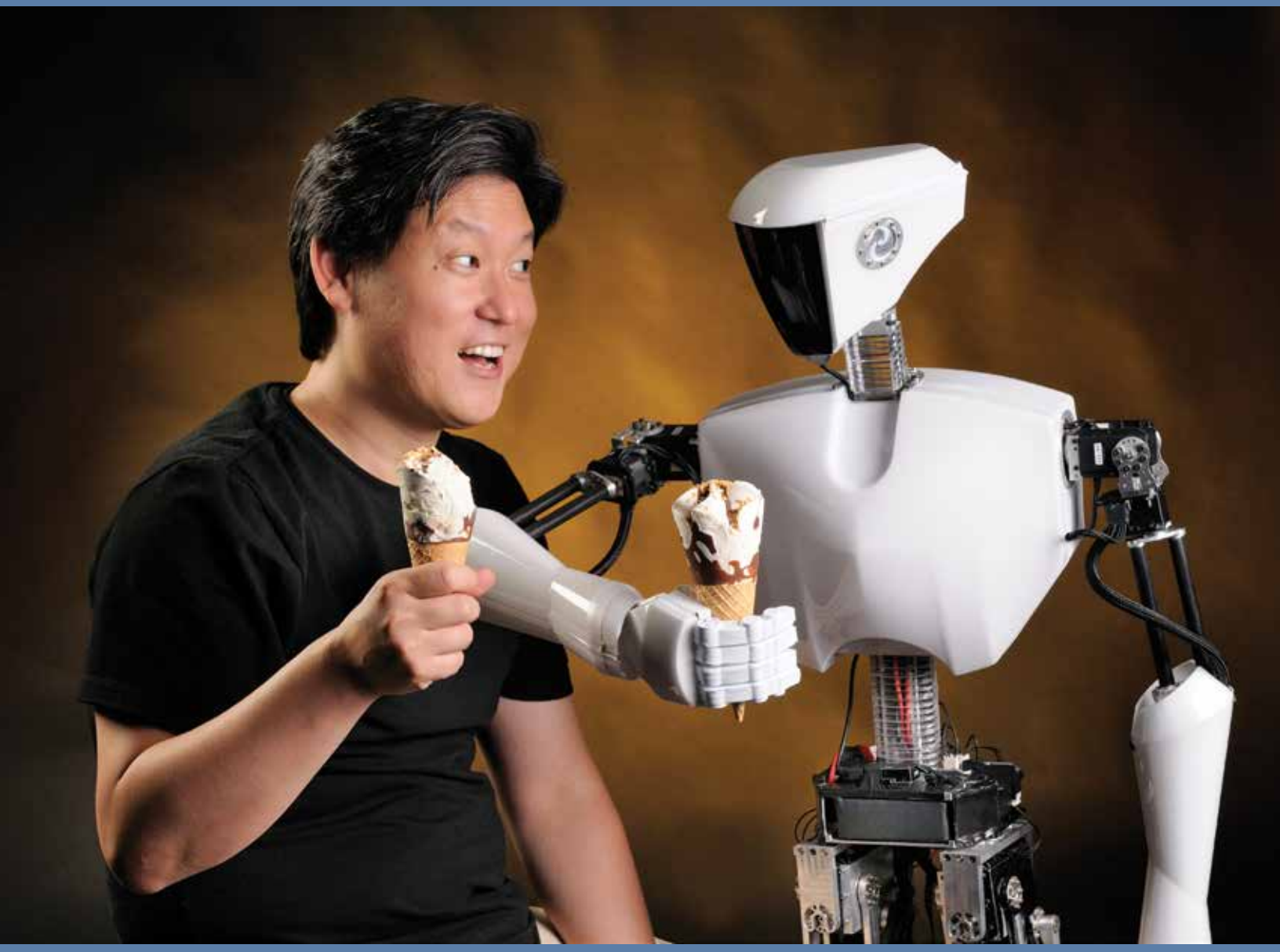
Mechanical & Aerospace Engineering Department

2013-14



UCLA ENGINEERING
Henry Samueli School of Engineering and Applied Science

Birthplace of the Internet

Chair's Message

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 2013-14 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

FRONT COVER: Professor Dennis Hong and CHARLI the humanoid robot enjoy ice cream together.

BACK COVER: UCLA Racing | Baja SAE Team takes honors in El Paso.

Mission Statement

Our mission is to educate the nation's future leaders in the science and art of mechanical and aerospace engineering. Further, we seek to expand the frontiers of engineering science and to encourage technological innovation while fostering academic excellence and scholarly learning in a collegial environment.

The Department gratefully acknowledges UCLA Images for use of images throughout this report.

Alexander Duffy: Editor and Graphic Designer.

UCLA MAE Annual Report 2013-14

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Faculty and Staff

Ladder Faculty:	32
Joint Faculty:	2
Emeritus Faculty:	9
Adjunct Faculty:	8
Lecturers:	28
Administrative Staff :	18
Staff Research Associates:	19
Development Engineers:	9
Postdoctoral Scholars:	21
Visiting Ph.D. Scholars:	25
Visiting International non-degree Students:	16
GSRs total for the year:	304
TAs (3 quarters) total:	118
Volunteers (including high school students):	33

Recognitions

Society Fellows:	29
CAREER or Young Investigator Awards:	10
NAE members:	7
Regular Faculty:	4
Affiliated Faculty:	2
Emeriti:	1

Publications

Journal Articles:	124
Conference Papers:	53
Books & Book Chapters:	3
Patents:	7

Research Centers

CESTAR: Center for Energy Science and Technology Advanced Research (Abdou)

FSTC: Fusion Science and Technology Center (Abdou)

SMERC: Smart Grid Energy Research Center (Gadh)

SYDYC: Systems, Dynamics and Controls (Gibson, M'Closkey)

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

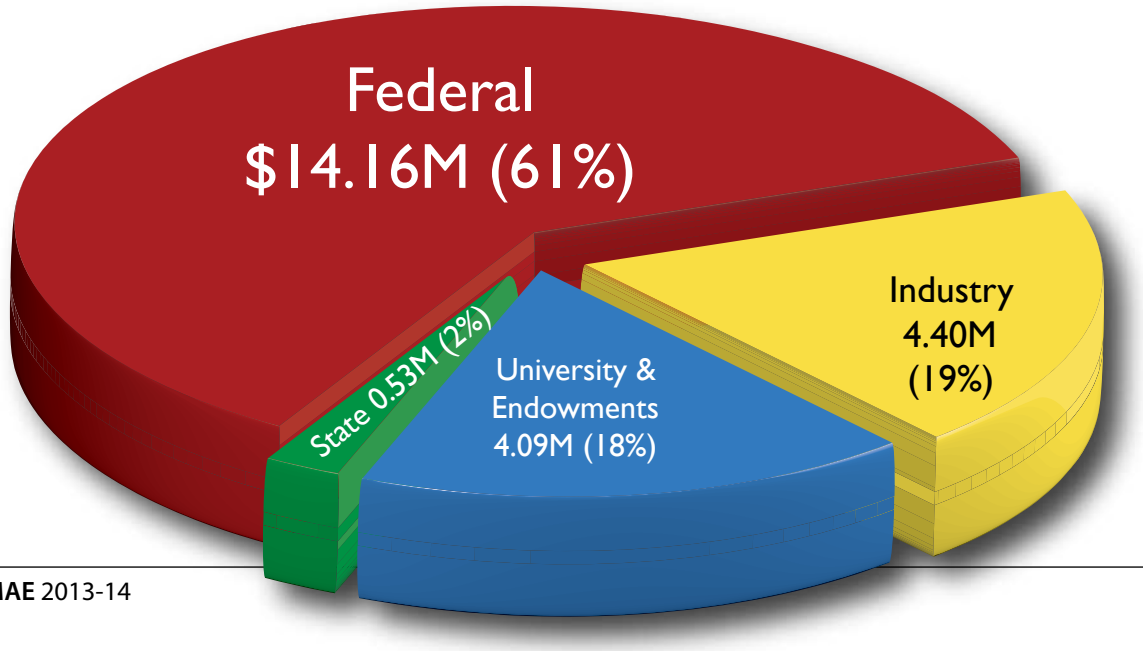
WINMEC: Wireless Internet for Mobile Enterprise Consortium (Gadh)

Laboratories and Research Groups

Active Materials (Carman)
Autonomous Vehicles Systems and Instrumentation (Speyer)
Beam Control (Gibson)
Boiling Heat Transfer (Dhir)
Chen Research Group
Complex Fluids & Interfacial Physics (Kavehpour)
Computational Biomechanics (Klug)
Energy & Propulsion Research (Karagozian, Smith)
Hypersonics & Computational Aerodynamics Group (Zhong)
Materials Degradation Characterization (Mal)
Materials in Extreme Environments (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)
Multiscale ThermoSciences (Ju)
Optofluidics Systems (Chiou)
Pilon Research Group
Simulations of Flow Physics and Acoustics (Eldredge)
Thin Films, Interfaces, and Composites Characterization (Gupta)
Turbulence Research (Kim, J.)
Wirz Research Group

Fiscal Year 2013-2014 Sponsored Research Budget - Total $23.2M

(Fiscal Year 2013-2014 Sponsored Research Expenditures - Total $10.8M)



Undergraduate Freshman Admission Statistics

Applications: Mechanical 2384 / Aerospace 1079 / Total 3463
Admits: Mechanical 306 / Aerospace 139 / Total 445
Admit Rate: Mechanical 12.8% / Aerospace 12.9%
Positive SIR: Mechanical 70 / Aerospace 42 / Total 112
Enrolled: Mechanical 68 / Aerospace 41 / Total 109

Undergraduate Transfer Admission Statistics

Applications: Mechanical 440 / Aerospace 115 / Total 555
Admits: Mechanical 34 / Aerospace 18 / Total 52
Admit Rate: Mechanical 7.7% / Aerospace 15.7%
Positive SIR: Mechanical 8 / Aerospace 12 / Total 20
Enrolled: Mechanical 8 / Aerospace 12 / Total 20

Fall Quarter 2013 Undergraduate Enrollment

Mechanical 389
Aerospace 180
Total 569

Graduate Admission Statistics

	Applicants			Admits			Enrolled		
	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total
Mechanical	198	410	608	128	98	226	59	39	98
Aerospace	82	73	155	59	16	75	20	5	25
Total	***280***	***483***	***763***	***187***	***114***	***301***	***79***	***44***	***123***

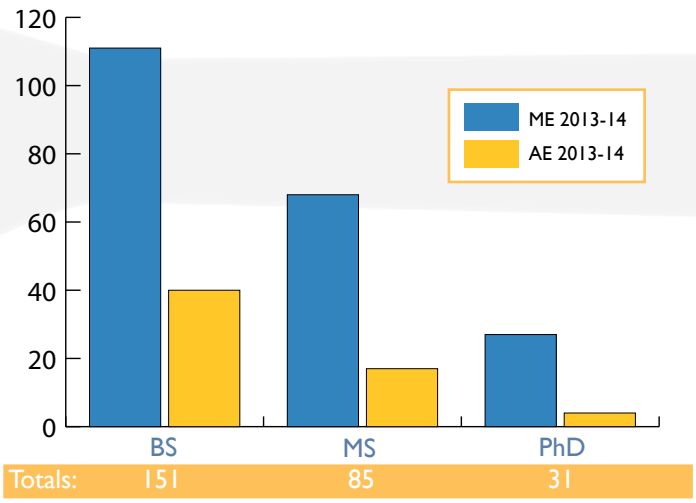
Number of ME & AE degrees conferred 2013-14 (BS, MS, PhD)

BS Mechanical: 111
BS Aerospace: 40
Total: 151

MS Mechanical: 68
MS Aerospace: 17
Total: 85

PhD Mechanical: 27
PhD Aerospace: 4
Total: 31

ME & AE Degrees Conferred 2013-14



Funding Received by Graduate Students

GSR Salaries (without benefits)	$1,610,272.00
Research Scholarships (Graduate Division)	$680,169.00
Teaching Assistantships	$606,826.00
Eugene Cota Robles Fellowships (4 Mechanical, 2 Aerospace)	$108,924.90
Dissertation Year Programs (3 Aerospace, 1 Mechanical)	$93,616.00
Graduate Opportunity Fellowship	$66,616.00
Dean's Matching NRT Funds	$15,102.00
Leon & Alyne Camp Fellowship Funds	$15,000.00
Dean's Fellowship Funds	$14,000.00
Total	**$3,210,525.90**

Vijay Gupta - Making football helmets safer to prevent concussions

By Mike Fricano / Originally published in UCLA Today

Vijay Gupta

As a sports fan with expertise in biomechanical engineering, UCLA professor Vijay Gupta marvels at the efficient, effective way the human body is built.

For example, the human head — which encases a three-pound brain suspended in cerebral-spinal fluid in the hard shell of the skull — is what the research engineer describes as "the best shock-absorbing system you could ever design." But it wasn't designed to withstand the shockwaves resulting from a collision with a 250-pound football player wearing a helmet.

So Gupta is applying his expertise in materials science, mechanical engineering and bioengineering to protect the brain from the forces that cause concussions and traumatic brain injury. He's created a polymer that could diminish the force of helmet-to-helmet hits on a football field or shockwaves from explosive devices on a battlefield. To test out his material, Gupta uses lasers and a grandfather-clock-sized hammering machine.

This 2-millimeter-thick polymer has shown early promise as a way to decrease the risk of concussions.

"If I cut down the level of force with my material, that's going to help concussion reduction," Gupta said. A professor of mechanical and aerospace engineering, bioengineering, and materials science and engineering who grew up in India, Gupta is also sports fan who developed an interest in American football while living with sports fanatics during his graduate studies at Massachusetts Institute of Technology.

As concussions have become a much-discussed topic among athletes, sports fans, officials with various sports leagues and parents, Gupta thought to himself, "As someone who likes football and as a biomechanical engineer, what can I do?"

He started by building on previously published research about brain injuries from the 1960s and, more recently, a study sponsored by the NFL. To determine concussion probabilities for football players, researchers examined game videos of hits, some that resulted in concussions and others that did not lead to brain injury. Taking into account the size of the players and measuring how fast they were running, researchers were able calculate the G-force of the football hits and establish a concussion probability curve.

"Above 90 Gs, you have an almost 90 percent probability of a concussion," Gupta said.

To improve on the shock-absorbing ability of the standard football helmet without radically changing its design, Gupta added a 2-millimeter-thick wafer (about the thickness of a nickel) of a firm, but flexible polymer he devised to reinforce the helmet's foam padding. Then Gupta and his students Matt Timsit, Ryan Crum and Jason Citron used the hammering machine to drop a weight on top of the helmet from a specified height to generate a range of G-forces. They measured the force felt by using a sensor.

The special polymer that Gupta has produced in his lab in the Henry Samueli School of Engineering and Applied Science, with his students Ninh Le and George Youssef, has yielded promising results. They've tried different mixes of the polymer to alter its rigidity and viscoelasticity, as well as varying its thickness and where they placed the polymer layers in the helmets. Gupta and his team have been able to achieve up to a 25 percent reduction in the force a person would feel. This translates to a similar reduction in the probability of getting a concussion.

"This is a remarkable reduction given that we are adding such a small amount of material that essentially leaves the current helmet unaltered," Gupta said. If the helmet is altered too much, the concern is that it might affect how players are forced to play and they might not want to wear it.

Gupta noted that improvement comes only when the shock-absorbing polymer is placed inside the helmet on the foam padding. When the polymer is placed outside the helmet it actually increases the impact force.

In addition to helping prevent injuries in football, Gupta's also testing how well his material would absorb shock for runners. He said that tests have shown a significant reduction in the shock by placing just a 1.5-mm-thick layer of the material below the sock liner. Gupta estimates that runners who run five to 10 miles per week could increase the life of their knee cartilage life by 10 to 15 years (depending upon the age of the runners). Gupta said that's a similar shock absorption as insoles you can buy now, but his polymer is just one-tenth as thick.

Gupta started working with this polymer about eight years on a project for the U.S. Navy, which needed a substance that would bond steel and a composite material in a new ship design. The substance he created ended up being stronger than the composite material he was joining with the steel. These joints forged by his material proved they could withstand shocks from explosions and that's when he realized the shock absorbing potential of his polymer for protection against explosions.

Not surprisingly then in addition to helping prevent

injuries in athletics, Gupta sees possible military applications for the polymer. Soldiers are subjected to powerful shockwaves from explosive blasts on the battlefield, and Gupta thinks adding his polymer to military helmets could help diminish those effects and reduce traumatic brain injuries.

When shockwaves from an explosive hit the brain, the impact lasts far less than a football collision, so Gupta uses lasers to replicate such shocks. "An athlete feels the force of helmet-to-helmet [hits] over 10 to 30 milliseconds. That's several thousandths of a second," Gupta said. "The shockwaves of an explosive device last for just a millionth of a second but has tremendous force."

Impacts, whether from hits by a hard object or high-speed shockwaves, are one of two causes of concussions and traumatic brain injury. The impact literally causes a stress wave to pulse through the brain, hit the other side of the skull and rebound back through the brain. These reverberations cause pushing and pulling forces that tear apart tissue, like blood vessels and neurons, Gupta said. Concussions can also result from the head being violently shaken, but there's no materials technology to lessen the traumatic effects of that, Gupta said.

The brain injuries that result from concussions can also be difficult to diagnose, especially if the force of the impact is lower. "You get hit, and the shockwave goes in and comes back, but you don't have enough intensity to cause visible damage in an MRI," Gupta said. The repeated effects of low intensity shockwaves on the body remains a debated topic, and further research is needed to settle this conclusively, Gupta said.

Upper left: To help ensure that players would want to wear safer helmets, UCLA engineering professor Vijay Gupta and his team of students kept the polymer thin so as not to alter current football helmets too much.

Upper right: This grandfather-clock-sized machine is so powerful it shakes the floor when it drops its weight onto a helmet.

Bottom: Professor Vijay Gupta in his lab.

Mohamed Abdou receives multi-year, multimillion-dollar research contracts from Korea and India to develop fusion technology

Mohamed Abdou

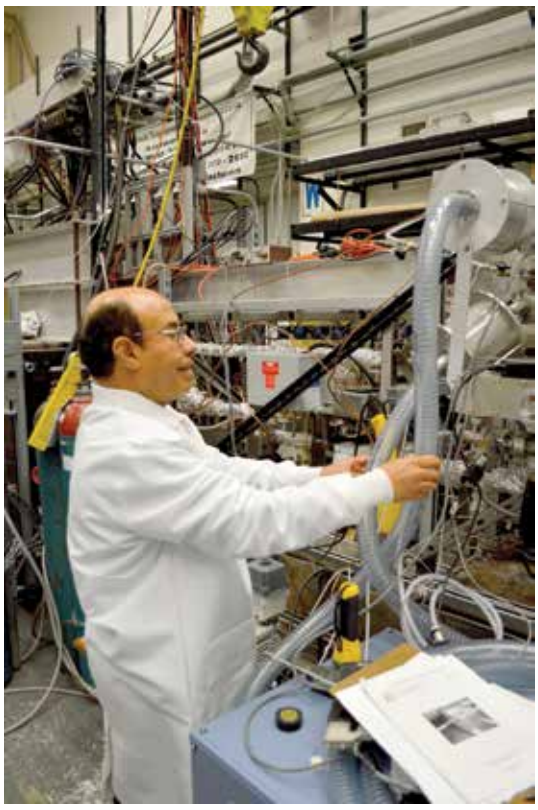
Mohamed Abdou, Distinguished Professor in the Mechanical and Aerospace Engineering Department, negotiated and signed first-of-a-kind research contracts with South Korea and India, in which the UCLA Fusion Science and Technology Center will receive several million dollars over 6 years to develop fusion nuclear technology. Both agreements were approved by the US Department of Energy, which will provide UCLA with "matching" funds.

UCLA will help the National Fusion Research Institute (NFRI) in Korea to develop a breeding blanket based on helium-cooled lithium-based ceramic pebble bed concept. The blanket will simultaneously extract energy and breed tritium utilizing neutrons produced in the fusion reaction. The ultimate objective of the joint UCLA-NFRI collaborative research agreement is to enable Korea to develop the blanket concept and build a prototype to test in ITER. The ITER Project is being constructed in South France as a collaborative project among EU, Japan, USA, China, Korea, India, and Russia. ITER will demonstrate the principles of fusion energy and produce 500 MW of fusion power. ITER is the largest science project ever and is a unique model of international collaboration. ITER's first plasma is scheduled for 2021.

The objective of the collaborative research agreement between UCLA and the Institute of Plasma Physics (IPR) in India is for the UCLA researchers to help India develop an innovative blanket concept that utilizes Lead-Lithium liquid as a coolant and a lithium ceramic pebble bed as breeder. The ultimate goal of the collaboration is to help India resolve key scientific issues and develop this innovative blanket concept in time to test a prototype in ITER.

The collaborative research agreement between UCLA and NFRI Korea was signed on July 22nd in Daejeon, Korea. The signing ceremony was attended by a large number of key people from Korea including the President of NFRI, the ITER Korea director general, the director of the advanced DEMO division, and many others. Prof. Abdou represented USA and UCLA. A kick-off technical meeting was held at UCLA on November 12, 2013. The UCLA and IPR India agreement was signed on October 31, 2013.

Both research projects with Korea and India involve several UCLA researchers and a number of graduate students. The UCLA research will include experiments and modeling on several challenging areas including liquid metal MHD, tritium behavior and transport, ceramic breeder thermomechanics, material response to extreme environment, and neutronics, as well as design and analysis. The ceramic breeder and liquid metal research efforts will be led by Dr. Alice Ying and Dr. Sergey Smolentsev, respectively.



