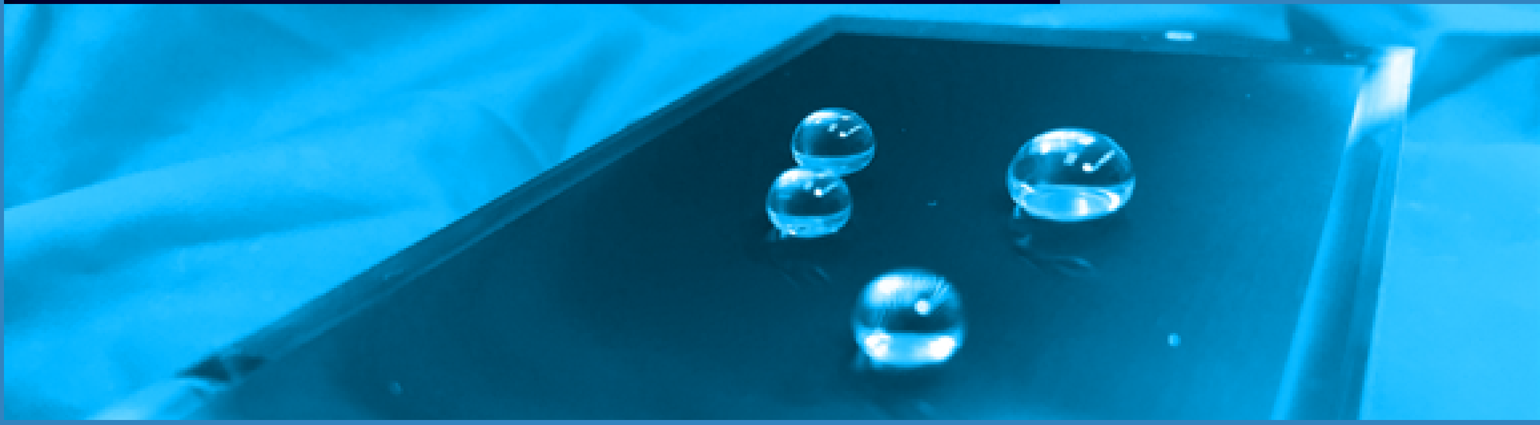
Mechanical & Aerospace Engineering Department
2014-15



UCLA ENGINEERING
Henry Samueli School of
Engineering and Applied Science

Birthplace of the Internet

FROM THE CHAIR

Dear Friends and Colleagues,

I am pleased to present to you the Annual Report of the Mechanical and Aerospace Engineering Department. The Report presents highlights of the accomplishments and news of the Department's alumni, students, faculty, and staff during the 2014-15 Academic Year.

As a member of the global higher education and research communities we strive to make significant contributions to these communities and to positively impact society. From reading these pages, I hope you will sense the pulse of our highly intellectual and vibrant community.

Sincerely Yours,

Tsu-Chin Tsao

Tsu-Chin Tsao, Department Chair

UNIVERSITY OF CALIFORNIA LOS ANGELES
MECHANICAL AND AEROSPACE ENGINEERING DEPARTMENT

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Front cover: Water droplets rolling around on a superhydrophobic surface designed to reduce the friction of water flows. Developed by PhD candidate Mr. Muchen Xu in the Micro and Nano Manufacturing Lab of Prof. CJ Kim.

Back cover: THOR triumphs at 2015 Robocup.

Graphic designer: Alexander Duffy

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Research Centers

CCAS
UCLA-AFRL Collaborative Center for Aerospace Sciences (Karagozian)

FSTC
Fusion Science and Technology Center (Abdou)

SMERC
Smart Grid Energy Research Center (Gadh)

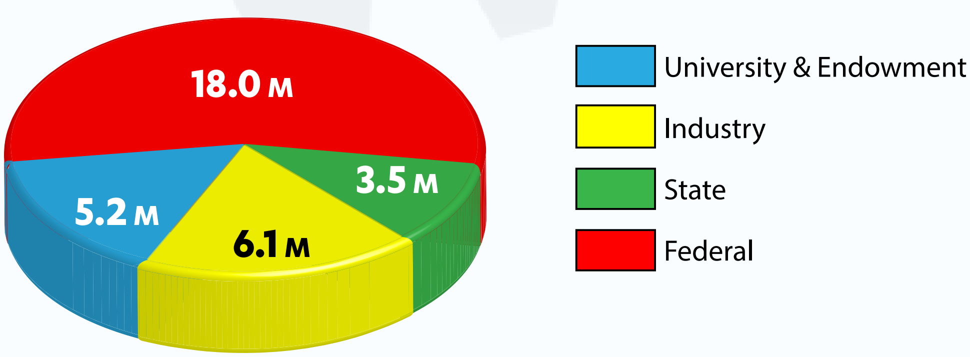
TANMS
Center for Translational Applications of Nanoscale Multiferroic Systems (Carman)

Laboratories and Research Groups

Active Materials (Carman)
Autonomous Vehicles Systems and Instrumentation (Speyer)
Beam Control (Gibson)
Biomechatronics (Santos)
Bionics (Rosen)
Boiling Heat Transfer (Dhir)
Chen Research Group
Complex Fluids & Interfacial Physics (Kavehpour)
Computational Biomechanics (Klug)
Computational Fluid Dynamics
Design and Manufacturing
Energy & Propulsion Research (Karagozian, Smith)
Flexible Structures Design (Hopkins)
Fluid Mechanics Research
Heat Transfer Laboratories
Hypersonics & Computational Aerodynamics Group (Zhong)
Materials Degradation Characterization (Mal)
MATRIX (Ghoniem)
Mechatronics and Controls (Tsao)
Micro Nano Manufacturing (Kim, C.J.)
Micro Systems (Ho)
Modeling of Complex Thermal Systems (Lavine)
Morrin-Gier-Martinelli Heat Transfer Memorial (Catton, Pilon)
Multifunctional Composites
Multiscale ThermoSciences (Ju)
Nanoscale Heat Transfer & Thermoelectric
Optofluidics Systems (Chiou)
Pilon Research Group
Plasma and Beam Assisted Manufacturing
RoMeLa: Robotics & Mechanisms Laboratory
Simulations of Flow Physics and Acoustics (Eldredge)
Thin Films, Interfaces, and Composites Characterization (Gupta)
Turbulence Research (Kim, J.)
Wirz Research Group

Fiscal Year 2014-15 Sponsored Research Budget - Total $32.8 M

(Fiscal Year 2014-15 Sponsored Research Expenditures - Total $14.2 M)



Student Overview

Undergraduate Admissions Statistics

Freshman Admissions	Mechanical	Aerospace	Total
Applicants	2993	1184	4177
Admits	375	151	526
Admit Rate	12.5%	12.8%	
Positive SIR	129	36	165
New Students Enrolled	128	34	162

Transfer Admissions	Mechanical	Aerospace	Total
Applicants	549	140	689
Admits	87	17	104
Admit Rate	15.8%	12.1%	
Positive SIR	35	14	49
New Students Enrolled	31	14	45

Graduate Admissions Statistics

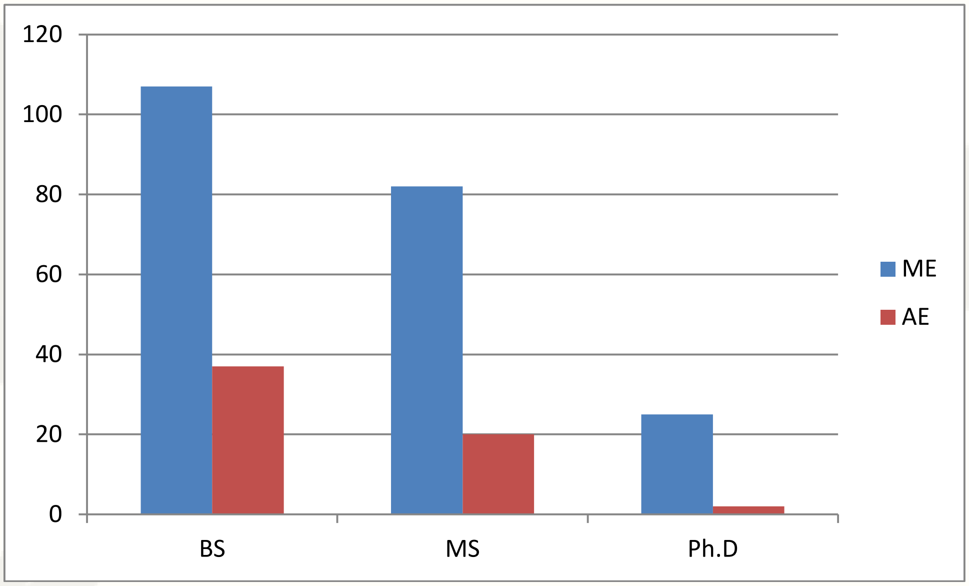
	Applicants			Admits			Enrolled		
	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total
Mechanical	205	516	721	140	137	277	59	57	116
Aerospace	82	65	147	48	18	66	27	5	32
Total	***287***	***581***	***868***	***188***	***155***	***343***	***86***	***62***	***148***

Number of ME & AE degrees conferred 2014-15 (BS, MS, PhD)

BS Mechanical 107
BS Aerospace 37
Total 144

MS Mechanical 82
MS Aerospace 20
Total 102

PhD Mechanical 25
PhD Aerospace 2
Total 27



Funding Received by Graduate Students	Amount
GSR salaries	$1,526,459.64
Graduate Divsions	$680,169.00
Fellowships (Out of State)	$360,640.00
Eugene Cota- Robles (ME)	$322,307.04
SEAS Dean	$132,000.00
Fellowships (In State)	$89,934.00
Eugene Cota- Robles (AE)	$80,576.76
NonResident Graduate Doctroal Awards	$75,510.00
Graduate Dean's Scholar Award (4)	$58,000.00
Graduate Opportunity Fellowship (AE)	$33,288.38
Graduate Opportunity Fellowship (ME)	$33,288.38
Total	$3,392,173.20

THOR triumphs at 2015 RoboCup

By Bill Kisliuk

Dennis Hong

THOR, a humanoid robot under the command of UCLA and University of Pennsylvania, has kicked its way to the top of the robotic soccer world, winning first place and a top technology trophy on July 22 at RoboCup, an annual robot soccer tournament held this year in Hefei, China. More than 400 teams from 40-plus countries participated.

UCLA and University of Pennsylvania students partnered to lead Team THORwIn (named for THOR and Darwin, a smaller robot that the team has competed with in the past) to victory in the adult-size humanoid robot category with a 5-4 win in the finals over Baset Robot Laboratory of Tehran. Team THORwIn also earned RoboCup's Louis Vuitton Cup Best Humanoid Award, given to the team that best demonstrates advances in artificial intelligence and robotics.

The world championship title is the second in a row for UCLA and the fifth consecutive championship — and second Louis Vuitton award — for team leader Dennis Hong, a professor of mechanical and aerospace engineering at the UCLA Henry Samueli School of Engineering and Applied Science. Hong led RoboCup teams for Virginia Tech before joining the UCLA Engineering faculty in 2014.

THOR, short for Tactical Hazardous Operations Robot, is a 5-foot-tall, 119-pound humanoid with hardware designed and built primarily by students in Hong's Robots and Mechanisms Laboratory (RoMeLa) at UCLA. The software that guides THOR to make the right moves on the field was developed primarily by students in UPenn's General Robotics Automation, Sensing and Perception (GRASP) Laboratory, led by professor Daniel Lee.

RoboCup athletes are autonomous robots that are programmed to perform independently of humans once they are on the soccer pitch. To be successful they must combine speed and agility, kick a ball with either foot, maneuver around the field and be able to sense the locations of opposing players as well as the goal.

The two laboratories have worked together for years and entered THOR in the DARPA Robotics Challenge last month in Pomona.

Several UCLA students traveled to Hefei for the tournament, including Min Sung Ahn, a robot handler who worked on software; Kevin Liu, a robot handler who focused on hardware; and Rachel Park, who served as a referee and worked on strategy. Postdoctoral researcher Hak Yi was team manager and handled logistics.

In an email to Team THORwIn members who did not go to China, Ahn reported that conditions were challenging in the early rounds: Electricity was spotty as many teams powered up their robots at the same time. And the white background in the competition area made it difficult for the robot's vision-processing equipment. "However," Ahn wrote, "as it is the same for all teams and as four-time defending champs, we are figuring out our ways through these obstacles successfully."

Alumnus Virgil Bourgon, who earned a bachelor's degree from UCLA Engineering in 1961 and a master's degree in 1964, and his wife Mary sponsored the team's China trip.

While today's adult-sized humanoid robots lumber around the field slowly, the smaller robots in other categories are faster and more agile. Winners in these categories included Carnegie Mellon University, the Chiba Institute of Technology in Japan, and the University of New South Wales in Australia.

The ultimate goal of RoboCup is to host a competitive human vs. robot match by 2050.

At the end of the event, the teams met for a symposium to address the latest research in robotics.

"RoboCup is action-packed," said Hong. "Thousands of people from all around the world with cutting-edge robots and technology are all in one place. While it is great to win, the event is more about friendship than competition."

Video of THOR in action at the DARPA Robotics Challenge is available at https://www.youtube.com/watch?v=JhWYYuba1nE.

UCLA's humanoid robot flexes its muscles at international competition

Professor Dennis Hong and a team of students competed with their humanoid robot to build a robot that can go places humans cannot

Story by Judy Lin and Bill Kisliuk | Photos by John Vande Wege

The future of disaster response, as envisioned by the U.S. Defense Advanced Research Projects Agency (DARPA), is in the electro-mechanical hands of robots. Guided by sophisticated computer software, they will be able to carry out complex, dangerous tasks, like disabling a nuclear power plant during a radiation-spewing meltdown, without putting human lives at risk.

The opportunity to play a part in DARPA's vision for the future came for UCLA engineering professor and renowned robotics expert Dennis Hong last weekend, June 5-6, at the Pomona Fairplex. That's where a robot he created, THOR-RD, competed against other robots developed by 23 other teams from around the world.

At stake for THOR, Hong and the robot's 35-member team of postdoctoral, graduate and undergraduate students from UCLA and the University of Pennsylvania were pride points and $3.5 million in prize money to fund future research and development.

"The top robotics researchers in the world compete," said Hong during the event. "But we're friends and colleagues. Nobody's really doing it for the money. The goal is to develop technology that one day will save people's lives."

UCLA students first began preparing THOR — a 5-foot-tall, 119-pound humanoid robot — for the challenge last year when Hong joined the faculty at the UCLA Henry Samueli School of Engineering and Applied Science, which recruited him and other experts to build a world-class robotics program.

To reach the finals, THOR outperformed other bots at preliminary trials. But for the final clash of the robotic titans, DARPA was challenging the robots and their human masters to execute even tougher moves — from driving a vehicle to stepping over a pile of rubble without taking a tumble.

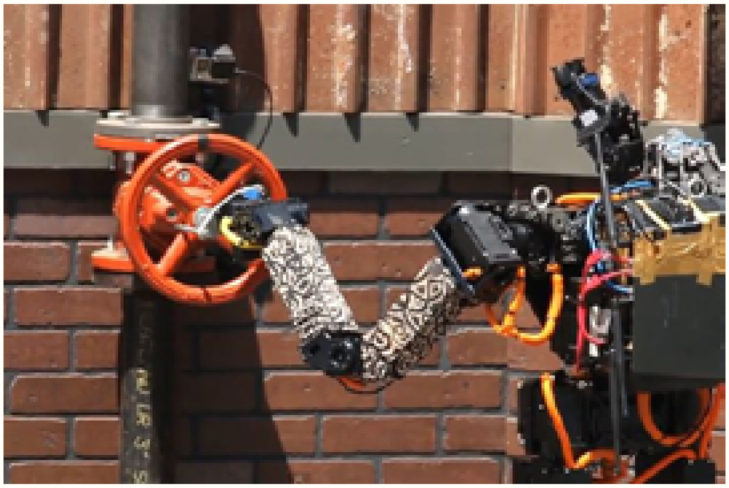
The competitors started arriving at the Fairplex early last week, setting up in "the garage," a hangar-like building where teams worked around the clock, performing maintenance on their robots, testing robot limbs, writing code on banks of laptops set up on portable tables, eating and occasionally napping. Team THOR's bay was strewn with wires, routers, laptops, power strips, power drills, screwdrivers, duct tape and hardhats bearing the UCLA and UPenn logos.

THOR's team essentially functioned as two units working side-by-side. The UCLA crew primarily handled the mechanical engineering, or physical traits, of the robot. One of their biggest challenges, said Hong, was to find the best design and material for the "gripper" that would enable THOR's hand to perform fine-motor tasks like turning a doorknob and picking up and operating an electric drill.

The UPenn crew, led by Daniel Lee, professor of engineering and director of the General Robotics Automation, Sensing, Perception Lab, primarily perfected the software that works with the robot's sensors to see, identify and respond to objects in its surroundings — essential skills for pulling off semi-autonomous tasks like spotting a door across a room or navigating a vehicle along a winding course — all managed from two computers.

