Department of

Mechanical & Aerospace Engineering

Summer 2010

www.mae.ufl.edu

UF UNIVERSITY of FLORIDA

Chair's Column

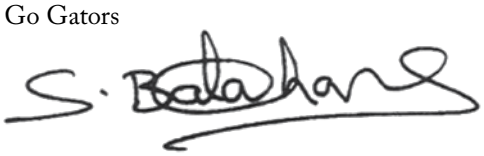
This was a very special year for the College and the Department. We celebrated our 100th anniversary throughout the academic year. Our celebrations started in the fall with a symposium, plaque dedication, fall picnic and a tailgate party before the Vandy game. The celebrations continued during the spring when we had our advisory board meeting, research poster symposium and the annual awards ceremony. In addition, last November we held our Gator Mechanical & Aerospace Engineering (MAE) get together reception at the annual ASME meeting at Orlando and an informal reception honoring our new Dean in May at Palm Beach Gardens.

Our engagement and interaction with our alums has never been better in the recent history of the Department. The overwhelming support and the enthusiastic participation of a large number of our MAE grads is truly heartwarming. We have always enjoyed the loyal support of our die-hard Gator grads. Expanding, deepening and strengthening this connection with our key stakeholder alumni group has been one of my primary goals since I joined as the chair. Our efforts are beginning to show results. But we are still far away from where we need to be and where our peers are. We have brainstormed a few new ideas for MAE alumni interaction with the Department, which we will be implementing soon. One simple great way for you to reconnect is to send in your alumni story and we will include it in the next newsletter. We want to hear from you and we want to share your story with others. I also invite you to attend the annual Fall Picnic (Sept. 24th 2010) and the annual Award Ceremony (April 8th, 2011). This fall the College also is hosting a Leadership Symposium on Friday, Sept. 24 and a Reunion Tailgate party on Saturday, Sept. 25 prior to the Florida vs. Kentucky game. Please contact Becky Hoover at 352-392-6795 or bhoov@eng.ufl.edu for details on the weekend and how to purchase football tickets.

UF in general and our Department in particular are in fantastic position. While most other peer institutions are retrenching and implementing painful furloughs for balancing their budget, our worst of the budget crisis seems to have ended. We are in a growing mode. Three new faculty will be joining the Department this fall. This has been an outstanding year for recruiting new talent - we are one of the very few hiring new faculty. We interviewed a select group of stellar candidates and I wish we could have hired every one of them. The three new faculty will add strength to our aerospace program and in the emerging areas of energy, nano and biotechnology. In addition, the College is in the process of hiring 20 more interdisciplinary faculty in the key areas of energy and sustainability, micro & nanotechnology, bio & healthcare, computational sciences and engineering, and IT. MAE has been very active in this strategic planning and hiring initiative. Several of these new hires will likely choose MAE as their home or affiliate department. By 2011 we expect to reach an important goal of 55 faculty that I set when I started. This is about 27% growth in the Department over the past five years and it is clearly in line with the increasing popularity of the Mechanical and Aerospace disciplines nationwide and the recognition of our growing importance and enrollment by the Dean and the Provost.

I wish all of you a great summer and I look forward to seeing you all next year at the Department activities.

Go Gators



S "Bala" Balachandar

Cover Photo: Professor Peter Ifju, in conjunction with the Florida Cooperative Fish and Wildlife Research Unit, and the UF School of Forest Resources and Conservation Geomatics Program has developed an unmanned aerial vehicle (UAV) through funding from the Army Corps of Engineers and US Geological Survey. The battery powered UAV has been utilized in the Everglades and around Lake Okeechobee to study the eradication of invasive plants and the abundance of wildlife. The cover shows a take-off sequence and a landing sequence superimposed over a mosaic compiled from many individual digital photographs from the high resolution camera. The backdrop shows a nesting bird colony, the airboat (right middle) and an enlarged inset of an American Alligator. The UAV has a flight duration on the order of one hour and can be preprogrammed to fly in a raster pattern to cover a region of nearly one square mile in a single flight.

Haselbacher and Barooah Win CAREER Awards

The National Science Foundation has awarded Professors Prabir Barooah and Andreas Haselbacher Faculty Early Career Development (CAREER) awards. This award is considered the NSF's most prestigious award in support of junior faculty.

Barooah received his CAREER award in support of his project entitled "Distributed estimation and control for energy efficient buildings," which proposes to develop estimation and control methods to increase energy efficiency of buildings, especially large commercial buildings.

Barooah explained, "This project aims to improve energy efficiency by estimating key variables (such as the location and occupancy level of the building) then taking appropriate control so that thermal comfort and air quality is maintained while using the minimum possible energy."

Most of the current efforts in the field of building energy are focused on developing more efficient components for Heating, Ventilation, Air-Conditioning and Lighting (HVAC&L) systems. Barooah explained that his project takes an alternate view: instead of developing more-efficient components, it seeks to use components in such a way that the efficiency of the entire system is maximized.