Xiaochun Li uses nanoparticles to put materials on 'Atomic Diet Control'

By Matthew Chin

Xiaochun Li

Growth is a ubiquitous phenomenon in plants and animals.

But it also occurs naturally in chemicals, metals and other inorganic materials. That fact has, for decades, posed a major challenge for scientists and engineers, because controlling the growth within materials is critical for creating products with uniform physical properties so that they can be used as components of machinery and electronic devices. The challenge has been particularly vexing when the materials' molecular building blocks grow rapidly or are processed under harsh conditions such as high temperatures.

Now, a team led by researchers from the UCLA Henry Samueli School of Engineering and Applied Science has developed a new process to control molecular growth within the "building block" components of inorganic materials. The method, which uses nanoparticles to organize the components during a critical phase of the manufacturing process, could lead to innovative new materials, such as self-lubricating bearings for engines, and it could make it feasible for them to be mass-produced.

The study was published May 9 in the journal Nature Communications.

Xiaochun Li, UCLA's Raytheon Chair in Manufacturing Engineering and the principal investigator on the research, compared the new process to creating the best conditions for plants to grow in a garden.

"In nature, some seeds sprout earlier than others and the plants grow larger, preventing nearby sprouts from growing by blocking their access to nutrients or sunshine," said Li, who also is a professor of mechanical and aerospace engineering. "But if the earlier plants are on a controlled diet that limits their growth, the other plants will have a better chance to be healthy — maximizing the yield in the garden.

"We are doing this on a nanoscale, controlling growth at the atomic level by physically blocking agents of growth to obtain high-performance materials with uniformity and other desired properties. It is like an atomic diet control for material synthesis."

The method uses self-assembling nanoparticles that rapidly and effectively control the materials' building blocks as they form during the cooling — or growth — stage of the manufacturing process. The nanoparticles are made of thermodynamically stable materials (such as ceramic titanium carbonitride) and are added and dispersed using an ultrasonic dispersion method. The nanoparticles spontaneously assemble as a thin coating, significantly blocking diffusion of the materials.

The technique is effective for both inorganic and organic materials.

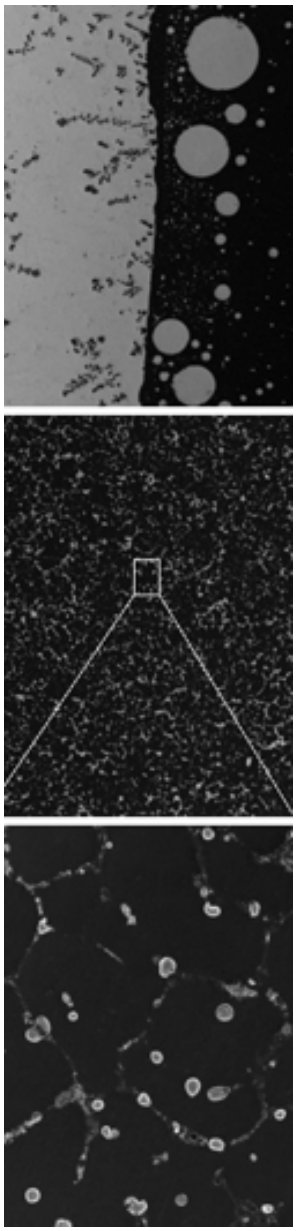
In their study, researchers demonstrated the method could be used for aluminum-bismuth alloys. Normally, aluminum and bismuth — like oil and water — cannot be completely mixed. Although they can be temporarily combined under high heat, the elements separate when the mixture is cooled, resulting in an alloy with uneven properties. But, using the nanoparticle-controlled process, the UCLA-led team created a uniform and high-performing aluminum-bismuth alloy.

"We are controlling the nucleation and growth during the solidification process in order to obtain uniform and fine-size microstructures," said Lianyi Chen, the lead author of the study and a postdoctoral scholar in mechanical and aerospace engineering. "With incorporation of nanoparticles, the aluminum-bismuth alloy exhibits 10 times better performance in terms of reducing friction, which can be used to make engines with significantly improved energy efficiency."

Li said the new approach will prove useful in a broad array of applications, possibly including efforts to limit the growth of cancer cells.

Other contributors to the research include Jiaquan Xu, a UCLA engineering graduate student; Hongseok Choi and Hiromi Konishi, former postdoctoral scholars advised by Li while he was on the faculty of the University of Wisconsin – Madison; and Song Jin, a professor of chemistry at Wisconsin.

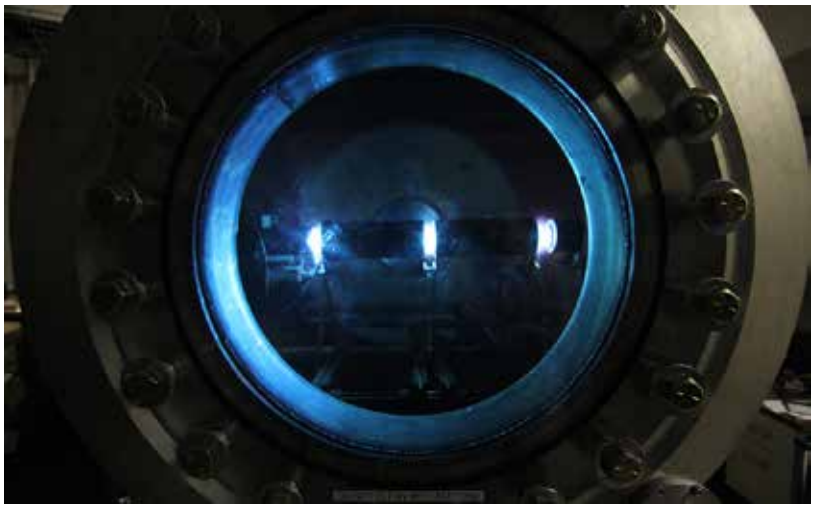
The research was funded by the National Institute of Standards and Technology.



An aluminum-bismuth alloy without the introduction of nanoparticles (top, at 500 microns), and after nanoparticles were introduced before the alloy is cooled (center, at 500 microns, and bottom, at 50 microns).

UCLA engineering team lands major Air Force grant to study plasma surfaces

By Matthew Chin



A preliminary build of the UCLA Plasma-Material Interactions facility. This picture shows the plasma column viewed through a 1-m diameter window of 2" thick plexiglass. The AFOSR grant will be used to build a version that can operate at high-power, in ultra-high vacuum, and with precision diagnostics.

What happens at tiny scales when an electrically charged hot gas hits new advanced materials? An interdisciplinary team of UCLA Engineers has won an $890,000 grant from the Air Force Office of Scientific Research (AFOSR) to explore this question. The grant amount is the largest distributed from the office this year.

Plasmas are gases comprised of electrically charged particles, electrons and ions, which are commonly used in electric propulsion systems for spacecraft. These electric thrusters use electromagnetic forces to accelerate ions to extremely high velocities to propel spacecraft at high efficiency.

A new generation of advanced microarchitectured materials could hold great promise for spacecraft, as well as many other applications. But more research is needed to understand how these materials and their boundaries respond in the presence of the ions and electrons in high temperature plasmas, simply put, how durable are they for these applications?

With funding from AFOSR, the UCLA Engineering team will construct a new high-power plasma source withhigh-precision diagnostic facility. Currently, materials bombarded by plasma are commonly examined after a long cool-down period with exposure to atmospheric conditions. The new UCLA Engineering facility will allow the researchers to use powerful diagnostics and microscopes to carefully analyze the materials as they are hit with ions and electrons inside a large vacuum chamber, at equivalent temperatures as high as three million Kelvin. This will allow researchers to examine, at nano-scales, what happens to the structure and composition of the material surface, the plasma, and at the interface between the two.

The principal investigator on the grant is Richard Wirz, UCLA assistant professor of mechanical and aerospace engineering, a leader in plasma processes for advanced space propulsion systems. The project's co-principal investigators are Nasr Ghoniem, UCLA professor of mechanical and aerospace engineering, a world expert in aerospace materials who has pioneered research and modeling in microarchitectured materials that are well-suited for demanding plasma applications; and Suneel Kodambaka, UCLA associate professor of materials science and engineering, an expert in the thermal, chemical, and mechanical characterization of materials and will provide important insight to the surface dynamics of the advanced materials that will be examined in this facility.

"This facility will provide a leap forward in space travel and communication by demonstrating materials that are ideal for long life and high power operation of electric thrusters and spacecraft communication systems," Wirz said. "Such technologies will enable exciting space missions such as asteroids retrieval, and ambitious missions to other planets and their moons."

Richard Wirz, associate professor of mechanical and aerospace engineering, Nasr Ghoniem, professor of mechanical and aerospace engineering, and Suneel Kodambaka, UCLA associate professor of materials science.

Nature-inspired engineering

For several UCLA Engineering faculty members, a primary research focus is exploring the elegant solutions nature has already devised to solve problems, and adapting those solutions for new technologies and products.

LOCOMOTION CONTROL

From a manta ray gliding through the ocean depths to a snake slithering along the ground, the animal kingdom has provided many examples of how to adapt to and move around in changing environments. Tetsuya Iwasaki, professor of mechanical and aerospace engineering, and researchers in his lab are exploring the neuronal control mechanisms underlying animal locomotion, their optimality and resonance, and applications for the design of dynamic feedback systems. Recent studies include fish and ray biology and robotic prototypes.

http://www.seas.ucla.edu/~iwasaki/

"We aim to establish a control theory for coordinated oscillations by translating biological knowledge to engineering principles. The fundamental research will have a broad range of potential applications, including robotic vehicles, assistive devices, neural prostheses, locomotor rehabilitation, and brain-state control. "

– Tetsuya Iwasaki

Tetsuya Iwasaki

MICROALGAE ALTERNATIVE

Biofuels – in particular those produced by photosynthetic microorganisms such as microalgae – may prove to be powerful alternatives to fossil fuels in addressing climate change and energy security concerns. Microalgae, found in oceans and freshwater, need sunlight, carbon dioxide, water and nutrients to grow and produce lipids that can be converted into biodiesel. Laurent Pilon, professor of mechanical and aerospace engineering, and his research group are exploring several applications for sustainable energy, including how microalgae grown in photobioreactors can most efficiently utilize and convert incoming light energy.

www.seas.ucla.edu/~pilon/

"We are investigating the interaction between light and photosynthetic microorganisms and developing tools and strategies to maximize their lipid production."

– Laurent Pilon

Laurent Pilon

BIO-INSPIRED MICRO AERIAL VEHICLES

Think of a hummingbird, or a dragonfly. Much like those masters of flight, small but highly maneuverable aircraft that can stop on a dime and change direction hold great promise for aviation and aerospace exploration. Jeff Eldredge, associate professor of mechanical and aerospace engineering, leads the Simulations of Flow Physics and Acoustics Laboratory, which specializes in studying unsteady flows – for example, air around a flapping wing. The lab's projects include modeling aerodynamics of agile bio-inspired micro air vehicles, as well as fluid flows around flexible structures (like the water around an undulating fish).

http://kefalari.seas.ucla.edu/~jeff/SOFIA/

"To achieve their remarkable abilities, airborne and aquatic creatures exploit the mechanics of their medium in intricate ways. We are developing novel tools to distill and model the essential mechanics of locomotion, so that engineered vehicles and systems can be more robust and agile or extract more energy from their environment."

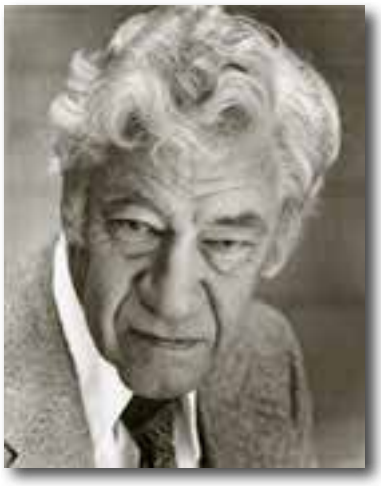
– Jeff Eldredge

Jeff Eldredge

Ann Karagozian delivers the W. Duncan Rannie Lecture in Aerospace at Caltech

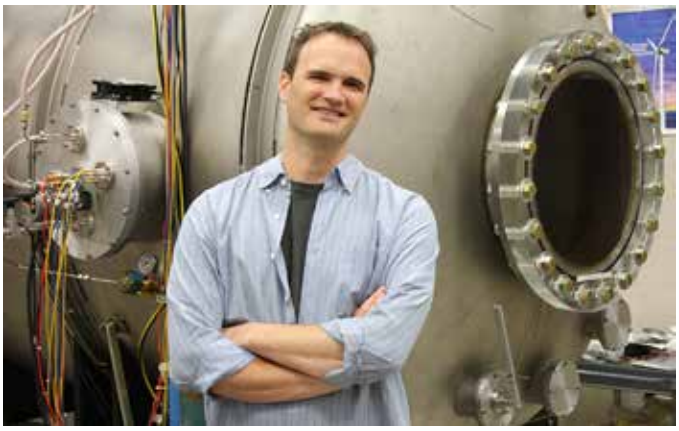
Ann Karagozian

Prof. Ann Karagozian delivered the W. Duncan Rannie Lecture in Aerospace at the Graduate Aerospace Laboratories of the California Institute of Technology (GALCIT), on Friday, February 7, 2014. This lecture is part of a series honoring past GALCIT faculty and has been made possible through a gift from two distinguished Caltech alumni, Drs. James and Susan Wu. Prof. Karagozian spoke on "Instabilities in Reactive and Non-Reactive Flowfields: Fundamental Issues Underlying Future Energy and Propulsion Systems."



Prof. W. Duncan Rannie (Caltech)

Wirz Research Group highlighted



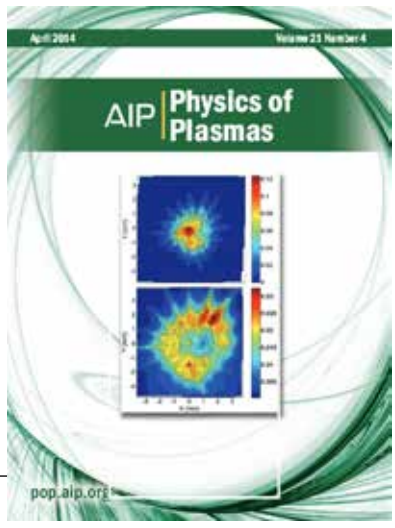
Richard Wirz

The Wirz Research Group was highlighted in Aerospace America's "2013 Year In Review." Aerospace America, a publication of the American Institute of Aeronautics and Astronautics (AIAA), highlighted Prof. Richard Wirz's group in the article "Busy times for electric propulsion" as follows:

"A plasma interactions facility developed at UCLA produces conditions similar to those found in electric propulsion and uses diagnostics to characterize plasma wetted surfaces."

The article, by James Szabo of the Electric Propulsion Technical Committee, can be found in the December 2013 issue of Aerospace America on page 53.

Additionally, an experimental effort used to examine the primary electron loss behavior for micro-scale discharges by the Wirz Research Group was featured on the April 2014 cover of AIP's Physics of Plasmas. The research for this experiment was conducted by Ben Dankongkakul, Samuel J. Araki, and Richard E. Wirz.



In Memoriam
Andrew F. Charwat 1925-2013

Andrew F. Charwat, a UCLA professor emeritus of mechanical and aerospace engineering who began his academic career with the school in 1955, passed away July 5, 2013. He was 88.

Charwat received his M.E. from Stevens Institute of Technology in 1948, and his M.S. and Ph.D. from UC Berkeley, in 1949 and 1952, respectively.

After graduating from UC Berkeley, Charwat spent a few years working in Southern California's booming aerospace industry, including with Propulsion Research Corp. of Santa Monica; Northrop Aircraft Corp., of Hawthorne; and Rheem Manufacturing Co. of Downey.

He joined UCLA Engineering in 1955 as an assistant professor, and led the school's aerodynamics laboratory for many years. He taught undergraduate and graduate engineering courses in aerodynamics, fluid dynamics, vehicle propulsion, mechanics and structures, and compressible flows and was recognized in 1974 with a distinguished teaching award from the Engineering Society of the University of California (ESUC). Charwat retired in 1991, but continued to teach at UCLA Engineering up until the 2009-10 academic year.

"For more than 50 years, Andrew served the school and the university with distinction, in particular having taught fluid mechanics in classroom settings and in the laboratory to generations of UCLA engineering students, as well as working on many significant problems in aerodynamics," said Vijay K. Dhir, dean of the UCLA Henry Samueli School of Engineering and Applied Science. "On behalf of the school, I want to express my deepest condolences to his daughter, Danuta."

Mechanical and aerospace engineering professors emeriti Robert Kelly and Anthony Mills both offered high praise for Charwat, their long-time colleague in the department, in particular for his teaching, broad range of research activities and his longevity as an active faculty member.

"In his early research and teaching career, Andrew Charwat established a reputation as a demanding scholar and teacher of fluid mechanics with special expertise in the fundamentals of hypersonic flow," Mills recalled. "Due to the high standards he expected of his students, they would often acknowledge the significant contribution he made to their education. However, what set Andrew apart was that he was always an engineer in the sense that he was competent in most of the disciplines of mechanical and aerospace engineering."

For example, Charwat developed a pilot project on ocean thermal energy conversion that brought several disciplines together.

"He directed a fundamental study of supersonic flow past cavities in 1961 that continues to be cited to this day," Kelly added. "He also studied jet penetration into supersonic flow, sublimation phenomena, and -- together with his graduate student Larry Redekopp (now a professor of fluid mechanics at USC) -- completed a basic study of supersonic interference flow between intersecting surfaces."

In additional Kelly remembered with fondness that Charwat had been particularly encouraging to him during a difficult period for his family, and he expressed much gratitude for Charwat's support.

Charwat supervised 35 M.S. students and 13 Ph.D. students. In addition, he served for many years as an instructor in physical sciences for UCLA Extension, including courses in physical oceanography, coastal engineering, and the design and applications of turbochargers. Charwat was a member of Tau Beta Pi and Sigma Xi, and was a Fulbright and Guggenheim Fellow.

Xiaochun Li joins UCLA MAE as Raytheon Chair in Manufacturing Engineering

Xiaochun Li

Professor Xiaochun Li has joined UCLA MAE as the new Raytheon Chair in Manufacturing Engineering. Li was previously at the University of Wisconsin-Madison College of Engineering.

Li's recent research focuses on science-driven manufacturing (Scifacturing as the next level of manufacturing) as science meets manufacturing more directly and faster than ever in the 21st century. He believes that traditional manufacturing curricula will need significant changes to allow science to power and transform manufacturing seamlessly. He is very enthusiastic about driving nanoscience toward scale-up nanomanufacturing for nanoproduction. Some of his specific interest areas include scalable self-assembly of materials and nanoparticles for nanostructured superstructures, Solidification Nanoprocessing and Nanomanufacturing of nano-structured materials for high energy efficiency, structurally integrated micro/nano-systems (especially sensors and actuators) for manufacturing, energy conversion processes, and biomedical applications, meso/micro Solid Freeform Fabrication (SFF), and laser micro/nano materials processing and manufacturing.

Li's honors include the Outstanding Young Manufacturing Engineer Award, from the Society of Manufacturing Engineers; a National Science Foundation CAREER Award; and the Sir Humphrey Scientific Merit Award, and the Howard F. Taylor Award, both from the American Foundry Society (AFS). He has published more than 100 journal papers and is the owner of more than 20 patents.

Yongjie Hu joins UCLA MAE as new heat transfer faculty

Yongjie Hu

Yongjie Hu's has joined UCLA's MAE Department as an assistant professor. Hu's research is at the interface of thermal engineering, materials chemistry and transport physics. He develops devices and systems for a wide range of energy, electronic and environmental applications by integrating unique structures and transport phenomena at the micro- and nano-scale. His current research focuses on improving the efficiency, performance, and safety of energy conversion, storage and thermal management technologies.

Prior to joining UCLA, he worked as a post-doctoral fellow in mechanical engineering at the Massachusetts Institute of Technology, and received his Ph.D. from Harvard University. He has received honors from diverse research societies and academic institutes including ASME, MRS, IEEE, ACS, Battelle Memorial Institute, Harvard and MIT.

Powell Library

Three new robotics faculty join UCLA MAE

First responder robots that can drive a car into a natural disaster zone. Artificial hands with supreme articulation and sensitivity. Surgical robots that enhance a doctor's ability to save lives. Those aren't in the future. They're here now, at UCLA Engineering.

Three new faculty members who specialize in robotics joined the UCLA Mechanical and Aerospace Engineering Department this year: Dennis Hong, Jacob Rosen, and Veronica J. Santos.

"We already have a number of people in the department and at UCLA who work in areas that are related to the interdisciplinary field of robotics," department chair T.C. Tsao said, referring to researchers in dynamic systems and controls, MEMS, manufacturing and design, computer vision and artificial intelligence. "Now we have great faculty who are at the center of the robotics program. They build robots!"

Tsao noted that today's high school students have been exposed to robotics through extracurricular competitions, and these experiences inspire them to major in engineering. In addition, while robots have become prominent in industrial automation, they're now being developed for diverse applications. The UCLA robotics faculty seek to make profound contributions and in both education and developing technology to serve societal needs.

