CornellEngineering
Sibley School of Mechanical and Aerospace Engineering

MAE

Newsletter
Fall 2014

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MESSAGE FROM THE DIRECTOR

Dear Sibley School and Alumni Friend:

"Seven minutes of terror..."

to quote Dr. Charles Elachi, Director of JPL and the 2013 Sears Lecturer, in reference to the Curiosity mission. The oft-quoted term about the landing is particularly characteristic of space missions and the people associated with them. Given the extensive time put into development and launch of space missions, the binary result (it worked or it didn't) can sometimes be cruel. I personally have seen these highs and lows, first as a graduate student with a successful project on the space station, and then as a professor with a formation flying mission and a CubeSat scintillation science mission, which were not as successful due to items outside of our control. Luckily the people in this field – students, faculty, staff, etc. – are amazingly passionate and keep coming back for more.

Charles Elachi of NASA's Jet Propulsion Laboratory (JPL) and President Skorton sign a memorandum of understanding, establishing a special collaborating university relationship between JPL and Cornell.
Left to Right: President Skorton, Jonathan Lunine (Astronomy), Charles Elachi, and Mark Campbell

This year we saw some exciting progress in our space systems work. Dr. Elachi signed an agreement with President Skorton making Cornell one of a select few strategic partners for JPL. Mason Peck rejoined the faculty after a two year stint as NASA's Chief Technologist. Two new faculty joined us, Dmitry Savransky and Daniel Selva, who are profiled in this newsletter. And we had two spacecraft launches – CUSat and Chipset – both of which hold promise for more. We look forward to hearing more successes from these folks.

In addition, Professor Rebecca Barthelmie joined us and will lead our (and the College's) efforts in Wind Energy. Cornell, as with other universities, continues to be a leader in the energy and sustainability areas, particularly in research and education. With her impact stretching from computational to sensing to extensive field experiments, we are now positioned to be one of the leaders in this area.

This newsletter also highlights three innovative leaders with ties to the Sibley School. First, Peter Meinig (B.S. ME '62) shares some of his thoughts on life lessons after Cornell. Mr. Meinig has a long history of working with and leading Cornellians, from his being chair of the Cornell Board of Trustees to his current co-chair position for the upcoming Sesquicentennial celebration this year. Professor Jane Wang has been working toward bridging the people and research of several communities – Engineering, Physics, and Biology; her article details new exciting work in the modeling and analysis of dragonflies. Finally, Dr. Rebecca Macdonald just finished her first year as the Swanson Director of Project teams, overseeing the continued growth of the number of teams and students, as well as funding and impact. We look forward to having her lead the College in our efforts to integrate the project teams further into our educational paradigms, as the benefits are seen by everyone – students, faculty, and industry!

I am also excited to let everyone know there are some big plans to update the facilities in the Sibley School. In particular, Kimball Hall is currently being renovated to house bio and materials related research. The Sibley School continues to make innovative strides in microsystems such as labs on a chip, artificial lymph nodes, and biomechanics; the new Kimball, estimated to be completed in Summer 2015, will allow this interdisciplinary research to flourish. In addition, we are planning a large scale renovation of Upson Hall during the next several years. The plans look fabulous and will enable the School to provide cutting edge educational programs and research for our many students.

Finally, it is with a heavy heart that I deliver the news to you that Professor Ephrahim Garcia passed away in September. Ephrahim was a gregarious colleague with a huge heart and self-proclaimed desire to "mix it up a bit". His passion and impact on students at all levels was tremendous. In the past few years, he advised three project teams, had an army of undergrads and M.Eng. students in his lab, taught a hugely popular Mechatronics class, and had a vibrant group of Ph.D. students. He continued to reinvent his impactful research over the years, ranging from smart materials to exoskeletons to energy harvesting. He also steadfastly supported aerospace in the department, and diversity causes in general. He will be sorely missed.

As usual, you will find the newsletter full of other notables, including awards for students and faculty, the success of our project teams, and a few reunion pictures. Our website gives you continual updates of these and other interesting tidbits. As always, please keep in touch with us about your news and successes through the alumni link off of our website, or simply a quick email to mae_alum_news@cornell.edu. We look forward to hearing from you.

Warm Regards,

Mark Campbell

A TRIBUTE

It is with great sadness that we share this news. On Sept 10th, 2014 our friend and colleague Prof. Ephrahim Garcia, Ph.D., passed away. A man who had abundant love and pride for his family, high hopes and dreams for his students, and great respect for his colleagues.

Dr. Garcia was one of four boys, born in New York City to two Cuban immigrants. He attended State University of New York at Buffalo's engineering program where he received his Ph.D. (1990), M.S. (1988) and B.S. (1985). From 1991-97, Garcia owned and operated a corporation now called Dynamic Structures and Materials, which designs and fabricates smart materials based on actuators. He was an associate professor of mechanical engineering at Vanderbilt University, where he was Director of the Center for Intelligent Mechatronics from 1995-2001. Dr. Garcia was a program manager in the Defense Sciences Office of the Defense Advanced Research Projects Agency (DARPA) from 1998-2002. Garcia came to Cornell in 2001 because he felt he had found a place where he could let his imagination roam free.

Dr. Garcia was the recipient of the American Institute of Aeronautics and Astronautics (AIAA) Abe M. Zarem Advisor Award in Aeronautics in 2010 and received Merrill Presidential Scholar advisor recognitions in 2008 and 2010. In 2006 he received the Dennis G. Shepherd Teaching Award from the Sibley School.

He held interests in several areas of dynamics and controls, especially sensors and actuators involving smart materials. Together with his students, the Laboratory for Intelligent Machine Systems (LIMS) worked on projects ranging from modeling and analysis of flapping wings to energy harvesting for biological systems.

At Cornell, Professor Garcia recently served as Director of Graduate Studies (DGS) for the field of Aerospace Engineering. He advised three student project teams; ran a lab with many undergraduates, M.Eng. and Ph.D. students; and taught a large mechatronics class. He supported and was involved in diversity causes across the college and university.

He was an exceptional educator, researcher and mentor, and shared his work ethic and positive attitude with his many students. Dr. Garcia did not just talk the research talk, he walked the research walk.

"Keep at it kid" ~ Dr. Ephrahim Garcia, Ph.D.

Remembrances:

Dan Inman, Department Chair, Aerospace Engineering, University of Michigan

"We lost a friend, colleague and luminary in our field. He was really a very remarkable man—able to balance an aggressive and successful career with a dedicated family life. His professional contributions include many excellent papers and ideas. He also gave his time to serve the technical community in unselfish ways – especially his many successes as a DARPA program manager and as Editor-in-Chief of *Smart Materials and Structures* (SMS). He was extremely clever, had a tremendous work ethic and lived life with gusto and purpose. Most of us know him for his contributions to our profession. However, he was also a wonderful husband, father and friend. In his all too short life he has made a tremendous impact on technology, on friends, and family. We will all miss him a great deal."

Malika Grayson, on behalf of Ephrahim's graduate research group

"The relationship we, his students, had with Professor Garcia had many layers, beyond special ... and beyond words. The fact that he was so open with us showed us that he not only cared but he thought of us as family. Like any parent-child relationship we fought but we always listened and appreciated the wisdom he shared. Professor Garcia truly cared about his students. As quick as he was to ensure you were doing the right thing, he also made sure you left the office with more confidence than you came in with and a pep talk to encourage you for the next "brutal" meeting. He impacted more lives than some of us will ever impact in our lifetime and we aspire to be as great as him. For us, we have not just lost a mentor or an advisor but we lost someone who was like a father to us."