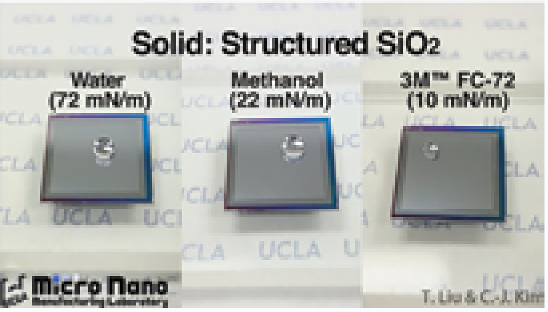
"This is a very, very special place right now," said Hong, as all the teams worked into the wee hours of the morning preparing for Friday and Saturday competition runs. "In the future, all the breakthroughs in humanoid robotics will be coming out from people in this very room."

Please click here to read the entire article at http://newsroom.ucla.edu/stories/uclas-humanoid-robot-flexes-its-muscles-at-international-competition.



UCLA engineers create 'superomniphobic' texture capable of repelling all liquids

By Matthew Chin



Superomniphobic surface

Water, methanol and FC-72, a fluorinated solvent, rolling around on the UCLA researchers' superomniphobic surface.

A pair of researchers from the UCLA Henry Samueli School of Engineering and Applied Science has created the first surface texture that can repel all liquids, no matter what material the surface is made of.

Because its design relies only on the physical attributes of the texture, the texture could have industrial or biomedical applications. For example, the surface could slow corrosion and extend the life of parts in chemical and power plants, solar cells or cookware.

Water will bead up on a nonstick cooking pan because it is coated with a hydrophobic material that repels water thanks to its chemical composition. If the hydrophobic material also is rough at the microscopic scale, it can trap air at its surface, causing the water to bead up and roll around effortlessly. Scientists have named such surfaces "superhydrophobic" to distinguish their unusual zeal to repel water. As an example in nature, water droplets will bead and roll down on some leaves.

"At the microscopic scale, the leaves' surfaces are 'hairy' and points of contact with water are reduced," said Chang-Jin "CJ" Kim, a UCLA professor of mechanical and aerospace engineering, and the study's principal investigator. "This reduction in points of contact means the water is held up by its own surface tension. Manmade superhydrophobic surfaces have been designed to take advantage of this phenomenon by forming microscale roughness or patterns on a hydrophobic material."

While a nonstick cooking pan is hydrophobic, it is not "oleophobic," meaning that it does not repel oil-based liquids. Cooking oil spreads out rather than beading up because it has a lower surface tension than water, making it more difficult to repel. Since the material is not oleophobic, roughening it won't make its surface oleophobic, let alone "superoleophobic."

However, in recent years scientists have created certain microscopic textures capable of making surface hydrophobic materials' surfaces not only oleophobic but also superoleophobic.

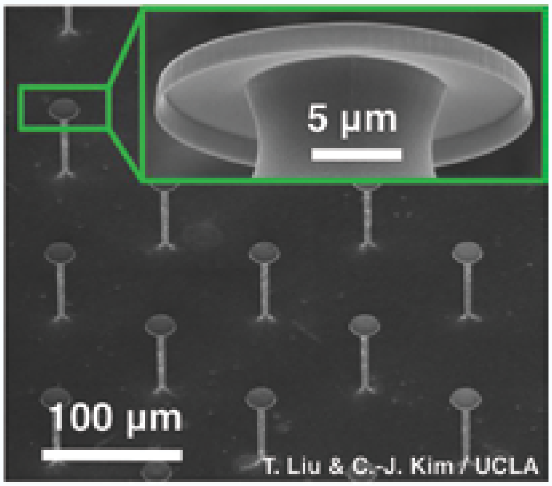
But a true "omniphobic" surface — one that can repel any liquid, even those with the lowest surface tensions — has remained elusive.

Liquids with extremely low surface tension will "wet" not only the cooking pan but also even the best-performing superoleophobic surfaces today, collapsing into their microscopic texture. These liquids include fluorinated solvents, some of which are used for industrial applications like cooling electronic devices. Although the term "superomniphobic" began to be used by some, no surface was shown to repel the fluorinated solvents.

Working with Tingyi "Leo" Liu, a postdoctoral scholar in Kim's lab and the paper's lead author, Kim demonstrated for the first time true omniphobicity. The engineers formed a surface covered with thousands of microscale flathead nails, each about 20 micrometers in head diameter — each much smaller than the width of a typical human hair — resembling the appearance of existing superoleophobic textures.

The effect had never previously been observed, either on manmade or natural surfaces. It relies solely on the physical attributes of the texture, rather than any chemical properties of the material the surface is made of. Kim said it would actually be appropriate to call it a "mechanical" surface.

The research, which was part of Liu's doctoral dissertation at UCLA, is published in the journal Science. Videos of the surface in action are available at the UCLA Newsroom.



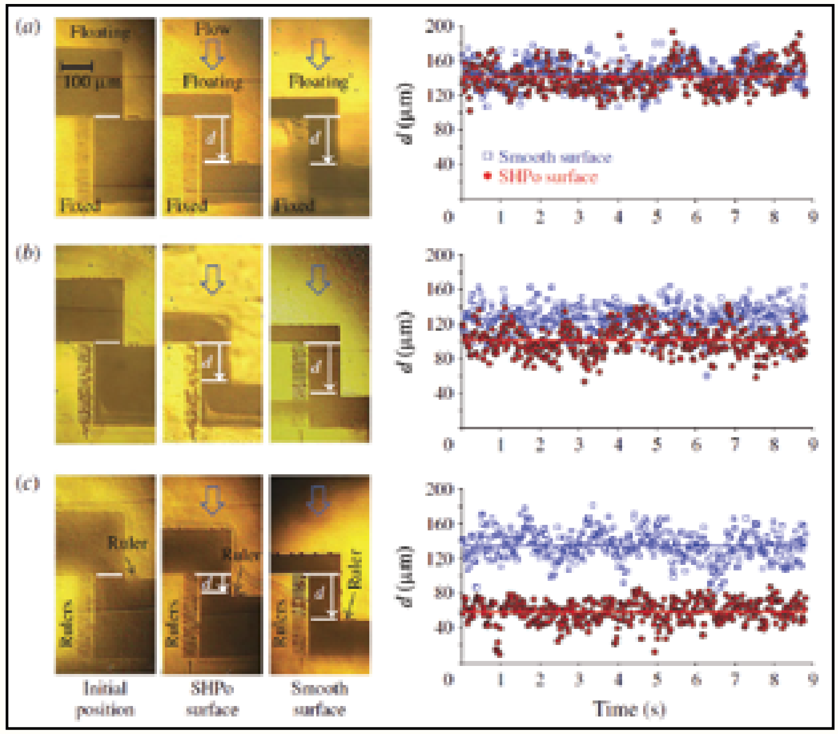
Above: Microscopic view of the superomniphobic surface.

CJ Kim: Superhydrophobic surfaces slippery even under turbulence

By Matthew Chin

Since their introduction 10-20 years ago, superhydrophobic surfaces have been a very popular R&D topic for their key application – reducing drag of water flows. Microscale roughness or grooves trap a film of air and allow water to "slip" over the engineered surface, rather than "stick" the surface. Think of an air hockey table where the thin layer of air keeps the puck from surface friction.

Superhydrophobic surfaces have been proven to reduce drag of liquid flows in capillary tubes under laminar flow conditions – where the liquid moves in an orderly and predictable way. However, most important applications involve open flows under turbulent conditions – characterized by relatively faster speeds and chaotic mixing. Tests by several groups have been inconsistent in their respective results, leaving fundamental questions as to whether or not superhydrophobic surfaces would have a chance for real world applications.



Above right: Displacement readings of three exemplary samples.

Now, researchers at the UCLA Henry Samueli School of Engineering and Applied Science have proven such surfaces indeed perform well under turbulent conditions. The key was they developed an experimental method that produces unequivocal results. The novel experiment had both the superhydrophobic and control surfaces on a single silicon chip that was etched by photolithographic microfabrication, allowing the two surfaces to be tested at the same time and location in a turbulent flow and compared directly. This method allowed the group to develop the surfaces for high performance, leading to a reduction in drag as much as 75 percent – by far an unprecedented high value.

"The certainties of comparative measurements made possible by the lithographic microfabrication of samples and the direct visual observation of flow tests definitively showed that superhydrophobic surfaces can be designed to work under open turbulent conditions as well," said Chang-Jin "CJ" Kim, UCLA professor of mechanical and aerospace engineering and director of the Micro and Nano Manufacturing Lab.

The research was published in the Journal of Fluid Mechanics. Other authors are two former post-doctoral scholars of Kim's: Hyungmin Park, now on the faculty of Seoul National University, South Korea, and Guangyi Sun, on the faculty of Nankai University, China.

Chang-Jin Kim

"Perhaps the biggest application for these types of superhydrophobic surfaces would be on the undersides of ocean-going cargo ships," Kim said. "Reducing drag as they move across open waters could save significantly in fuel consumption – cutting down on fuels costs and on gas emissions. Studies have shown that today, oceanic shipping alone accounts for nearly 10 percent of the global oil supply and about 4 percent of carbon dioxide, 25 percent of nitric oxide, and 10 percent of sulfuric oxide emissions of the world, so even a moderate amount of drag reduction can have a huge global impact. Certainly, there are still challenges to address, but using these surfaces for real-world applications now seems much more possible than it was several years ago. It's exciting."

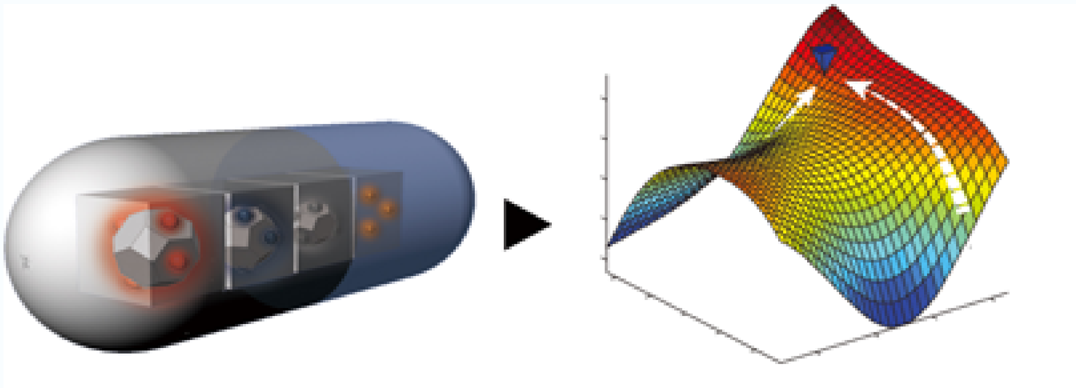
The work was supported by grants from the Office of Naval Research and the National Science Foundation.

Chih-Ming Ho: Cutting-edge technology optimizes cancer therapy with nanomedicine drug combinations

UCLA bioengineers develop platform that offers personalized approach to treatment

By Brianna Aldrich | Please read full article at UCLA Newsroom

Nanomedicine combo therapy



Optimization of nanomedicine combination therapy. Schematic of a combination therapy based on nanodiamond-drug complexes for breast cancer treatment, left. The technology platform constructs a personalized response map that pinpoints the optimal drug-dose ratio, right. (American Chemical Society)

In greater than 90 percent of cases in which treatment for metastatic cancer fails, the reason is that the cancer is resistant to the drugs being used. To treat drug-resistant tumors, doctors typically use multiple drugs simultaneously, a practice called combination therapy. And one of their greatest challenges is determining which ratio and combination — from the large number of medications available — is best for each individual patient.

Dr. Dean Ho, a professor of oral biology and medicine at the UCLA School of Dentistry, and Dr. Chih-Ming Ho, a professor of mechanical engineering at the UCLA Henry Samueli School of Engineering and Applied Science, have developed a revolutionary approach that brings together traditional drugs and nanotechnology-enhanced medications to create safer and more effective treatments. Their results are published in the peer-reviewed journal ACS Nano.

Chih-Ming Ho, the paper's co-corresponding author, and his team have developed a powerful new tool to address drug resistance and dosing challenges in cancer patients. The tool, Feedback System Control.II, or FSC.II, considers drug efficacy tests and analyzes the physical traits of cells and other biological systems to create personalized "maps" that show the most effective and safest drug-dose combinations.

Currently, doctors use people's genetic information to identify the best possible combination therapies, which can make treatment difficult or impossible when the genes in the cancer cells mutate. The new technique does not rely on genetic information, which makes it possible to quickly modify treatments when mutations arise: the drug that no longer functions can be replaced, and FSC.II can immediately recommend a new combination.

"Drug combinations are conventionally designed using dose escalation," said Dean Ho, a co-corresponding author of the study and the co-director of the Jane and Jerry Weintraub Center for Reconstructive Biotechnology at the School of Dentistry. "Until now, there hasn't been a systematic way to even know where the optimal drug combination could be found, and the possible drug-dose combinations are nearly infinite. FSC.II circumvents all of these issues and identifies the best treatment strategy."

The researchers demonstrated that combinations identified by FSC.II could treat multiple lines of breast cancer that had varying levels of drug resistance. They evaluated the commonly used cancer drugs doxorubicin, mitoxantrone, bleomycin and paclitaxel, all of which can be rendered ineffective when cancer cells eject them before they have had a chance to function.

The researchers also studied the use of nanodiamonds to make combination treatments even more effective. Nanodiamonds — byproducts of conventional mining and refining operations — have versatile characteristics that allow drugs to be tightly bound to their surface, making it much harder for cancer cells to eliminate them and allowing toxic drugs to be administered over a longer period of time.

The use of nanodiamonds to treat cancer was pioneered by Dean Ho, a professor of bioengineering and member of the UCLA Jonsson Comprehensive Cancer Center and the California NanoSystems Institute.

Eric Pei-Yu Chiou: UCLA researchers deliver large particles into cells at high speed

By Matthew Chin

A new device developed by UCLA engineers and doctors will eventually help scientists study the development of diseases, enable them to capture improved images of the inside of cells and lead to other improvements in medical and biological research.

The researchers created a highly efficient automated tool that delivers nanoparticles, enzymes, antibodies, bacteria and other "large-sized" cargo into mammalian cells at the rate of 100,000 cells per minute — significantly faster than current technology, which works at about one cell per minute.

The research, published online in Nature Methods on April 6, 2015, was led by Eric Pei-Yu Chiou, associate professor of mechanical and aerospace engineering and of bioengineering at the Henry Samueli School of Engineering and Applied Science. Collaborators included students, staff and faculty members from the engineering school and the David Geffen School of Medicine at UCLA.

Currently, the only way to deliver so-called large cargo, particles up to 1 micrometer into cells is by using micropipettes, syringe-like tools common in laboratories, which is much slower than the new method. Other approaches for injecting materials into cells — such as using viruses as delivery vehicles or chemical methods — are only useful for small molecules, which are typically several nanometers in length. (A nanometer is one one-thousandth of a micrometer.)

The new device, called a biophotonic laser-assisted surgery tool, or BLAST, is a silicon chip with an array of micrometer-wide holes, each surrounded by an asymmetric, semicircular coating of titanium. Underneath the holes is a well of liquid that includes the particles to be delivered.

Researchers use a laser pulse to heat the titanium coating, which instantly boils the water layer adjacent to parts of the cell. That creates a bubble that explodes near the cell membrane, resulting in a large fissure — a reaction that takes only about one millionth of a second. The fissure allows the particle-filled liquid underneath the cells to be jammed into them before the membrane reseals. A laser can scan the entire silicon chip in about 10 seconds.
Chiou said the key to the technique's success is the instantaneous and precise incision of the cell membrane.

"The faster you cut, the fewer perturbations you have on the cell membrane," said Chiou, who is also a member of the California NanoSystems Institute.

Device can insert 'cargo' into 100,000 cells per minute, up from current standard of about 1 per minute

Inserting large cargo into cells could lead to scientific research that was previously not possible. For example, the ability to deliver mitochondria, could alter cells' metabolism and help researchers study diseases caused by mutant mitochondrial DNA.

It also could help scientists dissect the function of genes involved in the lifecycle of pathogens that invade the cell and understand the cell's defense mechanisms against them.

"Now it doesn't matter the size or type of material you want to deliver. You can just push all of it into the cell," Chiou said.

"The new information learned from these types of studies could assist in identifying pathogen targets for drug development, or provide fundamental insight on how the pathogen–host interaction enables a productive infection or effective cellular response to occur," said Dr. Michael Teitell, chief of the division of pediatric and developmental pathology, and a co-author of the paper.

Because the device can deliver cargo to 100,000 cells at once, a single chip can provide enough data for a statistical analysis of how the cells respond in an experiment.

The paper's first author was Yi-Chien Wu, a former student of Chiou's who received his doctorate in December. Other UCLA authors were Ting-Hsiang Wu, a former doctoral student of Chiou's; Dr. Daniel Clemens, adjunct professor of medicine; Bai-Yu Lee, an assistant researcher; Ximiao Wen, a graduate student in mechanical engineering; and Dr. Marcus Horwitz, professor of medicine and of microbiology, immunology and molecular genetics.

The research was supported by a University of California Discovery Biotechnology Award, the National Institutes of Health, NanoCav and the National Science Foundation.