Dennis Hong

DENNIS HONG

Professor of Mechanical and Aerospace Engineering

"Robots are needed for what are known as the "three Ds" – dull, dirty, and dangerous. These are jobs that are unsuitable for humans. At RoMeLa, we are building robots to get into the dangerous places and do the dirty work."

At seven years old, Dennis Hong was blown away by watching Star Wars: A New Hope. What stood out for him were the droids. Right after watching the movie, he told his parents he wanted to build robots. Today he leads the Robotics and Mechanisms Laboratory (RoMeLa), which designs and develops humanoid bipedal robots, as well as novel locomotion strategies. He and his students are four-time winners of the RoboCup.

Next year his lab will take THOR-OP, a full-size humanoid robot, into the finals of DARPA's Robotics Challenge, which seeks to find the best robots for disaster response scenarios. Among the tasks it needs to complete: get into a car, drive it, and get out; open doors; and climb ladders.

www.romela.org

Jacob Rosen

JACOB ROSEN

Professor of Mechanical and Aerospace Engineering

"We're trying to push technology beyond the teleoperation mode into automation of surgical procedures, allowing surgeons to focus on making critical decisions."

Jacob Rosen is focused on surgical robotics systems and rehabilitation robotic systems. He is best known for developing Raven, an award-winning open platform robotic system for minimally invasive surgery. The newest version, Raven IV, includes four operating arms and two stereo cameras that can substitute for two surgeons. His current research efforts are focused on testing the feasibility of performing telesurgery aboard the International Space Station, with the operator stationed on Earth.

Rosen is also focused on studying and developing an exoskeleton system with applications in stroke rehabilitation, brain plasticity, and human machine interfaces. The current mode of study is based on mirror-image symmetric motion, in which a patient uses his or her fully functional arm to control the disabled arm through a virtual reality therapeutic environment.

Rosen is a member of UCLA's Center for Advanced Surgical and Interventional Technology.

bionics.seas.ucla.edu

Veronica Santos

VERONICA SANTOS

Associate Professor of Mechanical and Aerospace Engineering

"Our Biomechatronics Lab is dedicated to improving quality of life by enhancing the functionality of artificial hands and their control in human-machine systems."

It was an injury during high school basketball practice that slightly limits how much Veronica Santos can move her elbow. That incident was the inspiration for Santos' scholarly path into robotics, where she aims to improve the quality of life of people with significant physical limitations.

The over-arching theme of her research is getting humans and robots to work together – specifically, developing technologies for artificial hands that incorporate rich sensory feedback with intuitive control and functional movement.

One current project is the development of a robot hand testbed for human-inspired grasp, manipulation, and exploration of objects. Another project is designing and testing deformable, polymeric tactile sensor skins for artificial hands.

BiomechatronicsLab.ucla.edu

Distinguished FACULTY

DR. IVAN CATTON AND DR. VIJAY DHIR

Ivan Catton and Vijay K. Dhir received the 75th Anniversary Medal from the American Society of Mechanical Engineers Heat Transfer Division. They were recognized for service to the community and contributions to the field. The medals were presented July 15 at the 2013 ASME Summer Heat Transfer Conference.

Catton, a distinguished professor of mechanical and aerospace engineering, has conducted pioneering work in thermal sciences in a broad range of areas, including natural convection, flow instability, solar energy and porous media transport to nuclear reactor safety.

Dhir, dean of the school and distinguished professor of mechanical and aerospace engineering, leads the Boiling Heat Transfer Lab, which has conducted pioneering work in fundamental and applied sciences involving boiling, an efficient process of heat removal.

DR. JEFF ELDREDGE

Jeff Eldredge was elected to the grade of Associate Fellow in the American Institute of Aeronautics and Astronautics (AIAA). AIAA Associate Fellows are individuals of distinction who have made notable and valuable contributions to the arts, sciences, or technology of aeronautics or astronautics. Eldredge was presented with his Associate Fellow pin and certificate at the AIAA Associate Fellow Dinner on January 13, 2014, in conjunction with the AIAA SciTech Forum.

DR. NASR GHONIEM

Nasr Ghoniem was selected as a 2014 Materials Research Society (MRS) Fellow. The citation reads: "For seminal contributions to the theory of radiation interaction with materials, his development of dislocation dynamics to describe material deformation, and for mentoring a generation of students and young scientists." This makes Prof. Ghoniem a fellow of four major societies (MRS , ANS, ASME, AAM) pointing to the breadth of his contributions across several engineering disciplines.

DR. CHIH-MING HO

Chih-Ming Ho has been elected a Distinguished Fellow of the American Institute for Medical and Biological Engineering (AIMBE) for his seminal impacts made in the microfluidic system technology for applications in medical diagnosis and biological research. The induction of the Class of 2014 took place on March 24, 2014, at the National Academy of Sciences (NAS).

AIMBE is the authoritative voice and advocate for the value of medical and biological engineering to society. It is an organization of leaders in medical and biological engineering.

DR. KUO-NAN LIOU

Kuo-Nan Liou was selected as the 2013 American Geophysical Union (AGU) Roger Revelle Medalist. This medal is awarded for outstanding contributions in atmospheric sciences, atmosphere-ocean coupling, atmosphere-land coupling, biogeochemical cycles, climate, or related aspects of the Earth system. Prof. Liou is a Distinguished Professor in the Atmospheric and Oceanic Sciences Department, and has a joint appointment with UCLA MAE.

DR. CHRISTOPHER LYNCH

Christopher Lynch has been honored with the Smart Materials and Structures Lifetime Achievement Award by 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.

Prof. Lynch's research is focused on multi-field and multi-scale constitutive law development with finite element implementation in support of numerous sensing and actuation applications. Recent work by his colleagues at UCLA on multiferroic coupling at the nanoscale has demonstrated the ability to switch magnetization using strain coupling between magnetic features deposited on ferroelectric single crystals. This contributed to establishing the UCLA TANMS NSF-NERC where Prof. Lynch serves as the thrust lead for the modeling team.

NAE
National Academy of Engineering Members

Albert Carnesale
Chancellor Emeritus

Albert Carnesale is Chancellor Emeritus and Professor at the University of California, Los Angeles (UCLA). He was Chancellor of the University from July 1, 1997 through June 30, 2006, and now serves as Professor of Public Policy and of Mechanical and Aerospace Engineering. His research and teaching focus on public policy issues having substantial scientific and technological dimensions, and he is the author or co-author of six books and more than 100 articles.

Chih-Ming Ho
Ben Rich
Lockheed Martin Chair

Professor Chih-Ming Ho, director of the Center for Cell Control and holder of the Ben Rich Lockheed Martin Chair, was elected in 1997 for his contributions to the understanding and control of turbulent flows. He joined UCLA to lead research in microelectromechanical system (MEMS) in 1991, and served as the founding director of the Center for Micro Systems. UCLA's MEMS program has been recognized as one of the top three programs worldwide.

Kuo-Nan Liou

Professor Kuo-Nan Liou, who holds a joint appointment in mechanical and aerospace engineering, was elected in 1999 for contributions in the theories of radiation transfer and light scattering, with applications to remote sensing technology and climate modeling.

Vijay Dhir

Vijay K. Dhir, Dean of the UCLA Henry Samueli School of Engineering and Applied Science and professor of mechanical and aerospace engineering, was elected into the National Academy of Engineering (NAE) in 2006, in honor of his work on boiling heat transfer and nuclear reactor thermal hydraulics and safety. Dhir has been a faculty member at UCLA since 1974, and leads the Boiling Heat Transfer Lab, which conducts pioneering work in fundamental and applied research in phase change heat transfer.

John Kim
Rockwell Collins Chair

Professor John Kim was elected into the National Academy of Engineering in 2009 for development of direct numerical simulation and seminal contributions to the understanding of the physics and control of turbulent flows. Kim, who also holds the Rockwell Collins Chair in Engineering, revolutionized the way turbulent flows are studied and modeled. He has made outstanding contributions to the development of direct numerical simulations and large eddy simulations as reliable and respected tools for understanding the physics and control of turbulence.

Jason Speyer
Ronald and Valerie Sugar Chair

Professor Jason Speyer was elected to the National Academy of Engineering in 2005 for "the development and application of advanced techniques for optimal navigation and control of a wide range of aerospace vehicles." He has pioneered new optimal deterministic and stochastic control, team and differential game strategies, estimation, and model-based fault detection.

NAE Professor Emeritus: Lucien Schmit (not pictured)

MAE Industrial Advisory Board Meeting January 23, 2014

MAE Industrial Advisory Board, 2013-14

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Bryan McEnerney
Materials & Processes Engineering

Aerospace Corporation
Wayne H. Goodman, Ph.D. (IAB Chair)
Vice President, Space Program Operations

Air Force Research Laboratory
Shawn Phillips
Deputy Chief, Space & Missile Propulsion

Alcoa
Luke Haylock
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Senior Technical Fellow

Boeing Company
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HRL Laboratories, LLC
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Northrop-Grumman Electronic Systems
Steve Toner
Vice President, ONIR Programs & SBIRS Program Manager

Phillips 66
Jim M. Hardy
Manager, Project Engineering

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

Left to right: William R. Goodin, MS '71, PhD '75 ME (Chair), Gerard Toribio '08 AE, Greg Glenn '03, MS '06 ME, David Lee MS '90, PhD '98 ME, Mark Ford '82, MS '88 AE, Wai Hong Tai '14 AE, Prof. Adrienne Lavine, Anthony Tyson '12 ME, Prof. T-C Tsao.

MAE Alumni Advisory Board 2013-14

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Sarah Vasquez, '08, Chevron
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AISES Rocket Project wins top prize

The hard work of the AISES members paid off as their rocket project won first place in the First Nations AISES and Tribal Rocket Launch Competition.

By Jasmine Aquino

Top left: The American Indian Science and Engineering Society Rocket Project builds rockets and works with community programs to teach them about science. (Kelsey Kong/ Daily Bruin)

Top right: Getting the rocket ready for launch. From left: Aaron Tiscareno, Dylan Rodarte, Edward Lopez, Daniel Calderon and, below, competition coordinator Daniel Hawk, with the UCLA AISES rocket.

Flashing lights and high-pitched sirens went off as dozens of students erupted into cheers. The rocket's landing device had made it home and their months of hard work paid off.

The eight-and-a-half foot tall rocket was built by members of the American Indian Science and Engineering Society Rocket Project, a UCLA student-run program that launched three years ago.

The growing team flew to Milwaukee earlier this quarter to compete in the First Nations AISES and Tribal Rocket Launch Competition, taking home the top prize for the first time.

AISES Rocket Project co-directors Daniel Calderon and Dylan Rodarte, both fourth-year mechanical engineering students, started recruiting for the team during the first two weeks of fall quarter.

The club met weekly in Boelter Hall and both Calderon and Rodarte taught the engineering students the fundamentals of rocketry.

"We taught them things that are very basic, but may not be very intuitive," Rodarte said. For example, he explained, not every student knows that when designing a rocket, you have to make sure it flies into the wind instead of with it.

Once the entire team chose the best rocket design, the students were able to transform their idea into a tangible project. The students drove to Calderon's dad's machine shop in Riverside for three Saturdays and spent about 12 hours machining.

At one point in the project, Rodarte was operating a drill while a younger team member held onto the rocket part. Rodarte lost control of the drill and cut his right middle finger.

"I can honestly say blood went into building this rocket," Rodarte said, laughing.

Justine Figuerres, a second-year electrical engineering student, said the most difficult part of the project was trusting herself and the work she had done.

"Things have to be extremely precise to the tenth of a centimeter, to the tenth of a millimeter even," she said. "I could mess up and it would be the difference between our rocket flying successfully and our rocket just plummeting like a missile."

The rocket project also works on different communityprograms, such as inviting K-12 students from local schools and teaching them about science.

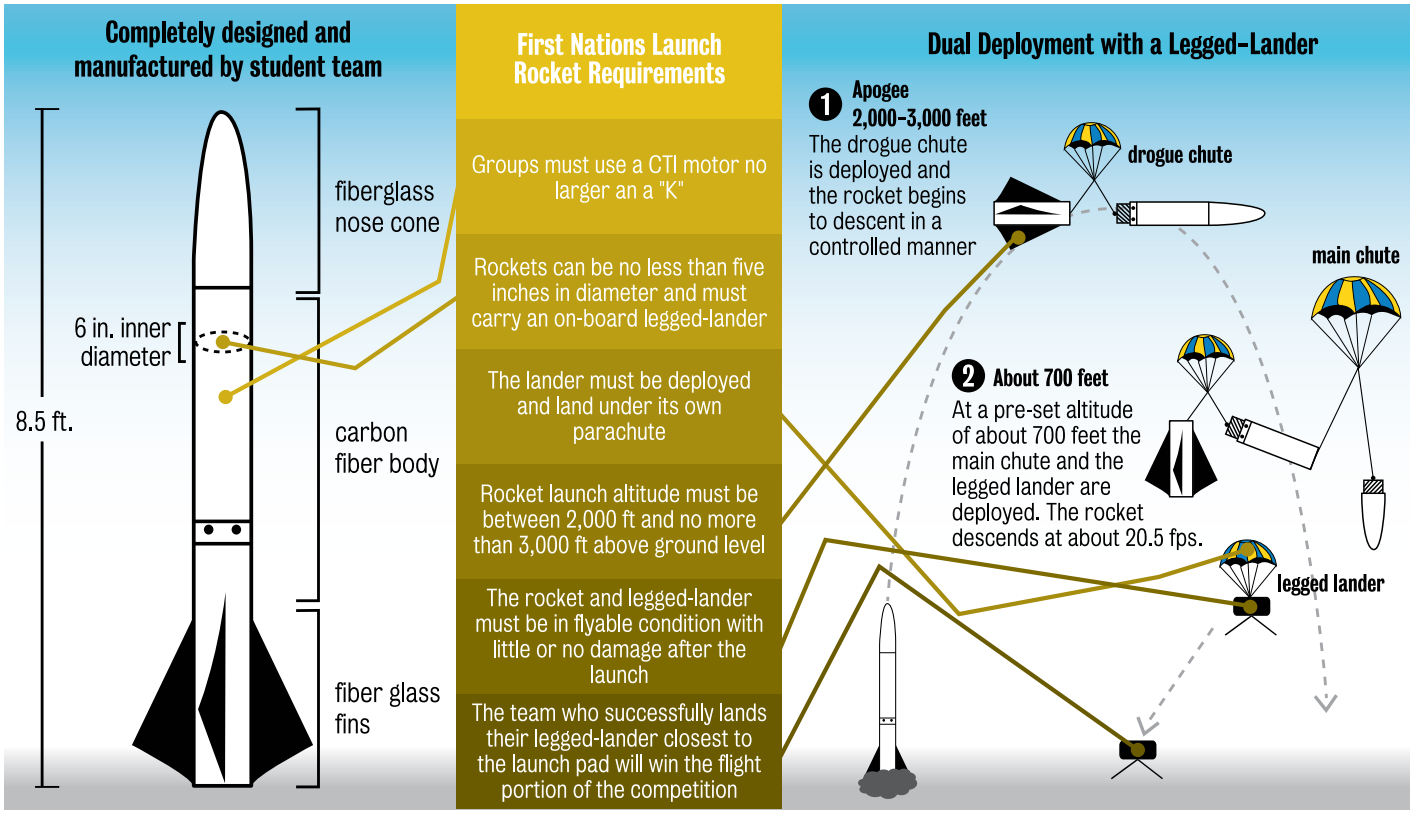
To get the younger students excited about chemistry and physics, the project works with the students on different science experiments, such as making ice cream with liquid nitrogen or making silly putty out of crafting glue.

The project also goes to John Adams Middle School during the week to tutor a group of about 20 students. The AISES Rocket Project works in conjunction with UCLA's Latino and black engineering campus organizations respectively – the Society of Hispanic Professional Engineers and the National Society of Black Engineers.

The most memorable part of the trip for second-year electrical engineering student Kari Garcia was painting the rocket the night before the launch in

ROCKET SCHEMATICS

The UCLA American Indian Science and Engineering Society, or AISES, Rocket Team recently flew to Wisconsin to participate in a nation-wide rocket competition called First Nations Launch. The team placed first in the competition by building a dual-deployment high-powered rocket and having a successful launch.



SOURCE: Justine Figuerres, American Indian Science and Engineering Society member, First Nations Launch website. Compiled by Amanda Schallert, Bruin senior staff. Graphic by Jennifer Mallipudi, Bruin staff.

the hotel parking lot.

"It was really cold and we were all bundled up not used to the cold snow," Garcia said. She added that she used what she had learned in her engineering classes to construct the electrical circuitry of the lander's alarm system.

"I haven't taken any classes on rocketry. Everything I learned about rockets was from just doing this project," Calderon said, adding that the team plans to expand the makeup of the group by inviting students of all academic departments for next year's project.

The team aimed to land their rocket as close to the launch site as possible, which successfully set off the lights and alarm of the the rocket's landing device upon reaching the ground, said Rodolfo Barranco, a second-year aerospace engineering student.

"When our rocket landed, it did all those things perfectly – it was gorgeous," he said with a smile.

Next year, the team will take on the Mach 1 challenge – building a rocket that can break the speed of sound.

Though Calderon is graduating this year and Rodarte is staying for a fifth year, both students plan to step down as co-directors and focus on teaching the younger students enough information on building rockets to help make the team self-sufficient for coming years.

UCLA AISES team members Daniel Calderon and Demi Gamboa at the 2014 First Nations Launch competition.

Christopher Dodson, Brett Lopez, Jennifer Smolke offered NSF GRFP awards

Three UCLA MAE students (current and former) received National Science Foundation Graduate Research Fellowship Program awards, announced April 1, 2014. Congratulations to the following students!

From http://www.nsfgrfp.org:

> The National Science Foundation's Graduate Research Fellowship Program (GRFP) helps ensure the vitality of the human resource base of science and engineering in the United States and reinforces its diversity. The program 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 US institutions. The NSF welcomes applications from all qualified students and strongly encourages under-represented populations, including women, under-represented racial and ethnic minorities, and persons with disabilities, to apply for this fellowship.

Christopher Dodson is a current UCLA graduate student working in UCLA MAE Assistant Professor Richard Wirz's Plasma and Space Propulsion Laboratory. He received his B.S. degree in mechanical engineering from Ohio University in 2006. Dodson's research investigates plasma-material interactions of microengineered materials for electric propulsion and pulsed power technologies. Experiments performed in the Plasma Interactions facility in the lab involve exposing material samples to a plasma column of varying conditions. Plasma and material diagnostics will provide information on surface morphology as well as the effects this has on the near-surface plasma properties. Experiments will be complemented by computational plasma models of the bulk and near-surface plasma, which will be used as inputs into material models that will help in the understanding of plasma-material interactions and allow for improved material designs.

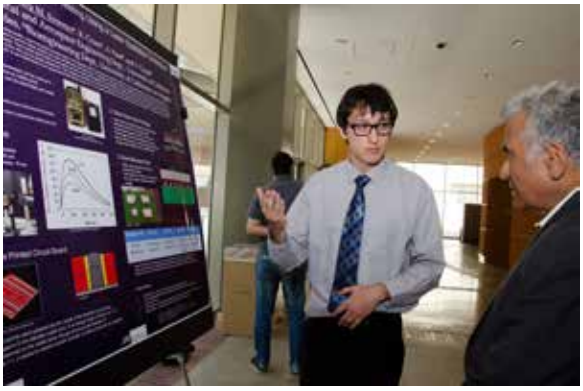
Brett Lopez received his BS degree in Aerospace Engineering in the Spring of 2014. He worked for two years in UCLA MAE Professor Ann Karagozian's Energy & Propulsion Research Laboratory under the support of the UC CARE and MSD Scholar programs. Lopez has worked on an experimental project involving acoustically coupled combustion instabilities.

Jennifer Smolke received her BS degree in Aerospace Engineering from UCLA in the Spring of 2012. She formerly worked as an undergraduate researcher in Prof. Karagozian's lab on optical diagnostics to study transverse jet shear layer instabilities, under the support of the NSF REU program. Smolke is currently a graduate student in combustion at USC.

Adam Garcia, Edward McAboy, and Edgar Mendoza win big at the CEED Undergraduate Research Poster Competition

On August 22, 2013, the UCLA Center for Excellence in Engineering and Diversity (CEED) held its 9th Annual Research Intensive Series in Engineering for Underrepresented Populations (RISE-UP) Undergraduate Research Poster Competition. In the lobby of the California NanoSystems Institute (CNSI), sixteen researchers participated in the competition that was judged by: Catherine Douglas, Associate Director of CEED Pre-college Programs; Dr. Pirouz Kavehpour, Professor Mechanical & Aerospace Engineering; Dr. Vasilios Manousiouthakis, Professor of Chemical & Biomolecular Engineering; and Dr. Abdon Sepulveda, Lecturer of Mechanical & Aerospace Engineering.

First place was awarded to Adam Garcia (who recently completed his 1st year in Mechanical Engineering) for his work on Characterizing Magnetorefractive Glass sponsored by the NSF-funded Center for Translational Applications of Nanoscale Multiferroic Systems (TANMS), under the direction of Professor Gregory Carman. Second place was awarded to Edward McAboy (who recently completed his 2nd year in Chemical Engineering) for his work on Magnetostrictive Materials for use in Composite Multiferroic Systems, under the direction of UCLA Engineering Associate Dean and Professor Jane P. Chang. His work was sponsored by both Intel through the Semiconductor Research Corporation Education Alliance (SRCEA), as well as the NSF-funded Center for Translational Applications of Nanoscale Multiferroic Systems (TANMS). Third place was awarded to Edgar Mendoza (who recently completed his 1st year in Mechanical Engineering) for his work on The Effect of In-plane vs. Through-plane Dielectrophoretic Assembly on the Mechanical Properties of a Barium Titanate/Epoxy Resin Nanocomposite sponsored by the NSF-funded Center for Scalable and Integrated NanoManufacturing (SINAM), under the direction of Professor Adrienne Lavine.