Liza Hamilton, Manager, National Academy of Science

"I had the pleasure of working with Ephrahim for the past five years on Army panels. At our meetings he would often brag about his brilliant wife, 'the doctor' and he would always book the first plane home after the meeting, saying he needed to get back to his family. He would keep the whole panel in stitches with his sly, devilish wit, and on their toes with his brilliant observations. I found an email from him recently where he told me I needed to hide all the panel alcohol from another panel member (my father, who was also on the panel). Ephrahim will be sorely missed. I know that his light and example of how to live a full life shines on in those he loved the most. I am praying that his memory will continue to make you laugh out loud and continue to bring you great joy."

David Hartino, Cornell University

"Professor Garcia has been many things to many people in his time here at Cornell: teacher, mentor, co-worker, and friend. I am privileged to call him all of these. As a teacher, he always expected me to perform to the best of my abilities - - and then exceed them. As I worked toward my B.S., then an M.Eng., he brought me into his lab to give me the opportunity to excel and to show me 'how it was done'. As an MAE staff member, support to his classes was always aimed at maximizing the students' experience. And as a friend, we traded 'war stories' in the halls countless times, and he always made sure I was taking care of my family. His impact cannot be overstated, nor can my appreciation for all of these experiences. Thanks, Ephrahim."

Prof. Chih-Kung (CK) Lee, National Taiwan University

"Our research community has lost a great man who has contributed so much to the professional field. Many of us have lost a great friend as we will never be able to hear his wisdom again. As a member of the SMS board, I must say our board has lost our leader. Chinese saying '哲人日已遠 典型在夙昔 (A great man is gone and the model he left will last forever)' can only slightly express our deepest reflection on Professor Garcia."

FACULTY PROFILE/ RESEARCH

Professor Jane Wang works on fluid dynamics and biophysics. Her main research interest is on understanding insect flight. She asks "How do insects fly, why do they fly the way they do, and how can we infer their 'thoughts' from their flight dynamics?"

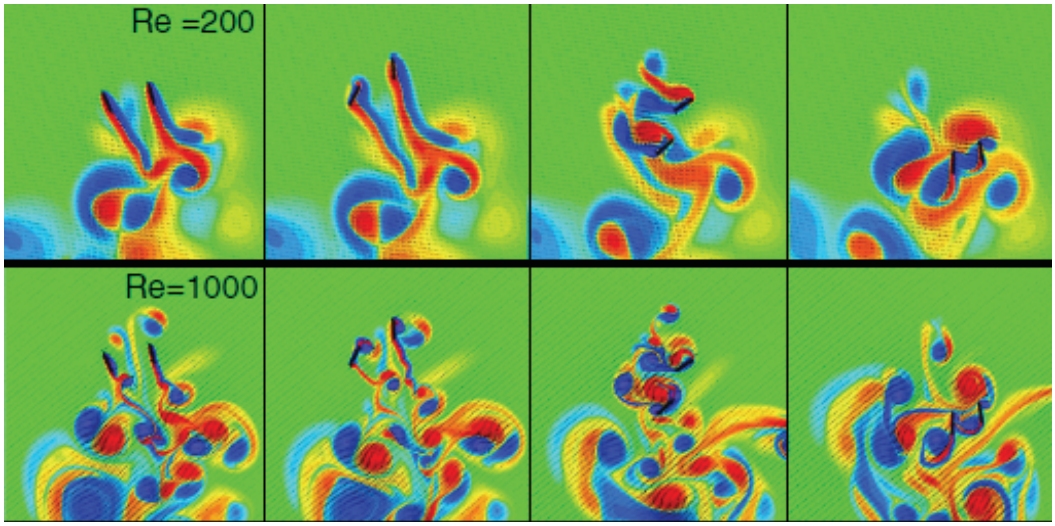
These questions are part of a broader inquiry, 'Why does a living organism move the way it does?' The organism's movement is in part dictated by physics, and in part by the organism's response to its own movement. To understand bird and insect flight, Professor Wang started from physical principles, solving the Navier-Stokes equations (the basic equations that describe fluid flow), coupled to the wing motions. Here the objective was to understand the unsteady aerodynamics of flapping flight, as well as the dynamic control of flight. Currently she and her group have been analyzing experiments done on dragonflies and fruit flies, and they have developed 3D computer simulations of controlled flight. The goal is to understand the inner organization of the insects, making connections between macroscopic laws of flight and the neural control mechanisms.

"MUCH OF OUR WORK IS DRIVEN BY OUR DESIRE TO SEE AND CONCEPTUALIZE THE WORLD AROUND US. WE STRIVE TO FIND SHARP AND INTUITIVE ANSWERES TO THE INTER-CONNECTED PUZZLES IN COMPLEX SYSTEMS"

One of the questions Professor Wang and her group have studied is the efficiency of flapping flight compared to fixed wing flight. Professor Wang explains, "Birds and insects have evolved to fly with flapping wings. Planes are designed to fly with fixed wings. These different styles of flight result from the complex evolutionary history of animals and machines, and as such cannot be entirely explained by aerodynamics. Nevertheless, the coexistence of these strikingly different flight styles motivates us to ask whether one of them is aerodynamically more advantageous than the other. There are reasons to argue for different answers. First, noting the complex flow created by flapping wings we could argue that flapping flight appears to waste energy in churning up the flow and thus is less efficient. Alternatively, noting that fixed and flapping wings are employed at different scales, we could argue that fixed wing flight is more efficient at larger scales, and flapping flight at smaller scales. It turns out that most prescribed flapping motions are less efficient than the optimal fixed-wing motion. But we found that certain flapping motion can be more efficient than fixed wing motion, although it is rare."

Professor Wang summarizes her research philosophy: "Much of our work is driven by our desire to see and conceptualize the world around us. We strive to find sharp and intuitive answers to the inter-connected puzzles in complex systems." In the pursuit of finding answers to the mysteries of animal flight, she and her group have developed novel computational methods, theoretical analyses as well as new experiments.

"We start by asking questions, and play with ideas and calculations. These lead to more questions, calculations, and occasional insights."



Computed Flow Field Generated by A Pair of Dragonfly Wings during Hovering. Red and blue indicate positive and negative vorticity.

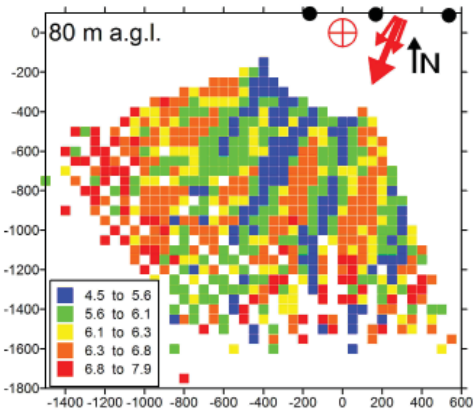
From: Z.Jane Wang and David Russell; "Effect of Forewing and Hindwing Interactions on Aerodynamics Forces and Power in Hovering Dragonfly Flight," Phys. Rev. Lett. 99, 148101 (2007).

WELCOME NEW FACULTY

Rebecca J. Barthelmie is Croll Faculty Fellow and Professor in the Sibley School of Mechanical and Aerospace Engineering. Her research encompasses many aspects of wind engineering but focuses primarily on the use of remote sensing technology and modeling to quantify wind resources and wind turbine wakes for wind farm design and optimization.

An early advocate of the science of wind energy, she was a European Union Marie Curie fellow and senior scientist at Risø National Laboratory (now the Danish Technical University) from 1993-2006. Her research at this leading institution for wind engineering led the development of novel resource assessment techniques for offshore wind energy and wind power production forecast for the first offshore wind farms in Europe. She also generated the first data sets for characterizing offshore wind turbine and large-scale wind farm wakes. During her time at DTU, Rebecca led several large international projects including 'Efficient Development of Offshore Wind Farms' and was the leader of the 'Flow' work-package in the large international project 'UPwind' funded by the European Commission. In 2009 she received the annual scientific award from the European Wind Energy Academy for 'her extraordinary efforts and achievements in the field of wind energy research'.