Adrienne Lavine leads new Solar Thermochemical Storage with Anhydrous Ammonia project

Adrienne Lavine

On July 1, 2014, UCLA's MAE Department began its DOE Sunshot Award project "Solar Thermochemical Storage with Anhydrous Ammonia." The participants from the department are Professors Adrienne Lavine (the PI), Richard Wirz, and Pirouz Kavehpour, and Dr. Gopinath Warrier.

In Concentrating Solar Power (CSP) plants, there is a need to store energy to generate electricity at night or for cloudy periods. The current state-of-the-art is to store energy "thermally" by heating up molten salt. This technology requires large volumes of molten salt, at considerable expense. In contrast, "thermochemical" storage stores energy in chemical bonds; this allows energy to be stored in a much smaller volume and consequently has the potential for lower costs. The team will conduct research on using the ammonia dissociation and synthesis reactions for energy storage in a CSP plant. Solar energy would be used to dissociate ammonia (NH3) into nitrogen (N2) and hydrogen (H2). These gases would be stored and recombined at night to synthesize ammonia, giving off heat to power a turbine and generate electricity.

In an interview with *Climate Wire*, Prof. Lavine was quoted about the program:

"In general, thermochemical storage has a potential to use a smaller volume because you can store more energy in chemical bonds for a given mass than you can in just raising the temperature of a fluid," explained Adrienne Lavine, a professor of mechanical and aerospace engineering at the University of California, Los Angeles.

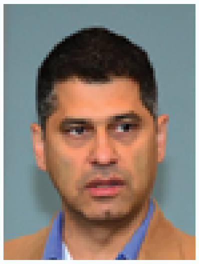
"The advantages [of ammonia] are mainly that it's a very simple reaction and very plentiful materials are involved," Lavine said. Though the process is mature, she noted that gases are not as energy-dense as other thermochemical approaches, so her team is investigating the feasibility of storing these gases underground.

On the experimental side, Lavine is looking into how to run the ammonia storage process around 650 degrees Celsius, the target temperature for supercritical steam. "Even though it is a well-understood process, it has not [yet] been run at the high temperatures that we want to achieve," she said.

Links:
DOE Press Release
List of Funded Projects (including UCLA MAE's)

Pirouz Kavehpour: Breaking the Code for 3-D Printing

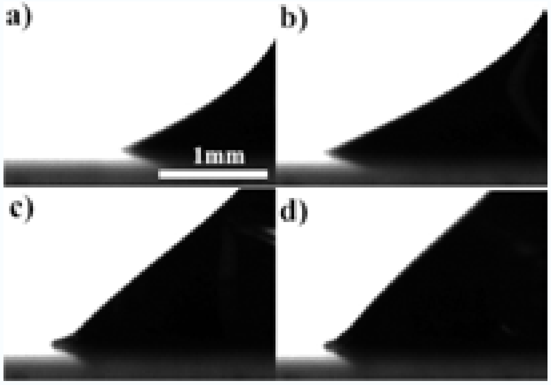
By Matthew Chin



Pirouz Kavehpour

Researchers at the UCLA Henry Samueli School of Engineering have defined precise parameters for a 3-D printing process, which could give users of the technology high-precision control what they print down to microscopic resolutions.

Three-dimensional printing technology has quickly grown in recent years, as it's come down in cost, and pushed by innovators in the sciences, technology and the arts. Much like an ink-jet printer, drop-based 3-D printers lay down drop after drop of a liquid that quickly cools into a solid. Using computer-aided design, printers can make an endless array of three-dimensional objects from these droplet building blocks. The research was published in Langmuir.

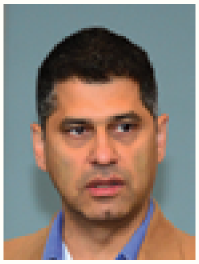


Hexadecane spreading and solidification sequence on a cold glass substrate at (a) 80, (b) 1323, (c) 1833, and (d) 3667 ms after the touchdown (*Ste* = 0.03) with a flow rate of 200μ L/min.

However, while the technology has flourished, the physics of how and when those drops spread and solidify was not known. Now, UCLA researchers have developed guidelines for this process following theoretical and experimental work.

"What we've done is defined the precise guidelines on a microscopic scale, of how and when those liquid drops turn into solid form – taking in to account liquid's properties such as melting point, thermal capacity, and the substrate temperature," said Pirouz Kavehpour, a UCLA associate professor of mechanical and aerospace engineering who was the principal investigator on the research. "While there's been a rapid adoption and expansion of 3-D printing technology over the past few years, we're only seeing the first waves of applications. This model can allow innovators a new level of control on what they can print, and how quickly and efficiently it can be printed."

UCLA engineers receive $1.6M grant to develop hybrid energy storage system



Pirouz Kavehpour

A team of engineers from the UCLA Henry Samueli School of Engineering and Applied Science, in partnership with Southern California Edison, has received a $1.62 million grant from the California Energy Commission to build a hybrid energy storage system that stores energy harvested from intermittently productive renewable sources such as solar panels and wind farms, then releases that energy into the grid when demand is high.

The lead investigator is Pirouz Kavehpour, UCLA professor of mechanical and aerospace engineering (MAE). Other UCLA faculty on the team are MAE faculty Richard Wirz, Adrienne Lavine and Rajit Gadh.

The energy system under development is a hybrid of compressed air energy storage and thermal energy storage technologies. Although compressed air has long been used in energy storage, this system will use a state-of-the-art, high-temperature storage unit to enhance storage capacity and economic viability. This innovative technology offers the potential for a highly efficient, ultra low-cost zero-carbon emission solution for storing intermittent renewables.

This approach stores energy at a very low cost compared to batteries and other technologies currently on the market, said Kavehpour. "Our estimated cost of energy for this unit is about $100 per kilowatt hour, which is much lower than any battery system of which we are aware."

The technology will be built on the Cal Poly Pomona campus and will be operated in conjunction with Southern California Edison. technical conferences and is on the editorial board of several technical journals.

Xiaochun Li: UCLA researchers receive $1.29M NSF grant for scalable nanomanufacturing

Xiaochun Li

A team of UCLA researchers has received a $1.29 million, four-year grant from the National Science Foundation to explore low-cost methods of manufacturing fibers with unprecedented continuous metal nanowires — a material with potential for ultra high-resolution cellular electrophysiology analysis technologies that could conduct sub-cellular and intracellular measurements down to a single biological cell.

The principal investigators of the research team include Xiaochun Li, Raytheon Professor of Manufacturing and Chi On Chui, associate professor of electrical engineering and bioengineering, both of the UCLA Henry Samueli School of Engineering and Applied Science; and Huan Meng, an adjunct assistant professor of nanomedicine at the UCLA David Geffen School of Medicine.

While there is a great demand for the high-volume production of fibers with continuous metallic nanowires, there has not been a reliable and scalable manufacturing method due to fundamental and technical issues surrounding their nanoscale size. This includes instability of molten metals during thermal drawing of the wires, and difficulties controlling wire formation using traditional manufacturing techniques.

The UCLA research team will explore novel approaches to address these barriers to a low-cost, reliable and scalable nanomanufacturing process.

Current cellular electrophysiology analyses are used in high-volume, such as the development of pharmaceuticals, toxicity screenings, and threat detection. Using fibers with continuous nanowires as narrow as just tens of nanometers in diameter would enable high resolution analytical platforms, which could examine a single to few biological cells at a time. The resultant platforms could measure cellular events that, for example, indicate the presence of cancer cells, earlier than current technologies can. Specifically, the researchers and their students will explore theoretical materials and functional designs for nanoelectrode arrays; scalable nanomanufacturing of fibers with metal nanowires through thermal drawing; observation and characterization of nanoelectrode arrays; and development and validation of nanoelectrode-enabled cell-based assay platforms.

Other potential technologies for this include high-resolution semiconductors and metamaterials characterizations, and neural and cardiac electrical signal recorders.

Rajit Gadh

Rajit Gadh

Rajit Gadh and the Internet of Everything

UCLA MAE Prof. Rajit Gadh was quoted in UCLA Magazine about the Internet of Everything:

Refrigerators, Meet the Grid

If our electric cars and appliances could talk to the power grid, they could automatically use minimal energy during expensive peak periods. That's the concept behind the work of Rajit Gadh, engineering professor and founder of the UCLA Smart Grid Energy Research Center (SMERC). Gadh and his team developed the WINSmartGrid, which allows electric cars, washers, dryers and air conditioners to be monitored, connected and controlled via a wireless or wireline hub. SMERC is in the process of adding electronics to about 30 refrigerators and installing them in UCLA dorms to gather usage data and demonstrate the effectiveness of the devices. The smart fridges will communicate with the local electricity grid in order to reduce the power used during the grid's top demand time. "The temperature may go down a little in the main part of the fridge, or the automatic defrost cycle may be delayed to a nonpeak time, but residents hardly notice," Gadh says.

Additionally, SMERC is researching smart sensors that would tweak our lighting, heating and cooling based on remote commands from homeowners and the demands of the grid. "More consumers are asking for smart appliances — the drive for the connected home is being driven from the ground up," says Gadh.

Please read the entire article by Joan Voight and view all of the illustrations **here**.

Rajit Gadh featured in UCLA's "We, the Optimists" campaign

UCLA MAE Professor Rajit Gadh is being featured in UCLA's new "We, the Optimists" campaign.

From http://www.ucla.edu/optimists/:

The Power of Optimism
There are people who believe anything is possible – and frequently prove it. At UCLA, we call this optimism and we call ourselves optimists. We are a public university; we were created to serve. So this site is for you too. And all optimists everywhere. Because it has never been just about us. It has always been about we.

From http://www.ucla.edu/optimists/we-solve:

The project brings together 72 faculty and staff from about 30 centers and nearly two dozen departments across campus. For examples, **Rajit Gadh**, a professor in the Samueli School of Engineering and Applied Science and founding director of the UCLA Smart Grid Energy Research Center (SMERC), is leading the charge to build and test innovative smart grid technologies. This technology could integrate renewable energy sources, reduce energy losses and power outages, be more responsive to market, consumer and societal needs – and change the way we consume energy forever.

Rajit Gadh quoted in LA Times article covering Tesla's new energy storage business

The Los Angeles Times indicates that Tesla is expected to announce its entrance into the battery energy storage market for residential and commercial customers. Batteries can help offset electricity costs, reduce pollution, and bolster the power grid by storing the almost limitless generation from renewable energy sources. Tesla and its partners will invest in a $5 billion "gigafactory" for large-scale production of lithium-ion batteries, which Elon Musk has stated will reduce production costs by about 30% and facilitate the introduction of a more affordable electric vehicle. SMERC director Dr. Rajit Gadh is quoted in the article stating, "You can look at the battery as an asset on the grid and then you can start to figure out the financial opportunities."

Read the full article: http://www.latimes.com/business/autos/la-fi-hy-tesla-battery-home-energy-20150423-story.html

Rajit Gadh, Richard Wirz appointed to Sustainable LA Grand Challenge Project Committees

UCLA MAE Professor Rajit Gadh and Associate Professor Richard Wirz have been appointed to the Energy Committee, and Prof. Wirz also to the Project Steering Committee, of the **Sustainable LA Grand Challenge Project** *Thriving in a Hotter Los Angeles*. This project is part of UCLA Grand Challenges.

Click **here** for the link to Vice Chancellor for Research James S. Economou's detailed information statement about the project.

Energy Committee
Rajit Gadh
Energy Management & Delivery

Richard Wirz
Alternative Energy Generation and Storage

Ann Karagozian

CCAS: UCLA and AFRL create new joint research center


Ann Karagozian

The Air Force Research Laboratory (AFRL) at Edwards Air Force Base is pleased to announce the creation of a joint research center with UCLA, the **Collaborative Center for Aerospace Sciences (CCAS)**. This multi/transdisciplinary collaborative research center is focused on the pursuit of fundamental and applied basic studies relevant to aerospace systems. Research projects in CCAS broadly span the computational and experimental arenas, and are conducted at UCLA as well as the Air Force Research Laboratory (AFRL/RQR) at Edwards Air Force Base, located approximately 130 miles northeast of the UCLA campus. UCLA faculty, students, and postdoctoral researchers collaborate extensively with AFRL scientists and engineers, working on high-impact problems to advance US capabilities in aerospace systems. More information on CCAS may be found at its website: http://ccas.seas.ucla.edu/index.html.

"We're delighted to partner with our colleagues at AFRL in creating a center that formalizes research collaborations that have been ongoing for a number of years now", said CCAS' Director, Prof. Ann Karagozian of UCLA's Mechanical and Aerospace Engineering Department. Added Dr. Steve Rodgers, Division Science Advisor for AFRL/RQR: "We are optimistic that this Center will serve as a mechanism for further advancing aerospace sciences, enabling UCLA faculty from a range of technical disciplines to collaborate with AFRL research scientists in advancing the state-of-the-art."

The risks and the future of commercial space flight

UCLA MAE Professor Ann Karagozian was asked about the risks and the future of commercial space flight in light of two recent accidents, and quoted in both The Christian Science Monitor, and The Verge.

From The Christian Science Monitor's article "Virgin Galactic and Antares crashes: What now for commercial space efforts?":

"I don't think this spells doom for so-called commercial space," notes Ann Karagozian, a professor of mechanical and aeronautical engineering at the University of California at Los Angeles.

"Many different companies are developing concepts that are experiencing a lot of success," she adds, with Space Exploration Technologies Corp. (SpaceX) a prime example.

But progress in spaceflight has seldom been smooth. Over the years "the country has seen a number of launch failures," she adds.

As tragic as these failures have been for the people and institutions directly involved and for the nation, each one brings additional technical knowledge, understanding, and expertise that launch providers put in place for future systems, observes Dr. Karagozian, who has served on advisory groups for the country's military and civilian space programs.

From The Verge's article "Spaceflight's no good, very bad week: After two serious accidents, what's next?":

"If there's a common lesson here it's that space launch is not a trivial venture," says Ann Karagozian, a professor of aeronautical engineering at UCLA. "I don't think anyone in the business thinks that, but the general public should realize that this is not as routine an activity as aircraft flight. There will be failures." Rockets are inherently dangerous, she says. "The way launch systems typically work is such that you need a very high pressure, high temperature chamber that exhausts burning gasses from a nozzle. It's like flying with a bomb." Add to that incredibly high speeds; the requirement that the rocket burn through and jettison its stages extremely precisely; the jarring vibrations of the launch; and the fact that the rocket's single engine has no redundancy — and you have a system where minor problems can turn into catastrophic failures.

Prof. Karagozian was also featured in "UCLA in the News."

Veronica Santos on PBS NewsHour: Can modern prosthetics actually help reclaim the sense of touch?

UCLA MAE Associate Professor Veronica Santos was featured in a recent PBS NewsHour science story "Can modern prosthetics actually help reclaim the sense of touch?" The story, which aired February 13, 2015, is 9:24 length, and Prof. Santos' segment begins at about 4:57, though all of it is fascinating and worth watching.

Excerpted from the story transcript:

Science correspondent Miles O'Brien had much of his left arm amputated last year after an accident while on a reporting trip for the "NewsHour." He has since been exploring leaps forward for modern prosthetics.

Last night, he tested a prototype robotic arm, and, tonight, one of the hardest things to replicate that might finally be within reach.

MILES O'BRIEN: Across the country in a lab at UCLA, mechanical engineer Veronica Santos is trying to close that gap.

VERONICA SANTOS, UCLA Biomechatronics Lab: For a long time, people have been trying to build robots that emulate humans, but there's now a way that we can actually directly impact someone's quality of life by building a robot that becomes part of someone's body.

MILES O'BRIEN: Here, in Dr. Santos' Biomechatronics Lab, they're constructing a language of touch that a computer and a human can both understand.

They're quantifying this with mechanical touch sensors that meet objects of varied shapes, sizes and textures. Using an array of instrumentation, they are able to transact that interaction into data a computer can understand.

VERONICA SANTOS: So, for example, Miles, as you put your hand in there to stop it, we would be able to record the posture of the finger when it came in contact with you, as well as the general areas of the fingertips that were making contact and how much pressure there was or how much the skin was deforming as you made contact.

But those are the types of raw percepts that you would give to someone and then with training they would put it all together and say, hey, I think I'm touching something deformable or soft.

MILES O'BRIEN: The training includes machine learning. The data is used to create a formula or algorithm that gives the computer the ability to each common patterns between the items it has in its library of experience and something it has never felt before.

VERONICA SANTOS: So, we're interested in developing this idea of artificial haptic intelligence.

MILES O'BRIEN: Making haptic sensation useful for an amputee is the big challenge.

Prosthetic and robotic technology has far surpassed the ability of an amputee to command a limb or understand what the device is sensing. The bottleneck is melding the technology with the biology.

VERONICA SANTOS: I think one of the challenges is understanding how much information can you flood someone with before, you know, they just — they can't make use of it?

I think, in a perfect world, if we did our job right, you wouldn't even know we'd done our job. Your prosthetic hand would feel like your native limb, where all of the robotics, algorithms and intelligence that we have built in at the very low level acts just like your spinal cord. You don't even know they're there. All you know is, it's more fun to use this arm, it's easier to use the arm, and our job would be done.