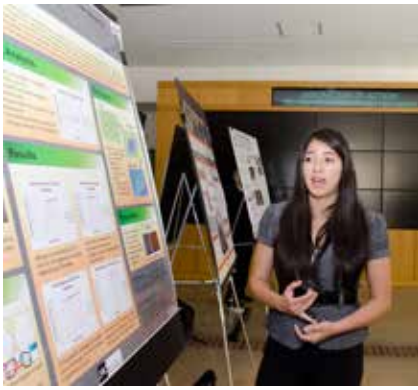


Henry Sommer (4th Year Mechanical Engineering major) presenting his Solder Joint Strength Testing Using a Laser Spallation Technique research to UCLA Engineering Dean Vijay Dhir.

During the Summer of 2005, CEED began its Research Intensive Series in Engineering for Underrepresented Populations (RISE-UP) program. With support from the National Science Foundation (NSF) Science Technology Engineering & Mathematics Talent Expansion Program for Underutilized Populations (STEP-UP), Intel, Hewlett-Packard, the University of California Leadership Excellence through Advanced Degrees (UC LEADS), the UCLA Undergraduate Research Center - Center for Academic and Research Excellence (URC-CARE) and the NSF-funded Center for Scalable and Integrated NanoManufacturing (SINAM), CEED had a total of (15) undergraduate students involved in its inaugural 10-week, summer immersion, research program. The program has since been expanded to include academic year, as well as summer research appointments, and is now funded by Intel through the Semiconductor Research Corporation Education Alliance (SRCEA) and the NSF-funded Center for Translational Applications of Nanoscale Multiferroic Systems (TANMS).

(L-R) Edward McAboy—2nd Year Chemical Engineering Major (2nd Place), Adam Garcia—1st Year Mechanical Engineering Major (1st Place), Edgar Mendoza—1st Year Mechanical Engineering Major (3rd Place).

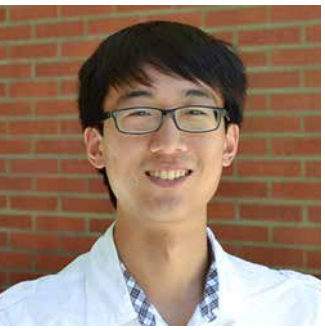
The purpose of this program is to keep engineering and computing students, particularly from underrepresented groups, interested in the excitement of learning. Research encourages innovation, discovery, independent thinking and provides collaborative learning in a team atmosphere between professors, graduate students and undergraduate students. In the research environment, students seem to derive greater enjoyment from exploring and applying the basic principles of engineering, science, computing, and mathematics than they do in a traditional classroom. RISE-UP provides opportunities for undergraduate students to accomplish this under the direction of innovative and motivated faculty members, post-doctoral researchers, and graduate students, who are working in leading research areas.



Stephanie Cantu (1st Year Mechanical Engineering major) presenting her Modeling Studies in Magnetostrictive Nanoellipses for New Magnetic Memory Applications research.

Norris Tie

2014 Russell R. O'Neill Distinguished Service Award



Norris Tie (photo by Matthew Chin)

Named after the former engineering school dean, the Russell R. O'Neill Distinguished Service Award recognizes outstanding contributions to the undergraduate student body, student organizations, the school, and to the advancement of the undergraduate engineering program through service and participation in extracurricular activities.

Norris Tie, B.S. Aerospace Engineering, was recognized for several successful efforts to enhance student life and open more cross-campus connections. He founded the UCLA Entrepreneurship Council, a collective of 16 student groups and professional organizations, and he served as the president of TEC. He also reestablished the MAE Town Hall Meeting and MAE Student Council. The council focused on providing resources and promoting collaboration between students, clubs and faculty members. Following graduation, Tie will join Northrop Grumman Aerospace Systems as a propulsion engineer.

What motivated you to found this organization and to connect with other entrepreneur groups across campus?
I was motivated to found the Entrepreneurship Council because I saw that all the entrepreneurship groups were disconnected and rarely communicated with each other. We cornered ourselves to different portions of campus (business school, medical school, engineering school, etc.) and did not collaborate in events often nor support each others' projects. I believed that by bringing our groups together and begin collaboration, we could better stimulate and foster UCLA's entrepreneurship culture, starting with the existing infrastructure. Once we were all on the same page, we could have fewer conflicting events, coordinate larger events like the Fall Innovation Week, and provide campus-wide resources like www.bruincubate.com, a one-stop shop website for all of UCLA's entrepreneurial resources.

What are your thoughts now that entrepreneurship seems to have firmly taken root here in the school and across campus?
Entrepreneurship is still growing within the university and can have a much firmer root within the school of engineering. There are many groups that support entrepreneurship but unfortunately there is not as much institutional support. However, there are a couple resources, like the Blackstone Launchpad program and Startup UCLA, to promote undergraduate entrepreneurship. Other groups like TEC nurture entrepreneurship at a more grass-roots level. As these resources continue to exist, more students will realize that entrepreneurship is a viable career path. More importantly though, these resources foster a sentiment within students that they are not limited by knowledge, but by their imagination. As long as students dream to change the world, they can. Of course, the institution can support them in these endeavors, either through technical or moral support.

Your most memorable UCLA experience?
Meeting my girlfriend Lydia Ann, who will become a medical student next Fall. Most importantly, I value people above all else and I cannot think of anyone who supported me in my endeavors more than her. She was quite an integral part of my UCLA experience for the past three years. Her encouragement, counsel and friendship have been invaluable to my success.

Your favorite class and why?
Communication Studies 1: Principles of Oral Communication. This class, even though it did not count at all towards graduation, was very inspirational. I had the opportunity to share with the class my passions for commercial space transportation. Surprisingly, the class was very supportive, which encouraged me even more to pursue my ambitions and not give up. In addition to that, I learned to be a more competent and confident communicator. Every year, alumni come back talking about how engineers need to improve both verbal and written communication. This class definitely helped me work on that.

Brett Lopez

CEED undergraduate excels in research

Aerospace Engineering student Brett Lopez presented his project during UCLA's Undergraduate Research Week

Brett Lopez, a UCLA aerospace engineering student, conducts experiments on how different alternative fuels — such as methanol and ethanol — react to sound waves.

Sound waves can wreak havoc on the combustion chambers of rocket engines, eventually destroying them, Lopez said. So the research he's working on under the leadership of mechanical and aerospace engineering professor Ann Kargozian could lead to finding a fuel that's more resistant to sound waves and won't lead to engine failure.

"This project is a good test for picking a fuel and testing it on a much larger scale," Lopez said.

The senior is just one of approximately 600 students who will be presenting their research prowess and talents during Undergraduate Research Week, which runs today through Friday.

Throughout the week, students in the humanities and social sciences will make oral and poster presentations at Powell Library while fine arts students will perform at Glorya Kaufman Hall. Students in the life and physical sciences as well as engineering will present their research at Science Poster Day on Tuesday.

"The ability to conduct research alongside world-class scholars is one of the hallmarks of a UCLA undergraduate education," said Patricia Turner, dean and vice provost of undergraduate education in the UCLA College of Letters and Science. "Our undergraduates have the opportunity to conduct the kind of high-level and meaningful research that often isn't available to students until graduate school."

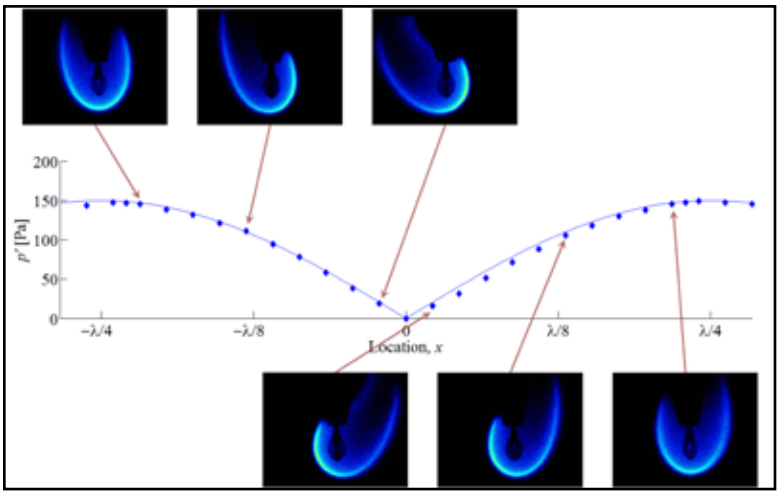
Lopez credits his undergraduate research, as well as the guidance he received from the university's Undergraduate Research Centers, with helping him earn acceptance into a master's program in aerospace engineering at the Massachusetts Institute of Technology. After he receives his master's, Lopez plans to complete MIT's Ph.D. program.

Lopez, who transferred to UCLA from El Camino College and is the first in his family to attend a four-year college, said he often advises younger students to take advantage of the research opportunities UCLA offers.

"If you are driven and want to learn and be successful," he said, "UCLA definitely gives you the tools to do that."

Brett Lopez, an aerospace engineering student who is presenting his project during UCLA's Undergraduate Research Week, examines how different alternative fuels react to sound waves. (UCLA)

Jeffrey Wegener receives the AIAA Liquid Propulsion Student Award



Mean OH* chemiluminescence images of ethanol fuel droplet combustion under acoustic forcing in an acoustic waveguide in the UCLA Energy and Propulsion Research Lab. Flames are consistently deflected away from the pressure node (PN) at x = 0 within the waveguide, with a flame "switch" in orientation occurring at the PN.

It was announced at the 49th AIAA/ASME/SAE/ASEE Joint Propulsion Conference in July, 2013 that MAE PhD student Jeffrey Wegener has received the prestigious AIAA Liquid Propulsion Student Award. This award was made by the AIAA Liquid Propulsion Technical Committee (LPTC), recognizing Jeff's outstanding doctoral research related to Liquid Rocket Engine combustion processes. This research is being conducted in the UCLA Energy and Propulsion Research Laboratory, under the supervision of Profs. Ann Karagozian and Owen Smith, and also at the Air Force Research Laboratory at Edwards Air Force Base, in collaboration with Drs. Ivett Leyva, Doug Talley, and David Forliti. Jeff's research involves detailed experimental exploration of the coupling between oscillatory combustion processes and large amplitude pressure oscillations, in atmospheric conditions as well as at high pressure conditions in the AFRL high pressure hot fire facility, EC4. Phase-locked imaging of the electronically excited hydroxyl radical (OH* chemiluminescence) enables this exploration, as seen, for example, in the ethanol droplet combustion images shown right.

Wei Yu's Lyxia Corp. selected as a finalist in the LA Business Journal's 2013 Patrick Soon-Shiong Innovation Awards

UCLA MAE Ph.D. student Wei Yu's start-up Lyxia Corporation was selected as a finalist at the Los Angeles Business Journal's 2013 Patrick Soon-Shiong Innovation Awards Ceremony. These awards honor and acknowledge individuals and organizations that demonstrate excellence in innovation in the greater Los Angeles area.

Lyxia, a biofuel startup based on research from UCLA MAE Professor Chih-Ming Ho's Micro System Laboratories, was also prominently featured in the Los Angeles Business Journal article "Special Report: Innovation / Tech Transfer."

Following is the text from the award ceremony supplement:

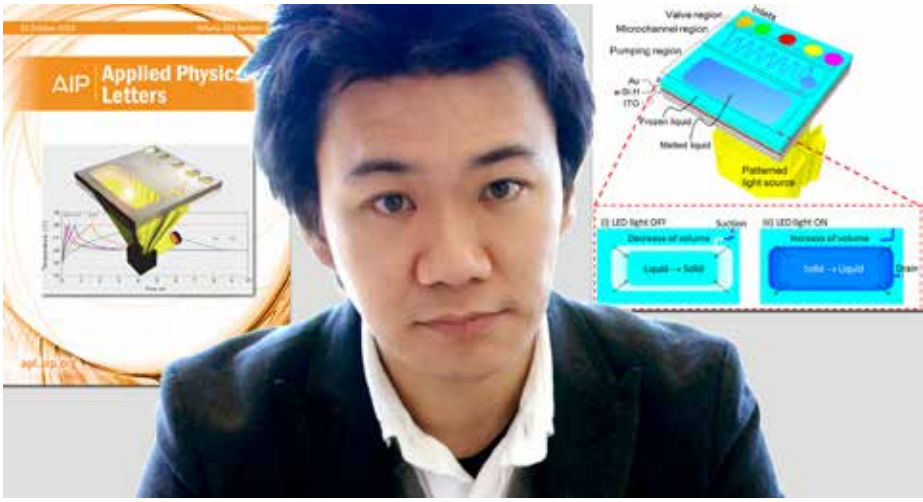
LYXIA Corporation is an early stage company focusing on biofuel technology and other relevant environmental strategies. Its mission lies in the commercialization of a disruptive technology from UCLA that enables microalgae to rapidly and directly convert CO_2 into ASTM-certified crude oil. While the current sugar-based microalgae biofuel industry is striving against the spread between sugars and fuels, researchers and scientists are exploring an efficient, natural way of directly converting carbon dioxide into fuels via microalgae. One possible candidate to this question in a commercial scale deployment could be Botryococcus Braunii, a green, pyramid shaped planktonic microalga, which lives in fresh water, but can also adapt to a large range of sea salt concentration. Botryococcus Braunii produces hydrocarbons, which have been described as equivalent to the "gas-oil fraction of crude oil." Like

petroleum, these hydrocarbons can be turned into gasoline, kerosene and diesel. Three research groups spent five years on engineering B.braunii to optimize its growth and biofuel yield. Accidently, Lyxia founder Wei Yu and his team found a combinational use of catalysts with special pH treatment could contribute to a dramatic increase of growth rate and oil yield. In addition, this procedure only uses small amounts of catalysts, which avoid the use of expensive corn-based feed or glucose. Lyxia aims to build a scalable plant in Southern California to demonstrate the production capacity using its proprietary formula. Eventually Lyxia could utilize this technology to help supplement or even substitute the use of fossil fuels.

Masaya Hagiwara's research is featured on the cover of Applied Physics Letters

UCLA MAE post-doctoral student Dr. Masaya Hagiwara's research was featured on the cover of Applied Physics Letters. Hagiwara is part of UCLA MAE Professor Chih-Ming Ho's Micro Systems Laboratories. The paper, "Reconfigurable microfluidic pump enabled by opto-electrical-thermal transduction," was written by Masaru Takeuchi, (UCLA MAE and Nagoya University), Masaya Hagiwara, Gauvain Haulot, and Chih-Ming Ho (all UCLA MAE).

Hagiwara joined the Micro Systems Laboratories under the supervision of Professor Ho at UCLA as a Visiting scholar from 2012 in order to pursue the technology in Bioengineering and Microfluidics. He is currently working on building a platform for single cell monitoring using optoelectronic reconfigurable microchannels as well as cell morphogenesis control in 3D culture environment.



Sarah Miller '13 receives the Edward K. Rice Outstanding Bachelor of Science Student Award

Edward K Rice and Sarah Miller

UCLA MAE alumna Sarah Miller received the Edward K. Rice Outstanding Bachelor of Science Student Award at the UCLA Henry Samueli School of Engineering and Applied Science Annual Awards Banquet on November 1, 2013. Sarah graduated summa cum laude with her B.S. degree in Aerospace Engineering in the Spring of 2013, and also received the MAE Department's Outstanding B.S. in AE award.

Miller, a native of Highlands Ranch, CO, completed a UCLA Professional Engineering Internship with the engineering team at Disney's Animal Kingdom in Florida in 2011. She worked as an undergraduate research assistant under Mechanical and Aerospace Engineering Professor Ann Karagozian in the UCLA Energy and Propulsion Research Laboratory. She is an active member of the Society of Women Engineers and the American Institute of Aeronautics and Astronautics.

"Sarah was an exceptionally talented student at UCLA in the classroom and in the laboratory, and contributed quite significantly to the transverse jet experiments and optical diagnostics we perform in our lab", says Prof. Karagozian. "She has a very bright future ahead of her and will be an excellent representative of UCLA wherever she goes."

Miller is currently pursuing a Master's Degree in Aerospace Engineering Sciences, Astrodynamics and Satellite Navigation Systems at the University of Colorado at Boulder.

Gregory Caguimbal wins first place in research

The 2013 Society of Hispanic Professional Engineers (SHPE) national conference was held in Indianapolis, IN from October 30th - November 3rd. A total of 9 students, along with Chapter Advisor Enrique (Rick) Ainsworth, represented UCLA's Society of Latino Engineers and Scientists (SOLES) at the event. In addition, one of the students took the top spot for outstanding achievement in research.

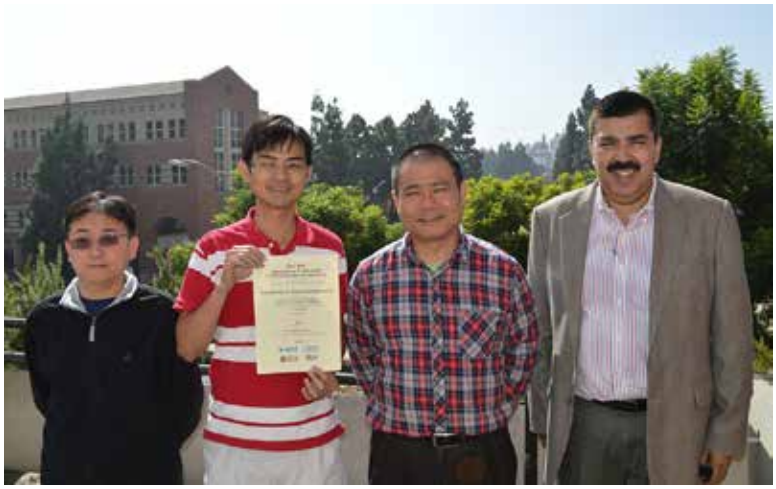
Gregory Caguimbal (Junior Mechanical Engineering Student) won First Place in the SHPE national undergraduate research poster competition for his work entitled A Parametric Study on Dielectric and Mechanical Properties of Barium Titanate/Epoxy Resin Polymer Composites, conducted under the direction of UCLA Professor Adrienne Lavine. There were 35 undergraduate competitors in all, and the competition was sponsored by Chevron and Intel. There were 3 judges: Professor Iris Rivero from Iowa State University, Professor Jandro Abot from The Catholic University of America, and Professor Heidi Taboada from the University of Texas El Paso. In addition to winning First Place in the research poster competition, Mr. Caguimbal was also invited to the high achievers breakfast and was recognized by the CEO of SHPE, Pilar Montoya.

First Place undergraduate research poster winner Gregory Caguimbal presents his poster on A Parametric Study on Dielectric and Mechanical Properties of Barium Titanate/Epoxy Resin Polymer Composites.

MAE team wins IEEE RFID bronze best paper award

A team from UCLA's MAE Dept won the Best Paper (Bronze) award at the 2013 IEEE International Conference on RFID Technologies and Applications. The paper was "Design of RFID Mesh Network for Electric Vehicle Smart Charging Infrastructure," by Ching-Yen Chung, Aleksey Shepelev, Charlie Qiu, Chi-Cheng Chu and Rajit Gadh. The event was 4th-5th September 2013, at the ZON Regency Hotel by the sea, Johar Bahru, Malaysia.

The award was conferred by Prof. Dr. Abdul Hanan Abdullah, General Chair, 2013 IEEE International Conference on RFID Technologies and Applications. The event was organized by IEEE, CRFID (IEEE Technical Committee on RFID), UTM (Universiti Teknologi Malaysia), and USM (Universiti Sains Malaysia).



Charlie Qiu, Ching-Yen Chung, Chi-Cheng Chu, and Rajit Gadh.

2014 Commencement Awards and Honors

RUSSELL R. O'NEILL DISTINGUISHED SERVICE AWARD

Norris Yi-Dong Tie, B.S., AE, Sp14

ENGINEERING ACHIEVEMENT AWARD FOR STUDENT WELFARE

Daniel Calderon, B.S., ME, F14
Siyan Dong, B.S., ME, Sp14
Aurora Garcia, B.S., ME, Sp14
Asya Cara Hollins, B.S., ME, Sp14
Marlon Michael Jimenez, B.S., ME, Sp14
Wen Yu "Terry" Peng, B.S., AE, Sp14
Adam Jonathan Provinchain, B.S., ME, Sp14
Perry Moses Sablan Roth-Johnson, Ph.D, AE, Sp14
Shannon Tan, B.S., AE, Sp14
Norris Yi-Dong Tie, B.S., AE, Sp14
Danielle Elizabeth Waters, B.S., AE, Sp14

MAE DEPARTMENT AWARDS

Brett Thomas Lopez, B.S., AE, Sp14
Joseph Robert Lee, B.S., ME, Sp14
Takeshi Shoji, M.S., AE, F13
Andrew Siver, M.S., ME, W14
Patrick Timothy Greene, Ph.D., AE, W14
Dariush Seif, Ph.D., ME, F13

UCLA Racing | Baja SAE Team takes honors in El Paso

Members of the UCLA Racing | Baja SAE team drove non-stop to El Paso, Texas, this month and returned home with several first-place awards and an overall fifth-place finish in a Society of Automotive Engineers' Collegiate Design Series competition.

