE)

has been awarded the 2016 European Inventor Award from the European Patent Office. (<http://www.automotiveworld.com/news-releases/retired-bosch-associate-anton-van-zanten-honored-lifes-work/>)



NutriPhone dials in fast, affordable health care:

NutriPhone®, a new smartphone app to monitor users’ nutrition, blood and stress, was developed at Cornell’s Atkinson Center for a Sustainable Future. (<http://www.news.cornell.edu/stories/2015/12/nutriphone-dials-fast-affordable-health-care>)



Engineering Society founded in honor of Ephraim Garcia:

Cornell Engineering has announced the formation of the Ephraim Garcia Engineering Society in honor of Ephraim Garcia, Professor (MAE), who passed away in 2014. (<http://www.engineering.cornell.edu/research/faculty/EphraimGarciaEngineeringSociety/index.cfm>)



MAE team wins design competition

from Soft Robotics Toolkit with their soft wheel robot. (<http://softroboticstoolkit.com/announcing-winners-2015-design-competition>)



Foam heart could pump inside you just like the real thing:

Different materials being tested by MAE's Prof. Shepherd and his team. (<http://news.cornell.edu/stories/2015/10/porous-material-holds-promise-prosthetics-robots>)



Sibley School recognizes AIAA executive board members:

Executive board members have shown exemplary leadership qualities. (http://www.mae.cornell.edu/mae/news/spotlights.cfm?s_id=619&page=1)



Passion and engineering combine for first-time entrepreneur:

Rev Hardware Accelerator alumna wins Student Business of the Year. (http://www.mae.cornell.edu/mae/news/spotlights.cfm?s_id=611&page=1)



MAE Ph.D. student and team won the Grand Prize & 1st Place in the Visualization in the Data Science Hackathon.

(http://www.mae.cornell.edu/mae/news/spotlights.cfm?s_id=593&page=2)



New atlas could help wind energy sweep across Great Lakes

by compiling meteorological wind data. Cornell scientists have assembled the first full observational wind atlas of the Great Lakes in hopes of developing wind energy in the region. (<http://www.news.cornell.edu/stories/2015/09/new-atlas-could-help-wind-energy-sweep-across-great-lakes>)



Affinito-Stewart grants support to 12 women faculty:

Twelve Cornell women assistant professors have been awarded research grants by the Affinito-Stewart Grants Program to advance research necessary to obtain tenure. (<http://www.news.cornell.edu/stories/2015/08/affinito-stewart-grants-support-12-women-faculty>)



Savransky savors role in major exoplanet discovery:

Dmitry Savransky is passionate about his role in finding 51 Eridani b, an extrasolar planet—planets found outside of our own solar system—about 100 light-years away. (<http://www.news.cornell.edu/stories/2015/08/savransky-savors-role-major-exoplanet-discovery>)



Engineering project teams exemplify alumni support:

A quarter of all undergraduate engineering students participate on project teams. Alumni routinely comment on the value of team participation. (http://www.mae.cornell.edu/news/index.cfm?news_id=93721&news_back=news%5Farchive)



Bones reveal new engineering secret:

Dr. Hernandez delves into how bones heal themselves and return to their original function, which could give machines in faraway places a

chance to last longer without replacement parts. (<http://academicminute.org/2016/05/chris-hernandez-cornell-university-bones-reveal-new-engineering-secret/>)



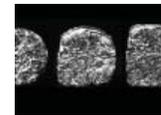
Cornell Engineering student project team competitions update: 100+

students took to the road in May and returned with various successes! (http://www.mae.cornell.edu/mae/news/spotlights.cfm?s_id=607&page=1)



Fighting lymphoma in three dimensions:

Professor Singh is part of a team taking a three dimensional approach to lymphoma—literally. (<https://www.asme.org/engineering-topics/articles/bioengineering/fighting-lymphoma-in-three-dimensions>)



Morphing metal could create shapeshifting robots:

Scientists at Cornell University have developed a metal-foam compound that can change shape then reform itself into a rigid structure. (<http://news.discovery.com/tech/robotics/morphing-metal-could-create-shapeshifting-robots-160321.htm>)



Two Mechanical Engineering students selected as 2015-16 Frank and Rosa Rhodes Scholarship recipients:

The Sibley School of Mechanical and Aerospace Engineering Community congratulates Zachary Bialik, B.S. ME '17, and Asta (Yan) Li, B.S. ME '17. (http://www.mae.cornell.edu/mae/news/spotlights.cfm?s_id=568&page=2)



Barb McGaughn Barton, Ed Barton, Chick Ver Valen



Philip Jones, Hilary Diekow, Andy Malcolm



Jack Howell, Elliott Siff, Marlene Siff



Adam Maher, Molly and Kelly Maher



Stacey Cowan, Jeff Lux, Madeline Lux, Chris Peterson, Dana Lindquist, Gretchen Paul Schnabel



Jack Thompson, Paul Hujing



Scott Gold, Al George



MAE Director Mark Campbell welcomes group



*The Sibley School of Mechanical and Aerospace Engineering
Reunion June 11-12, 2016*

THE NEW UPSON HALL

Cornell University's Sibley School has been at the forefront of research and applications in mechanical and aerospace engineering for 150 years. Research has evolved in many ways since the times of Hiram Sibley, and in order to continue to lead in the 21st century, the Sibley School needed a 21st century facility.