Wind energy now supplies sufficient electricity to power more than 15 million homes in the US (4.5% of all electricity) and wind power plants contributed 30% of new electricity capacity to the grid over the last five years (for an average price of 4¢/kWh). All utility scale wind energy production now occurs in large wind power plants where tens or hundreds of wind turbines are deployed in arrays extending over many square kilometers. Professor Barthelmie's research applies state-of-the-art remote sensing measurement and modelling approaches to fluid dynamics to improve the accuracy with which electricity from these developments is maximized and predicted, by quantifying both the ambient flow field and the complex interactions of the air with these turbines. Quantifying spatiotemporal variability of flow across the wind array and wakes (the distributed region of flow behind each turbine) is critical to the optimization of the design and operation of wind 'farms' on a scale consistent with other electricity generation. Her research is thus designed to quantify the speed and turbulence in the flow over long (multi-year) and short (seconds) timescales, and across spatial scales from cm's to many kilometers, and to use that information to develop even better ways to 'harness the power of the wind'. Professor Barthelmie's current research also includes components that lie at the critical nexus of wind energy engineering and climate science. Her recent paper in Nature Climate Change integrated future energy scenarios with the latest climate forcing models to quantify the potential impact of wind energy on electricity supply in 2030, and to quantify how much wind energy can contribute to climate change mitigation.



Example of scan of wind turbine wakes using Doppler Lidar (in ms^{-1}).

Professor Barthelmie holds a Cooperative Research and Development Agreement with the National Renewable Energy Laboratory and is currently the lead on a number of research projects funded by the Department of Energy and the National Science Foundation, focused on quantifying characteristics of wind turbine wakes and resources for large wind farms, both on- and off-shore. Professor Barthelmie is Co-chief Editor of the journal, *Wind Energy*, and is a member of the science and technical committees of many wind energy and engineering conferences.

Field measurments of wind turbine wakes using Doppler Lidar.

WELCOME NEW FACULTY

Savransky at the first light of the Gemini Planet Imager at Cerro Pachón in Chile

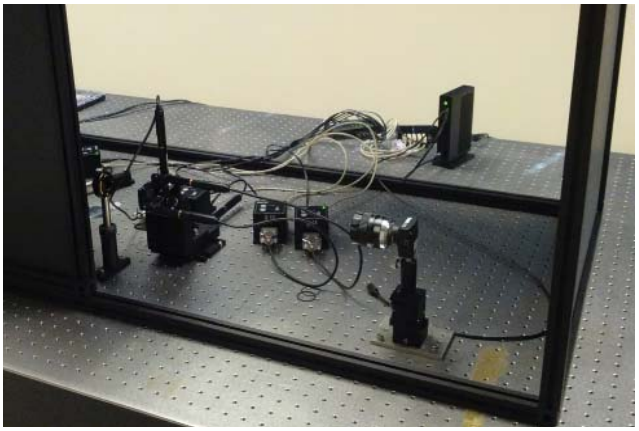
Dmitry Savransky joined the Sibley School as an Assistant Professor in January 2014. He is interested in a variety of engineering problems associated with the exploration of space and the detection of extrasolar planets (planets orbiting stars other than our sun). His work is highly interdisciplinary and he collaborates closely with colleagues in astronomy at Cornell and other institutions around the world.

Savransky has been involved in space-related projects since his time as an undergraduate at Cornell. While receiving his B.S. and M.Eng. from the Sibley School, Savransky worked on research projects with various professors from astronomy, eventually working on data processing for two different Mars missions: the Mars Odyssey Orbiter and the Mars Exploration Rovers (MER). He helped create algorithms that produce true color images from MER images and are still in use today (http://pancam.astro.cornell.edu). After graduation, he joined the MER operations teams, assisting in the daily operations of the rovers and helping to write command sequences for the MER panoramic cameras.

Savransky received his Ph.D. in Mechanical and Aerospace Engineering from Princeton University, where he was a member of the High Contrast Imaging Lab (https://www.princeton.edu/~hcil/). This group works on developing methods to directly image extrasolar planets (the majority of planets are currently found via indirect means), and to design missions around these instruments. In his thesis work, Savransky developed a methodology for simulating entire, new mission concepts and producing estimates of potential science returns. His work tied together modeling of high-contrast imaging systems, statistical descriptions of planetary systems from previous observations, and an intelligent scheduling mechanism that could autonomously schedule observations and dynamically update based on simulated outcomes. This modeling framework was used not only to evaluate new concepts, but also to optimize instrument designs and optimize mission operations.

During his postdoctoral work at the Lawrence Livermore National Laboratory, Savransky helped to integrate, test and commission the Gemini Planet Imager (GPI; http://planetimager.org/)—a next-generation facility instrument for the 8 m Gemini South observatory in Chile. GPI is specially designed to detect young, giant, extrasolar planets (like Jupiter in the first 10-100 million years of our solar system). To this end, the instrument incorporates an extreme adaptive optics system to correct for atmospheric turbulence in real time, and an integral field spectrograph science instrument, which produces three dimensional data cubes that contain both spatial and spectral information (i.e., every pixel of a science image is also a spectrum). GPI successfully carried out its first observations in late 2013, and is currently preparing for a 3 year exoplanet survey of 600 nearby stars, in search of new exoplanets. Savransky is also a member of the GPI science team and will participate in the survey and subsequent data analysis work.

At Cornell, Savransky has started the Space Imaging and Optical Systems lab (SIOS lab; http://sioslab.mae.cornell.edu/), whose main goals are to study mission and survey optimization for next generation astronomical instrumentation, and the autonomous operation of complex optical systems. Instruments such as GPI and future space telescopes are highly reconfigurable, but also have extremely tight tolerances on their internal alignments. Savransky and his team apply machine learning and computer vision algorithms to autonomously align optical systems and maintain alignments throughout various disturbances. The laboratory is also being set up as a test bench for future instrumentation and flight projects. By tying together the computational and experimental sides of his group, Savransky hopes to enable the next generation of instruments that will help us gain a better understanding of our universe, and the origins of our solar system.



Experimental setup for a self-aligning lens, using just one camera to both maintain alignment and collect science data.

Assistant Professor Daniel Selva joined Cornell this summer with the mission of strengthening both the aerospace-related activities in the Sibley School and the cross-departmental Systems Engineering program.

After earning MS degrees in electrical engineering and aeronautical engineering in Spain and France, Selva worked for four years as an operational engineer at Arianespace, the company that operates the European Ariane 5 launch vehicle. During this time, he specialized in on-board data handling and guidance navigation and control first, and later worked on ground systems. "Being part of the Ariane 5 launch team was a life-changing experience, not only because it gave me the opportunity to work so close to the rocket, but also because it introduced me to the world of systems engineering, which ended up being my research field in grad school," he says.

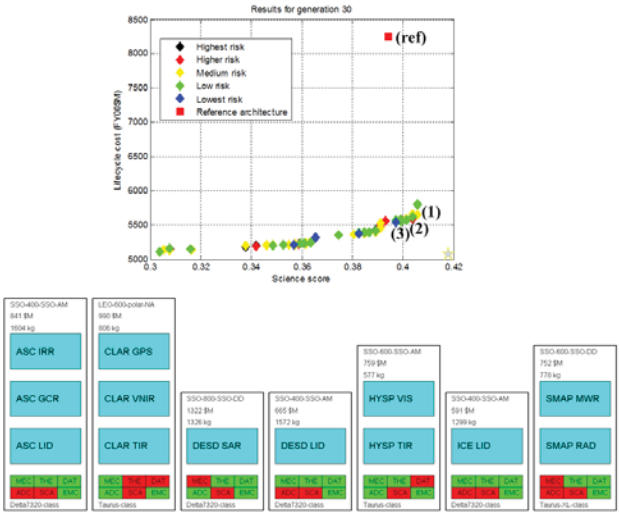
After 21 successful Ariane 5 launches, Selva started a Ph.D. in Space Systems at MIT, where he worked on the application of artificial intelligence techniques to systems architecture. "The architecture of a system is its highest-level system design, i.e. the selection of the main functions to be performed by the system, the main system components to perform those functions, and their arrangement and interfaces. My favorite metaphor to describe it is as the DNA of the system, because of its ability to determine most of the system's lifecycle properties such as performance, cost, flexibility and so forth."