Ninety-four collegiate teams from across the country participated in the event, which took place April 25-27 at the University of Texas at El Paso.

In SAE's Collegiate Design Series, each student-run team must design, manufacture, fund and race a prototype single-seat, off-road Baja race vehicle. Teams are judged on their race car's design, performance and marketability.

The UCLA team took first place overall in dynamic events, which include acceleration, hill climb, maneuverability and suspension and traction. The UCLA team earned a first-place award for the hill climb.

Teams are also judged in static events including a sales presentation that tests the marketability of the vehicle, a cost report, and a design presentation that highlights the engineering features of the vehicle. UCLA finished first in the sales presentation.

The UCLA Racing Baja race vehicle was built at the UCLA Engineering Creativity Center in Boelter Hall.

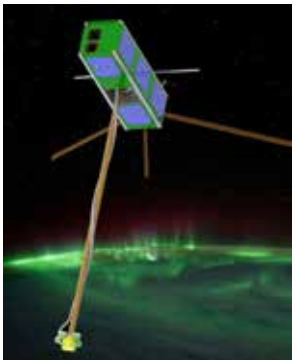
The team extends its thanks to the Mechanical and Aerospace Engineering Department at the UCLA Henry Samueli School of Engineering and Applied Science as well as to industry sponsors for their generous support.

Team members invite everyone to follow the club as it prepares to race in another SAE competition, from May 22-25 at Pittsburg State University in Pittsburg, Kansas.

Facebook: https://www.facebook.com/uclaracing
Twitter: https://twitter.com/uclaracing
Website: http://uclaracing.org/baja/
Youtube: http://youtu.be/Y4xY1XD4huU Watch our latest video from last season!

CUBE SAT - UCLA undergrads are first to build an entire satellite on campus

Emmanuel V. Masongsong / UCLA Newsroom



ELFIN Aurora Portrait Computer image of ELFIN in orbit measuring the Aurora. Once in orbit, ELFIN will study the phenomena that cause the dazzling auroras.

To conduct research on space weather, an enterprising group of UCLA undergraduates is manufacturing the first satellite built entirely on the UCLA campus.

The Electron Loss and Fields Investigation CubeSat, or ELFIN, is a tiny satellite the size of a loaf of bread that still packs the scientific punch of significantly larger, more expensive satellites. When launched, ELFIN will determine how solar wind particles and radiation behave in Earth's environment, a topic of increasing concern because magnetic storms can wreak havoc on space infrastructure like GPS, communication and weather satellites, and even damage the electrical grid here on Earth.

"With the advent of space tourism and the increased reliance on satellites, understanding space weather is becoming increasingly important to our society," said Vassilis Angelopoulos, a professor in the UCLA Department of Earth, Planetary, and Space Sciences and ELFIN principal investigator. "We need to study the electron loss process to assemble the full picture of how space radiation is driven by solar particles."

From the beginning, ELFIN had only scant internal funding, and the outlook for completion was unclear.

In spite of this uncertainty, a team of several dozen intrepid undergraduate students took on the project as their own, collectively putting in thousands of hours as a labor of love, developing and testing the satellite's subsystems with the hope that the project would someday be fully funded.

After three years of diligent work and patience, the tide finally turned in 2013 when the U.S. Air Force awarded the team a $110,000 grant to continue development and buy much-needed parts. Last February, the opportunity to achieve their goal became even more real for these space Bruins when NASA's CubeSat Initiative and the Low-Cost Access to Space program guaranteed them a launch spot.

A collaboration between the Aerospace Corporation and UCLA's departments of Earth, Planetary and Space Sciences; Mechanical and Aerospace Engineering (MAE); and Atmospheric and Oceanic Sciences, ELFIN will not only benefit UCLA students, who will have the opportunity to work on a real-world space program, but will also resolve a critical space physics question.

"ELFIN will train tomorrow's leaders in space science and engineering," said Richard Wirz, a professor in the UCLA Department of Mechanical and Aerospace Engineering and a mission co-investigator. "This educational experience enables students to apply what they learn in the classroom in a hands-on, team setting and do whatever it takes to reach a scientifically compelling and challenging goal."

UCLA Supermileage 2013-2014 recap

By Joseph Lee

At the beginning of this school year, the Supermileage Vehicle Team (SMV) determined to improve on its results from the previous year. While the 2013 team achieved a fuel economy over 400 MPG of gasoline and 2nd Place in the Design Report at the SAE Supermileage Competition, the new officer board and team's lead engineers set out to achieve even greater goals. The end results were achievements in both technological goals and a much-improved fuel economy.

2013 was a year that already marked great technological advancement for the team. For the first time, the team replaced the classical metal chassis and composite fairing combination with a new composite monocoque design. A monocoque essentially combines the chassis and the fairing so that the body panels of the vehicle bear all structural loading. This monocoque design uses a sandwich composite structure with pre-impregnated carbon fiber sheets along both sides of one-inch aluminum flexcore. In 2014, the new officer board continued in this spirit of innovation and attempted an even more ambitious structural design. Employing the same mold from the previous year's fabrication efforts, the new monocoque design uses only four layers of carbon fiber sheets as opposed to six layers as in 2013. This reduction in materials amassed to an eventual 8 lbs reduction in total vehicle weight, which is over 7% weight reduction from the 2013 model.

If you would like more information about the Supermileage project, please email smvucla@gmail.com.

UCLA DBF - Project overview and 2014 DBF Competition results

Summary by Edward Barber, AIAA Design-Build-Fly Project Manager

First prototype maiden flight at the Apollo XI Model Aircraft Field in the San Fernando Valley.

The 2014 DBF Competition took place in Wichita, KS, over the weekend of April 11th-13th. Of the 100 entries this year, 80 universities submitted design reports, and 71 universities attended competition. Of these, UCLA placed 14th in the Design Report category and 21st overall. Most notably, UCLA was one of only 20 teams to successfully complete all three flight missions and the taxi mission. This was a great milestone for the team, as it was the first time in at least four years in which we were able to achieve this goal.

Design/Build/Fly at UCLA (DBF) is a student project based around the American Institute of Aeronautics and Astronautics' annual Design/Build/Fly competition. Co-hosted by Cessna and Raytheon Missile Systems, the competition gives undergraduate engineering students the opportunity to apply their theoretical studies to a physical application, in the form of a remote-controlled airplane. The aircraft is designed and built by students in order to complete missions outlined in the contest rules, which are released each September. Teams are judged based on aircraft performance during each mission, aircraft weight, and a 60-page designed report which must be submitted by the end of February. The project concludes in April with the contest fly-off, where students compete to best perform the prescribed missions. The competition regularly draws over eighty universities from around the world and has been held each year since 1997. The UCLA DBF team has been active since the early 2000's.

UCLA BEAM's 1st Culmination Showcase

Written by Jessica Lin / Photo by Daniel Marcelino Garcia

On May 31, 2014, over 100 elementary school students, parents, and educators roamed Bruin Plaza and South Campus for BEAM's first Culmination Showcase. Building Engineers and Mentors (BEAM) is a student-run organization that consists of dedicated UCLA undergraduate and graduate students who bring engaging hands-on science and engineering activities to Los Angeles elementary and middle schools, striving to diversify and expand the science and engineering community. All science lessons are developed by BEAM mentors, who also take the experience as one that hones their science communication and writing skills. With 30 undergraduate and graduate mentors, BEAM served three elementary schools and one middle school during the 2013-2014 school-year.

This year, BEAM's Culmination Showcase brought students, families, and educators to the UCLA campus to provide them a college campus experience, expose them to real-world applications of science and engineering, and engage them in preparing for college with a pre-college seminar. Elementary and middle school students had opportunities to ask questions and interact with UCLA student representatives from Baja SAE, ELFIN, and Rocket Project.

Learn more about BEAM at beam.ucla.edu.

MAE-94 CAD & Rapid Prototyping Competition Fall 2013

Top: Joseph Nicolino and Gerrit Lane (not present) won First Place with their device traveling a distance of 48 feet.

Middle: Anthony Vong and Yue Dou (not present) came in as Second with their device traveling a distance of 37 feet.

Bottom: Metchawin Thanyakarn (center) and Patarapol Chutinuntanakul (right) won Third Place in the annual MAE-94 rapid prototype competition.

The second "CAD & Rapid Prototyping Competition" of the Mechanical and Aerospace Engineering (MAE) sophomore course in Computer Aided Design (CAD) and Drafting (MAE-94) was held at the end of Finals Week of Fall 2013.

This year Prof. Robert Shaefer challenged the students to design and build a device, which propels itself using nothing but a single rubber band. The requirements were that the device would be designed using a CAD software and then fabricated using only a rapid prototyping device (no machining was permitted). The device could not be larger than 0.10 x 0.10 x 0.25 m3 and must travel a minimum distance of 0.5 meter on a flat surface using nothing but the potential energy stored in single rubber band. Additionally, the teams were told that following demonstration of their device a competition would be held to determine the top three performing designs based on the longest distance travelled. The top three winning teams would receive a "Certificate of Winning" and extra credit towards their final grade.

To promote cooperation and build camaraderie among student team members the class was divided into 23 teams with 2 students per team. First, a conceptual design was developed and presented and on the day of competition a Final Design Report was handed in, which included rubber-band energy analysis, assembled CAD Solid Model of the device, and engineering drawings of all the parts as well as testing and evaluation analysis of their final product along with fabrication experience gained during construction. Despite the many setbacks caused by malfunctioning of the MakerBot® printing devices, 19 of the 23 teams successfully built and demonstrated their device on the day of the competition.

The students were to use a rapid prototyping device, which is capable of replicating a digital CAD solid model into a free-standing 3-dimensional (3-D) structure made of plastic, such as ABS (Lego® plastic). The devices are generally called "3-D Printers," because similar to an inkjet printer they "print" an object by continuously depositing a fine string of molten plastic, layer by layer resulting in a 3-D object. The 3-D printers for this project are desktop printers, which are not designed to operate for extended number of hours. The MAE-94 demand on the printers surpassed the performance capabilities of the printers and thus students had to suffer innumerous setbacks during fabrication of their parts. Despite, the many 3-D printing delays and setbacks, 19 of the 23 teams succeeded in fabricating their devices. The remaining 4 teams were given permission to fabricate their device using conventional materials and to use the student machine shop.

The "printing" experience was everything but smooth. Because this was the first time the new Rapid Prototype devices were being used (they had arrived just weeks before the quarter started), a number of unexpected performance issues had to be resolved. However, the students were persistent; some teams spent as much as 8 hours in the CAD lab to produce just a single part. Several teams had to redesign their device, due to the limitations of the "printer" and some had to redo their parts due to unexpected fabrication flaws.

On the day of competition, Dec. 13th 2013 (last day of Finals week), 23 eager teams gathered in the CAD LAB (38-138 Engineering-IV). They displayed their products and demonstrated the performance of their device by "charging" the rubber bad; either winding it up on an axle, pulling it, or twisting the rubber band. Almost all teams showed that their device was designed and built within required design specifications, and where able to travel the required distance of 0.5 m, thus fulfilling all high-level design requirement. Following the demonstration the competition took place. The large variety of designs resulted in a wide spread in traveled distance. Because several parts were made of low-density ABS-plastic (faster printing speed), some of the devices failed during multiple attempts to break the record. In the end, the first place-winning device traveled a distance of 48 feet, the second place winning device rolled about 37 feet, and the third place distance was about 27 feet.

Because some of the devices were able to travel distances longer than the 38-138 E-IV room, the competition was moved to the hall way. As a result of the commotion and cheers of participating teams, the vice-chair of the MAE department, Prof. Adrienne Lavine along with other faculty members were drawn out of their offices and witnessed the competition first hand. Judging from the excitement among students and faculty, it became apparent that the competition at the end of the quarter was a great celebration of the students' hard work.

In the end, the process of concept innovation, designing and modeling of parts, overcoming fabrication challenges, re-designing, and spending a lot more time manufacturing than originally anticipated, gave the students the opportunity to experience a near real-life product development process.

UCLA Capstone Design Course Competition Spring 2014

The Mechanical and Aerospace Engineering 4th Annual Capstone Design Competition (MAE162D/E) was held on June 13, 2014 and winning teams received plaques in recognition of their excellent design. This year's senior mechanical engineering design project was an "Autonomous Material Transporter." The challenge to the students was to build a 11 x 11 x 11 inch electromechanical device, which can locate a billiard ball randomly placed on a 48 x 48 inch platform, approach and retrieve the ball, and then find the entrance to a 16 inch wide ramp and navigate the ramp with two inclines and three 900 bends and finally deliver it into a collection bin at the end of the path. After delivering the billiard ball the device has to return down the ramp back to the starting platform. The entire process had to be autonomous, except for pushing a start button on the device. Winning scored depended on the number of fully autonomously delivered billiard balls, within the allowable time span of 5 minutes.

The first prize went to Team-14, whose vehicle delivered 5 balls, the second prize went to Team-15 with 4 deliveries, and the third prize winner was Team-13 with a count of 3 billiard balls.

The MAE162D/E Capstone Design course spans over two quarters. In the first quarter, students are provided with tools to complete the design of device (CAD software, FEM-analysis, and hands-on feedback & control hardware). In the second quarter, students focus on fabrication, programming feedback & control, and ultimately demonstrate and testing/evaluation of their device. This sequence of design activities exposes students to a complete cycle of design of a product in the context of engineering, starting with a need-statement, concept development, analysis of the product, procurement of parts and components, machining, fabrication and assembly, and testing and evaluating whether specific design requirements were fulfilled.

In addition this course introduce students to mechatronics, the combination of electronics with mechanical devices, which is critical for engineering product development. Industry is very interested in students who've taken our hands-on design course MAE-162D/E, because this course provides the valuable hands-on learning experience sought after by many companies. The sequence also encourages teamwork in design, fabrication, and resource management, written documentation, and oral presentations. Because the students are grouped into 5-member teams, the course also encourages camaraderie and cooperation, all of which are essential for a successful career.

Leading the charge for this year sequence (MAE162D/E) was Professor Robert Shaefer, who taught the course with two other co-instructors, Dr. Jason Warren, and Prof C. J. Kim. Instruction for the first term focused on conceptual design and analysis, including mechanical component design and mechatronics. Lab work included CAD (computer-aided design), FEM analysis, Motion studies, Mechatronics and conceptual designs. Students began designing their projects in 162D in their CAD and realized it in 162E. Students were taught fundamentals of machining before fabrication. Project demonstration and finally competition with their fellow classmates were held during the last week of the Spring Quarter, 2014.

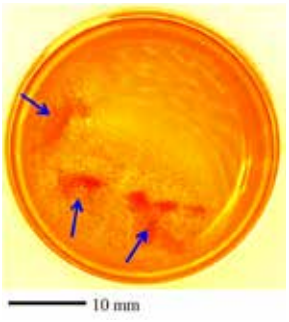
Winning Team-14 with (left to right) the Chairman, Prof. T-C. Tsao, Luke Jonse, Samuel Neff, Michael McKittrick, Mark Warwick, Thomas Lee, Jason Hatakeyama (Boeing), Prof. A. Levin, and Prof. R. Shaefer.

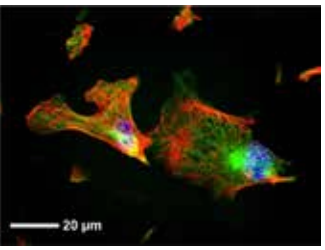
157A Competition - Five planes, five amazing designs

The challenge for this year's 157A competition was to build the fastest drag racing autonomous airplane. The race course was seven meters long and with a one meter tall barrier at the finish line. A wireless transmitter started the race. Thereafter, the airplanes had to fly completely autonomously over the barrier. The students were provided with a battery, motor, propeller, and micro-controller that they had to integrate into their design. Outside of the provided materials, the students had a $100 budget for any other parts they might need. The since the propulsion system was fixed for all vehicles, the team that could minimize drag while still making it over the one meter barrier would ultimately win the competition. The concepts covered include aerodynamics, controls and stability, design optimization, solid mechanics, programming in C, and fabrication techniques.

There were 42 students split into five teams in total. All teams completed their vehicles and competed in the final. The final consisted of three solo flight time trials. The two teams with the fastest times (Team Panda and Team Free Willy) competed head to head in the final race. Team Panda ultimate won the competition with a healthy lead and a course time of 1.86 s.

Cynthia Yin, researcher in Chih-Ming Ho's Micro Systems Laboratory, shines in research, academics, and beyond





Top: Image of complex macroscale pattern formation from nanocatalyst, taken by Cynthia Yin. Waves propagate from the lower left as indicated by the blue arrows, while Turing patterns self-organize in the upper right.

Middle: Fluorescence images of vascular endothelial cells, taken by Cynthia Yin. Blue denotes cell nuclei; green, microtubules of the cytoskeleton; and red, stress fibers.

Bottom: Cynthia Yin at graduation with a gold valedictorian medal, white National Honor Society stole, gold California Scholarship Federation stole and cord, and purple cord for 4.0+ GPA.

Cynthia Yin finished her fourth year of research under the guidance of Professor Chih-Ming Ho in Micro Systems Laboratories, Mechanical and Aerospace Engineering Department, UCLA. Over the years, she has investigated structural integrity of the cytoskeleton in response to myosin inhibitors, optimal drug cocktails for triple-negative breast cancer via Feedback System Control, and nanoscale catalyst to induce self-organization of complex spatiotemporal structures. Yin also participated in SINAM (Center for Scalable and Integrated NanoManufacturing) Research Program as part of UCLA SPUR (Summer Programs for Undergraduate Research) for two years. SINAM was directed by Professor Adrienne Lavine and coordinated by KiMi Wilson. At the culmination of the program, she presented her research to UCLA faculty and students. While contributing to the field, Yin shared her knowledge and interacted with other scientists and engineers.

Through her research at UCLA, Yin has garnered multiple awards at regional, state, national, and international science competitions. In January 2014, with nearly 6,000 attendees at the international SLAS (Society for Laboratory Automation and Screening) Conference, she showcased her research on combinatorial drug treatments for breast cancer as a Tony B. Academic Awardee. Yin gained insights into a variety of disciplines from professionals in academia and industry. Furthermore, with her recent research on macroscale pattern formation, she was named Intel Science Talent Search Semifinalist, Ventura County Science Fair (VCSF) 1st place in Senior Division Chemistry Category, and California State Science Fair Finalist in Senior Division Chemistry Category. 2014 marked Yin's 7th year of participation in VCSF, and 5th year in CSSF. She totaled 7 top three finishes at VCSF and CSSF.

In May 2014, Yin was named one of the top two Ronald Reagan Presidential Foundation Scholars. While honoring the legacy of President Ronald Reagan, the Foundation praised Yin: "She has undoubtedly achieved excellence as a young student leader. Cynthia has enrolled in the most rigorous curriculum at school, and pursues a myriad of academically challenging activities outside of the classroom. Beyond academics, she excels at piano, golf, and service-related efforts. Her achievements in math and science are astounding, and we are certain she will make a name for herself in the STEM world." Additionally, Yin earned the titles of U.S. Presidential Scholar Semifinalist, National Merit Scholar, National AP Scholar, and Ventura County Star Scholar. President Barack Obama awarded her the White House President's Education Award for Outstanding Academic Excellence.

In June 2014, Yin graduated from Westlake High School (WHS) as Valedictorian, National Honor Society Member, and California Scholarship Federation (CSF) Gold Seal Bearer. She logged two years of presidency in Physics Club, Math Club, and CSF Chapter. Yin not only organized club activities for these student groups, but was also actively involved on VEX Robotics Team, Science Olympiad Team, and Mu Alpha Theta Math Honor Society. For four years, Yin also played competitively on WHS Varsity Girls Golf Team. Moreover, Yin took a total of 17 AP exams including Calculus, Statistics, Computer Science, Physics, Chemistry, and Biology. At the end of her senior year, Yin was selected Student of the Year for Calculus. Attesting to Yin's unwavering commitment and dedication, her peers voted her as Most Likely to Succeed. Honoring her wide range of accomplishments in research, academics, and extracurricular activities, Ventura County Office of Education featured Yin in its Focus on Education magazine.

Research at UCLA has made a profound impact on Yin's life. She remarks, "I am truly grateful for the unparalleled experiences I have had at UCLA. Empowered by research, I am equipped for success. The transformative potential of novel discoveries inspires me to continue pursuing innovation and my passion for STEM." Intrigued by the interdisciplinary nature of research, she is determined to tackle challenges and shape the future.

Yin would like to thank UCLA Mechanical and Aerospace Engineering Department, Professor Ho, Professor Lavine, mentors Ieong Wong, Ting-Hsuan Chen, and Hann Wang, as well as other lab members for their support and technical advice.

For the fall 2014 undergraduate admission, Yin was accepted to UCLA (UC Regents Scholar), UC Berkeley (UC Regents Candidate), UCSD (UC Regents Scholar and full-ride Jacobs Engineering Scholar), MIT, Caltech, Princeton, Harvard, and Stanford. She will major in STEM at Stanford University.

Royce Hall and the Shapiro Fountain

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

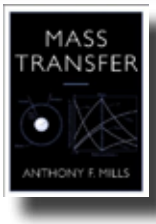
A. Lavine

A. Lavine

K. N. Liou

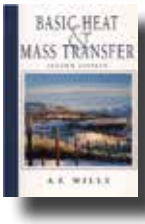
C. Lynch

A. Mal

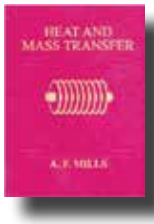


A. Mills

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

Ivan Catton

HEAT AND MASS TRANSFER

Heat transfer and fluid mechanics, transport phenomena in porous media, nucleonics heat transfer and thermal hydraulics, natural and forced convection, thermal/hydrodynamic stability, turbulence.