NSF Science Nation: Giving Robots and Prostheses the Human Touch (video)

Research engineers and students in UCLA's Biomechatronics Lab are designing artificial limbs to be more sensational, with the emphasis on sensation. The lab's director is Veronica Santos, associate professor of mechanical and aerospace engineering. The lab was also featured in the March 2015 issue of Newsmax (67-68).

UCLA Engineering receives cutting-edge aircraft part from Airbus Americas

By Bill Kisliuk

UCLA mechanical and aerospace engineering students will have the unusual opportunity to analyze the composition, structure, thermal and other properties of a piece of cutting-edge commercial aircraft equipment, thanks to a donation from Airbus Americas.

The part, a 28-foot-long elevator from an Airbus A330, was delivered to the UCLA Henry Samueli School of Engineering and Applied Science today. The elevator, which is used for flight control on the aircraft's tail, is valued at $750,000.

"This gift will play an important role in the education and research of our undergraduate and graduate students," said T.C. Tsao, chair of mechanical and aerospace engineering at UCLA Engineering. "Having access to materials that are used for commercial purposes today will help us in our mission to develop new and better technologies in the future."

Barry Eccleston, president and CEO of Airbus Americas, said the gift is intended to help prepare the next generation of aviation and aerospace engineers. "For Airbus, our partnership with academic institutions in Southern California is an investment in our future and will help to foster a thriving aerospace workforce in the region," he said. "This donation will allow engineering students to experience the new materials used in aerospace and better prepare them to become the future innovators of the aviation industry."

The equipment will be housed at UCLA's Materials Degradation Characterization Laboratory, which is supervised by Ajit Mal, distinguished professor of mechanical and aerospace engineering.

On Dec. 8, MAE staffers Benjamin Tan and Miguel Lozano coordinated delivery of the A330 elevator from a large flatbed truck into Professor Mal's lab on the ground floor of Engineering IV.

While the elevator is relatively light, it was delivered in a heavy, 30-foot long wooden crate. Two forklifts were required to remove the crate from a truck parked outside the lab. Unloading the crate, unpacking the elevator, carrying it into the lab and then cutting up and removing the crate took more than an hour.

Ajit Mal

Tsu-Chin Tsao

"This material and this structure are very advanced," Mal said. "It is so important to have a real piece of aircraft in the lab so students can have access to new and advanced materials and structures."

Mal's long-term research goal is to develop sensors that can be embedded in composite materials to communicate when a vital component of a structure is damaged by impact with a foreign object.

"Our lab is seeking to develop techniques that would alert users when a mechanical system is compromised, just as your brain knows immediately when you have cut your finger — and whether you need to put a bandage on it or to go to the ER," Mal said.

Airbus Americas spends more than $14 billion annually on manufacturing in the U.S., including more than $1 billion in the Southern California region.

"This donation from Airbus Americas to UCLA is an excellent example of business working hand in hand with academia to both educate students and help to build our future workforce," said Los Angeles Mayor Eric Garcetti. "Airbus Americas' contribution to UCLA will help to attract, retain and grow valuable jobs in aerospace and fuel the local economy."

Richard Wirz nominated to the UCLA "Sustainable LA" Grand Challenge Steering Committee

Richard Wirz

Prof. Wirz was nominated to the UCLA "Sustainable LA" Grand Challenge Steering Committee. This committee is coordinating a UCLA campus-wide initiative to achieve 100% Energy, Water, and Ecosystem sustainability by 2050.

More information can be found at http://www.grandchallenges.ucla.edu/challenges/thriving-in-a-hotter-los-angeles/.

Prof. Wirz serves as the Energy expert on the committee and is working closely with water, ecosystem, public health, and policy experts to develop and execute this plan and the associated research.

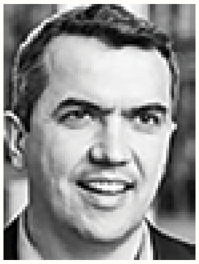
Distinguished Professor Ali Mosleh joins UCLA MAE

UCLA's Mechanical and Aerospace Engineering Department welcomes Professor Ali Mosleh joining the faculty. Prof. Mosleh is a joint appointment with UCLA's Materials Science and Engineering Department.

BIO

Dr. Ali Mosleh is Distinguished Professor and holder of the Evelyn Knight Chair in Engineering at the University of California in Los Angeles. Prior to that he was the Nicole J. Kim Eminent Professor of Engineering and Director of the Center for Risk and Reliability at the University of Maryland. He was elected to the US National Academy of Engineering in 2010, and is a Fellow of the Society for Risk Analysis, and the American Nuclear Society, recipient of several scientific achievement awards, and consultant and technical advisor to numerous national and international organizations, including appointment by President George W. Bush to the U.S. Nuclear Waste Technical Review Board, a position in which he continued to serve in the administration of President Obama. He conducts research on methods for probabilistic risk analysis and reliability of complex systems and has made many contributions in diverse fields of theory and application. These include risk and reliability of hybrid systems of hardware, human and software; complex systems prognostics and health monitoring with limited information; dynamic systems reliability; common cause failure analysis; accident sequence precursor methodology; Bayesian methods of inference with uncertain evidence; reliability growth prediction; methods for software reliability and cyber security; cognitive models for human performance in complex systems; and models of the influence of organizational factors on system reliability and safety. On these topics he holds several patents, and has edited, authored or co-authored over 450 publications including books, guidebooks, and technical papers. In 2013 he received the American Nuclear Society Tommy Thompson Award for his numerous contributions to improvement of reactor safety. Dr. Mosleh has led many major studies on risk and safety of complex systems such as space missions, nuclear power plants, commercial aviation, communication networks, and healthcare systems. He has chaired or organized numerous international technical conferences and is on the editorial board of several technical journals.

Laurent Pilon appointed Associate Editor of ASME Journal of Heat Transfer


Laurent Pilon

UCLA MAE Professor Laurent Pilon has been appointed Associate Editor of the ASME Journal of Heat Transfer.

The ASME Journal of Heat Transfer disseminates information of permanent interest in the areas of heat and mass transfer for a broad range of applications including energy systems, biotechnology, microscale and nanoscale devices, electronics cooling, manufacturing, and materials processing, among others.

Prof. Pilon's research group engages in a wide range of interdisciplinary research projects at the intersection between interfacial and transport phenomena, material science, and biology for energy conversion, storage, and efficiency technologies. He is the recipient of various awards including the U.S. National Science Foundation CAREER Award and the 2008 ASME Bergles-Rohsenow Young Investigator Award in Heat Transfer.

Christopher Lynch appointed Editor-in-Chief of Smart Materials and Structures


Christopher Lynch

UCLA MAE Professor Christopher Lynch has been appointed Editor-in-Chief of Smart Materials and Structures (SMS).

Smart Materials and Structures is dedicated to technical advances in smart materials, systems and structures, including materials, sensing and actuation, optics and electromagnetics, structures, control and information processing.

As well as a leading figure in his field, Prof. Lynch has been a supportive and engaged member of the SMS Board since he joined as an Associate Editor in 2008.

Dennis Hong: Google planning OS for robots


Dennis Hong

From ***The Korea Herald***

Google Planning OS for Robots (please click link to read full article)
Dennis Hong, UCLA professor of mechanical and aerospace engineering, was interviewed by the Korea Herald on rising interest in robotics, his specialty, and on advice to young people considering careers in engineering.

Vijay Gupta: Baseball Bat With an Axe Handle Brings More Power, Fewer Injuries


Vijay Gupta

From ***Wired***

Baseball Bat With an Axe Handle Brings More Power, Fewer Injuries
A biomechanical study by UCLA engineering professor Vijay Gupta showed that a baseball bat with an oval-shaped axe handle is more comfortable, delivers more power and speed, and reduces injuries when compared with traditional bats. The news was also featured in USA Today.

CJ Kim's water-repelling surfaces highlighted in numerous news stories


Chang-Jin Kim

From ***Business Insider***

Scientists Create Teflon-Like Surface That Could Make Oil Tankers Super Fast
A scientist at UCLA Engineering is developing technology that could increase the speed and efficiency of large cargo ships and oil tankers. Chang-Jin Kim is a professor of mechanical and aerospace engineering at UCLA, where he also serves as the director of the school's Micro and Nano Manufacturing Lab.

From ***The American Physical Society***

http://physics.aps.org/synopsis-for/10.1103/PhysRevLett.113.136103

The water-repelling properties of superhydrophobic surfaces may last longer when they're used at shallower depths.

From ***Spiegel***

http://www.spiegel.de/wissenschaft/technik/materialforschung-an-dieser-oberflaeche-perlt-alles-ab-a-1005410.html

Researchers have developed a material roll off the water as well as oils. The feat was accomplished by microscopically small nail heads. Even perfluorohexane, which has the lowest known surface tension, was repelled, reported Chang-Jin Kim and Liu Tingyi from UCLA in the journal "Science".

CJ Kim Receives Korea's Highest Prize for Engineering

Chang-Jin Kim

Chang-Jin "CJ" Kim, professor of mechanical and aerospace engineering and leader in microfluidics and micro-eletro-mechamical systems (MEMS), has received the 2015 Ho-Am Prize for Engineering.

Established in 1990 by Kun-Hee Lee, the chairman of Samsung, the Ho-Am prize is considered the Korea's highest honor for science, engineering, medicine, the arts and community service. The Prizes are named for Samsung's late founder Byung-chull Lee, whose nickname was "Ho-Am." The Ho-Am Prize for Engineering "covers the entire field of basic engineering and applied technology, and is presented to people of Korean heritage whose accomplishments have contributed to the development of industry for greater prosperity for humanity."

Kim, who joined the UCLA Henry Samueli School of Engineering and Applied Science in 1993, is best known for pioneering work in microfluidic MEMS, specifically with the electrowetting on dielectrics or EWOD – that is, manipulating and moving micro-scale size droplets of fluids on surface using only electric voltages. Kim is continuing research in this field, which has applications such as lab-on-a-chip, camera lenses, and electronic paper.

Kim has also made major breakthroughs in creating micro- and nanoscale structures that control the solid-liquid interactions. Applications in this area include reducing drag of water vehicles, as well as preventing surface founding in biology and medicine. Most recently, he led research published in Science in 2014 that demonstrated the first true "superomniphobic" surface, which repels all liquids including those with the lowest known surface tensions.

Born in South Korea, Kim received his bachelor's degree from Seoul National University and his Ph.D. from UC Berkeley.

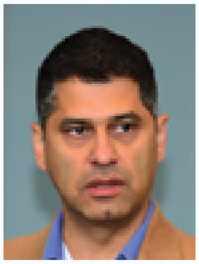
Kim, who was in Seoul during UCLA's spring break, received an email March 27, 2015 from the Samsung Foundation which allocates the prize asking him to call them. Thinking at first, they might have been asking about his thoughts on potential candidates, he called them back. He did not know he was a nominee. The committee let Kim know he was this year's laureate for engineering. He was overwhelmed.

"The individuals who have won the Ho-Am Prize are role models and even heroes to the Korean people, and to be named as this year's laureate for engineering is both a tremendous honor and humbling one as well," Kim said. "I want to thank the many amazing students that I've enjoyed teaching and mentoring at UCLA and my colleagues who are a pleasure and inspiration to work with."

Kim is the third UCLA faculty member to win the prize. The previous two, also members of the Department of Mechanical and Aerospace Engineering, are J. John Kim, the Rockwell International professor, who received the prize for engineering in 2002, and H. Thomas Hahn, a distinguished professor emeritus, who received the prize for engineering in 1999.

Recipients of the Ho-Am Prize are each presented with Diploma, a pure gold medal (187.5g) and a cash prize of 300 million Korean Won (about $275,000). On days both prior to and following the prize ceremony on June 1, 2015, the laureates present a series of lectures at universities and research organizations for specialists as well as the general public and youth.

Pirouz Kavehpour elected an ASME Fellow



Pirouz Kavehpour

UCLA MAE Professor Pirouz Kavehpour has been elected as an ASME Fellow. Kavehpour is internationally known for his contributions to the understanding of mechanisms of fluid mechanics and heat transfer. His research covers a wide area including drop coalescence, fundamentals of spreading drops and coating, 3D printing, biological fluid mechanics, heat transfer in micro-scales, and energy storage systems.

Dan M. Goebel elected to the NAE

Dan Goebel

UCLA MAE Adjunct Professor Dan M. Goebel of the UCLA Henry Samueli School of Engineering and Applied Science was among the 67 members elected to the National Academy of Engineering on February 5, 2015. Election to the academy is among the highest of honors that can be accorded to an American engineer.

Dr. Goebel is a senior research scientist at NASA's Jet Propulsion Laboratory, where he oversees the development of high-efficiency electric thrusters, advanced long-life components such as cathodes and grids, and thruster life model validation for deep space missions. He was elected for "contributions to low-temperature plasma sources for thin-film manufacturing, plasma materials interactions, and electric propulsion." Goebel is a UCLA adjunct professor of mechanical and aerospace engineering and received all three of his degrees from UCLA, including a B.S. in physics, an M.S. in electrical engineering, and a Ph.D. in applied plasma physics/electrical engineering. He is also an adjunct professor of electrical engineering at USC and serves on the UCLA Electrical Engineering Department's alumni advisory board.

Chih-Ming Ho: HKUST Awards Honorary Doctorate; elected fellow of the International 3M-Nano Society

Chih-Ming Ho

Chih-Ming Ho, UCLA's Ben Rich Lockheed Martin Professor of Engineering, received a Doctor of Engineering honoris causa from the Hong Kong University of Science and Technology.
Partial Citation

From pioneering "smart skin" research for controlling turbulence on an aircraft's wings to phenotypic personalized medicine, Professor Chih-Ming Ho's interdisciplinary insights and innovative mindset have helped unleash a seemingly unstoppable flow of ideas and applied solutions. His journey of multiple discoveries has taken him across an array of science and engineering frontiers.

Following his bachelor degree in Mechanical Engineering at National Taiwan University, Professor Ho moved to Johns Hopkins University in the United States, where he earned a PhD in 1974 before heading into academia at the University of Southern California.

Focusing initially on experimental research of turbulent free shear layers made him a global front-runner in fluid mechanics by the 1990s. He moved across town and joined UCLA in 1991. Professor Ho has ventured forth into many emerging areas, pioneering advances in microfluidics, and biomolecular sensors. It is an amazing confluence of fields for a single academic, all traversed at world-leading levels.

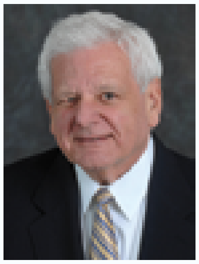
Additionally, Prof.Ho was elected a Fellow of the International Society of Nano Manipulation, Manufacturing and Measurement (3M-NANO) for his outstanding professional achievement in nano science and engineering. He delivered the opening keynote talk on "Complexity and Simplicity – Phenotypic Personalized Medicine" in the 2014 3M-NANO annual conference.

Greg Carman receives the SPIE 2015 Smart Structures and Materials Lifetime Achievement Award

Greg Carman

UCLA MAE Professor and TANMS Director Greg P. Carman has been selected to receive the 2015 Smart Structures and Materials Lifetime Achievement Award from SPIE, the International Society for Optics and Photonics. The award recognizes outstanding accomplishments in the careers of scientists and engineers in the field of smart structures and materials.

Professor Carman joined the Mechanical & Aerospace Engineering Department at the University of California Los Angeles in 1991. He is presently the Director of a new NSF Engineering Research Center entitled Translational Applications of Nanoscale Multiferroic Materials TANMS and is Executive Engineering Director of the Center for Advanced Surgical and Interventional Technology in the Department of Surgery at UCLA. Professor Carman has served as chairman for the Adaptive Structures and Material Systems of the ASME (2000-2002), holds a position as associate editor for the Journal of Intelligent Material Systems Structures, as well as the journal of Smart Materials and Structures. He was awarded the Northrop Grumman Young Faculty in 1995 and three best paper awards from the ASME in 1996, 2001, and 2007. In 2003 he was elected to the grade of Fellow in ASME and awarded the ASME Adaptive Structures and Material Systems Prize honoring his contributions to smart materials and structures in 2004. Presently his research interests focus on analytical modeling, fabricating, and testing nanoscale multiferroic (magnetoelectric) materials and developing devices for medical application.



Albert Carnesale

Election Year: 2011.

Election Citation: "For bringing engineering excellence and objectivity to international security and arms control, and for leadership in higher education."

Vijay Dhir

Election Year: 2006.

Election Citation: "For work on boiling heat transfer and nuclear reactor thermal-hydraulics and safety."

Dan Goebel

Election Year: 2015.

Election Citation: "For contributions to low-temperature plasma sources for thin-film manufacturing, plasma materials interactions, and electric propulsion."

Chih-Ming Ho

Election Year: 1997.

Election Citation: "For contributions to the understanding and control of turbulent flows."

John Kim

Election Year: 2009.

Election Citation: "For development of direct numerical simulation and seminal contributions to the understanding of the physics and control of turbulent flows."

Kuo-Nan Liou

Election Year: 1999.

Election Citation: "For contributions in the theories of radiation transfer and light scattering, with applications to remote sensing technology and climate modeling."