Selva's doctoral research focused on earth observing satellite systems. Throughout four years, he developed a knowledge-based decision support tool to explore a space of millions of different architectures automatically generated and evaluated by computers using large quantities of expert knowledge. The tool was successfully used to explore a variety of architecture spaces containing the traditional NASA science satellites as well as alternatives such as CubeSats and hosted payloads. Selva's research showed the promise of these alternatives to satisfy a substantial part of the scientific and societal requirements for such systems in a cost-effective way. After graduation, he spent two years of post-doctoral research adapting his tool to help NASA explore the architecture space for their next generation of communication satellites.

At Cornell, Selva has started the Systems Engineering, Architecture and Knowledge (SEAK) lab, which focuses on the development of intelligent software to explore large architecture spaces for complex systems. This is a challenging problem, not only because of the mathematical structure of the problem, but also due to the presence of large sources of uncertainty and ambiguity. For these reasons, the emphasis of these tools is on distributed computing and online interaction with humans as opposed to full automation. "It's a matter of optimal task allocation between humans and computers: we want to use humans to express subjective preferences, to provide high-level strategies to guide the search process, and to describe the high-level structure of the trade space to the computer; conversely, we want to use computers to evaluate architectures in a consistent way, to find patterns among the data, and to more fully explore the architecture space. Ultimately, my goal is to develop a truly symbiotic multi-agent framework where computer agents and human agents learn from each other and collaborate to explore a complex architecture space."

While developing these new tools, Selva's research group also applies tools to study new space architectures that are more performing, more intelligent, more agile, more flexible, and less costly than the current ones. Selva states, "Space architectures have remained practically unchanged for

almost fifty years. The current architectural paradigm represented by single-organization, large monolithic spacecraft is being stretched by more and more stringent requirements: we want much more data, we want higher quality and more customizable data, we want faster access to the data, and we want all of that for little money. Usually, when this happens in any industry, a new architecture eventually appears that partially solves the problem. Then, there is a period of architectural competition until one architecture becomes dominant and the cycle stabilizes again. I think an architectural paradigm shift is under way that will shape the next fifty years of space exploration, and I want to help steer the change."



Exploring the Architecture Trade Space for NASA's Earth Science Decadal Survey Satellites.

STUDENT HIGHLIGHT/ RESEARCH

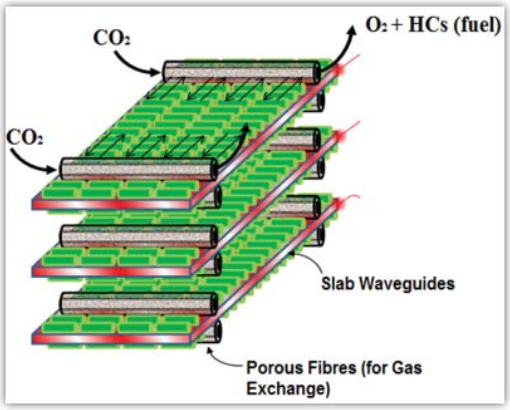
Written by: Aadhar Jain, Ph.D.

The effects of global warming due to continuous and increasing use of fossil fuels have been a cause of concern for a few decades. While numerous alternatives have been developed for generation of electricity—hydroelectric, solar, wind, nuclear, to name a few—almost all the transportation needs, accounting for around 20% of the world energy needs, are still dependent on some form of gasoline as the energy source. The recent evolution in battery technologies, popularized and commercialized successfully in cars by Tesla Motors is however still a luxury for most people, and hardly suitable for the millions taking up cars in the burgeoning economies of India and China.

Biofuels have been touted as the green solution to the problem, with ethanol (among other crop-based fuels) leading the charge albeit successful only due to substantial subsidies. Further, the use of corn based ethanol has led to over a threefold increase in corn prices with cascading effects on prices of other food commodities. As an alternate, algae with up to ten fold greater growth rates and nearly 30 times higher areal yields offers a more sustainable source for biofuel production.

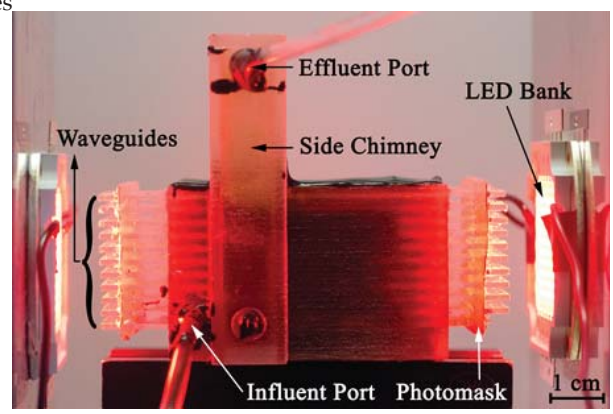
Algae, the ubiquitous green "stuff" that ostensibly grows everywhere and seems more of a nuisance than a biofuel source, have proven hard to commercialize as a biofuel source due to the high capital and operational costs associated with algae production, even in as simple a system as an open pond bioreactor. One of the more significant issues facing algae production currently is the distribution of light in these bioreactors with only a sliver of algae in the pond receiving the optimum range of light – neither too bright as the surface directly exposed at the top, or too dark deep below- for growth and sustenance. This is where the Erickson Lab, with its expertise in developing photonic devices for biological applications, came up with a novel design concept for a photobioreactor which can mitigate the issue of light distribution.

Inverting the paradigm of bringing algae to the light source by the energy and cost intensive mixing processes employed in current photobioreactors design, the new design kept the algae culture stationary and utilized an optical waveguide—a planar counterpart of ubiquitous optical fibers used for global internet—to deliver the light directly to the algae. The technology involved is similar to that found in monitors and TV screens, where scattering particles embedded on the screen are "excited" by light propagating from the edge of the screen. These planar "screens", or light-guiding sheets, were then stacked in a 3D scaffold, with small spacing in between the stacks to house the algae culture. Funded by a large grant from Advanced Research Projects Agency for Energy (ARPA –E), and in collaboration with Professor Largus Angenent from Biological and Environmental Engineering with expertise in bioprocess and bioreactor engineering, the design has now been developed into a prototype for demonstration.



Photobioreactor concept design with stacked "light sheets," with green algae sandwiched between the sheets.

With achieved production rates nearly 5 times higher than a traditional photobioreactor and efficiencies nearly two-fold higher within just a year of development, the developed ultracompact photobioreactor has already shown the benefits of the new concept. Subsidiary technologies, including the incorporation of tiny porous tubes for carbon delivery and fuel extraction, and *in-situ* (i.e. without the need to remove the culture) sterilization of the culture using ultraviolet light, have also been developed for integration into the final bioreactor. The team is now exploring expanding the development to a bench scale model and subsequently commercializing the technology.



The prototype ultracompact photobioreactor with incident red LEDs as the light source.

Each year the Society of Automotive Engineers sponsors the Mini Baja design challenge. Teams world wide design and build a four-wheel racecar capable of navigating the rough terrain of an off-road course.

As a senior on the team, this year marks my fourth year competing as part of Cornell Baja Racing. I joined the team as a freshman with no real experience in off-road racing, but have since learned a great deal about all of the nuances and important design characteristics that go into designing a fast and durable racecar. Cornell Baja Racing builds fast and durable racecars.