Fellow, ASME, 1989
Fellow, American Nuclear Society, 1999

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 (point defects, dislocations, voids and cracks); material degradation in severe environments (e.g. nuclear, fusion, rocket engines, etc.); plasma and laser processing; materials non-equilibrium, pattern formation and instability phenomena; radiation interaction with materials (neutrons, electrons, particles, laser & photons).

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.

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.

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

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

Chih-Ming Ho

MEMS AND NANOTECHNOLOGY
Molecular fluidic phenomena, nano/micro-elector-mechanical-systems, bio-molecular sensors, control of complex systems.
Member, National Academy of Engineering, 1997
Academician, Academia Sinica, 1998
Fellow, American Physical Society, 1989
Fellow, AIAA, 1994
Distinguished Fellow, AIMBE, 2014

Y. Sungtaek Ju

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

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.

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

Dennis Hong

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

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.

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

Christopher Lynch

STRUCTURAL AND SOLID MECHANICS

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

Fellow, ASME, 2004

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

Robert T. M'Closkey

SYSTEMS AND CONTROL

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

William Klug

STRUCTURAL AND SOLID MECHANICS

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

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

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

Laurent G. Pilon

HEAT AND MASS TRANSFER

MEMS AND NANOTECHNOLOGY

Radiation transfer, biomedical optics, photobiological fuel production, sustainable energy, nanoscale thermoscience, foams.

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.

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

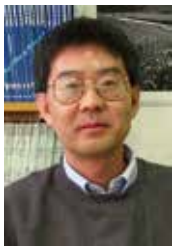
Modeling and control of dynamic systems with applications in mechanical systems, manufacturing processes, automotive systems, and energy systems, digital control; repetitive and learning control, adaptive and optimal control, mechatronics.

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

PROFESSORS EMERITI

Friedmann, Peretz
Hahn, H. Thomas
Kelly, Robert
Mills, Anthony
Mingori, D. Lewis
Schmit, Lucien
Smith, Owen
Westmann, Russell
Yang, Daniel

ADJUNCT PROFESSORS

Goebel, Dan
Lackman, Les M.
Marner, Webb
Morley, Neil
Sepulveda, Abdon
Shaefer, Robert
Siegel, Neil
Warrier, Gopinath

JOINT APPOINTMENTS

Carnesale, Albert (Public Policy)
Liou, K. N. (Atmospheric and Oceanic Sciences)

LECTURERS

Amar, Ravnesh
Aryafar, Hamarz
Chatterjee, Amiya
Colonno, Michael "Mike"
Fay, Gary L
Goebel, Dan
Golub, Alex
Goyal, Vinay
Jorns, Benjamin Alexander
Jun, Insoo
Kinsey, Robert "Bob"
Majlessi, Abdi
Marner, Webb
Mills, Anthony
Murphy, Jeffrey John
Nezhad, Shervin Taghavi
Po, Giacomo
Rahim, Faranak
Roughen, Kevin
Sepulveda, Abdon
Shafer, Robert "Shahram"
Swider, Jan
Tham, Yuk Fai
Toohey, Damian
Wang, Xiaowen
Warrier, Gopi
Wilson, Jason
Yang, Daniel

STAFF

Heejin Baik	Faculty Support Staff
Samantha Becker	Purchasing
Angie Castillo	Student Affairs Officer
Coral Castro	Fund Manager
Duy Dang	Management Services Officer
Alexander Duffy	Web and Publications Manager
Evgenia Grigorova	Staff Personnel/Payroll
Lance Kono	Facilities Manager
Abel Lebon	Student Affairs Officer
Annie Lee	Faculty Support Staff
Miguel Lozano	Senior Laboratory Mechanician
Mary Ann Macaso	Business Office Manager
Jennifer Ono	Fund Manager
Benjamin Tan	Senior Development Engineer
Marcia Terranova	Academic Personnel/Payroll

Mechanical Engineering Ph.D.

Summer 2013

Hockel, Joshua Leon (Carman, G.), "Deterministic Magnetization Control by Magnetoelastic Anisotropy and its Dependence on Geometry and Scale."

Hur, Janet (Kim, C.-J.), "Stackable Miniature Fuel Cells with On-Demand Fuel and Oxygen Supply."

Luong, David (Tsao, T.-C.), "Modeling, Estimation, and Control of Waste Heat Recovery Systens."

Medina, Albert (Eldredge, J.), "The Aerodynamics of Deforming Wings at Low Reynolds Number."

Sarkar, Mainak (Klug, W.), "Coupled Cardiac Electrophysiology and Contraction using Finite Element."

Fall 2013

Chong, Kwi Tae (Eldredge, J.), "Particle Manipulation in Viscous Streaming."

Fernandez, Javier Huerta (Speyer, J.), "Methods for Estimation and Control of Linear Systems Driven by Cauchy Noises."

Keller, Scott M. (Carman, G.), "Wave Propagation in Multiferroic Materials."

McKinley, Ian Meeker (Pilon, L.), "Thermomechanical Energy Conversion Using Ferroelectric Materials."

Rezaei, Ali (Speyer, J.), "Speed and Path Control for Conflict-Free Flight in High Air Traffic Demand in Terminal Airspace."

Seif, Dariush (Ghoniem, N.), "Multiscale Defect Formation and Transport in Materials in Extreme Enviroments."

Hsu, Chin-Jui (Carman, G.), "Engineering Magnetic Anisotropy in Nanostructured 3d and 4f Ferromagnets."

Tang, Yujie (Ju, Y.), "Microfluidic Brain Slice Chambers and Flexible Microelectrode Arrays for in vitro Localized Stimulation and Spatial Mapping of Neural Activities."

Winter 2014

Chen, Yue (Chiou, P.), "Pulsed Laser-Triggered High-Speed Microfluidic Fluorescence-Activated Cell Sorter."

Wang, Hainan (Pilon, L.), "Modeling and simulations of electrical energy storage in electrochemical capacitors."

Wegener, Jeffrey Lewis (Karagozian, A.), "Multi-phase Combustion and Transport Processes Under the Influence of Acoustic Excitation."

Zhou, Feng (Catton, I.), "Development of Closure for Heat Exchangers Based on Volume Averaging Theory."

Spring 2014

Aktinol, Eduardo (Dhir, V.), "Numerical Simulations of Bubble Dynamics and Heat Transfer In Pool Boiling - Including the Effects of Conjugate Conduction, Level of Gravity, and Noncondensable Gas Dissolved in the Liquid."

Chung, Ching-Yen (Gadh, R.), "Electric Vehicle Smart Charging Infrastructure."

Jia, Yanbing (Ju, Y.), "Implementation and Characterization of a Novel Solid-State Refrigerator Based on the Electrocaloric Effect and Liquid-B,ased Switchable Thermal Interfaces."

Jung, Jaedal (Lynch, C.) "Identification of arbitrarily shaped scatterers embedded in elastic heterogeneous media using dynamic XFEM."

Liu, Tingyi (Kim, C.-J.), "Meniscus Shape Engineering Through Micro and Nano Fabrication."

Saeidi, Sheida (Abdou, M.), "Study of MHD Corrosion and Transport of Corrosion Products of Ferritic/Martensitic Steels in the Flowing PbLi and its Application to Fusion Blanket."

Shen, Alex Ming (Chen, Y.), "Carbon Nanotube Based Spike Neuromorphic Devices and Circuits."

Shin, Kwang Sup (Gupta, V.), "Biomechanics of Compartmentalized Mechanical Properties of Extraocular Muscle and Tendon."

Wang, Hann (Ho, C.-M.), "Predictive Optimization of Pharmaceutical Efficacy."

Aerospace Engineering Ph.D.

Fall 2013

Lei, Jia (Zhong, X.), "Numerical Study of Freestream Waves Receptivity and Nonlinear Breakdown in Hypersonic Boundary Layer."

Winter 2014

Greene, Patrick Timothy (Kim, J.), "Numerical Simulations of High-Speed Flows Over Complex Geometries."

Spring 2014

Folk, Christopher Richard (Ho, C.-M.), "Optimized Mixing in Microchannels with Integrated Microactuators."

Johnson, Perry Moses Sablan (Wirz, R.), "Aero-structural modeling methods for multi-element wind turbine blades."

(Note: During 2013-14, there were 31 total graduating UCLA MAE Ph.D. students. 30 are listed here. One name is omitted due to a privacy request.)

Mechanical Engineering M.S.

Summer 2013

Bah, Abubakarr
Blaise, Brittney
Hope, Cara Danielle
Quintero, Jose Alejandro
Schuler, Alejandro (Ho, C.-M.), "Controlled Pattern Formation in a Reaction-Diffusiion Systen: A Novel Application of Non-Linear Model Predictive Control to Distributed Parameters Systems."

Fall 2013

Alvarez, Morad
Calderon, Carlos William
Chang, Eric
Chen, William
Crum, Ryan Scott
Filimonova, Olga Sergeevna
Heng, Ri-Liang
Lee, Jessica
Li, Jieming
Matthes, Christopher Stanley Rut
Mckinley, Ian Meeker
Rieck, Albert John
Ro, Christopher James
Rousselet, Yohann Lilian
Song, Yuanping
Souza, Michael Anthony
Zhou, Yi

Winter 2014

Gao, Feng
Jeun, Jin Ah
Li, Chin
Raymundo, Francis Rey
Siver, Andrew (Mal, A.), "Mechanistic Effects of Porosity on Structural Composite Materials."
Wang, Shaoyu
Wang, Yang
Zhao, Yue

Spring 2014

Allen, Ryan Kurt
Aroyan, Andre H
Beach, Ryan
Bran, Gabriela Alejandra
Chan, Marvin Mark
Checkles, Constantine Raynard
Chen, Siyu
Cheng, Kevin Kevin Cheng
Chung, Steve
D'Entremont, Anna Leone
Freeman, Ryan Thomas
Gao, Edward Xiang
Hou, David Muqing
Huang, Freddy Chen-Tong
Hwang, Orson
Jew, Matthew Gregory
Jong, Eric Robert
Kerst, Capella Frances
Lai, Shannon
Lam, Wilson
Le, Ninh
Liang, Michael
Nakamura, Robert Takeshi
Nashelskiy, Oleg
Ng, Ka Lun
Pan, Joseph Joseph Pan
Peng, Xinzhi
Salfity, Jonathan
Sarkissians, Alen
Scott, Michael Baran
Taylor, Joshua Adam
Tse, Louis
Vashchenko, Yana
Vasquez, Alejandra Gonzalez
Xie, Andi
Yasin, Rashid Muhammed

Aerospace Engineering M.S.

Summer 2013

Tudor, Andrew William

Fall 2013

Asada, Matthew
Dankongkakul, Ben
Lin, Anthony Shih-Hao
Orchard, Aidan Alistair
Quan, William
Wang, Nora

Spring 2014

Canan, William
Gomez, Evelyn Garcia
Li, Yuan
Matson, James Andrew
Murali, Aditya
Sreedharan, Aashish
Struett, Ryan Christopher
Sung, Aaron Nicholas
Young, Alan

(Note: During 2013-14, there were 85 total graduating UCLA MAE M.S. students. 82 are listed here. Three names are omitted due to privacy requests.)

Bachelor of Science

Ahmad Bukhari, Amir Farhan
Ahn, Christopher Sungmin
Balitaan, Karl Vincent Hortinela
Barker, Kenneth Donovan
Bowers, Brett Shepperd
Budd, Brian
Buss, Eric William
Camacho, Angelica Louise Esteban
Carlson, Kevin Donald
Chaing, Oliver
Chan, Alan Leland
Chan, Brandon I
Chang, Raymond Andrew
Chinn, James Zane
Chow, Kevin K
Chung, Boris Thomas
Cleverly, Griffin Thomas
Coleman, Matthew Joseph
Darmawan, Robin
Dashti, Sayyedeh Parisa
Datta, Sanjeev
Delgado, Kristine Michelle
Dimapasoc, Brando
Dong, Siyan
Downey, Brian Christopher
Edstrom, Mark Greggory
Ferguson, Ian Thanh
Flynn, Michael Maxwell
Forster, Zachary Ian
Furukawa, Tsubasa
Garcia, Aurora
Garg, Archit
Godina, Everardo Hernandez
Grant, Robert Joseph
Gu, Yu
Hakobyan, Vardan
Hall, Royce Patrick Mitsuaki
Hee, Bryan M
Hoff, Daniel Joseph
Holden, Emily Nicole
Hollins, Asya Cara
Houssainy, Sammy
Hsu, Jonathan R D
Huang, Wen-Chieh
Hwang, Jae-Woong
Jariwala, Chirag Mukesh
Jiang, Jay Jiajun
Jimenez, Marlon Michael
Johnson, Ryan Shaun
Jones, Luke Alexander
Jung, Joo Hyuk
Katz, Asher
Khov, Zhuo
Kik, Filip Leszek
Kim, Daeyoung
Kim, Joshua Paul
Kinoshita, Alan Mitsuo
Kitchener, Bryan Alexander
Knox, Allison Shelby
Ko, Brian Ambrosio
Kuong, Wai Leong
Kurihara, Matthew
Lam, Betty
Larson, Erik Scott
Law, Jonathan Chung-Keen
Le, Dai Huu
Lee, Jong Hak
Lee, Thomas Henry
Leong, Thomas Toshio Lim
Levin, Cole Richard
Li, Cheuk Hang Chester Alan
Li, Patrick G
Lim, Daniel Jungwoo
Liu, Hsuan-Chen
Lopez, Brett Thomas
Matsunami, Kameron Kazumi
Mcbirnie, Michael James
Mccarthy, Andrew Leonard
Mckittrick, Michael Thomas, Iii
Meirovitch, Daniel Joseph
Miller, Ryan Jeffrey
Mitragotri, Neel
Neff, Samuel S
Nelson, Brandon Dewey
Nguyen, Phuong Le
Nishioka, Crystal Michiko
Okano, Jillian Akemi
Padula, Andrew Robert
Pajuelo Lopez, Paulo Cesar
Pang, Andrew Michael
Peng, Wen Yu
Petersen, Daniel Ryan
Pham, Sonny Hoang
Phan, Thach Khac
Phan, Tri Minh
Pickett, Dana Ann
Rafferty, Michael Joseph
Rechnitz, Jared Philip
Riner, Elise Marie
Robinson, Joe Harley
Ruff, Carlton Joseph
Ruiz, Hector Jesus
Sakamoto, Layne Masashi
Schreiner, Eli Joseph Brett
Seo, John Dongbin
Shadish, Matthew Wing-Mon
Shen, Philip Jonathan
Sheu, Oliver Gene
Shorum, Mitchell David
Shyong, Eric Yawtzuu
Soriano, Justin
Stange, Michael Craig
Stern, Brian Preston
Stromlund, Adam Lindquist
Suh, Jungwoo
Sulaiman, Kerubin Suryaatmaja
Sun, Daniel Andrew
Sundin, Stephen Robert
Tan, Jared Evan
Tan, Jonathan Da Chuan
Tan, Shannon
Tang, Shengjie
Tate, Austin Jonathan
Toor, Paramveer Singh
Toriyama, Jimmy Susumu
Vasko, David Joseph
Walter, David Louis
Warwick, Mark Anthony
Waters, Danielle Elizabeth
Winters, Zachary Allen
Wong, Brian Jian
Wong, Tsz Yeung
Wood, Jacob Duncan
Wood, Kevin
Yagi, Yuki
Yang, Brandon
Yang, Yang
Yoo, Duane Hyun
Zhang, Yuheng

(Note: During 2013-14, there were 151 total graduating UCLA MAE B.S. students. 139 are listed here. 12 names are omitted due to privacy requests.)

Janss Steps

Journals

Fluid Mechanics

Le, H.P., Karagozian, A.R., and Cambier, J.-L., "Complexity Reduction of Collisional-Radiative Kinetics for Atomic Plasma," Physics of Plasmas, 20:123304-1-123304-18, 2013.

Wang, C., and Eldredge, J.D., "Low-Order Phenomenological Modeling of Leading-Edge Vortex Formation," Theoretical and Computational Fluid Dynamics, 27(5):577-598, August 2013.

Sevilla-Esparza, C.I., Teshome, S., Wegener, J.L., 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.

Fong, K.D, Wang, X., and Zhong, X, "Numerical Simulation of Roughness Effect on the Stability of A Hypersonic Boundary Layer," Computers & Fluids, 96:350-367, June 2014.

Heat and Mass Transfer

Dhir, V.K., Warrier, G.R., and Aktinol, E., "Numerical Simulation of Pool Boiling: A Review," J. Heat Transfer 135:061502, May 16, 2013.

Wang, H., Thiele, A., and Pilon, L., "Simulations of Cyclic Voltammetry for Electric Double Layers in Asymmetric Electrolytes: A Generalized Modified Poisson-Nernst-Planck Model," The Journal of Physical Chemistry C, 117:18286-18297, August 2013.

Ying, A., Liu, H., and Abdou, M., "Analysis of Tritium/Deuterium Retention and Permeation in FW/Divertor Including Geometric and Temperature Operating Features," Fusion Science and Technology, 64(2):303-308, August 2013.

Attia, J.A., Kohli, S., and Pilon, L., "Scaling Laws in Steady-State Aqueous Foams including Ostwald Ripening," 436:1000-1006, September 2013.

Lee, E., and Pilon, L., "Absorption and Scattering by Long and Randomly Oriented Linear Chains of Spheres," Journal of the Optical Society of America A, 30(9):1892-1900, September 2013.

Wong, C.P.C., Abdou, M., et al., "Progress on DCLL Blanket Concept," Fusion Science and Technology, 64(3):623-630, September 2013.

Zhang, H., Ying, A., and Abdou, M., "Impact of Pressure Equalization Slot in Flow Channel Insert on Tritium Transport in a DCLL-Type Poloidal Duct," Fusion Science and Technology, 64(3):651-656, September 2013.

Smolentsev, S., Vetcha, N., and Abdou, M., "Effect of a Magnetic Field on Stability and Transitions in Liquid Breeder Flows in a Blanket," Fusion Engineering and Design, 88(6-8):607-610, October 2013.

Wang, H., Fang, J., and Pilon, L., "Scaling Laws for Carbon-Based Electric Double Layer Capacitors," Electrochimica Acta, 109:316-321, October 2013.

Li, F.-C., Sutevski, D., Smolentsev, S., and Abdou, M., "Experimental and Numerical Studies of Pressure Drop in PbLi Flows in a Circular Duct Under Non-Uniform Transverse Magnetic Field," Fusion Engineering and Design, 88(11):3060-3071, November 2013.

Liu, H., Abdou, M.A., and Greenwood, L.R., "^{55}Fe Effect on Enhancing Ferritic Steel He/dpa Ratio in Fission Reactor Irradiations to Simulate Fusion Conditions," Fusion Engineering and Design, 88(11):2860-2864, November 2013.

McKinley, I.M, Goljahi, S., Lynch, C.S., and Pilon, L., "A Novel Thermally-Biased Mechanical Energy Conversion Cycle," Journal of Applied Physics, 114:224111, December 2013.

D'Entremont, A.L., and Pilon, L., "First-Principles Thermal Modeling of Electric Double Layer Capacitors Under Constant-Current Cycling," Journal of Power Sources, 246:887-898, January 2014.

Pilon, L., Janos, F., and Kitamura, R., "Effective Thermal Conductivity of Soda-lime Silicate Glassmelts with Different Iron Contents between 1100 and 1500°C," Journal of the American Ceramic Society, 97(2):442–450, February 2014.

Lee, E., Pruvost, J., He, X., Ramakanth, R., and Pilon, L., "Design Tool and Guidelines for Outdoor Photobioreactors," Chemical Engineering Science, 106:18-29, March 2014.

Heng, R.-L., Lee, E., and Pilon, L., "Radiation Characteristics and Optical Properties of Filamentous Cyanobacteria Anabaena Cylindrica," Journal of the Optical Society of America A, 31(4):836-845, March 2014.

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

D'Entremont, A.L, and Pilon, L., "First-Order Thermal Model of Commercial EDLCs," Applied Thermal Engineering, 67:439-446, June 2014.

Thiele, A.M., Kumar, A., Sant, G., and Pilon, L., "Effective Thermal Conductivity of Three-Phase Composites Containing Spherical Capsules," International Journal of Heat and Mass Transfer, 73:177–185, June 2014.

Manufacturing and Design

Chen, L.-Y., Weiss, D., Morrow, J., Xu, J.-Q., and Li, X., "A novel manufacturing route for production of high-performance metal matrix nanocomposites," Manufacturing Letters, 1(2):62-65, 2013.

Estruga, M., Chen, L., Choi, H., Li, X., and Jin, S., "Ultrasonic-Assisted Synthesis of Surface-Clean TiB2 Nanoparticles and Their Improved Dispersion and Capture in Al-Matrix Nanocomposites," ACS applied materials & interfaces, 5(17):8813-8819, 2013.

Li, H., Choi, H., Ma, C., Zhao, J., Jiang, H., Cai, W., Abell, J.A., and Li, X., "Transient Temperature and Heat Flux Measurement in Ultrasonic Joining of Battery Tabs Using Thin-Film Microsensors," Journal of Manufacturing Science and Engineering, 135(5):51015, 2013.