Upson Hall, home to the Sibley School, was built in 1956. It served admirably for 60 years. Understanding that the continuous development of technology shapes the future, Upson Hall is being completely updated, top to bottom and walls to wires. When it is complete in summer 2017, the \$63 million renovation will guarantee that the mechanical and aerospace engineers at Cornell remain at the forefront of innovations in fields as diverse as medical technology and space exploration.

The new Upson Hall will have a state-of-the-art Robotics Facility, an entire floor devoted to the wildly successful Student Project Teams that have been a hallmark of Cornell Engineering for many years, seven collaboration spaces designed to encourage the cross-pollination of ideas, specialized hybrid research areas—including a drop tower and a wind tunnel, and many features designed to enhance the visual façade while greatly increasing the energy efficiency of the building.

Upson Hall will truly be a 21st century home for the Sibley School to continue to create the technology of the future.



Artistic rendering of the future Upson Hall (Hoy Road).



Beginning of Upson Hall exterior renovations.



Upson Hall exterior renovations on Aug. 13, 2015.



Upson Hall exterior renovations on Sept. 20, 2016.

THE NEW UPSON HALL



Upson Hall 4th floor B-wing
Oct. 15, 2015.



Upson Hall 3rd floor B-wing
Oct. 30, 2015.



Upson Hall 3rd floor B-wing
Oct. 4, 2016.



Temporary exterior walkway
to Duffield and Upson Halls.

BREAKING THE RULES TO ENGINEER UPSON HALL



Upson Hall demo
Sept. 8, 2015.



Farewell to Upson lounge
July 12, 2016.



Upson Hall 4th floor interior bump-out
Sept. 29, 2015.



Upson Hall 4th floor interior bump-out
Oct. 4, 2016.



Upson Hall 4th floor conference room
Oct. 4, 2016.



Upson Hall exterior (Engineering Quad)
Sept. 1, 2015.



Artistic rendering of the future Upson Hall (Engineering Quad).



Dave Heller, B.S. ME '81, has been a loyal supporter of the Student Project Teams for more than 15 years. As an undergraduate, Dave and his teammates were fortunate to work closely with Professor Al George to test and optimize a bicycle built inside of a wing as part of the World Human Powered Speed Competition. He fondly recalls, "We did not win the competition, but the lessons and the memories of riding our winged bicycle up and down the runway at Ithaca Airport before sunrise remain with me to this day."

When Dave learned about the Upson renovation and that the Student Project Teams are getting a space of more than 24,000 square feet, he and his wife Gayle jumped at the chance to make a gift to support the construction.

Why do we give financial support to student teams?

"Because Student Project Teams help students to develop the problem solving skills needed to become well-rounded, effective engineers. Few things are as gratifying as coming back to Cornell and talking to the students working on Student Project Teams. Their work and accomplishments are truly impressive. Student teams teach engineering problem-solving and industrial creativity as a collaborative, not an individual, effort. When reviewing an application as an employer, the student who has design and management experience gained from working as a part of a team stands head and shoulders above the other candidates".

Dave is CEO of Heller Industries in Florham Park, New Jersey.



Dave Heller with Swanson Director of Engineering Student Project Teams Rebecca Macdonald, alumni, and Engineering students in NYC (July 2016).

Funding Opportunities

There are numerous funding opportunities to support the renovation of Upson Hall, ranging from spaces supporting the 1000+ students on project teams, to experiential classrooms, to state-of-the-art collaborative research labs. A focus on maximizing functional space and energy efficiency for current needs and anticipating future uses complete this dynamic project.

Select Funding Opportunities

- Student Project Team Pod Engine Build Room—\$50,000
- Student Project Team Pod Design and Build Areas (8)—\$100,000 each
- CAD/CAM Student Project Team Lab—\$100,000
- State-of-the-Art MAE Classrooms—\$150,000 – \$250,000
- Student Collaboration Lounges—\$300,000
- Various Faculty Research Labs—\$100,000 – \$500,000
- Rooftop Skyline Research and Testing Lab—\$1,000,000

For more information, please contact:
Laurence Drozd at lld7@cornell.edu -(607) 254-7126 or
Debra Hurley at dlh242@cornell.edu -(607) 255-1789.



THE SIBLEY SCHOOL OF
**MECHANICAL
& AEROSPACE
ENGINEERING**

Cornell University
105 Upson Hall
Ithaca, NY 14853

Nonprofit Org.
U.S. Postage
PAID
Cornell University

Fall 2016

The Cornell MAE newsletter is published by the Sibley School of Mechanical and Aerospace Engineering at Cornell University

Director:
Mark Campbell

Editors:
Laura Houghton
Virginia McAuley
Cornell Engineering Communications
Layout & Design:
Laura Houghton

Cornell University
Sibley School of Mechanical and
Aerospace Engineering
105 Upson Hall
Ithaca, NY 14853

Photography:
Brenda Smith
University Photography
Virginia McAuley
Laura Houghton

Printer:
MidState Printing
Syracuse, NY

© 2016 Cornell University

ON THE COVER
BREAKING RULES to engineer ROBOTS
"Professor Rob Shepherd uses an infrared camera to measure the thermal gradient of a melting metal-rubber composite foam. Justin Choi (Undergraduate) and Mandy Wong (former M.Eng.) demonstrate the extensibility of the composite material when the metal has been melted into a liquid at 62°C."

www.mae.cornell.edu