This past year we won first place overall in the Illinois Mini Baja Challenge at the Caterpillar Testing Facility in Peoria, Illinois, against more than one hundred teams from all over the world. It was the teams' 4th victory in the past five years. En route to victory the team won the four-hour climatic endurance race for the first time in team history. For me, the endurance race has always been the one thing that sets Mini Baja apart from all other collegiate design competitions. In most collegiate design competitions each team designs and builds their entry, then earns the chance to run it on a closed track to see which team gets the fastest time. That's all well and fine, but what makes Mini Baja special is that during the endurance race all one hundred teams are out on the track racing at the same time. Drivers must deal with the added pressure of racing alongside other drivers. Racecars must be built to withstand the added variability of a dynamic race track. This past year while competing in a Baja SAE event in Pittsburg, Kansas our car was leading the endurance race and in a close battle with the second place team. As we approached an obstacle our driver slowed down, but the team just behind us did not. He collided hard with our back wheel and pushed us forward causing our car to roll. When the dust had settled, we had broken off a front right wheel, and by the time a repair could be made we had been knocked back to near 30th place. That is Mini Baja. That is the kind of unpredictability that makes competing on the team so much fun. I am thankful to Cornell for its support of the team and the wonderful experiences it has given me.

Anyone who wishes to learn more about Cornell Baja Racing can visit our website at http://baja.mae.cornell.edu/

Written by: Noah Wade, Baja Team Leader

MAETEAMS

Rebecca Macdonald is the first Swanson Director of Engineering Student Project Teams at Cornell University. The position was made possible by a generous endowment from John. A. Swanson '61, M.Eng. '63 and is responsible for leading the project teams program. Rebecca was awarded a Ph.D. in civil engineering by the University of Alabama in August of 2013. Macdonald is also a graduate of the Georgia Institute of Technology and has completed two master's degrees - in civil engineering and economics. She previously spent nearly a decade involved in various facets within the energy utility field.

Rebecca Macdonald checks in with the Formula SAE driver Harry Galbraith (BS '18) at competition in Toronto, Canada, on September 27th.

FROM PLANES, TRAINS, AND AUTOMOBILES...

TO ROCKETS, SATELLITES AND SUBMARINES!

MAE students are members on nearly every project team across the College of Engineering, from Concrete Canoe to Genetically Engineered Machines. In fact, approximately a third of MAE undergraduates participate on a team! These highly motivated and dedicated students strengthen their understanding of engineering fundamentals and gain critical professional skills through their work on teams, while fostering a passion for lifelong learning. Project team members are highly sought after by top and emerging companies for their proven capacity for leadership, creative approach to problem-solving, and a host of other desirable skills. Project team members leave Cornell with a solid foundation in engineering fundamentals and the benefit of hands-on experience, including facing real world challenges and constraints; a combination that will excel these students in whatever path they may choose after graduation.

Students on project teams represent not only themselves well, but also exemplify an MAE and Cornell education.

Some of last year's major team accomplishments include:

- The successful launch of CUSat's Nano Satellite, with successful communication from the ground.
- A third place finish for Engineering World Health in their very first competition.
- Cornell Racing returned to design finals with their added aero package.
- CUAUV took home first prize for the third time in San Diego, while running a mission optimizer for the first time.
- Cornell Baja aimed for the lofty goal of taking the Iron Team award and succeeded! (Iron Team is presented to a team that competes in all three Baja events in the U.S. and has the highest point total for all three). Their list of wins for each event included an overall competition win at Illinois, their first ever endurance win, and a number of other dynamic events.
- CUAir repeated last year's competition win with the Best Flight award and is placing second overall after making advances in their design and weight reduction.

One can only imagine what 2014-15 will bring!

> "I learn more on the team than I do in many of my classes. It's the reason I chose Cornell, and I'm really happy with that decision."
> ~CUAir team member

Design Build Fly at competition with Professor Garcia.

"This has been the best part of my Cornell experience. I am constantly surrounded by great team members, supportive faculty, and work that I am actually interested in. My work on the team is what has gotten me my summer internships and will get me a permanent job when I need it." ~CUSD project team member

"Being able to design something independently and sharing that work with the community means a lot to me. The team does a ton of outreach during the spring semester, and it's very important to me to not just build something for ourselves, but to share that work and our message with others."
~CUAUV team member

"This self-governing and self-directing collaborative team environment has been a critical component of my overall learning experience at Cornell. I would wholeheartedly recommend joining a project team to anyone interested!!!" ~CUGEM team member


Engineering World Health 2013 - 2014.

Several faculty members in MAE dedicate their time as advisors for project teams. They are Mason Peck, Yingxin Gao, Al George, Olivier Desjardins, Alan Zehnder, and C. Thomas Avedisian.

With reverence, we remember the broad impact that Professor Ephrahim Garcia had (and still has) on the project team program, having served as advisor to three of the ten Mechanical Engineering advised project teams.

These teams also receive crucial support from Emily Tompkins, in the mechanical engineering undergraduate program office and specialized lab support from Joe Sullivan, David Hartino, Liran Gazit, and Rick Schmidt.

"Joining this project team was the best decision I've made since I came to Cornell. I am learning things here that I otherwise would have had to learn in the real world, without a group of like-minded, caring, individuals willing to help me to learn. I sincerely think that the project teams are one of the best things that the Cornell Engineering School has going for them. Going to college is all about learning and getting a job, right? Well I've learned more useful things from the project teams over the last two semesters than I have from the rest of my college experience. And the things that I have learned from my classes are finally being put to good use."
~FSAE team member


Cornell Rocketry Team prepares for launch.


Cornell Mars Rover at Mars Desert Research Station.

AlumniPROFILE

PETER C. MEINIG
CHAIRMAN
HM International, LLC

Meinig was born in Pennsylvania and graduated from Cornell in 1962 with a Bachelor's Degree in Mechanical Engineering. In 1964, he received a MBA from The Harvard Graduate School of Business Administration. After two years with a steel company in Pittsburgh, Meinig was transferred to Mexico City where he directed a small tool manufacturing business. Subsequently he was Managing Director of one of Mexico's largest auto parts businesses, which fabricated leaf and coil springs and industrial fasteners. He moved to Tulsa in 1979 and founded HM International, LLC. The company has started and acquired numerous manufacturing businesses including ones involved in oil field valves, optical character recognition letter sorting equipment, ethnic frozen foods and pipeline security and communications systems. A past member of the boards of the Williams Companies and Purolator Inc., he served on the Tulsa Library Commissions and was inducted into the Library Hall of Fame. Meinig also was elected to the Oklahoma Hall of Fame in 2004. With his wife Nancy, who he met while in high school, Meinig has endowed two professorships and the women's tennis coach position at Cornell University and the Meinig Family National Scholar Program, which supports entering Cornell students who have displayed leadership potential. A member of Cornell's Board of Trustees since 1991, he served as chairman of the board from 2002 – 2012.

In 2012, Mr. Meinig spoke with some of the graduating students of Cornell University to give advice and talk about what he took away from his Cornell education that prepared him for his career. He began by telling them that he played freshman football in 1957, #32; that he is just an older version of them, "The only difference between then and now is the haircut." While at Cornell he joined the Phi Gamma Delta (Fiji).