Li, L., Li, B., Ehmann, K.F., and Li, X., "A thermo-mechanical model of dry orthogonal cutting and its experimental validation through embedded micro-scale thin film thermocouple arrays in PCBN tooling," International Journal of Machine Tools and Manufacture, 70:70-87, 2013.

Li, L., Li, B., and Li, X., Ehmann, K.F., "Experimental investigation of hard turning mechanisms by PCBN tooling embedded micro thin film thermocouples," Journal of Manufacturing Science and Engineering, 135(4):41012, 2013.

Ma, C., Chen, L., Xu, J., Fehrenbacher, A., Li, Y., Pfefferkorn, F.E., Duffie, N.A., Zheng, J., and Li, X., "Effect of fabrication and processing technology on the biodegradability of magnesium nanocomposites," Journal of Biomedical Materials Research Part B: Applied Biomaterials, 101(5):870-877, 2013.

Ma, C., Vadali, M.,; Duffie, N.A., Pfefferkorn, F.E., and Li, X., "Melt Pool Flow and Surface Evolution During Pulsed Laser Micro Polishing of Ti6Al4V," Journal of Manufacturing Science and Engineering, 135(6):61023, 2013.

Pfefferkorn, F.E., Duffie, N.A., Li, X., Vadali, M., and Ma, C., "Improving surface finish in pulsed laser micro polishing using thermocapillary flow," CIRP Annals-Manufacturing Technology, 62(1):203-206, 2013.

Harb, R., Taciroglu, E., and Ghoniem, N., "Partitioning of elastic energy in open-cell foams under finite deformations," Acta Materialia, 61(5):1454-1468, March 2013.

Hopkins, J.B., "Designing Hybrid Flexure Systems and Elements Using Freedom and Constraint Topologies," Mechanical Sciences, 4:319-331, June 2013.

Berry-Pusey, B.N., Chang, Y.C., Prince, S.W., Chu, K., David, J., Taschereau, R., Silverman, R.W., Williams, D., Ladno, W., Stout, D., Tsao, T.-C., and Chatziioannou, A., "A Semi-Automated Vascular Access System for Preclinical Models," Physics in Medicine and Biology, IOP Publishing, 58(16):5351-5362, July 2013.

Lee, E.K., Gadh, R. and Gerla, M., "Energy Service Interface: Accessing to Customer Energy Resources for Smart Grid Interoperation," IEEE Journal on Selected Areas in Communication (J-SAC), 31(7):1195-1204, July 2013.

Ghoniem, N., Po, G., and Sharafat, S., "Deformation mechanisms in ferritic/martensitic steels and the impact on mechanical design," Journal of Nuclear Materials, 441(1):704-712, October 2013.

Lee, E.K., Chu, P., and Gadh, R., "Fine-Grained Access to Smart Building Energy Resources," IEEE Internet Computing, 17(6):48-56, November 2013.

Sharafat, S., Aoyama, A., Williams, B., and Ghoniem, N., "Development of micro-engineered textured tungsten surfaces for high heat flux applications," Journal of Nuclear Materials, 442(1):S302-S308, November 2013.

Crosby, T., and Ghoniem, N., "Multiphysics model of thermomechanical and helium-induced damage of tungsten during plasma heat transients," Journal of Nuclear Materials, 442(1):S261-S266, November 2013.

Chen, L.-Y., Xu, J.-Q., Choi, H., Konishi, H., Jin, S., and Li, X., "Rapid control of phase growth by nanoparticles," Nature Communications 5, 2014.

Chen, L.-Y., Peng, J.-Y., Xu, J.-Q., Choi, Hongseok, and Li, X., "Achieving Uniform Distribution and Dispersion of a High Percentage Nanoparticles in Mg18Sn Matrix by Solidification Processing," Magnesium Technology 2014, 465-470, 2014.

Estruga, M., Girard, S.N., Ding, Q., Chen, L., Li, X., and Jin, S., "Facile and scalable synthesis of Ti 5 Si 3 nanoparticles in molten salts for metal-matrix nanocomposites," Chemical Communications, 50(12):1454-1457, 2014.

Hopkins, J.B., Vericella, J.J., and Harvey, C.D., "Modeling and Generating Parallel Flexure Elements," Precision Engineering, 38(3):525-537, 2014.

Ma, C., Vadali, M., Li, X., Duffie, N.A., and Pfefferkorn, F.E., "Analytical and Experimental Investigation of Thermocapillary Flow in Pulsed Laser Micropolishing," Journal of Micro and Nano-Manufacturing, 2(2):21010, 2014.

Mutyala, M.S.K, Zhao, J., Li, J., Pan, H., Yuan, C., and Li, X., "In-situ temperature measurement in lithium ion battery by transferable flexible thin film thermocouples," Journal of Power Sources, 260:43-49, 2014.

Zhou, Q., Zhou, J., De Cicco, M., Zhou, S., and Li, X., "Detecting 3D Spatial Clustering of Particles in Nanocomposites based on Cross-sectional Images," Technometrics, 56(2):212-224, 2014.

Valdovinos, J., Shkolyar, E., Carman, G.P., et al., "In Vitro Evaluation of an External Compression Device for Fontan Mechanical Assistance," Artificial Organs, 38(3):199-207, March 2014.

Chung, C., Chynoweth, J., Chu, C., and Gadh, R., "Master-Slave Control Scheme in Electric Vehicle Smart Charging Infrastructure," The Scientific World Journal, May 2014.

Huang, R., Wang, Y., Chu, C.-C., Gadh, R., and Song, Y., "Optimal Configuration of Distributed Generation on Jeju Island Power Grid Using Genetic Algorithm: A Case Study," Special Issue on RFID Technologies & Internet of Things, Journal of Communication Software and Systems, 10(2):1-10, June 2014.

MEMS and Nanotechnology

Fang, X.-Q., Gupta, V., and Liu, J.-X., "Effect of Couple Stress at the Interfaces of a Nano-Hole on the Anti-Plane Electro-Mechanical Behavior," Philosophical Magazine Letters, 93(1):58-67, 2013.

Fang, X.-Q., Liu, J.-X., and Gupta, V., "Fundamental Formulations and Recent Achievements in Piezoelectric Nano-Structures: A Review," Nanoscale, The Royal Society of Chemistry, 5:1716-1726, 2013.

Gaspera, E.D., Tucker, R., Star, K., Lan, E.H., Ju, Y.S., and Dunn, B., "Copper-Based Conductive Composites with Tailored Thermal Expansion," ACS Applied Materials Interfaces, 5(21):10966-10974, 2013.

Guo, Y., Chen, T.H., Zeng, X., Warburton, D., Bostrom, K.I., Ho, C.-M., Zhao, X., and Garfinkel, A., "Branching Patterns Emerge in a Mathematical Model of the Dynamics of Lung Development," Journal of Physiology, 1-12, 2013.

Jain, A., Youssef, G., and Gupta, V., "Dynamic Tensile Strength of Polyurea Bonded Steel/e-glass Composite Joints," Journal of Adhesion Science and Technology, 27(4):403-412, 2013.

Kim, H.I., Tian, J., and Gupta, V., "In-Situ Measurement of Solder Joint Strength in Board-mounted Chip-scale Packages Using a Quantitative Laser Spallation Technique," Journal of Adhesion Science and Technology, 27(7):719-730, 2013.

Lillehoj, P.B., Huang, M.C., Troung, N., and Ho, C.-M., "Rapid Electrical Detection on a Mobile Phone," Lab on a Chip, 13:2950-2955, 2013.

Tian, J., Kim, H.I., and Gupta, V., "Measurement of Solder Joint Strength in Freestanding Chip-Scale Packages Using a Quantitative Laser Spallation Technique," Journal of Adhesion Science and Technology, 27(8):835-842, 2013.

Youssef, G., and Gupta, V., "Resonance in Polyurea-Based Multilayer Structures Subjected to Laser-Generated Stress Waves," Experimental Mechanics, 53:145-154, 2013.

Youssef, G., Crum, R., Prikhodko, S.V., Seif, D., Po, G., Ghoniem, N., Kodambaka, S., and Gupta, V., "The influence of laser-induced nanosecond rise-time stress waves on the microstructure and surface chemical activity of single crystal cu nanopillars," Journal of Applied Physics, 113(8):084309, 28 February 2013.

Kim, K., Chen, C.-L., Truong, Q., Shen, A.M., and Chen, Y., "A Carbon Nanotube Synapse with Dynamic Logic and Learning," Advanced Materials, Wiley, 25(12):1693-1698, 25 March 2013.

Shah, G.J., Ding, H., Sadeghi, S., Chen, S., Kim, C.-J., and van Dam, R.M., "On-Demand Droplet Loading for Automated Organic Chemistry on Digital Microfluidics," Lab on a Chip, 13(14):2785-2795, July 2013.

Cho, B., Kim, K., Chen, C.-L., Shen, A.M., Truong, Q., and Chen, Y., "Nonvolatile Analog Memory Transistor Based on Carbon Nanotubes and C60 Molecules," Small, Wiley, 9(13):2283-2287, 8 July 2013.

Shen, A.M., Chen, C.-L., Kim, K., Cho, B., Tudor, A., and Chen, Y., "Analog Neuromorphic Module Based on Carbon Nanotube Synapses," ACS Nano, American Chemical Society, 7(7):6117-6122, 27 July 2013.

Finizio, S., Foerster, M., Vaz, C.A.F., Carman, G., et al., "Electrical-field control of magnetism mediated by strain in Ni nanostructures fabricated on pre-poled PMN-PT (011)," Spin, 3(3):1340008, September 2013.

Choi, W., Rubtsov, V., and Kim, C.-J., "Miniature Netting System for Endoscopic Object Retrieval from Hard-to-Reach Area," Journal of Microelectromechanical Systems Letters, 22(5):1158-1165, October 2013.

Dooraghi, A.A., Keng, P.Y., Chen, S., Javed, M.R., Kim, C.-J., Chatziioannou, A.F., and Van Dam, R.M., "Optimization of microfluidic PET tracer synthesis with Cerenkov imaging," Analyst, 138(19):5654-5664, October 2013.

Honda. Y., Ding X., Mussano, F., Wiberg, A., Ho, C.-M., and Nishimura, I., "Guiding the osteogenic fate of mouse and human mesenchymal stem cells through feedback system control," Scientific Reports 3, 5 December 2013

Colorado, H.A., Navarro, A., Prikhodko, S.V., Yang, J.-M., Ghoniem, N., and Gupta, V., "Ultrahigh strain-rate bending of copper nanopillars with laser-generated shock waves," Journal of Applied Physics, 114(23):233510, 21 December 2013.

Chen, Y., Chung, A.J., Wu, T.-H., Teitell, M.A., Di Carlo, D., and Chiou, P.Y., "Pulsed Laser Activated Cell Sorting with Three Dimensional Sheathless Inertial Focusing," Small, 10:1746-1751, 2014.

Jia, Y., and Ju, Y.S., "Solid-Liquid Hybrid Thermal Interfaces for Low-Contact Pressure Thermal Switching," Journal of Heat Transfer, 136:074503, 2014.

Riahi, R., Wong, S., Long, M., Li, N., Chiou, P.Y., Zhang, D., and Wong, P., "Mapping Photothermally Induced Gene Expression in Living Cells and Tissues by Nanorod-Locked Nucleic Acid Complexes," ACS Nano, 8:3597-3605, 2014.

Teh, B.E., French, C.T., Chen, Y., Chen, I.G., Wu, T-H., Sagullo, E., Chiou, P.Y., Teitell, M.A., Miller, J., and Gan, Y.-H., "Type three secretion system-mediated escape of Burkholderia pseudomallei into the host cytosol is critical for the activation of NFkB," BMC Microbiology, 14:115, 2014.

Yamane, D., Wu, Y.-C., Wu, T.-H., Toshiyoshi, H., Teitell, A.M., and Chiou, P.Y., "Electrical impedance monitoring of photothermal porated mammalian cells," Journal of Laboratory Automation, 19:50-59, 2014.

Warrier, G.R., Kim, C.-J., and Ju, Y.S., "Microchannel cooling device with perforated side walls: Design and Modeling," International Journal of Heat and Mass Transfer, 68:174-183, January 2014.

Javed, M.R., Chen, S., Kim, H-K., Wei, L., Czernin, J., van Dam, R.M., Kim, C.-J., and Keng, P.Y., "Efficient Radiosynthesis of 3-deoxy-3-[18F]fluorothymidine Using Electrowetting-on-Dielectric Digital Microfluidic Chip," Journal of Nuclear Medicine, 55(2):321-328, February 2014.

Javed, M.R., Chen, S., Lei, J., Collins, J., Sergeev, M., Kim, H.-K., Kim, C.-J., van Dam, R.M., and Keng, P.Y., "High Yield and High Specific Activity Synthesis of [18F]Fallypride in a Batch Microfluidic Reactor for Micro-PET Imaging," Chemical Communications, 50(10):1192-1194, February 2014.

Sun, G., Liu, T., Sen, P., Shen, W., Gudeman, C., and Kim, C.-J., "Electrostatic Side-Drive Rotary Stage on Liquid-Ring Bearing," Journal of Microelectromechanical Systems, 23(1):147-156, February 2014.

Cherepov, S., Amiri, P.K., Alzate, J.G., Carmen, G., et al., "Electric-field-induced spin wave generation using multiferroic magnetoelectric cells," Applied Physics Letters, 104(8), Article Number 082403, 24 February 2014.

Chen, S., Javed, M.R., Kim, H-K., Lei, J., Lazari, M., Shah, G.J., van Dam, R.M., Keng, P.Y., and Kim, C.-J., "Radiolabelling Diverse Positron Emission Tomography (PET) Tracers Using a Single Digital Microfluidic Reactor Chip," Lab on a Chip, 14(5):902-910, March 2014.

Peng, C., Zhang, Z., Kim, C.-J., and Ju, Y.S., "EWOD (Electrowetting on Dielectric) Digital Microfluidics Powered by Finger Actuation," Lab on a Chip, 14(6):1117-1122, March 2014.

Finizio, S., Foerster, M., Buzzi, M., Carmen, G., et al., "Magnetic Anisotropy Engineering in Thin Film Ni Nanostructures by Magnetoelastic Coupling," Physical Review Applied, 1(2):021001, 1 March 2014.

Cirigliano, N., Sun, G., Membreno, D., Malati, P., Kim, C.-J., and Dunn, B., "3D Architectured Anodes for Lithium-Ion Microbatteries with Large Areal Capacity," Energy Technology, 2(4):362-369, April 2014.

Park, H., Sun, G., and Kim, C.-J., "Superhydrophobic turbulent drag reduction as a function of surface grating parameters," Journal of Fluid Mechanics, 747:722-734, May 2014.

Shen, H.-H., Fan, S.-K., Kim, C.-J., and Yao, D-J., "EWOD microfluidic systems for biomedical applications," Microfluidics and Nanofluidics, 16(5):965-987, May 2014.

Structural and Solid Mechanics

Banerjee, I., Kim, H.K.D., Keller, S., Carman, G., et al., "Magneto-Dielectric and Magnetic Anisotropy Maxima in γ-Fe_2O_3 Nanocomposite," IEEE Magnetics Letters, Volume: 4, Article Number 2500104, 2013.

Krishnamoorthi, S., Sarkar, M., and Klug, W.S., "Numerical Quadrature and Operator Splitting in Finite Element Methods for Cardiac Electrophysiology," International Journal for Numerical Methods in Biomedical Engineering, 29(11):1243-1266, 2013.

Rasool, H.I., Ophus, C., Klug, W.S., Zettl, A., and Gimzewski, J.K., "Measurement of the Intrinsic Strength of Crystalline and Polycrystalline Graphene," Nature Communications, 4(2811):1-7, 2013.

Chen, Z., and Ghoniem, N., "Effects of biaxial strain on diffusivity of low index tungsten surfaces," APS Meeting Abstracts, 1:40010, 20 March 2013.

Takahashi, A., and Ghoniem, N., "Fracture mechanics of propagating 3-d fatigue cracks with parametric dislocations," Philosophical Magazine, 93(20):2662-2679, 4 April 2013.

Chen, Z., and Ghoniem, N., "Biaxial strain effects on adatom surface diffusion on tungsten from first principles," Physical Review B, 88(3):035415, 9 July 2013.

Gallagher, J.A., and Lynch, C.S., "Characterization of ferroelectric single crystals with field induced phase transformations," Smart Materials and Structures, IOP Science, 22(9):094004-1-094004-7, August 2013.

Goljahi, S., and Lynch, C.S., "Effects of electric field on the fracture toughness (K_{Ic}) of ceramic PZT," Smart Materials and Structures, IOP Science, 22(9):094014-1-094014-9, August 2013.

Seif, D., and Ghoniem, N., "Effect of anisotropy, sia orientation, and one-dimensional migration mechanisms on dislocation bias calculations in metals," Journal of Nuclear Materials, 442(1):S633-S638, November 2013.

Po, G., and Ghoniem, N., "Continuum modeling of plastic flow localization in irradiated fcc metals," Journal of Nuclear Materials, 442(1):S607-S611, November 2013.

Cui, J., Hockel, J.L., Nordeen, P.K., Pisani, D.M., Liang, C., Carman, G.P., and Lynch, C.S., "A method to control magnetism in individual strain-mediated magnetoelectric islands," Applied Physics Letters, 103(23):232905-1-232905-5, December 2013.

Cui, J., Hockel, J.L., Nordeen, P.K., Carmen, G., et al., "A method to control magnetism in individual strain-mediated magnetoelectric islands," Applied Physics Letters, 103(23), Article Number 232905, 2 December 2013.

Aggarwal, A., Chen, J.-S., and Klug, W.S., "A Meshfree Method For Mechanics and Conformational Change of Proteins and Their Assemblies," CMES: Computer Modeling in Engineering & Sciences, 98(1):69-99, 2014.

Rim, J.E., Purohit, P.K., and Klug, W.S., "Mechanical Collapse of Confined Fluid Membrane Vesicles," Biomechanics and Modeling in Mechanobiology, 1-12, 2014.

Cui, J., Hockel, J.L., Nordeen, P.K., Pisani, D.M., Carman, G.P., and Lynch, C.S., "Giant electric-field-induced magnetic anisotropy reorientation with patterned electrodes on a Ni thin film/lead zirconate titanate heterostructure," Journal of Applied Physics, 115(17):17C711-1-17C711-3, January 2014.

Moss, S.D., Hart, G.A., Burke, S.K., Carmen, G., et al., "Hybrid rotary-translational vibration energy harvester using cycloidal motion as a mechanical amplifier," Applied Physics Letters, 104(3), Article Number 033506, 20 January 2014.

Seif, D., Po, G., Crum, R., Gupta, V., and Ghoniem, N., "Shock-induced plasticity and the hugoniot elastic limit in copper nano films and rods," Journal of Applied Physics, 115(5):054301, February 2014.

Gallagher, J.A., Jo, H.R. and Lynch, C.S., "Large-field dielectric loss in relaxor ferroelectric PLZT," Smart Materials and Structures, IOP Science, 23(3):035007-1-035007-6, February 2014.

Lee, J., Oh, S., and Mal, A., "Calculation of interfacial stresses in composites containing elliptical inclusions of various types," European Journal of Mechanics A/Solids, 44:17-40, March-April 2014.

Dong, W.D., Finkel, P., Amin, A., Cunefare, K.A., and Lynch, C.S., "Energy harvesting using the FER-FEO phase transformation in [011] cut single crystal PIN-PMN-PT," Journal of Intelligent Materials, Systems, and Structures, published online before print March 10, 2014

Ong, P. V., Kioussis, N., Amiri, P.K., Carmen, G., et al., "Electric field control and effect of Pd capping on magnetocrystalline anisotropy in FePd thin films: A first-principles study," Physical Review B, 89(9), Article Number 094422, 24 March 2014.

Po, G., and Ghoniem, N., "A variational formulation of constrained dislocation dynamics coupled with heat and vacancy diffusion," Journal of the Mechanics and Physics of Solids, 66:103-116, May 2014.

Burbery, N.J., Das, R., Po, G., and Ghoniem, N., "Understanding the threshold conditions for dislocation transmission from tilt grain boundaries in fcc metals under uniaxial loading," Applied Mechanics and Materials,553:28-34, May 2014.

Cui, J., Hockel, J.L., Nordeen, P.K., Carmen, G., et al., "Giant electric-field-induced magnetic anisotropy reorientation with patterned electrodes on a Ni thin film/lead zirconate titanate heterostructure," Journal of Applied Physics, 115(17), Article Number 17C711, 7 May 2014.

Gallagher, J.A., Pisani, D.M., Smith-Stewart, B., and Lynch, C.S., "Stress and Electric Field Gradient Contributions to Dielectric Loss in Ferroelectrics with Interdigitated Electrodes," Journal of Intelligent Materials, Systems, and Structures, published online before print May 12, 2014

Systems and Control

Faghihi, A., Tesch, J., and Gibson, S., "Identified State-Space Prediction Model for Aero-Optical Wavefronts," Optical Engineering, SPIE, 52(7):1-10, July 2013.

Tesch, J., Gibson, S., and Verhaegen, M., "Receding-Horizon Adaptive Control of Aero-Optical Wavefronts," Optical Engineering, SPIE, 52(7):1-13, July 2013.

Chen, Z., Iwasaki, T., and Zhu, L., "Neural Control for Coordinated Natural Oscillation Patterns," Systems & Control Letters, 62(8):693-698, August 2013.