Ali Mosleh

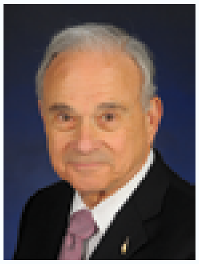
Election Year: 2010.

Election Citation: "For contributions to the development of Bayesian methods and computational tools in probabilistic risk assessment and reliability engineering."

Lucien A. Schmit, Jr.

Election Year: 1985.

Election Citation: "For pioneering work in structural synthesis, combining finite element analysis and nonlinear programming algorithms to create a powerful class of modern structural design methods."



Jason L. Speyer

Election Year: 2005.

Election Citation: "For the development and application of advanced techniques for optimal navigation and control of a wide range of aerospace vehicles."

MAE Alumni Advisory Board 2014-15

MAE Alumni Advisory Board annual meeting, June 1, 2015.

Left to right:
Sharat Batra '05, Sean Oh (ASME), Gerard Toribio '08, Anny Lin (AIAA), Nirav Mehta (SAE), Jessica Leung '15, Norris Tie '14, Prof. Ajit Mal, David Lee MS '90, PhD '98, Hannah Jorgensen '10, Anthony Tyson '12, Prof T-C Tsao, James Sharp '03, MS '06, William Goodin MS '71, PhD '75 (Chair).

Sharat Batra, '05, ME, LA DWP
Eddie Chau, '89, ME, CCI Valve
Mark Ford, '82, MS '88, AE, Northrop Grumman
Anthony Gambardella, '12, MS '13, ME, SpaceX
Greg Glenn, '03, MS '06, ME, Freedom innovations
Aditi Gobburu, '07, MS '08, ME, Northrop Grumman
William Goodin, 'MS '71, PhD '75, ME, UCLA
Bill Holbrow, '90, ME, Blakely Sokoloff LLP
Sean Hutchinson, '12, AE, Zodiac
Hannah Jorgensen, '10, AE, Northrop Grumman
David E. Lee, 'MS '90, PhD '98, ME, Northrop Grumman
Sasha Lukyanets, '07, MS '09, AE, The Aerospace Corporation
Mark Malicdem, '05, AE, B/E Aerospace
Eugene Nemirovsky, '05, ME, Scaled Composites
Avi Okon, '02, MS '05, ME, JPL
Yesha Shah, '14, AE, Orbital ATK
James Sharp, '03, MS '06, ME, Northrop Grumman
Brian Shedd, 'MS '05, PhD '08, ME, UCLA
Eliza Sheppard, 'MS '05, MBA '10, ME, Northrop Grumman
Marianne So, '07, ME, Honeywell
Norris Tie, '14, AE, Northrop Grumman
Gerard Toribio, '08, AE, Northrop Grumman
Anthony Tyson, '12, ME, Aerojet Rocketdyne
Sarah Vasquez, '08, ME, Chevron
Melody Vo, '11, ME, Kia Motors America
Marisa H. Wells, '04, ME, Northrop Grumman

MAE Industrial Advisory Board Meeting January 22, 2015

MAE Industrial Advisory Board 2014-15

Aerospace Corporation
Dr. Eric Hall (IAB Chair)
General Manager
Vehicle Systems Division

Air Force Research Laboratory
Michael T. Huggins
Chief/Site Director
Rocket Propulsion Division

Alcoa
Luke Haylock
Director
New Product Development

Boeing Company
Eugene Lavretsky
Senior Technical Fellow

Boeing Company
Steven J. Yahata
Director
Structures Technology,
Boeing Research & Technology

Honeywell Engines, Systems & Services
Matt Schacht
Acting Director
Environmental Control
Systems Engineering

HRL Laboratories, LLC
Geoffrey McKnight
Scientist
Sensors and
Materials Laboratory

Intel Assembly Technology Development
Gaurang Choksi
Manager
Core Competency Development

JPL NASA
Tom Cwik
Manager
NASA Space
Technology Program
JPL Astronomy, Physics, and
Space Technology Directorate

Lockheed-Martin Aeronautics Company
Philip A. Conners
Engineering Director
Palmdale Site

NASA Armstrong Flight Research Center
David McBride
Center Director

National Instruments
Ingo Foldvari
University Program
Manager, US West

Northrop-Grumman Aerospace Systems
Timothy J. Frei
Vice President
System Enhancements and
Product Applications

Northrop-Grumman Electronic Systems
Stephen J. Toner
Vice President
Western Region
Engineering & Logistics
Woodland Hills
Campus Executive

Phillips 66
Jim M. Hardy
Manager
Project Engineering

RAND Corporation
Natalie W. Crawford
Senior Fellow and former
Director, Project AIR FORCE

Raytheon Space and Airborne Systems
Patrick J. Fitzgerald
Department Manager
Thermal & Structural
Design Dept.
Mechanical & Optical
Engineering Center

MAE Career Fair 2014-15

On October 29, 2014, the MAE Department presented its first annual Career Fair. More than 200 students attended, along with representatives of 12 companies: ACCO Engineered Systems/Sunbelt Controls, Crane Aerospace and Electronics, Hi-Temp Insulation, L-3 Electron Technologies, Jet Propulsion Laboratory, Medtronic Diabetes, Northrop Grumman, PPG Industries, Raytheon, Sandia National Laboratories, Teledyne Controls, and USAF Test Center Edwards Air Force Base.

The event was organized by the student chapters of American Institute of Aeronautics and Astronautics (AIAA), American Society of Mechanical Engineers (ASME) and the Society of Automotive Engineers (SAE).

Crane Aerospace & Electronics

Hi-Temp Insulation Inc.

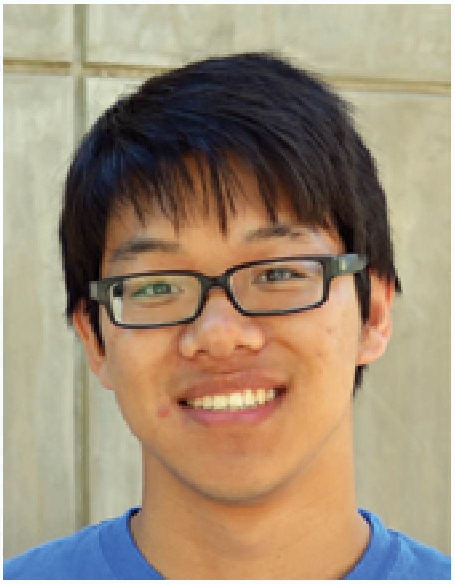
Northrop Grumman Corporation

PPG Industries, Inc.

Sandia National Laboratories

Three MAE grad students receive prestigious defense fellowships





L to R: Andrea Besnard, Carleton Knisely, Gary Li.

Three graduate students at the UCLA Henry Samueli School of Engineering and Applied Science have received a National Defense Science and Engineering Graduate (NDSEG) Fellowship, one of the country's top honors for students in the early part of their graduate study. The fellowships are awarded to students in 15 areas of Department of Defense interest.

The three students – Andrea Besnard, Carleton Knisely, and Gary Li – all in the Mechanical and Aerospace Engineering Department, are studying topics in aeronautical and astronautical engineering. They were among six UCLA students and 180 nationwide to receive the fellowship, announced by the program's administrating agency, the American Society for Engineering and Education. The fellowship pays for each student's full tuition and academic fees for three years. Students also receive a stipend.

Andrea Besnard
NDSEG Area: Aeronautical and astronautical engineering.
Research interests: Issues in transverse jet shear layer instabilities and their control, structural characteristics, mixing, and localized straining.
Faculty advisor: Ann R. Karagozian
Lab: Energy & Propulsion Research Laboratory
Besnard was an engineer at SpaceX in Hawthorne, Calif. before joining UCLA.

Carleton Knisely
NDSEG Area: Aeronautical and astronautical engineering.
Research interests. Analysis of hypersonic real gas boundary layers using advanced numerical tools.
Faculty advisor: Xiaolin Zhong
Lab: Hypersonics And Computational Aerodynamics Group
Knisley was an undergraduate mechanical engineering student at Bucknell University before joining UCLA.

Gary Li
NDSEG Area: Aeronautical and astronautical engineering.
Research interests: Investigating the behavior of advanced aerospace materials under unique plasma conditions.
Faculty advisor: Richard Wirz
Lab: Plasma and Space Propulsion Laboratory
Li was an undergraduate physics and astrophysics student at UC Berkeley before joining UCLA.

Three MAE grad students receive NSF Graduate Research Fellowships



L to R: Kelly Connelly, Kenneth Gutierrez, Adam Martin.

Three MAE graduate students at the UCLA Henry Samueli School of Engineering and Applied Science — Kelly Connelly, Kenneth Gutierrez, and Adam Martin — have received the prestigious Graduate Research Fellowship from the National Science Foundation.

The fellowship program, which offers three years of financial support, "recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master's and doctoral degrees at accredited United States institutions."

Kelly Connelly
Field: Mechanical engineering
Research interests: In-situ characterization of the eye's vitreous humor, the gel between the lens and retina, using rheological methods to quantify its viscoelastic behavior.
Faculty advisor: Pirouz Kavehpour
Undergraduate institution: University of Washington

Kenneth Gutierrez
Field: Mechanical engineering
Research interests: Artificial haptic intelligence for sensorized robotic and prosthetic hands.
Faculty advisor: Veronica Santos
Undergraduate institution: UC Irvine

Adam Martin
Field: Mechanical engineering
Research focus: Novel thermal energy storage to further improve current renewable energy technologies.
Faculty advisor: Richard Wirz
Undergraduate institution: UC Merced

ME Ph.D. candidate Hamidreza Nazaripouya's team places first in Finjan Mobile Defense Challenge 2015, wins 40k grant

Hamidreza Nazaripouya

Finjan Announces Winner of Mobile Defense Challenge 2015

A Team From UCLA, Northeastern and Rice University Selected

EAST PALO ALTO, CA — (Marketwired) — 07/15/15 — Finjan Holdings, Inc. (NASDAQ: FNJN), a cybersecurity company, today announced the winner of its Mobile Defense Challenge 2015, a student cybersecurity mobile application competition to promote innovation, cybersecurity education, and the entrepreneurial spirit in a combined effort to identify next generation consumer privacy and data protection technologies for mobile platforms.

The winning team is comprised of members Mr. Hamidreza Nazaripouya, a PhD candidate for Mechanical Engineering at University of California, Los Angeles; Ms. Shadi Emam, a PhD candidate at Northeastern University, College of Engineering; and Mr. Omidreza Nazaripouya, a Graduate Student at William Marsh "Rice" University, Department of Computer Science ("Team SeQrity"). Team SeQrity submitted the winning proposal entitled, Influential Manner of Smart-Phone Applications on User's Privacy through Machine Learning and Pattern Recognition Methods. To make it through to the final round, each team produced a white paper explaining their thesis, working wire frame models of the applications, and an introductory video to educate the judges on the consumer needs that would be met by the project.

"The judges were both impressed and inspired by the several proposals submitted in response to our inaugural Mobile Defense Challenge. The decision was difficult as we received proposals with the promise of covering many aspects of protecting consumer data and privacy on mobile platforms. Team SeQrity's proposal was chosen for its comprehensiveness as well as potential for broad applicability," stated Julie Mar-Spinola, Chief IP Officer and VP, Legal. "We look forward to working with them and fostering their continued innovation."

"We would like to express our sincere gratitude to Finjan for making this opportunity possible," stated Team SeQrity leader, Hamidreza Nazaripouya. "We were thrilled to learn of our selection for this honor and we deeply appreciate Finjan's support. It truly is a pleasure to have Finjan as our mentor for this project. We are delighted to move forward and start the next step and implement this application as soon as possible."

- The winning team will receive a $40,000 grant to be used for the development of a functioning mobile security application in accordance with their proposal. (Additional details can be found at: contest.finjan.com), and iPads.

- The winning team will also benefit from mentorship and guidance by Scot Robinson, co-founder of The App Company, including assistance with developing a project development plan with milestones and budget.

- Finjan may also offer the winner(s) a paid internship at Finjan's sole discretion.

The runner-up team — also receiving iPads — submitted a proposal entitled, Second Chance Instant Messaging, whose members include Mr. Mark Santiago, an undergraduate candidate in Computer Science & Engineering at University of California, Merced; Ms. Vineesha Kasireddy, a Masters degree candidate in Software Engineering at San Jose State University; and Mr. Richard Jang, an undergraduate candidate in Computer Engineering from San Jose State University.

UCLA ME major Ashwin Narkar among 8 badminton players chosen by US for World University Games

This week, 550 elite American athletes traveled to Gwangju, South Korea, to compete on the world stage at the World University Games.

While some of the athletes play bigger sports like basketball or water polo, many will make their mark in the lesser-known competitions.

UCLA sophomore Stephanie Lam and incoming freshman Ashwin Narkar were among the eight players chosen to represent the U.S. in badminton.

Narkar said he's already found great friends and mentors on the team, including his hometown friend Michael Buasan, who played for the 2013 World University Games badminton team.

"After (Buasan) went, I was like 'I want to do this,' and then I kind of forgot about it," said Narkar. "But then he called me and asked if I wanted to play, so I applied and was selected for the team."

However, Buasan wasn't the biggest influence in his badminton career, Narker said. The freshman's parents, both badminton players, introduced Narker to the sport when he was 10.

"I'm an only child so my parents kind of spoil me," Narkar said. "When I was little, my mom always used to drive up to my badminton classes for two hours a day, five days a week."

Narkar said his parents not only sparked his enthusiasm for badminton, but also mechanical engineering, his chosen major at UCLA, since both of them have also been involved in engineering.

Although engineering may be his career path, Narkar's future plans are not void of his beloved sport. Working with his friends, the 17-year-old helped to found American Badminton Challenge, a nonprofit which seeks to simultaneously promote the sport and raise money for charities.

In January, the organization held a charity tournament to raise money for the Red Cross and a local badminton magazine. Narkar hopes to continue working with the organization after he graduates.

As the youngest player chosen to represent the U.S., Narkar said he has been able to learn from his older teammates both in playing the sport and getting a glimpse into college life. Lam has been especially insightful since she is a Bruin as well.

"In a way, both (Narkar) and (Lam) are similar," said the U.S. team manager Ray Ng. "Both of them are initially quiet but their work ethic is great, always trying hard to improve themselves."

Lam, a second-year molecular, cell and developmental biology student, began playing badminton at the age of 13. She had previously been a tennis player and a swimmer.

"I was very active as a child and would always want to go outside and play sports," Lam said. "However, once I started playing badminton, I had to dedicate most of my time to training and was unable to continue playing these sports."

Lam fell in love with the sport and continued playing competitively. She has already played in the World University Badminton Championships. She was able to watch and play against the best badminton players in the world, particularly from Asian badminton powerhouses such as China, Japan, South Korea and Malaysia. Lam said this inspired her to join the U.S. team this summer.

"It's really a once-in-a-lifetime experience, and I wanted to further improve myself as a player after watching all the different international players at the championships," said Lam. "I've also really wanted to go to Korea, so the games being in Gwangju was a plus.

(From the Daily Bruin)

Audrey Pool O'Neal wins the 2015 Harry M. Showman Prize

Audrey Pool O'Neal

2015 HARRY M. SHOWMAN PRIZE
The Showman Prize is awarded to one undergraduate and one graduate student. The prize recognizes students who have effectively communicated the achievements, research, results or social significance of any aspect of engineering.

2015 Showman Prize Graduate Student
Audrey Pool O'Neal, Ph.D., Mechanical Engineering
O'Neal was an engineer at General Motors, where she worked for 10 years. The company sent her to UCLA to earn a master's degree, but instead of returning, she became intrigued with emerging smart materials and continued on as a doctoral student. O'Neal is also the associate director for undergraduate programs at UCLA's Center for Excellence in Engineering and Diversity (CEED). Her graduate advisor was Professor Adrienne Lavine, director of the Modeling of Complex Thermal Systems Laboratory.

What is the name of your dissertation and what is it about?
My dissertation title is "The Effect of Particle Size and Processing on the Properties of a Barium Titanate Polymer Composite." In layman's terms, our objective was to create a composite material that could serve as a structural capacitor. It can store and discharge significant amounts of electricity while subject to realistic static and dynamic loads, like vibrations or impacts. This research has military and automotive applications.