"My first job was with Allegheny Ludlum Steel Corporation. It was a fabulous job. My initial salary was a little less than $10,000 a year. I'm sure the average Johnson School graduate today comes out making more than $10,000 a month. I worked for a man who was responsible for all non-steel and international operations. I was basically doing acquisition analysis, reviewing strategic plans, and doing trouble shooting in the subsidiary companies. It was just a fabulous job for somebody coming out of school. I had great

exposure in the company and it really led to my next opportunity which involved one of Allegheny's companies located in Mexico City. The business manufactured tungsten carbide metal cutting tools. We mixed tungsten powder with carbon powder, put it in a pill press, pressed an insert, and then put it in an oven and sintered it at very high temperatures. That produces an insert that is almost as hard as a diamond so it's used in machining steel, machining engine blocks in the automotive industry. The company had about 100 employees, did about $3 million in sales and was unprofitable. In 1966 my boss said, 'Hey Pete would you go to Mexico? We want to figure out what the problems are with this company. You're good in accounting, you can do production scheduling; let's look at their inventory issues.' It was a neat little consulting type of job and I was game and ready to do it. We moved to Mexico City and frankly, the problem turned out to be the individual running the company. So here I was, 26 years old, and the folks in Pittsburgh said they had to find a solution to the problem and as it turns out, I was there, I had learned Spanish – so, I got the job. If they had known the problem was the person running the business, I wouldn't have been the person they sent.

I think there is a lesson here for everyone to think about. Here we were [he and his wife] with a 6 month old baby, we were willing to uproot our family, move to another country, and frankly it's the best move of my life. I got the job, one because I guess I was capable, but I got the job because I was there."

He thinks you should give back, that you can give back with your treasure or with your time. He states, "It doesn't matter whether you can write a big check or not, but be involved, look for opportunities to give back. Cornell is a great place. All of us who are graduates of the university need to find an area either with our time or treasure that we can support and give back to the university."

In May 2007, Meinig donated $25 million to fund research grants to Cornell faculty in the life sciences. Meinig is also a member of the Sphinx Head Society which is the oldest senior honor society at Cornell University. Sphinx Head recognizes Cornell senior men and women who have demonstrated respectable strength of character on top of a dedication to leadership and service at Cornell University.

The Meinigs have three daughters, two of whom are Cornellians, and eight grandchildren.

BERKS COUNTIANS AT CORNELL—Two Berks County scholastic products will be in the Cornell University Freshmen football lineup in its opener against Yale Freshmen Saturday at Ithaca, N.Y. They are fullback Pete Meinig (left), Wyomissing High grad, and center George Hoffman (center), former Central Catholic High athlete. At right is Paul Patten, coach of the Cornell yearlings.

1957

FACULTY


Professor C. Thomas Avedisian

Avedisian Awarded ASME 75th Anniversary Medal: of the Heat Transfer Division to recognize a select group of scientists and engineers for their research contributions and/or service to the Division.


Professor Rebecca Barthelmie

Named the Croll Faculty Fellow and won the European Offshore Wind Energy Conference Poster Prize (one of three non-student prizes) for poster *'Wake merging at Lillgrund'* co-authors Barthelmie, R.J., Pryor, S.C., Hansen, K.S. and Macguire, E.


Professor Joseph Burns

Brouwer Award: An annual award recognizing the achievements of a major contributor to the field of dynamical astronomy. Awardees receive an honorarium, a certificate, and presentation of an award lecture. The main criteria are (a) excellence in scientific research; (b) impact and influence in the field; (c) excellence in teaching and training of students; (d) outstanding advancement and other support of the field through administration, public service or engineering achievement. The Selection Committee seeks a wide range of award candidates differing in age, gender, nationality, occupation, field of interest, and scientific and technical contributions.


Assistant Professor Olivier Desjardins

NSF Career Award: Proposal title, *"Towards Understanding and Modeling Turbulent Atomizing Liquid-Gas Flows."* His goal is to develop a comprehensive, mechanistic and statistical theory of turbulence-interface interactions in liquid-gas flows.


Professor Brian Kirby

Kirby Awarded the Robert '55 and Vanne '57 Cowie Excellence in Teaching Award, Cornell College of Engineering


Assistant Professor Hadas Kress-Gazit

Fiona Ip Li '78 and Donald Li '75 Excellence in Teaching Award and chosen from among eighty-three of the nation's brightest young engineers selected to take part in the National Academy of Engineering's 20th annual U.S. Frontiers of Engineering symposium.


Professor Michel Louge

Served as a Distigushed Visiting Fellow of the Royal Academy of Engineering.


Professor Matthew Miller

Named Associate Director of the Cornell High Energy Synchrotron Source: where he will further develop structural material capabilities.


Associate Professor Mason Peck

NASA Distinguished Public Service Medal: Awarded to Mason Peck, Associate Professor of Mechanical and Aerospace Engineering, who served as NASA's Chief Technologist from January 2012 to December 2013. The Distinguished Public Service Medal is NASA's highest recognition to any nongovernment individual.


Assistant Professor Perrine Pepiot

James M. and Marsha D. McCormick Advising Award, Cornell College of Engineering


Professor Mark Psiaki

Promoted to Fellow of the Institute of Navigation for contributions to GNSS signal processing, software receivers, ionospheric scintillation modeling, satellite orbit and attitude determination. **Institute of Navigation Tycho Brahe Award** for exceptional contributions to the theory and practice of spacecraft attitude and orbit determination and to the advancement of GNSS algorithms for satellite navigation.

Lecturer Hadas Ritz

Ralph S. Watts '72 Excellence in Teaching Award, Cornell College of Engineering

Professor Wolfgang Sachse

One of Four Kendall S. Carpenter Memorial Advising Prizes: Selection is made by the university President, after rounds of selections at the College and Provost levels.

Assistant Professor Daniel Selva

International Faculty Fellow in the Mario Einaudi Center for a period of three years, July 1, 2014 - June 30, 2017 in recognition of internationally focused research and teaching.

Assistant Professor Robert Shepherd

3M Non-tenured Faculty Award: opportunities to share new ideas with their peers and 3M scientists.
and Illinois Young Alumnus for an alumnus under the age of 40 who has demonstrated unusual accomplishments in the early stages of his or her career.

Assistant Professor Ankur Singh

2014 Young Innovator: Ankur Singh is among 13 outstanding U.S. scientists recently recognized as 2014 Young Innovators in Cellular and Molecular Bioengineering.
and Rising Star Award for the 2014 Biomedical Engineering Society Cellular and Molecular Engineering (BMES-CMBE) Meeting. The theme for this scientific meeting is Multi-Scale Mechanobiology: From Morphogenesis to Nuclear Mechanotransduction.

Senior Lecturer, Master of Eng. Director Matt Ulinski

Kenneth A. Goldman '71 Excellence in Teaching Award, Cornell College of Engineering

Professor Marjolein van der Meulen

Chair of the Department of Biomedical Engineering; for a five-year term, July 1, 2014 - June 30, 2019

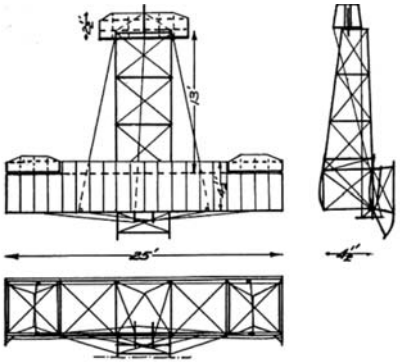
TRIVIA

By: Francis Moon, Professor Emeritus and Sibley Historian

Next year, Cornell will celebrate the sesquicentennial of its charter as a Land Grant university. In the charter year, 1865, Catherine (Kate) Gleason was born to Irish American parents in Rochester NY. Her father started a manufacturing shop making gears and by the time she was a teenager, she was working in the family business. In 1884 and 1888, Kate Gleason was the first female mechanical engineering student in the Sibley College of Mechanical Engineering and Mechanic Arts, taking special courses to help her family business. In 1890 she was treasurer of Gleason Gear Works. Later in 1918 she was the President of First National Bank of Rochester. She was elected the first woman member of ASME in 1917. The ASME Kate Gleason Award is named in her honor. Kate was a strong supporter of women's suffrage. (http://www.winningthevote.org/F-KGleason.html)

Almost a century ago another Sibley student, Clarence W. Spicer, was working on a design project to build a motor car. In 1903 he filed a patent to replace chain drives in automobiles with a universal joint in the drive train. In 1904, he started the Spicer Manufacturing Co., later called Dana Corporation that still exists today. He was elected to the Automotive Hall of Fame. So Cornell project team members have faith – you could be the next Spicer. (http://www.spicerparts.com/heritage)

A decade later another Cornell Sibley team built a student-designed glider. In 1910, the Cornell Aero Club was established. In 1914, this glider was flown on Alumni fields pulled by an automobile. Ivy school glider clubs competed in the years before the first World War.