Lin, C.-Y., and Tsao, T.-C., "Adaptive Control With Internal Model for High-Performance Precision Motion Control and Its Application to a Fast-Acting Piezoelectric Actuator," J. Dyn. Sys., Meas., Control 135(6), 061012, 23 August 2013.

Zhu, L., Chen, Z., and Iwasaki, T., "Oscillation, Orientation, and Locomotion of Underactuated Multi-link Mechanical Systems," IEEE Transactions on Control Systems Technology, 21(5):1537-1548, September 2013.

Hendrickson, C., and M'Closkey, R.T., "Compensation of Nonlinear Harmonic Coupling for Pulsed-Jet-Velocity Shaping," AIAA J., 51(11):1-15, November 2013.

Kim, D., and M'Closkey, R.T., "Spectral Analysis of Vibratory Gyro Noise," IEEE Sensors J., 13(11):4361-4374, November 2013.

Iwasaki, T., Chen, J., and Friesen, W.O., "Biological Clockwork Underlying Adaptive Rhythmic Movements," Proceedings of the National Academy of Science, 111(3):978-983, 2014.

Kohannim, S., and Iwasaki, T., "Analytical Insights into Optimality and Resonance in Fish Swimming," Journal of Royal Society Interface, 11(92, 20131073):1-11, 2014.

Speyer, J.L., Idan, M., and Fernandez, J.H., "A Stochastic Controller for a Scalar Linear System with Additive Cauchy Noise," Automatica, 50(1):114-127, January 2014.

Chang, H.L., and Tsao, T.-C., "High Sampling Rate Dynamic Inversion-Filter Realization and Applications in Digital Control," IEEE/ASME Transactions on Mechatronics, 19(1):238-248, February 2014.

Hara, S., Tanaka, H., and Iwasaki, T., "Stability Analysis of Systems with Generalized Frequency Variables," IEEE Transactions on Automatic Control, 59(2):313-326, February 2014.

Hemati, M.S., Eldredge, J.D. and Speyer, J.L., "Wake Sensing for Aircraft Formation Flight," Journal of Guidance, Control and Dynamics, 37(2):513-524, February 2014.

Idan, M., and Speyer, J.L., "Multivariate Cauchy Estimator with Scalar Measurement and Process Noises," SIAM Journal on Control and Optimization, 52(2):1108–1141, 25 March 2014.

Acikmese, B., Mandic, M., and Speyer, J.L., "Decentralized Observers with Consensus Filters for Distributed Discrete-Time Linear Systems," Automatica, 50(4):1037-1052, April 2014.

Conference Papers

Fluid Mechanics

Dankongkakul, B., Araki, S.J., and Wirz, R.E., "Influence of Upstream Field Structure on Primary Electron Loss for a Permanent Magnet Cusp," 49th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, San Jose, CA, July 2013.

Ganapathi, G.B, Berisford, D., Furst, B., Bame, D., Pauken, M., and Wirz, R.E., "A 5 kWh Lab Scale Demonstration of a Novel TES Concept with Supercritical Fluids," ASME 7th International Conference on Energy Sustainability, Minneapolis, MN, USA, July 2013.

Lakeh, R.B., Lavine, A., Kavehpour, H.P., Ganapathi, G.B., and Wirz, R.E., "Effect of Natural Convection on Thermal Energy Storage Using Supercritical Fluids," ASME 7th International Conference on Energy Sustainability, Minneapolis, MN, July 2013.

Matlock, T.S., Goebel, D.M., Conversano, R.W., and Wirz, R.E., "The Plasma Interactions Facility at UCLA," 49th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, San Jose, CA, July 2013.

Tse, L., Stopin, A., Ganapathi, G.B., Garcia-Garibay, M.A., and Wirz, R.E., "Thermal Testing of Organic Fluids for Supercritical Thermal Energy Storage Systems," ASME 7th International Conference on Energy Sustainability, Minneapolis, MN, July 2013.

Bran-Anleu, G., Lavine, A.S., Wirz, R.E., Lakeh, R.B., and Kavehpour, H.P., "An Algorithm to Determine the Optimized Data Range in Transient Hotwire Thermal Property Measurement," ASME International Mechanical Engineering Congress & Exposition (IMECE), San Diego, CA, November 2013.

Furst, B., Lavine, A.S., Lakeh, R.B., and Wirz, R.E., "Isobaric, Isochoric and Supercritical Thermal Energy Storage in R134a," ASME International Mechanical Engineering Congress & Exposition (IMECE), San Diego, CA, November 2013.

Lakeh, R.B., Kavehpour, H.P., Lavine, A.S., Ganapathi, G.B., and Wirz, R.E., "Study of Turbulent Natural Convection in Vertical Storage Tubes for Supercritical Thermal Storage System," ASME International Mechanical Engineering Congress & Exposition (IMECE), San Diego, CA, November 2013.

Gevorkyan, L., Getsinger, D., Smith, O.I., and Karagozian, A.R., "Structural and Stability Characteristics of Jets in Crossflow," Paper AIAA-2014-0230, 52nd AIAA Aerospace Sciences Meeting/Science and Technology Forum and Exposition, 1-19, January 2014.

Greene, P.T., Eldredge, J.D., Zhong, X., and Kim, J., "Numerical Simulation of High-Speed Flows Over Complex Geometries with a High-Order Multi-Zone Cut-Cell Method," AIAA SciTech 2014, National Harbor, MD., AIAA Paper 2014-0426, 1-23, January 2014.

Huang, Y., and Zhong, X., "Parametric Study of Boundary-Layer Receptivity to Freestream Hot-Spot Perturbation over a Blunt Compression Cone," AIAA paper 2014-0774, pp. 1-29, January 2014.

Park, H., and Kim, J., "The effects of superhydrophobic surface on skin-friction drag," Proceedings of Workshop on Progress in Wall Turbulence: understanding and modeling, Lille, France, June 18-20, 2014.

Heat and Mass Transfer

Lakeh, R.B., Lavine, A.S., Kavehpour, H.P., Ganapathi, G.B., and Wirz, R.E., "Effect of Natural Convection on Thermal Energy Storage using Supercritical Fluids," Proc. ASME 7th International Conference on Energy Sustainability, Minneapolis, MN, USA, 2013.

Dhir, V.K., and Garg, D., "Relaxation of assumptions in Zuber's hydrodymic theory of pool maximum heat flux," Presented at Symposium in Honor of Dr. Novak Zuber, 2013 International Mechanical Engineering Congress and Exposition, San Diego, California, November 20, 2013.

Dhir, V.K., "Wall heat flux partitioning during subcooled forced flow nucleate and film boiling," Workshop at Indian Institute of Technology Mumbai, December 26-27, 2013.

Dhir, V.K., "Nucleate pool boiling at different levels of gravity," Plenary Lecture, Indian Society for Heat and Mass Transfer, Indian Institute of Technology Kharagpur, December 29, 2013.

Manufacturing and Design

Chung, C., Chu, P., and Gadh, R., "Design of Smart Charging Infrastructure Hardware and Firmware Design of the Various Current Multiplexing Charging System," Seventh Global Conference on Power Control and Optimization PCO 2013, Prague, 25-27, August 2013.

Hopkins, J.B., "Analyzing and Designing Serial Flexure Elements," Proc. of the ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE 2013, Portland, OR, August 2013.

Chung, C., Shepelev, A., Qiu, C., Chu, C., and Gadh, R., "Design of RFID Mesh Network for Electric Vehicle Smart Charging Infrastructure," 2013 IEEE International Conference on RFID Technologies and Applications, The ZON Regency Hotel by the Sea, Johor Bahru, 4-5, September 2013.

Chung, C., Chynoweth, J., Qiu, C., Chu, C., and Gadh, R., "Design of Fair Charging Algorithm for Smart Electrical Vehicle Charging Infrastructure," International Conference on ICT Convergence 2013, Jeju, Korea, October 2013.

Chung, C., Youn, E., Chynoweth, J., Qiu, C., Chu, C., and Gadh, R., "Safety Design for Smart Electric Vehicle Charging with Current and Multiplexing Control," 2013 IEEE International Conference on Smart Grid Communications, Vancouver, Canada, October 2013.

Hopkins, J.B., and Panas, R.M., "Eliminating Parasitic Error in Dynamically Driven Flexure Systems," accepted to Proc. of the 28th Annual Meeting of the American Society for Precision Engineering, St. Paul, MN, October 2013.

Chang, Y.-C., Berry-Pusey, B.N., Tsao, T.-C., and Chatziioannou, A.-F., "Real-time image processing for locating vein in mouse tails," Proceedings of the ASME 2013 Dynamic Systems and Control Conference, Palo Alto, CA, October 21-23, 2013.

Chynoweth, J., Chung, C., Qiu, C., Chu, P., and Gadh, R., "Smart Electric Vehicle Charging Infrastructure Overview," 2014 IEEE PES Innovative Smart Grid Technologies (ISGT) Conference, Washington D.C., February 2014.

MEMS and Nanotechnology

Ding, X., Liu, N., Matsuo, K., Sun, M., Ho, C.-M., and Zhao, X., "Use of Cell Morphology as an Early Bio-Sensor for Viral Infection," IEEE NEMS 2013, Suzhou, China, 1167-1170, April 2013.

Huang, K.-W., Kung, Y.-C., Wu, Y.-C., Fan, Y.-J., and Chiou, P.Y., "Optoelectronic Tweezers Integrated with 3D Microfluidic Networks," IEEE/LEOS International Conference on Optical MEMS and Nanophotonics, Kanazawa, Japan, 79-80, August 2013.

Wu, T.-H., Wu, Y.-C., Sagullo, E., Teitell, M.A., and Chiou, P.Y., "Direct Nuclear Delivery of DNA Macromolecules Using the Photothermal Nanoblade," IEEE/LEOS International Conference on Optical MEMS and Nanophotonics, Kanazawa, Japan, 77-78, August 2013.

Zhuang, J., and Ju, Y.S., "Deployable MEMS Devices for Minimally Invasive Monitoring of Cortical Activities," Proceedings of the ASME 2013 International Mechanical Engineering Congress & Exposition, IMECE2013-66662, November 2013.

Chen, S, Dooraghi, A.A., Lazari, M., van Dam, R.M., Chatziioannou, A.F., and Kim, C.-J., "On-Chip Product Purification for Complete Microfluidic Radiotracer Synthesis," Proc. IEEE Int. Conf. MEMS, San Francisco, CA, 284-287, January 2014.

Chen, S., and Kim, C.-J., "Mirrored Anodized Dielectric for Reliable Electrowetting," Proc. IEEE Int. Conf. MEMS, San Francisco, CA, 1011-1014, January 2014.

Ma, X., Chen, S., Kim, C.-J., and van Dam, R.M., "Towards On-Chip Chemical Reaction Monitoring by EWOD Impedance Measurement," Proc. IEEE Int. Conf. MEMS, San Francisco, CA, 338-341, January 2014.

Xu, M., Sun, G., and Kim, C.-J., "Wetting Dynamics Study of Underwater Superhydrophobic Surfaces Through Direct Meniscus Visualization," Proc. IEEE Int. Conf. MEMS, San Francisco, CA, 668-671, January 2014.

Chen, Y., Chung, A.J., Wu, T.-H., Teitell, M.A., Di Carlo, D., and Chiou, P.Y., "Pulsed Laser Activated Cell Sorting with Three Dimensional Sheathless Inertial Focusing," IEEE NEMS 2014:The 9th IEEE International Conference on Nano/Micro Engineered and Molecular Systems, 1-4, April 2014.

Structural and Solid Mechanics

Mal, A., Ricci, F., Samajder, H., and Baid, H., "NDE of composite structures using ultrasonic guided waves," Health Monitoring of Structural and Biological Systems 2013, San Diego, 11-14 March 2013.

Samajder, H., Baid, H., Ricci, F., and Mal, A., "Lamb waves in a honeycomb composite sandwich plate," Health Monitoring of Structural and Biological Systems 2013, San Diego, 11-14 March 2013.

Gallagher, J., and Lynch, C.S., "Field-Driven Phase Transformations in Relaxor Ferroelectric Single Crystals," ASME SMASIS Proceedings, September 2013.

Ricci, F., Monaco, E., Baid, H., and Mal, A.K., "Guided waves in a disbonded honeycomb composite structure," Proc of 9th International Workshop on Structural Health Monitoring, Stanford University, CA, September 10-12, 2013

Cui, J., Hockel, J.L., Pisani, D.M., Nordeen, P.K., Carman, G.P., and Lynch, C.S., "Giant Reversible Electric-Field-Induced Magnetic Anisotropy Switching With Patterned Electrodes On Strain-Mediated Ni Thin Film/Pzt Heterostructure," Proceedings MMM Conference, Denver, CO, November 2013.

Moss, Scott D., Hart, Genevieve A., Burke, Stephen K., Carman G., et al., "Vibration energy harvesting using a spherical permanent-magnet," edited by Liao, W.H., Conference on Active and Passive Smart Structures and Integrated Systems, San Diego, CA, March 10-13, 2014.

Systems and Control

Iwasaki, T., and Liu, X., "Coordination and Synchronization of Weakly Coupled Harmonic Oscillators," SIAM Conference on Control and Its Applications, July 2013.

Pipeleers, G., Iwasaki, T., and Hara, S., "Generalizing the KYP Lemma to the Union of Intervals," Proceedings of European Control Conference, July 2013.

Rezaei, A., Sadovsky, A.V., Speyer, J.L., and Isaacson, D.R., "Separation-Compliant Speed Control in Terminal Airspace," Proceedings of the AIAA Guidance, Navigation and Control Conference, August 2013.

Speyer, J.L., "Guidance, Control and Navigation for Aerospace Systems: Charles Stark Draper's Influence on a Personal Perspective," Proceedings of the AIAA Guidance, Navigation and Control Conference, August 2013.

Luong, D., and Tsao, T.-C., "Nonlinear state estimation of moving boundary heat exchanger models for organic rankine cycle waste heat recovery," Proceedings of the ASME 2013 Dynamic Systems and Control Conference, Palo Alto, CA, October 21-23, 2013.

Madariaga, J., Tsao, T.-C., and Ruiz, I., "Formulation for interaction analysis between continuous and discrete structures subject to moving loads applied to turning," Proceedings of the ASME 2013 Dynamic Systems and Control Conference, Palo Alto, CA, October 21-23, 2013.

Kim, D., and M'Closkey, R.T., "A MEM Vibratory Gyro with Mode-Matching Achieved by Resonator Mass Loading", Proc. 2014 Position, Location and Navigation Symp. (PLANS), IEEE/ION, Monterey, CA, pp. 499-503, May 2014.

Fernandez, J., Speyer, J.L., and Moshe, I., "A Stochastic Controller for Vector Linear Systems with Additive Cauchy Noises," Proceedings of the 52nd IEEE Conference on Decision and Control, Firenze, Italy, December 10-13, 2013.

Idan, M., and Speyer, J.L., "Multivariate Cauchy Estimator with Scalar Measurement and Process Noises," Proceedings of the 52nd IEEE Conference on Decision and Control, Firenze, Italy, December 10-13, 2013.

Chang, Y.-C., and Tsao, T.-C., "Minimum-Time Contour Tracking with Model Predictive Control Approach," Proc. of American Control Conference (ACC), Publisher IEEE, 2014.

Kang, C., and Tsao, T.-C., "Control of Magnetic Bearings with Plug-In Time-Varying Harmonic Resonators," Proc. of American Control Conference (ACC), Publisher IEEE. p. 4237-42, 2014.

Luong, D., and Tsao, T.-C., "Linear Quadratic Integral Control of an Organic Rankine Cycle for Waste Heat Recovery in Heavy-Duty Diesel Powertrain," Proc. of American Control Conference (ACC), Publisher IEEE, 2014.

Kanik, M., Bordeenithikasem, P., Schroers, J., Kim, D., and M'Closkey, R.T., "Microscale Three-Dimensional Hemispherical Shell Resonators Fabricated from Metallic Glass," Proc. 1st IEEE Intl. Symp. Inertial Sens. Syst., Laguna Beach, pp. 9-12, February 2014

Lorentz, T., Kim, D. and M'Closkey, R.T., "A Novel Technique for Extracting Parametric Models from MEM Resonator Test Data,"Proc. 1st IEEE Intl. Symp. Inertial Sens. Syst., Laguna Beach, pp. 117-120, February 2014.

Books, Editorships, and Book Chapters

Pilon, L. and Berberoglu, H., 2014. "Photobiological Hydrogen Production," In: Handbook of Hydrogen Energy, S.A. Sherif, D.Y. Goswami, E.K. Stefanakos, and A. Steinfeld (Eds.), Boca Raton, FL: CRC Press, Taylor and Francis, 299-349, ISBN-13:978-1420054477.

Pilon, L., 2014. "Hydrogen Storage in Hollow Microspheres," In: Handbook of Hydrogen Energy, S.A. Sherif, D.Y. Goswami, E.K. Stefanakos, and A. Steinfeld (Eds.), Boca Raton, FL: CRC Press, Taylor and Francis, 757-802, ISBN_13:978-1420054477 (invited contribution).

Takeuchi, M., Haulot, G. and Ho, C.-M., 2013. "System Integration of a Novel Cell Interrogation Platform," In: Micro-Nano Mechatronics New Trends in Material, Measurement, Control, Manufacturing and their Applications in Biomedical Engineering, T. Fukuda, T. Niimi, and G. Obinata, (Eds.), InTech, 299-314.

Patents

Gadh, R., Chu, C.C. and Lee, E.K., "Microgrid Platform and Resource Centric Security System Using Object Oriented Design," UCLA Case No. 2014-291.

Hopkins, J.B. and Panas, R.M., ""Flexure-based Hexagonal Mirror Array for Steering Light", assigned to Lawrence Livermore National Laboratory IL-12708.

Kim, C.-J. and Liu, T., "Liquid-Repellent Surface Made of Any Materials" UCLA Case No. 2014-186, Provisional No. 61/883,862.

Wirz, R.E., "High Density Thermal Energy Storage" UC Case No. 2014-071.

Wirz, R.E., "High-Density, High-Temperature Thermal Energy Storage and Retrieval," U.S. Provisional Application No. 61/872462.

Wirz, R.E., "High-Strength Wind Turbine Blades and Wings" U.S. Patent App. 61/654708.

Wirz, R.E., "Thermal Property Measurement Device" U.S. Prov. Patent App. 61/878486.

Awards and Honors

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

Eldredge, Jeff. Associate Fellow, American Institute of Aeronautics and Astronautics.

Eldredge, Jeff. Rinn Dentsply Award for Best Research Poster, 64th Annual Meeting of the American Academy of Oral & Maxillofacial Radiology.

Gadh, Rajit. IEEE International Conference on RFID Technologies and Applications. IEEE RFID bronze best paper award-"Design of RFID Mesh Network for Electric Vehicle Smart Charging Infrastructure," by Ching-Yen Chung, Aleksey Shepelev, Charlie Qiu, Chi-Cheng Chu and Rajit Gadh.

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

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

Ho, Chih-Ming. Keynote Speaker, "Control of Complex Systems: FSC Technology Enabled Personalized Medicine", The 17th Annual Boston University Photonics Center Symposium, November 15-21, 2013.

Ho, Chih-Ming. Keynote Speaker, "Personalized Medicine", 2013 IEEE Nano Conference, August 5-8, 2013.

Ho, Chih-Ming. Plenary Speaker, "Cell-less Bio Fuel Production", Green Energy and Sustainability Symposium, June 30, 2014.

Ho, Chih-Ming. Plenary Speaker, "Personalized Medicine Enabled by FSC.X Technology", IEEE FTFC Conference, May 4, 2013.

Ho, Chih-Ming. Plenary Speaker, "Seamless Integration of Bio-complex System and Engineering System", Advances in Microfluidics and Nanofluics (AMN2014), May 21-23, 2014.

Ho, Chih-Ming. Plenary Speaker, "When Engineering Meets Medicine", ASME 2013 International Mechanical Engineering Congress, November 15, 2013.

Ho, Chih-Ming. Plenary Speaker, "When Medicine Meets Nanotechnology – Rapid Optimization of Combinatorial Drugs", Pediatrics 2040, October 3, 2013.

Hopkins, Jonathan. Nominated for the Presidential Early Career Award for Scientists and Engineers (PECASE), Lawrence Livermore National Laboratory.

Hopkins, Jonathan. Outstanding Poster First Prize Winner of the 7th Annual Postdoctoral Technical Showcase, received with coauthor Robert M. Panas (who presented the poster titled "Lightfield Directing Array") at Sandia National Laboratories during the Post Doc Professional Development Program for work performed on micro-mirror arrays.

Hopkins, Jonathan. UCLA's Faculty Career Development Award, $10k Received for Research Involving the Creation of Actively Controlled Microarchitectures, UCLA Faculty.

Iwasaki, Tetsuya. Plenary Speaker, The International Conference on Robot Intelligence Technology and Applications.

Karagozian, Ann R. 2013-2014 Midwest Mechanics Seminar Speaker, Consortium of 10 Universities.

Karagozian, Ann R. Fellow, ASME.

Karagozian, Ann R. Invited Lecture at Annual Meeting, American Physical Society Division of Fluid Dynamics.

Karagozian, Ann R. W. Duncan Rannie Memorial Invited Lecture, Caltech.

Kim, John. Fellow, AIAA.

Kim, John. Invited Lecture, International Workshop on Small-scale Turbulence, Rouen, France, July 3-5, 2013.

Lynch, Christopher. Fellow, SPIE.

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

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

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