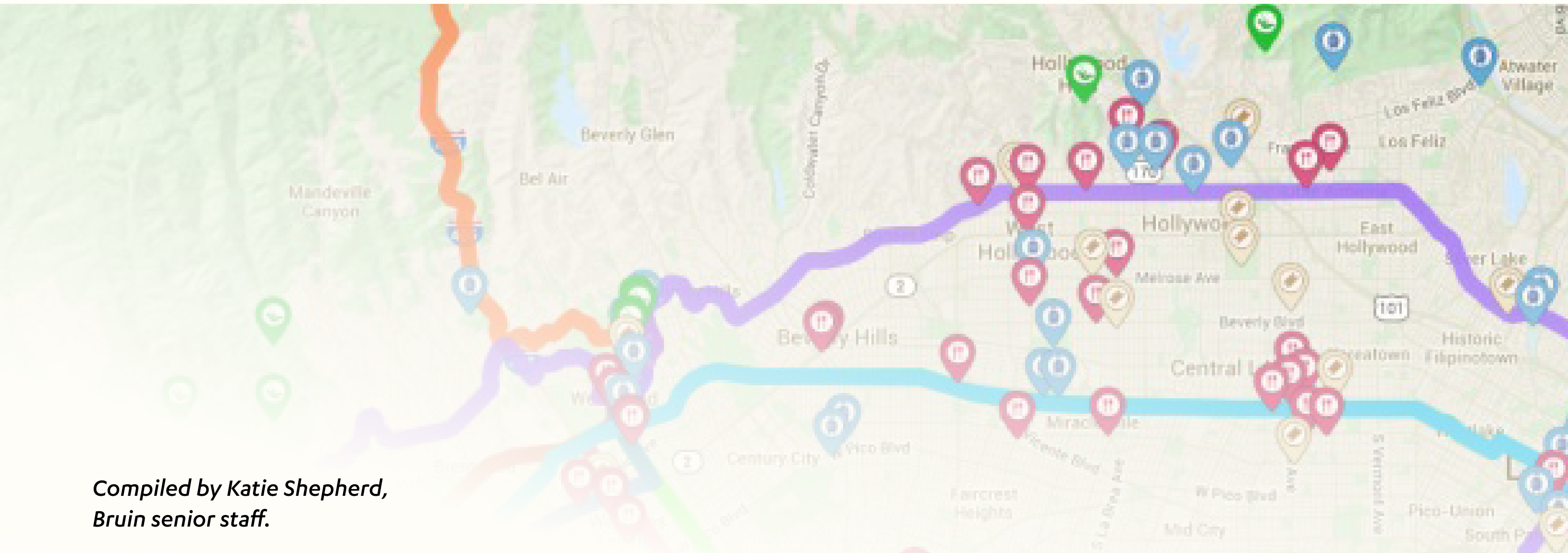
How did you get interested in that topic?
I took a smart materials class with Professor Gregory Carman and he introduced me to barium titanate. I was looking for a thesis topic at the time, and Professor Carman made it so interesting to me that I knew I wanted to work with it and collaborate with his lab in some capacity.

The Showman Prize recognizes communication of research, and I understand you worked with undergraduates on your research. What did you do for them, and what did they do for you?
I had the privilege of working with 11 undergraduate students and two high school students while completing my dissertation. I'd like to think that I helped them learn the scientific method and helped introduce them to the excitement of discovery and exploration that comes with original research. In turn, they gave me a passion to do the work. Seeing engineering principles come to life through their eyes was infectious. I was very fortunate to see two of the undergraduate researchers pursue advanced degrees in engineering, and eight of them won local and national awards for the research that we accomplished together. They have definitely given me more than I have given them and I am very grateful.

You also work with the Center for Excellence in Engineering and Diversity (CEED). What is your role there and what has been most rewarding about it?
I am the associate director for undergraduate programs in CEED. In this role, I have the opportunity to work with an amazing team of colleagues and serve as co-instructor for the Introduction to Engineering Disciplines course, as well as to direct CEED's undergraduate research program. The most rewarding part is watching freshmen come into our program and graduate a few years later. The time seems to fly, yet the transformation of the student is remarkable. They learn to be engineers, leaders, and professionals while we watch. It doesn't get much better than that!

What's next for you?
Working with the undergraduate students in research has shown me that I want to teach. In the immediate future, I plan to work part-time with CEED while pursuing an instructor or lecturer position.

ME student Byron Pang co-creates website encouraging the exploration of LA by bus



Compiled by Katie Shepherd, Bruin senior staff.

Two students aim to pop the “UCLA bubble” using a website they built to share iconic and interesting locations in Los Angeles accessible by bus.

UCLA students Byron Pang and Zheng Sun teamed up over the summer to create busla.me, which launched last week and highlights more than 100 locales across the city along nine different bus routes that run through west L.A.

“There’s so much out there, and people should get out and see the city they live in,” said Pang, a fourth-year mechanical engineering student.

Pang gathered the data for all of the locations, including their coordinates, how to get there by bus and the appeal of the site. Zheng, a fourth-year computer science student, built the website to showcase the information.

Pang said he and Zheng wanted to facilitate exploration of L.A., especially in students’ first two years at UCLA, when undergraduates may have the most free time and may not have access to cars.

Coming from the Bay Area, Pang said he came to UCLA with a desire to strike out into the city, but he had to find a way to get around without a car.

“Living on the Hill, none of my friends had cars, so I had to use the buses,” he said.

For the bus-riding newbie, Pang recommends starting with the Metro Rapid 720 line. The 720 runs from downtown to Santa Monica, showcasing a wide variety of L.A. hotspots.

Once students master using familiar bus routes, they can branch out to the less common lines.

Pang said he thinks a lot of students know about lines like the 720, the 1 and the 2, but the six other bus lines featured on the website offer a much broader range of places to visit.

Pang and Zheng chose locations based on personal experiences traveling around the city, he added. They expect to update the site quarterly and allow students to email in suggestions for additions to the routes.

One of his favorite locations featured on the site is a group of Santa Monica mountain hiking routes which lead to Inspiration Point.

“It’s one of my favorite places I go when I just need a short bus ride away from campus,” Pang said. “I go there when I need to get away from the (UCLA) bubble.”

busla.me maps more than 100 Los Angeles hotspots and the bus routes needed to reach them from campus. (Courtesy of Byron Pang)

MAE alumnus Avi Okon receives the NASA Exceptional Achievement Medal

UCLA MAE alumnus ***Avi Okon***, '02, MS '05, mechanical engineering, received the ***NASA Exceptional Achievement Medal*** for providing essential contributions to the development and successful operation of the MSL drill, as the Drill Cognizant engineer and Rover Planner.

In addition, Avi was part of a team award, the MSL SA/SPaH Dirty Testing Team, for exceptional design, development, and execution of the Mars Science Laboratory Sample Acquisition/Processing and Handling Subsystem Dirty Test Program.

Exceptional Achievement Medal (EAM)
This prestigious NASA medal is awarded to any Government employee for a significant specific achievement or substantial improvement in operations, efficiency, service, financial savings, science, or technology which contributes to the mission of NASA.

The criteria are as follows:

- Work-related achievements yielding high-quality results and/or substantial improvement that supports the Agency mission.
- Innovative approaches used in the conception, design, or execution of the individual's work.
- Impact and importance of the individual's achievement related to the Agency's goals and image.

Avi Okon is a Senior Engineer in the Robotic Vehicles and Manipulator Group at JPL. His current role is Mechanical Systems Engineer for the Sampling and Caching System on the Mars 2020 project. As the Mars Science Laboratory (MSL) Drill Cognizant Engineer he leads the development (design, assembly and flight qualification testing) of the Drill hardware and contributes to the operation (commanding) of the Drill on Mars.

News links with good images of the first drilling activity on Mars related to the MSL Drill:

- The Meridiani Journal: a chronicle of planetary exploration
- News on the Curiousity rover

Left: View of Curiosity's robotic arm showing drill in place

Right: Close-up view of the drill in place on the bedrock

MAE students Adam Garcia and Ruben Acevedo win 1st and 2nd place in CEED's 10th Annual RISE-UP Undergraduate Poster Competition

On August 21, 2014, UCLA's Center for Excellence in Engineering and Diversity (CEED) held its 10th Annual RISE-UP Undergraduate Poster Competition, and the first and 2nd place winners were MAE students.

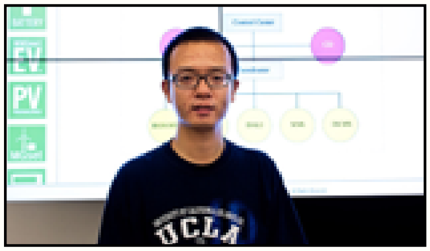
Adam Garcia was awarded 1st place for his work on Characterizing Thin Film Effects on a Reflectivity Study sponsored by the NSF-funded Center for Translational Applications of Nanoscale Multiferroic Systems (TANMS), under the direction of UCLA MAE Prof. Gregory Carman. Garcia just completed his 2nd year as a Mechanical Engineering major.

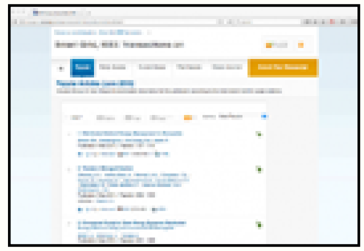
Ruben Acevedo was awarded 2nd place for his work on Micromagnetic Modeling and Simulation Using Finite Element Analysis, under the direction of UCLA MAE Asst. Adj. Prof. Abdon Sepulveda. Acevado just completed his 3rd year as a Mechanical Engineering major.

UCLA MAE Prof. Ann Karagozian served as a competition judge.

Please read the complete article on CEED's website here.

Wenbo Shi's paper was ranked most popular on IEEE Transactions on Smart Grid





"Distributed Optimal Energy Management in Microgrids," a paper by the UCLA SMERC team, including Ph.D. student Wenbo Shi, published in IEEE Transactions on Smart Grid (Vol. 6, Issue 3), was ranked the No. 1 most popular article based on downloads and was featured in the IEEE Xplore Digital Library.

Please see http://smartgrid.ucla.edu/news_071715.html for more details.

2015 Commencement Awards and Honors

2015 Harry M. Showman Prize

Audrey Pool O'Neal, Ph.D., ME, F14

2015 Engineering Achievement Award for Student Welfare

Dylan Michael Aramburu, B.S., ME, Sp15
Jaime Avila, B.S., ME, Sp15
Edward William Barber, B.S., AE, Sp15
Jessica Megan Leung, B.S., ME, Sp15
Edward John Lopez, B.S., AE, Sp15
Dylan Andrew Rodarte, B.S., AE, Sp15

Mechanical and Aerospace Engineering Department Awards

Edward William Barber, B.S., AE, Sp15
Metchawin Thanyakarn, B.S., ME, Sp15
Peng Lv, M.S., AE, W15
Jordan Kazuo Price, M.S., ME, Sp15
Samuel Jun Araki, Ph.D., AE, F14
Yi-Chien Wu, Ph.D., ME, F14

OASA Special Congratulations

Adam Lindquist Stromlund, M.S., ME, Sp15

UCLA ASME | Metal meets metal once more at Robogames

San Mateo, CA, Robogames 2015: The great "Olympics of Robots" has once more lit the torch, beckoning athletes from all around the world into the steel and Lexan reinforced Colosseum. Hearing the call, students of the UCLA American Society of Mechanical Engineers (ASME) fire up their CAD stations as the tried-and-trued Bridgeport mills roar to life.

For 6 months, the student machine shop is filled with thick coolant smoke and flying chips as billets of bulletproof plastic, aircraft grade aluminum, and armored steel are being machined down to specs. Two mechanical gladiators are representing UCLA ASME this year: In the 60lb weight class, the flagship horizontal drum spinner, DracUCLA Reborn, created by 3rd year mechanical engineer, Kevin Christensen. In the 1lb class, a vertical spinner, Raid, built by mechanical engineers Byron Pang (4th) and Shawn Wong (3rd).

Article and photos by Sean Oh

After a couple brawls in the main cage, DracUCLA admits defeat on a technical knockout. With only cosmetic damages, DracUCLA is looking to return next year with the appropriate upgrades. In the smaller division, Raid fights its way up the brackets, coming in at a successful 7th place out of the 40+ competitors.

As UCLA ASME is preparing for next year's competition, it is shifting gears to undergo big changes. Merging with the school's Unmanned Underwater Vehicle (UUV) team, ASME plans to provide a better learning environment for students who want to develop their technical skills in mechanical engineering, design, and manufacturing. The organization is looking forward to another great year.

During 2014-2015, BEAM reaches approximately 100 students at 3 Los Angeles elementary schools

Building Engineers and Mentors (BEAM) is an organization run by UCLA students consisting of both undergraduate and graduate students from all disciplines of the UCLA campus. BEAM's mission is to encourage students from underserved elementary and middle schools in the Los Angeles area to pursue careers in STEM fields. To do this, BEAM mentors travel to the schools and teach short lessons on science and engineering principles to students, on topics ranging from basic rocketry to microbiology. All the lessons that BEAM uses are created by mentors and refined and edited by BEAM's curriculum team in order to make sure that the lesson plans are in line with educational standards.

During the 2014-2015 school year, BEAM was able to reach approximately 100 students at 3 elementary schools in Los Angles. In the coming year, BEAM is looking to increase the range of its impact by creating an online video series that allows students outside of Los Angeles to learn and become excited about STEM. For more information, please visit beam.ucla.edu or email beam@ucla.edu.

Article by Matthew Nguyen

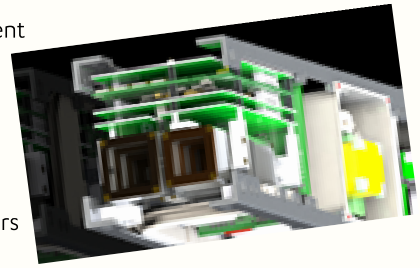
Photos by Maggie Shi

ELFIN, a joint NASA/NSF funded project, is working to create UCLA's very first satellite built on-campus by students

The Electron Losses and Fields Investigation (ELFIN) is a joint NASA/NSF funded project to create UCLA's very first satellite built on campus by students. Set to launch in 2017, the mission takes advantage of a 3U+ CubeSat design to reduce cost and complexity traditionally associated with a space mission of this kind. ELFIN will be conducting research in the space weather field utilizing two scientific instruments (an Energetic Particle Detector and a Fluxgate Magnetometer), in order to help characterize magnetospheric wave-particle interactions. Once in orbit, ELFIN will provide a unique dataset that will contribute to a marked increase in the fidelity of space weather models.

The project exists as a collaboration between the Aerospace Corporation and UCLA's departments of Earth, Planetary and Space Sciences and Mechanical and Aerospace Engineering. Since being awarded funding in 2014, development on ELFIN is far underway. Roughly 60 undergraduate students and a handful of staff and students have worked tirelessly in the last year to bring ELFIN from an intricate engineering concept to a functioning Development Model. Summer 2015 has brought the most productivity to date, resulting in a fully fabricated mass model of the spacecraft, a functioning instrument power supply and data processing unit, as well as successful integrations of various spacecraft components. In mid-October, members of the team will be flying to NASA facilities to perform random vibration analysis on the spacecraft to validate the structural design.

Heading into the fall quarter, the ELFIN team will be focusing on preparing for their Critical Design Review which will serve as the gateway to building the Engineering Model, or Flight Spare Model of the spacecraft. This model will contain all components of the spacecraft at their final design status, and will be used to thoroughly test the system and ensure it is ready for flight. For more information on the ELFIN Project, please visit elfin.igpp.ucla.edu.



Content provided by Lydia Bingley

SMV continues to innovate during the 2014 -2015 academic year, with an emphasis on design

The SuperMileage Vehicle (SMV) team at UCLA continued to innovate during the 2014 -2015 academic year. With a renewed emphasis on design and an aggregate two years of experience working with carbon fiber, the team built its most robust vehicle to date in 2015.

The body of the car is a carbon fiber monocoque that is shaped into a teardrop for optimum aerodynamic performance. For load-bearing sections we used aluminum flexcore plates to provide additional support. In 2015, we managed to reduce our weight by 13%, and the vehicle now weighs in at 100lbs. Our final result at the Shell Eco-Marathon was a solid 496 MPG, placing us 16th overall. Although the absolute mileage fell from 702 MPG in 2014, our relative ranking stayed constant.

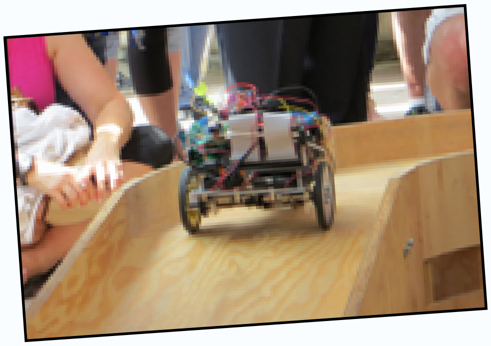
Aside from structural improvements, the team also focused on powertrain upgrades this year. With an already in place overhead valve modification, the next step was to begin the integration of an Electronic Fuel Injection system. Using a custom MCU our electrical team controlled the fuel injected into the engine to optimize efficiency. Unfortunately, there was little time to test the vehicle with EFI and we were unable to complete a run at the SAE Supermileage event at the end of the year. We did however earn the 3rd place prize in the SAE Design Award, which is an accolade that the UCLA team is quite used to receiving.

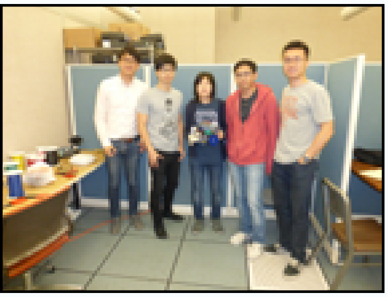
There are always ways to improve our vehicle, and our engineers will continue to think of new ways to design, build and test each component of the car to ensure we compete to the best of our abilities. For more information on UCLA SMV, please email uclasmv@gmail.com.