Cornell Glider No.2 (1910)

During the Cold War in 1981, Professor Wanda Szemplinska-Stupnicka was the first senior woman visiting professor in the College teaching dynamics in the Department of Theoretical and Applied Mechanics, now part of the Sibley School. She was a member of the Polish Academy of Sciences. As a student in Poland she became a famous glider pilot, setting records and flying over the Alps. In a visit to India, Wanda even took the prime minister of India on a flight, to the astonishment of the Indian Government officials. Wanda returned to Poland in 1983 and wrote several books on dynamics and "Chaos Theory". We were sad to learn that she passed away in March 2014 at the age of 81.

Students

The Sibley School community congratulates the graduated students who achieved the highest scholastic averages in Mechanical and Aerospace Engineering for 2014

2014 Senior Class Representative: Ahmed Salah Elsamadisi, B.S., M.E. '14

Adam Trofa
M.Eng. '14;
B.S, M.E. '13

2014 Outstanding Achievement Award: This award is presented to the graduating student who has achieved the highest academic standing in the Master of Engineering Program. Adam was also a recipient of the **2013 Sibley Prize**, for his academic standing in the Mechanical Engineering Class of 2013

Recipients of the 2014 Sibley Prize:

Daniel Floryan
B.S, M.E. '14

Jeff Rah
B.S, M.E. '14

The Sibley prizes were established in 1884 for the two seniors with the highest scholastic averages.

Thomas J. and Joan T. Kelly Prize: Awarded to undergraduate students displaying excellence in aerospace engineering, as demonstrated through coursework or an innovative design project.
Award Recipients: Jovanny Fuentes: B.S., M.E. '14; Rehan Pankaja Kaluarachchi: B.S., M.E. '15 candidate; Craig Chan: M.Eng. '14; Lisa Li: B.S., M.E. '15 candidate; Christina Middleton: B.S., M.E. '14.

Outstanding Senior: Awarded to an undergraduate student who has exemplified strong leadership skills, raising awareness of the Cornell chapter of ASME, through outreach, social and professional activities.
Award Recipient: Jeffry Lew: B.S., M.E. '14

Walter Werring 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: Stephanie Locks: B.S., M.E. '14; Natali Vannoy: B.S., M.E. '14

Frank O. Ellenwood Prize: Awarded to undergraduate students with the highest GPA in heat and power courses.
Award Recipients: Daniel Floryan: B.S., M.E. '14; Judy Kim: B.S., M.E. '14; Timothy Reiher: B.S., M.E. '14

McManus Design Award: Awarded for best technical paper of single or joint authorship presenting an original solution to a design problem or project.
Award Recipients: Jenna Witzleben: B.S., M.E. '15 candidate; Wei-Chih Kuo: Ph.D., M.E. '14; Adam W.S. Lowery: B.S., M.E. '14

R.N. Janeway Automotive Engineering Award: Awarded for technical paper of single or joint authorship presenting an original proposal for an improvement in automotive vehicles.
Award Recipient: Nathaniel Gilbert: M.Eng. '14

Bart Conta Prize in Energy and Environment: Awarded for best work on a research or design project dealing with energy and the environment.
Award Recipients: Sebastien Lachance-Barrett: B.S., M.E. '14; Naomi Weisz: M.Eng. '14; Michael Walsh: B.S., M.E. '14; Laura Nielson: B.S., M.E. '15 candidate; Andrew Vaslas: B.S., C.S. '15 candidate

Sibley Prize for Excellence in Graduate Teaching Assitance: Awarded to Ph. D. students, recognizing their dedication and excellence as teaching assistants for Sibley School courses.
Award Recipients: Matt J. Leineweber: Ph.D., M.E.; Boris Kogan: Ph.D., M.E.

H.D. Block Graduate Teaching Prize: Awarded to a Ph.D. student, recognizing their dedication and excellence as a teaching assistant in Engineering Mathematics and Engineering Mechanics
Award Recipient: Abhishek Srivastava: Ph.D., T.A.M.

Two-year Research Fellowship: Awarded to Ph.D. student, Kevin Kircher from the Hydro Research Foundation.

MAENEWS AND SPOTLIGHTS

CUAUV Won Top Prize in Robo Sub Competition: 17th Annual International RoboSub Competition, July 28-Aug. 3 in San Diego, Calif. With their latest vehicle, Gemini, Cornell took home a $10,000 prize, beating out close to 40 other teams from around the world. (http://www.news.cornell.edu/stories/2014/08/cuauv-again-takes-top-spot-robosub-competition)

CUAIR Scores Big at Autonomous Flight Competition: CUAIR took first in Flight/Mission and second place overall at the Association for Unmanned Vehicle Systems International's 12th annual Student Unmanned Aerial Systems competition. (http://www.news.cornell.edu/stories/2014/06/cuair-scores-big-autonomous-flight-competition)

Ph.D. Malika Grayson places 3rd at the Technical Research Exhibition Competition, Oral Session at National Society for Black Engineers Convention. (http://www.mae.cornell.edu/news/spotlights.cfm?s_id=427&page=2)

Natali Vannoy B.S., M.E. '14 is a recipient of The 2014 Merrill Presidential Scholars Award, which honors Cornell University's most outstanding graduating seniors. (http://www.news.cornell.edu/stories/2014/05/top-seniors-honored-2014-merrill-scholars)

Cruising High Seas, Engineers Detect Fake GPS Signals: For four days in late June, Cornell researchers tested the newest version of their GPS 'spoofing' – a technology that could lead to protection strategies against insidious GPS hackers. (http://www.news.cornell.edu/stories/2014/07/cruising-high-seas-engineers-detect-fake-gps-signals)

Inside Science TV - from Selfies, to Games: to measuring heart rate and calories burned, today's smartphone apps can do a lot of things. (http://www.insidescience.org/content/selfie-your-health/1741)

Publishes History of Innovation Book: Francis Moon, the Joseph C. Ford Professor of Engineering Emeritus, has published his ninth book, Social Networks in the History of Innovation and Invention (Springer 2013). (http://www.news.cornell.edu/stories/2014/06/francis-moon-publishes-history-innovation-book)

Baja Racing Wins Iron Team Award: The Cornell Baja Racing Team seized the Iron Team Award for the first time at the 2014 Baja SAE. The award is given to the team with the highest aggregate score across all three competitions in the North American Series. (http://www.mae.cornell.edu/news/index.cfm?news_id=65781&news_back=)

Cornell Partners with Incodema3D for START-UP NY: Hod Lipson, Associate Professor of mechanical engineering and computer science will help Incodema3D develop novel metals suitable for 3-D printing. (http://www.news.cornell.edu/stories/2014/06/cornell-partners-incodema3d-start-ny)

A New Dimension in Printing Could Reshape How We Live: Three-dimensional printers are becoming fixtures at makerspaces, design studios and factories around the country. (http://www.wpr.org/new-dimension-printing-could-reshape-how-people-live)

Top Seniors Honored as 2014 Merrill Scholars: The Cornell Merrill Presidential Scholars Program honored 33 outstanding graduating seniors. (http://www.news.cornell.edu/stories/2014/05/top-seniors-honored-2014-merrill-scholars)

JanFab Gives Student-Engineering Teams a Leg Up: Combine 80 Cornell students from five engineering project teams. Blend in the frenetic activity from Santa's workshop, marinade in the zest of March Madness, sift in *esprit de corps* of Slope Day and simmer in the serenity of the winter break. (http://www.fortmilltimes.com/2014/02/04/3264157/optofluidics-next-gen-nano-analyzer.html)

SAE Team Practice and Test at Watkins Glen Int'l.: Watkins Glen International announced a partnership with Cornell University that allows track access to the Cornell Racing Team. (http://www.examiner.com/article/motorsports-watkins-glen-int-l-announces-cornell-university-partnership)

Impressive Finishes for Steel Bridge, Concrete Canoe Teams: Both Cornell teams showed major improvement over last year, with the canoe team's second place. (http://www.news.cornell.edu/stories/2014/05/impressive-finishes-steel-bridge-concrete-canoe-teams)

Cracker-sized Satellites Launch into Orbit: After years of planning and several last-minute delays, about 100 Cornell-developed mini satellites demonstrating space flight at its simplest have launched into orbit and are now circling Earth. (http://www.news.cornell.edu/stories/2014/04/cracker-sized-satellites-launch-orbit)

MAENEWS AND SPOTLIGHTS

"Fabricated", 3D Book co-authored by Hod Lipson and Melba Kurman: selected among the Top 25 books in China for 2013, by the China Books Critics Society. (http://www.chinadaily.com.cn/culture/2014-04/25/content_17465705.htm)

What do Tiny Spacecraft and Texas Instruments Have in Common: A graduate student used Texas Instruments Inc.'s technology to launch tiny spacecraft into low Earth orbit. (http://bizbeatblog.dallasnews.com/2014/04/what-do-tiny-spacecraft-and-texas-instruments-have-in-common.html/)

Robot Sumo Battles: One day a year, the atria in Cornell University's Duffield Hall morph from their usual role as a gathering spot for engineering study groups and coffee breaks into an arena for battling sumo-style robots. (http://www.engineering.cornell.edu/magazine/features/mechatronics.cfm)

Tiger Beetle's Chase Highlights Mechanical Law: The tiger beetle, known for its speed and agility, does an optimal reorientation dance as it chases its prey at blinding speeds. (http://www.news.cornell.edu/stories/2014/04/tiger-beetles-chase-highlights-mechanical-law)

Cornell Team Wins $2500 for Children's Programming Tool: Three Cornell mechanical engineering students have won the "Young Innovators" award in the Science, Play and Research Kit Competition, a competition that looks for ideas that "encourage imagination and interest in science." (http://cornellsun.com/blog/2014/04/08/cornell-team-wins-2500-for-childrens-programming-tool/)

Robotic Gripper Makes Marketplace Debut: John Amend, a former Cornell graduate student who developed the gripper technology while he worked in Hod Lipson's Creative Machines Lab, co-founded Empire Robotics after he graduated in 2013. (http://www.news.cornell.edu/essentials/2014/01/robotic-gripper-makes-marketplace-debut)

Engineering World Health Project Team Wins Third Place for EWH design competition in 2014. (http://www.ewh.org/students/design-competition/design-competition)

SUPPORTMAE

Giving and Support

Giving: Private gifts are essential and help to ensure the continued excellence, relevance, and impact of initiatives for MAE. To make a gift using the secure online gift form, please visit: www.giving.cornell.edu or a check made payable to Cornell University, may be mailed to: Cornell University, Box 223623, Pittsburgh, PA 15251-2623. Please be sure to indicate your intention to designate your gift to MAE. Corporate matching gifts count as a gift from you and are a powerful way to double your giving. If your company has a matching gift program, please contact your HR director. Cornell's financial advisors can assist you with a number of gift-giving tools designed to meet your family's financial and philanthropic goals, including securities, trusts, bequests, and real estate. Please visit the Office of Trusts, Estates, and Gift Planning website: http://www.alumni.cornell.edu/fund/ways.cfm.

Graduate Fellowships: Our goal is to provide funding to each first-year Ph.D. student and to provide fellowships as part of the startup for new faculty.

Digital Manufacturing Initiative: Purchase and maintain new, modern equipment (e.g. 3D printing, laser cutters, etc.) for the design and fabrication of engineered systems, particularly for undergraduate research and project teams.

Teaching Laboratory Specialist: Additional technical specialist in support of experiential learning, including instructional labs, shops, wind tunnels, and digital manufacturing.

Teaching Laboratory Fund: Add new and renew laboratory equipment used in student labs, which serve as a cornerstone of the Sibley School courses.

Design Lecturer: Professor of Practice to lead MAE design program, teach design courses, lead the M.Eng program and provide liaison with industry.

Online Learning Initiatives: Develop a new series of online materials (lectures, problems, interactive sessions, simulations), both for on-campus students and the community at large.

Research Seed Grants: Provide support for faculty to undertake new initiatives, new directions and interdisciplinary collaborations.

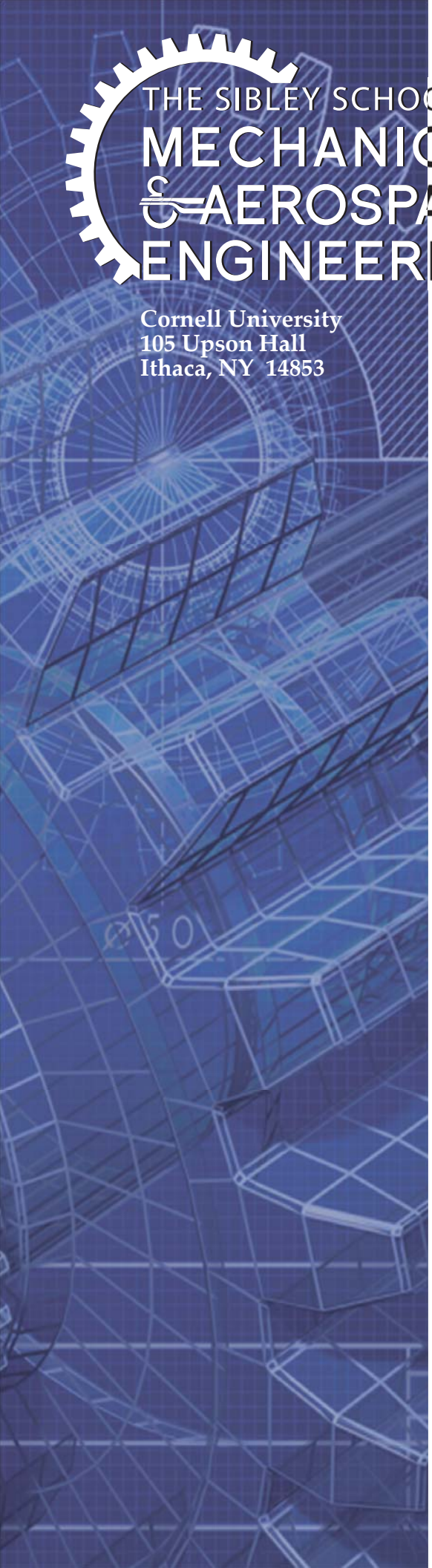
Distinguished Speakers Fund: To enable highly distinguished speakers to visit the Sibley School for the Colloquium and courses.

Student Projects: Provide support for undergraduate and M.Eng student projects in design, project teams, or research.

Student Organizations such as ASME and AIAA: Provide support for outreach activities as well as travel to student conferences.

The Sibley Schoool of Mechanical and Aerospace Engineering Reunion 2014

June 7,2014



THE SIBLEY SCHOOL OF
MECHANICAL & AEROSPACE ENGINEERING

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ON THE COVER
Professor Jane Wang juggles in her office.

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