Article by Aditya Kuroodi

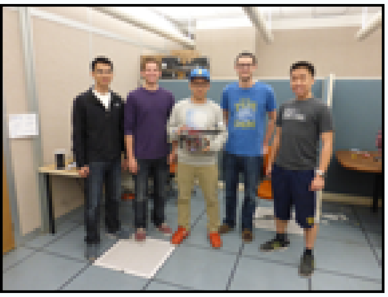
Photo by Shell

Robots take over in MAE's 5th Annual Design Competition

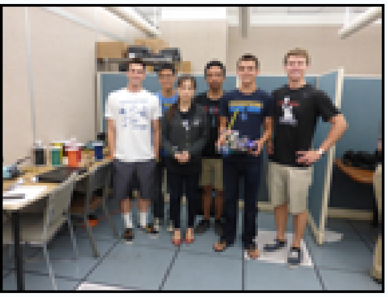




First place: Team 13 (15 balls) - Athena Huang, Daekyum Kim, Mel Kevin Siazon, Fangcheng Zhu and Hochang Lee



Second place: Team 17 (10 balls) - Daniel Kangho Lee, Daniel Kurek, Zeyi Guan, Vu Xuan Le, Ryan Sandzimier



Third place: Team 22 (9 balls) - Elliot Alexander Plant, Alexander Jacef Johnson, Junjun Feng, Andrew Calvin Hwang, Douglas Anthony Wanket, Dylan Aramburu

On June 12, the afternoon before many would graduate, roughly 100 mechanical engineering students at the UCLA Henry Samueli School of Engineering and Applied Science – and their robots – took over the patio terrace on Engineering IV.

The students were completing one last task before commencement, participating in the Mechanical and Aerospace Engineering Department's fifth annual Senior Design Competition. More than 20 teams of five students each designed and built miniature robotic vehicles as part of their two-quarter capstone course.

The goal: Prepare the robots to autonomously navigate the curves and incline of a specially-built course and deposit as many golf balls as possible into a series of three holes. Each robot had five minutes. The three teams whose robots did the best would earn extra credit.

Parents from as far away as Korea joined students and faculty members for the event, some getting a bird's-eye view of the action from windows a few floors above the patio. The robots came in a variety of designs – including some with spring-loaded cylinders to send the golf balls to their final destinations and others outfitted with a hammer to propel a golf ball.

Senior Mitchell Barnes-Wallace was part of a team trying to get the most from christened the Fully Torqued Hammer Bot. He said the greater goals were building a successful robot and earning bragging right, not polishing his academic resume. "It's less about extra credit and more about swag points," he said.

Roughly 200 students, family members and faculty came and went from the tent covering the wooden course as robots went through their paces. Senior Athena Huang, who learned later that her team took first place, said, "It's just really fun to share with everyone what we've been working on."

Several teams found that the robots performed differently on the big day than they had in the lab, and students worked on the fly to troubleshoot problems with wiring, voltage regulators and other parts.

Mechanical issues aside, graduating senior Jennifer Sheriff said the most challenging aspects of the months-long project were "staying on schedule and the persuasive power the leader needs to have."

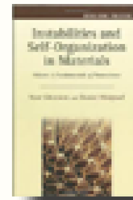
Rosella Guttadauro, mother of senior Joey Guttadauro, came to UCLA Engineering to catch the action, and planned to return to campus the next day to watch Joey graduate. She said she was impressed by the sophistication of the robots and their ability to navigate the course. The contest helped her understand how engineers have crafted self-driving vehicles so advanced that they may soon hit the streets.

"As someone who knows nothing about engineering, I am dialed in," said Guttadauro. She also said with a laugh that the event confirmed that a UCLA Engineering education was "money well spent on my son."

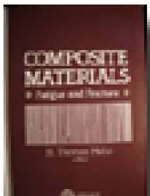
Faculty instructors for the capstone course include professor Dennis Hong, adjunct professor Robert Shaefer and MAE graduate student researcher Christopher S. Kang.

Books by Faculty

Numerous textbooks on graduate and undergraduate instruction are authored by our mechanical and aerospace engineering faculty. These are samples of the publications.

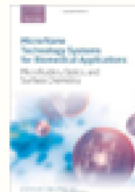


N. Ghoniem



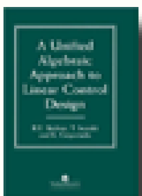
H. T. Hahn

D. Hong

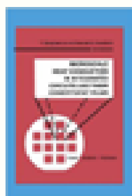


C.-M. Ho

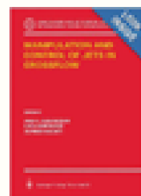
T. Iwasaki



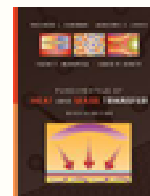
T. Iwasaki



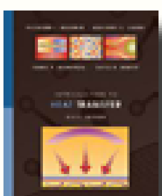
Y. S. Ju



A. Karagozian



A. Lavine



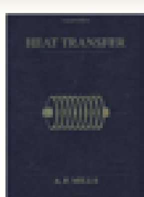
A. Lavine

K. N. Liou

C. Lynch

A. Mal

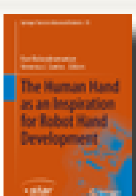
A. Mills



A. Mills

A. Mills

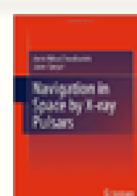
A. Mills



V. Santos

J. Speyer

J. Speyer



J. Speyer

Mohamed A. Abdou
HEAT AND MASS TRANSFER
MANUFACTURING AND DESIGN
PLASMA AND FUSION
Fusion, nuclear, and mechanical engineering design, testing, and system analysis; thermomechanics; MHD thermofluids; neutronics, material interactions; blankets and high heat flux components; experiments, modeling and analysis.
Fellow, American Nuclear Society, 1990
Fellow, TWAS, 1989

Oddvar O. Bendiksen
DYNAMICS
STRUCTURAL AND SOLID MECHANICS
Classical and computational aeroelasticity, structural dynamics and unsteady aerodynamics.
Associate Fellow, AIAA, 1995

Gregory P. Carman
MANUFACTURING AND DESIGN
MEMS AND NANOTECHNOLOGY
STRUCTURAL AND SOLID MECHANICS
Electromagnetoelasticity models, piezoelectric ceramics, magnetostrictive composites, characterizing thin film shape memory alloys, fiber optic sensors, design of damage detection systems for structures.
Fellow, ASME, 2003

Yong Chen
MEMS AND NANOTECHNOLOGY
Nanofabrication, nanoscale electronic materials and devices, micro-nano electronic/optical/bio/mechanical systems, ultra-scale spatial and temporal characterization.

Pei-Yu Chiou
MEMS AND NANOTECHNOLOGY
Biophotonics, nanophotonics, BioMEMS/NEMS, electrokinetics, microfluidics and biofluidics, guided self-assembly, high throughput single cell analysis.

Vijay K. Dhir
HEAT AND MASS TRANSFER
Two-phase heat transfer, boiling and condensation, thermal and hydrodynamic stability, thermal hydraulics of nuclear reactors, microgravity heat transfer, soil remediation.
Member, National Academy of Engineering, 2006
Fellow, ASME, 1989
Fellow, American Nuclear Society, 1997

Jeff D. Eldredge
FLUID MECHANICS

Bio-inspired locomotion in fluids; Numerical studies of high-speed flows; Development and application of computational tools for unsteady flow physics and flow-structure interaction; Generation and control and aerodynamic sound; Biomedical flows.

Associate Fellow, AIAA, 2013

Rajit Gadh
MANUFACTURING AND DESIGN

Smart Grid - Communication and control, Electric Vehicle aggregation for Smart Grid Integration, Vehicle to Grid and Grid to Vehicle, Automated Demand Response, Micro-grid modeling, Smart grid for renewable integration, Radio Frequency Identification (RFID), Wireless Internet of Artifacts, Reconfigurable Wireless Sensing and Networking Systems, Wireless Multimedia Architectures, CAD/CAM/VR/Visualization.

Fellow, ASME, 2011

Nasr M. Ghoniem
MANUFACTURING AND DESIGN
STRUCTURAL AND SOLID MECHANICS

Damage and failure of materials in mechanical design; mechanics and physics of material defects; material degradation in severe environments; plasma and laser processing; materials non-equilibrium, pattern formation and instability phenomena; radiation interaction with materials.

Fellow, American Nuclear Society, 1994
Fellow, ASME, 2006
Fellow, American Academy of Mechanics, 2010
Fellow, Materials Research Society, 2014

James S. Gibson
DYNAMICS
SYSTEMS AND CONTROL

Control and identification of dynamical systems. Optimal and adaptive control of distributed systems, including flexible structures and fluid flows. Adaptive filtering, identification, and noise cancellation.

Vijay Gupta
MEMS AND NANOTECHNOLOGY
STRUCTURAL AND SOLID MECHANICS

Experimental mechanics, fracture of engineering solids, mechanics of thin films and interfaces, failure mechanisms and characterization of composite materials, ice mechanics.

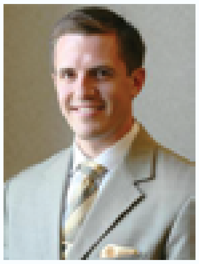
Fellow, ASME, 2005

Chih-Ming Ho
MEMS AND NANOTECHNOLOGY

Prototypical Personalized Medicine (PPM), bio molecular sensors, microfluidics, MEMS.

Member, National Academy of Engineering, 1997
Academician, Academia Sinica, 1998
Fellow, American Physical Society, 1989
Fellow, AIAA, 1994
Distinguished Fellow, AIMBE, 2014
Fellow, 3M-NANO Society, 2014
Doctor of Engineering Honoris Causa: HKUST 2014

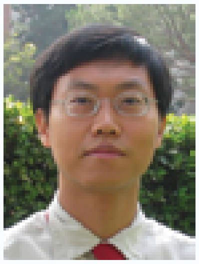
Dennis Hong
MANUFACTURING AND DESIGN
Humanoids and bipedal robots, robot locomotion and manipulation, soft actuators, robotic platforms, autonomous vehicles, machine design, kinematics and mechanisms.



Jonathan B. Hopkins
MANUFACTURING AND DESIGN
STRUCTURAL AND SOLID MECHANICS
SYSTEMS AND CONTROL
Design, analysis, and fabrication of sophisticated flexible structures that possess extraordinary capabilities.

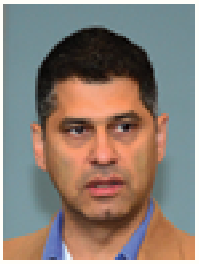
Yongjie Hu
HEAT AND MASS TRANSFER
MEMS AND NANOTECHNOLOGY
Heat transfer and electron transport in nanostructures, interfaces & packaging. Thermal, electronic, optoelectronic, thermoelectric devices and systems. Energy conversion, storage and thermal management. Ultrafast optical spectroscopy and high-frequency electronics. Nanomaterials design, processing and manufacturing.

Tetsuya Iwasaki
SYSTEMS AND CONTROL
Neuronal control mechanism of animal locomotion, nonlinear oscillators, and robust/nonlinear control theory and its applications to mechanical, aerospace, and electrical systems.
Fellow, IEEE, 2009



Y. Sungtaek Ju
HEAT AND MASS TRANSFER
MANUFACTURING AND DESIGN
MEMS AND NANOTECHNOLOGY
Micro- and nanoscale thermosciences, energy, bioMEMS/NEMS, nanofabrication.

Ann R. Karagozian
FLUID MECHANICS
Fluid mechanics and combustion, with applications to improved engine efficiency, reduced emissions, alternative fuels, and advanced high speed air breathing and rocket propulsion systems.
Fellow, AIAA, 2004
Fellow, American Physical Society, 2004
Fellow, ASME, 2013



H. Pirouz Kavehpour

FLUID MECHANICS
HEAT AND MASS TRANSFER
MEMS AND NANOTECHNOLOGY

Microfluidics and biofluidics, biofuel cells, cardiovascular flow, complex fluids, interfacial physics, micro-tribology, non-isothermal flows, drug delivery systems, and artificial organs.

Fellow, ASME, 2015

Chang-Jin "CJ" Kim

MEMS AND NANOTECHNOLOGY

Microelectromechanical systems (MEMS), surface-tension-based microactuation, nanotechnology for surface control, microdevices including microfluidic applications, full spectrum of micromachining technologies.

Fellow, ASME, 2011

John Kim

FLUID MECHANICS

Numerical simulation of transitional and turbulent flows, turbulence and heat-transfer control, numerical algorithms for computational physics.

Member, National Academy of Engineering, 2009
Fellow, American Physical Society, 1989
Fellow, AIAA, 2014

William Klug

STRUCTURAL AND SOLID MECHANICS

Computational structural and solid mechanics, computational biomechanics, and micro/nanomechanics of biological systems.

Adrienne Lavine

HEAT AND MASS TRANSFER

Solar thermal energy storage, thermal energy harvesting, thermal control of nanoscale manufacturing, thermomechanical behavior of shape memory alloys, thermal aspects of manufacturing processes including machining and plasma thermal spray.

Fellow, ASME, 1999

Xiaochun Li

MANUFACTURING AND DESIGN
MEMS AND NANOTECHNOLOGY

Scifacturing (science-driven manufacturing as the next level of manufacturing), interdisciplinary areas of innovative manufacturing and materials processing, Solid Freeform Fabrication (Additive Manufacturing), nanoscience and nanotechnology, laser micro/nano materials processing, and process/system integration.

Fellow, ASME
Fellow, International Society of Manufacturing

Christopher Lynch

STRUCTURAL AND SOLID MECHANICS

Ferroelectric materials including experimental characterization of constitutive behavior under multiaxial loading.

Fellow, ASME, 2004

Fellow, SPIE

Robert T. M'Closkey

SYSTEMS AND CONTROL

Nonlinear control theory and design with application to mechanical and aerospace systems, real-time implementation.

Ajit K. Mal

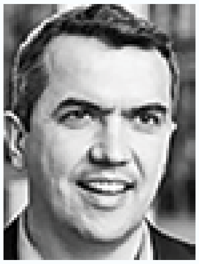
STRUCTURAL AND SOLID MECHANICS

Mechanics of solids, fractures and failure, wave propagation, nondestructive evaluation, composite materials, structural health monitoring, biomechanics.

Fellow, ASME, 1994

Fellow, American Academy of Mechanics, 1994

Fellow, International Society for Optical Engineering, 2005



Laurent G. Pilon

HEAT AND MASS TRANSFER

MEMS AND NANOTECHNOLOGY

Transport phenomena, radiation transfer, thermal sciences, interfacial phenomena, sustainable energy technologies, electrochemical energy storage, photobiological processes, waste heat harvesting.

Jacob Rosen

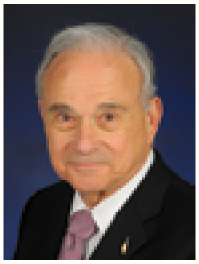
MANUFACTURING AND DESIGN

Biorobotics; Human centered robotics, medical robotics (surgery and rehabilitation), wearable robotics (exoskeleton), teleoperation, haptics and virtual reality, biomechanics, neuromuscular control, and human-machine interfaces.

Veronica Santos

MANUFACTURING AND DESIGN

Human-machine systems, robotics, prosthetics, tactile sensors, haptics, hand biomechanics, neural control of movement, stochastic modeling, and clinical applications of biomechanical modeling.



Jason Speyer
APPLIED MATH
SYSTEMS AND CONTROL
Stochastic and deterministic optimal control and estimation with application to aerospace systems; guidance, flight control, and flight mechanics.
Member, National Academy of Engineering, 2005
Life Fellow, IEEE, 2004
Fellow, AIAA, 1985

Tsu-Chin Tsao
MANUFACTURING AND DESIGN
SYSTEMS AND CONTROL
Modeling and control of dynamic systems with applications in mechanical systems, manufacturing processes, automotive systems, and energy systems, digital control; repetitive and learning control, adaptive and optimal control, mechatronics.
Fellow, ASME, 2011

Richard Wirz
FLUID MECHANICS
Electric and micro propulsion, low temperature plasma and plasma discharges, spacecraft and space mission design, alternative energy generation and storage.

Xiaolin Zhong
FLUID MECHANICS
Computational fluid dynamics, hypersonic flow, hypersonic boundary layer stability and transition, numerical simulation of transient hypersonic flow with nonequilibrium real gas effects, numerical simulation of micro two-phase flow, MHD control of hypersonic boundary layers, high-order numerical methods for flow simulation.
Associate Fellow, AIAA, 2004

Mechanical Engineering Ph.D.

Summer 2014

Chao, Ion Hong (Lavine, A.), "Modeling and Simulation of Plasmonic Lithography Process with Coupling Between Electromagnetic Wave Model, Phase Field Model and Heat Transfer Model."
Gallagher, John Alfred (Lynch, C.S.), "Field-Induced Phase Transformations in Relaxor Ferroelectric Single Crystals."
Jung, Jaedal (Lynch, C.S.), "Identification of Arbitrarily Shaped Scatterers Embedded in Elastic Heterogeneous Media Using Dynamic XFEM."
Kandilian, Razmig (Pilon, L.), "Control and Optimization of Light Transfer in Photobioreactors Used for Biofuel Production."
Pisani, David McIntyre (Lynch, C.S.), "Piezoceramic Sensors/Actuators with Interdigitated Electrode Patterns."
Rousselet, Yohann Lilian (Dhir, V.), "Interacting Effects of Inertia and Gravity on Bubble Dynamics."

Fall 2014

Chang, Yen-Chi (Tsao, T.-C.), "Precision Motion Sensing and Control Through Constrained Optimization."
Faghihi, Azin (Gibson, J.), "Identification of State-Space Models for High-Order Linear Systems and Optical Wavefronts."
Kang, Christopher (Tsao, T.-C.), "Control of an Active Magnetic Bearing-Rotor System."
Le, Hai Phuoc (Karagozian, A.), "Hydrodynamic Models for Multicomponent Plasmas with Collisional-Radiative Kinetics."
O'Neal, Audrey Pool (Lavine, A.), "The Effect of Particle Size and Processing on the Properties of a Barium Titanate Polymer Composite."
Silva-Vite, Aleidy Marlene (Ho, C.-H.), "Feedback System Control: Optimizing Drug Combinations for Tuberculosis Treatment."
Teng, Kuo-Tai (Tsao, T.-C.), "Repetitive and Iterative Learning Control for Power Converter and Precision Motion Control."
Wang, Chengiie (Eldredge, J.), "High-Fidelity Simulation and Low-Order Modeling of Bio-Inspired Fluid Dynamics."
Wu, Yi-Chien (Chiou, P.-Y.), "Massively Parallel Delivery of Large-Sized Cargo into Mammalian Cells with Light Pulses."
Zhang, Hongjie (Abdou, M.), "Modeling and Analysis of Tritium Transport in Multi-Region Lead-Lithium Liquid Metal Blankets."

Winter 2014

Heng, Ri-Liang (Pilon, L.), "Measurements and Predictions of the Radiation Characteristics of Biofuel-Producing Microorganisms."

Spring 2015

Huang, Chih-Yung (Yang, D.), "New Twin Screw Compressor Design by Deviation Function Method."
Gevorkyan, Levon (Karagozian, A.), "Structure and Mixing Characterization of Variable Density Transverse Jet Flows."
Sun, Wei-Yang (Carman, G.), "Control of Coupling Phenomena in Magnetic Nanostructures."
Tsuchiya, Nolan Eizo (Gibson, J.), "Disturbance Rejection and System Identification Using Multi-Channel Adaptive Filtering and RecedingHorizon Control."
Amouzegar, Ladan (Catton, I.), "A Multi-scale Study of Inorganic Aqueous Solution (IAS) for Advanced Heat Pipe Applications."
Dong, Wenda (Lynch, C.S.), "Characterization, Modeling, and Energy Harvesting of Phase Transformations in Ferroelectric Materials."
Park, Hyun Wook (Kim, J.), "A Numerical Study of the Effects of Superhydrophobic Surfaces on Skin-Friction Drag Reduction in Wall-Bounded Shear Flows.

Aerospace Engineering Ph.D.

Fall 2014

Araki, Samuel Jun (Wirz, R.), "Multi-Scale Multi-Species Modeling for Plasma Devices."
Mellquist, Erik Charles (Bendiksen, O.), "Computational Transonic Flutter Solutions for Cranked Wings by the Direct Eulerian-Lagrangian Method."

(Note: During 2014-15, there were 27 total graduating UCLA MAE Ph.D. students. 26 are listed here. One name is omitted due to a privacy request.)

Mechanical Engineering M.S.

Summer 2014
Chao, Ion Hong
Fujii, Amanda Mei Keiko
MS Thesis: "Effect of Nanoporosity on the Thermal Conductivity of Amorphous Carbon" (Pilon, L.)

Fall 2014
Barber, Albert George
Bickel, Jeffrey English
Budiman, Ryan
Cheng, Chen
Cowan, Thomas Christopher
Huang, Chih-Yung
Hubble, Steven Matthew
Jacobo, Jose Luis, Jr
Kang, Young Wook
Knoos, Johan
Krause, Steven Michael
Kuzhikattil, Nipun Krishnaraj
Lee, Jessica Dang
Li, Solomon
Lin, Chiao-Wen
Lin, Edward
Liu, Simond
Mohammed, Mahmoud Ahmed Lotfy Hoss
Nader Esfahani, Nima
Ouyang, Jian
Reis, Darren Robert
Revilla, Ryan Alan
Smith, Sean Raynor
Soni, Arpita
Thiele, Alexander
Wang, Yiqun
Yak, Kian Ming

Winter 2015
Bainbridge-Smith, Jessica
Beauchesne, David Matthew
Debela, Gutu
Dong, Song
Fan, Xiaoyu
Fowle, Samuel Gendler
Gao, Mingze
Hong, Timothy
Huang, Yue
Lotun, Devprakash
Rhodes, Tyler James
Shaw, Lucas Andrew
Simeone, Michael David
Wang, Michael Jun
Zhao, Peng
Zhao, Yuqi

Spring 2015
Behbahani, Amir Hossein
Cavalier, Grant
MS Thesis: "Modeling and Control of an Active Magnetic Bearing Spindle System" (Tsao, T.-C.),
Chang, Yung-Sheng
Datta, Sanjeev
Driscoll, Richard
Flynn, Michael Maxwell
Fujihara, Kyle Nobuo
Fusek, Pamela Ann
Gunter, Wesley William
He, Zihe
Houssainy, Sammy
Katz, Asher
Ke, Ming
Law, Jonathan Chung-Keen
Liu, Austin
Lyons, Thomas Francis
Matsunami, Kameron Kazumi
Panosian, Jasmine Marie
Petersen, Daniel Ryan
Price, Jordan Kazuo
Ramirez, Brian Josue
Ryan, Tyler John
Shah, Kushal Kishorchandra
Shammaa, Abed El Rahman
Shih, Daniel
Stromlund, Adam Lindquist
Tang, Shengjie
Thompson, Michael Bradley
Tiwari, Sawan K
Wallace, Charles
Wood, Kevin
Xu, Mengchi
Yang, Cherng-Shiun
Yang, Ruizhi

Aerospace Engineering M.S.

Summer 2014
Amouyal, Solal
Tran, Phuoc Hai Nguyen
MS Thesis: "Acoustically Coupled Droplet Combustion and Local Extinction under High Amplitude Excitation" (Karagozian, A.)

Fall 2014
Abrantes, Richard June Espino
Dodson, Christopher
Huang, Yuet
Miselis, Michael Paul

Winter 2015
Chung, Maxwell
Cortes, Elvia
Huerta, Cesar Eduardo
Lv, Peng

Spring 2015
Chiu, Derrick
Garg, Deepak
Girard, Henri Louis Jean Paul
MS Thesis: "Modeling and Physical Interpretation of Cyclic Voltammetry for Pseudocapacitors" (Pilon, L.)
Huang, Andy
Jou, Patrick Hong Chang
Kassis, Wadih
Sharifazadeh, Hossein
Vasko, David Joseph
Wood, Jacob Duncan

(Note: During 2014-15, there were 102 total graduating UCLA MAE M.S. students. 98 are listed here. Four names are omitted due to privacy requests.)

Bachelor of Science

Ahn, Min Sung
Al-Naggar, Omar Ashraf
Apelacio, John Carlo Concepcion
Aramburu, Dylan Michael
Asher, Jeffrey
Ashtari, Arash
August-Schmidt, Alexander Michael
Azam, Muhammad Usman
Baheti, Akash
Balcewicz, Jonathan Christopher
Barber, Edward William
Barnes-Wallace, Mitchell Ryan
Benzoni, Nicholas Albert
Berry, Alexander Scott
Blasko, Anthony Francis
Calderon, Daniel
Carroll, David Noah
Celeste, Lucio Michael
Chan, Gavin Yi
Charara, Mohammad
Chau, Calvin
Chen, Joshua Lee
Chutinuntanakul, Patarapol
Cooper, Andwele Ali
Cooper, Cody Tyler
Cropp, David Wheaton
David, Danzel Joshua Yturralde
Deyerle, Lewis Scott
Dissanayake, Ravisha Hashan
Drake, Erin Ching-Yi
Dunning, Daniel John
Dunst, Benjamin Adam
Fagrey, Dylan Michael
Friedman, Matthew Daniel
Frisch, Megan Somerset
Garvin, Connor Joseph
Ghazari, Arian
Griswold, James Steven
Guttadauro, Joseph Mariano
Hamada, William Shuryu
Harwin, Brett N
Helson, Ryan Douglas
Hendler, Ryan David
Hinrichs, Matthew Stephen
Ho, Kristen
Homer, Michael
Hruska, Dylan Vincent
Huang, Athena Yeh
Hwang, Andrew Calvin
Jain, Amol
Johnson, William John
Jozefov, Alexander Philip
Kim, Eric Lee
Kim, Jihoon
Kim, Simon Ji Ham
Kim, Soohan
Ku, Benson
Kwak, Wooyoung
La, Kevin Chan Kit
Lane, Gerrit Alexander
Lee, Dong Won
Liu, Kevin Khoi-Anh
Lloyd, James Derrick
Lopez, Edward John
Louie, Brian Matthew
Macpherson, Ian Douglas
Mansilla, Lowell Dominic Deysolong
Mcalpine, Cullen Allen
Mckennon, Craig Robert
Minami, Koei
Moon, Justin
Moon, Youngjin
Moore, Danielle Marie
Mount, Daniel Kaborycha
Murphy, Kaitlyn May
Nelson, James Kenneth
Nguyen, Corey Sanh
Nguyen, Lauren Kim
Oppenheimer, Aaron Bowen
Pang, Byron Elkanah
Park, Joon Ho
Partusch, Vincent Joseph
Patterson, Julian Ashton
Porte, Rainyr Darwyn
Prachumsri, Wudhidham
Provinchain, Adam Jonathan
Ramirez, Ricardo
Ro, Jason Kwangun
Rodarte, Dylan Andrew
Rooney, Dennis Patrick
Saad, Hassan Alie
Saitoh, Aki
Sandzimier, Ryan Joseph
Sarabian, Chareena Lynne
Schmidt, Dylan
Shafer, Melissa Rose
Shah, Yesha V
Sharpe, Conner Terry
Shi, Cong
Shin, Seung Ryul
Siazon, Mel Kevin
Sikora, Aanish Patel
Smith, Robert Kelley
Sommer, Henry Moises
Song, Biao
Stich, Nicholas James
Sun, Kevin Spencer
Sung, Timothy Chiun-Yen
Suri, Gautam
Sweeney, Lindsey Kathleen
Sy, Ki Cheong John Ryath
Tang, Emily
Thanyakarn, Metchawin
Thurber, Savannah Maria
Upton, Samantha Lynn
Voyen, Nicole Suzanne
Wan, Kevin
Wanket, Douglas Anthony
Williams, Kyle Leland
Wong, Denon
Wong, Jameson Zhong-Yee
Wong, Winston Kai-Wing
Wu, Elmer
Wun, Derek Neil
Xie, Yiding
Yamamoto, Shinnosuke
Yamayoshi, Itsui
Yeh, Dennis Miles
Yeh, Kevin
Young, Benjamin Alexander
Zapata, Isaac Edward
Zhang, Xiang
Zhu, Fangcheng
Zhu, Yifang

(Note: During 2014-15, there were 144 total graduating UCLA MAE B.S. students. 134 are listed here. 10 names are omitted due to privacy requests.)

Faculty Awards and Honors

Abdou, Mohamed. Honorary Chair, 12th International Symposium on Fusion Nuclear Technology (ISFNT-12), Jeju Island, South Korea.

Carman, Gregory. Smart Structures and Materials Lifetime Achievement Award, SPIE.

Carman, Gregory. 2016 Distinguished Lecturer for the IEEE Magnetics Society.

Carman, Gregory. Keynote Lecture SEM May 2015, Society of Experimental Mechanics.

Goebel, Dan, NAE, 2015.

Ho, Chih-Ming. Distinguished Fellow, American Institute for Medical and Biological Engineering (AIMBE).

Ho, Chih-Ming. Johns Hopkins Alumnus Global Achievement Award, The Johns Hopkins University.

Ho, Chih-Ming. Doctor of Engineering honoris causa, Hong Kong University of Science and Technology.

Karagozian, Ann. Director, Air Force Research Laboratory/ UCLA Collaborative Center for Aerospace Sciences (CCAS).

Karagozian, Ann. Elected Member, Executive Committee, Board of Trustees and Chair, Visiting Committee, Institute for Defense Analyses.

Karagozian, Ann. Member, Princeton University Mechanical and Aerospace Engineering Advisory Committee.

Karagozian, Ann. Presented the Minta Martin Distinguished Lecture at the Department of Aerospace Engineering, University of Maryland.

Karagozian, Ann. Chair, University of Arizona Aerospace & Mechanical Engineering Academic Program Review Committee.

Kavehpour, Pirouz, ASME Fellow, 2015.

Kim, C.-J. Ho-Am Prize in Engineering, The Ho-Am Foundation.

Lynch, Christopher. Smart Structures Lifetime Achievement Award, SPIE.

Pilon, Laurent. Research Chair for Junior Scientist, Region Pays de la Loire, France.

Journal Publications

Fluid Mechanics

Eldredge, J.D., Senocak, I., Dawson, P., Canino, J., Liou, W. W., LeBeau, R., Hitt, D. L., Rumpfkeil, M. P. and Cummings, R. M., "A best practices guide to CFD education in the undergraduate curriculum," International Journal of Aerodynamics, 4(3/4):200 - 236 (2014)

Getsinger, D. R., Gevorkyan, L., Smith, O. I., and Karagozian, A. R., "Structural and Stability Characteristics of Jets in Crossflow," Journal of Fluid Mechanics, 760:342 - 367 (2014)

Karagozian, A. R., "The Jet in Crossflow," Physics of Fluids, AIP, 26(101303):1 - 17 (2014) url: doi: 10.1063/1.4895900

Sevilla-Esparza, C. I., Wegener, J. L., Teshome, S., Rodriguez, J. I., Smith, O. I., and Karagozian, A. R., "Droplet Combustion in the Presence of Acoustic Excitation," Combustion and Flame, 161:1604 - 1619 (2014)

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Tavakoli, F., Davis, S. H., and Kavehpour, H. P., "Spreading and Arrest of a Molten Liquid on Cold Substrates," Langmuir, 30(34):10151 - 10155 (09/02/2014)

Karagozian, A. R., "Frank Marble (1918-2014): Tribute to an Aerospace Giant," Proceedings of the National Academy of Sciences, 112(18):5550 - 5551 (May 2015)

Kang, S.M., Speyer, J.L. and Kim, J., "Controller Synthesis for Periodic, Linear-Distributed Parameter Systems: Channel Flow Application," AIAA Journal of Guidance, Control, and Dynamics, 38(6):993 - 1000 (June 2015)

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Conversano R., Goebel D.M., Hofer R.R., Matlock T.S., Wirz R.E., "Development and Initial Testing of a Magnetically Shielded Miniature Hall Thruster", Plasma Science, IEEE Transactions on, PP, 99 (2014) doi: 10.1109/TPS.2014.2321107

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Araki S.J., Wirz R.E., "Cell-centered particle weighting algorithm for PIC simulations in a non-uniform 2D axisymmetric mesh," Journal of Computational Physics, Vol. 272, (2014) pp. 218–226, doi:10.1016/j.jcp.2014.04.037

Heat and Mass Transfer

Aktinol, E. and Dhir, V. K., "Numerical simulation of the effect of varying contact angle on the thermal response of the solid during nucleate pool boiling," Interfacial Phenomena and Heat Transfer, 301-324 (2014)

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Rousselet, Y., Warrier, G. R., Dhir, V. K., "Subcooled pool film boiling heat transfer from small horizontal cylinders at near-critical pressures," International J. Heat and Mass Transfer, 72:531 - 543 (2014)

Bran-Anleu, G., Lavine, A.S., Wirz, R.E., and Kavehpour H.P., "Algorithm to optimize transient hot-wire thermal property measurement," Review of Scientific Instruments, 85(4):045105 (2014)

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Po, Giacomo; Mohamed, Mamdouh S; Crosby, Tamer; Erel, Can; El-Azab, Anter; Ghoniem, Nasr;, "Recent Progress in Discrete Dislocation Dynamics and Its Applications to Micro Plasticity," Journal of Metals (JOM), Springer-US, 66(10):2108 - 2120 (2014)

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Engineering VI

OPENS IN THE HEART OF CAMPUS

UCLA leaders and prominent alumni gathered in March to celebrate the new jewel of the Henry Samueli School of Engineering and Applied Science, Engineering VI.

The building will feature state-of-the-art labs for research into renewable energy sources, next-generation semiconductors, nanotechnology, and new materials for healthcare and other applications, as well as the B. John Garrick Institute for Risk Sciences, and the technology-enabled 250-seat Dr. William M. W. Mong Memorial Learning Center. It will be home to the UCLA Computer Science Department and the engineering school's start-up incubator, the Institute for Technology Advancement.

The 60,000-square-foot north wing is complete and is expected to be occupied in May 2015. The 90,000-square-foot south wing is scheduled to be completed in 2017.

Construction is being funded by donors, the engineering school and the UCLA campus, without support from the State of California. Donors have pledged or given $45 million for the building so far, and the National Institute of Standards and Technology made a $6 million grant.

When Engineering VI is complete, UCLA Engineering will have added more than 250,000 square feet of research and teaching space in the span of a decade.

Photo: Joanne Leung

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