Andreas Haselbacher

Prabir Barooah

"A major source of inefficiency in current HVAC systems is the way they are operated: essentially all the rooms are maintained at a pre-specified temperature (set-points) by using local controllers installed in each zone. The goal of this project is to change these set-points on the fly so that the whole building energy use is minimized. To do so, variables such as occupancy levels have to be estimated accurately. Thus, real-time estimation is an important part of the project," said Barooah.

Haselbacher received his CAREER award in support of his project to carry out predictive simulations of mixed flow/powder-snow avalanches.

"Such avalanches," Haselbacher explained, "consist of a turbulent powder cloud that rides atop and therefore obscures a dense core of snow. Mixed avalanches are poorly understood and cannot be studied easily through experiments because they are destructive and snow and weather conditions that lead to their release cannot be controlled."

His project is supported by the Swiss Federal Institute for Snow and Avalanche Research, which will host Charles Cook, a PhD student of Haselbacher's, for several months each summer.

One unique requirement for the CAREER award is that all proposals must have an integrated research and education plan at their core. These education plans are expected to creatively

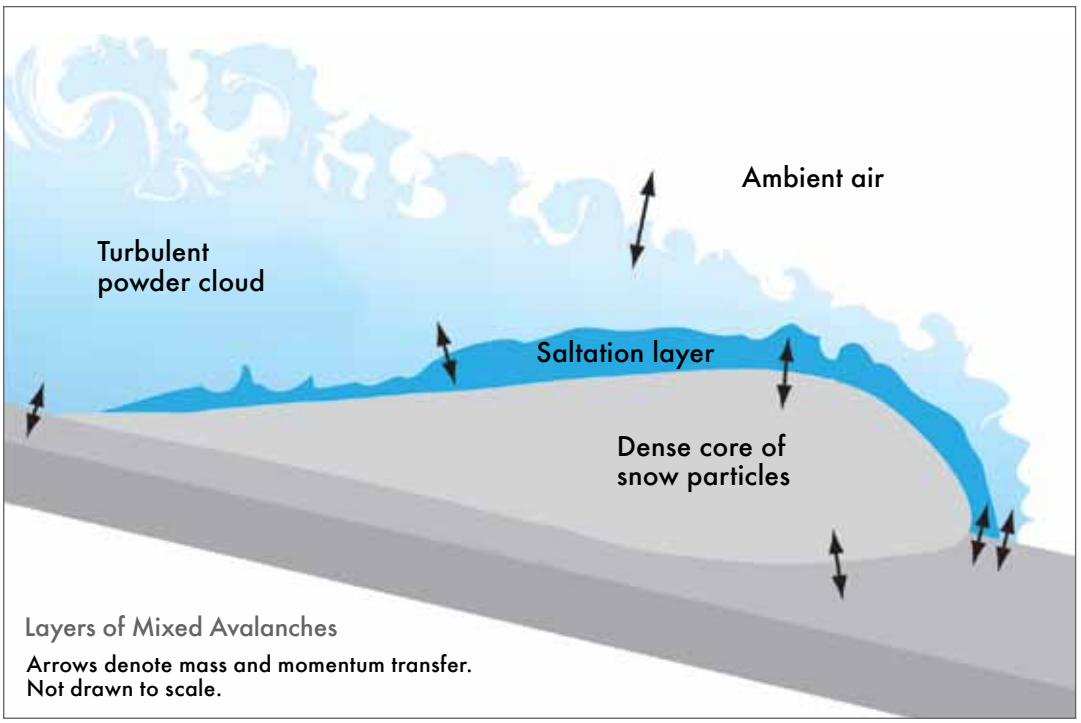
Avalanche. Photo by Perry Bartelt, Swiss Federal Institute for Snow and Avalanche Research

reflect the recipient's own disciplinary and educational interests as well as those of his or her organization.

Haselbacher answered this challenge by proposing to develop a simulation-based computer game in collaboration with physics teachers at Oak View Middle School in Newberry, FL. He explained that his research is focused on predictive simulations (computer simulations) of quantified accuracy that can be used to make decisions with confidence. These simulations can be thought of as 'virtual experiments' that are carried out on a computer.

Haselbacher said he was excited at the prospect of bringing such computer simulations to local middle school students in order to inspire them to make use of similar simulations to model the real world.

In addition, he stated, "I'm very grateful to have been awarded this prestigious award by the National Science Foundation and to have the opportunity to study such an interesting and challenging phenomenon. I hope that we will be able to make a lasting contribution and perhaps contribute not only to better understanding of mixed avalanches, but also to the construction of improved warning systems that will save human lives and infrastructure."



Layers of Mixed Avalanches

Arrows denote mass and momentum transfer. Not drawn to scale.

Professor **Ghatu Subhash** delivered a special two-day course on "Dynamic Behavior of Armor and Structural Ceramics" at the Material Science and Technology Conference and Exhibition- MS&T'09 & ACerS 11th Annual meeting in at Pittsburgh, PA, Oct. 29 -30, 2009. The course will be offered again at the next MS&T conference in Austin, TX, Oct. 21-22, 2010.

The Institution of Mechanical Engineers has awarded Professor **Scott Banks** the 2009 Engineering in Medicine and Health Division Presentation Prize for his paper, "It Only Takes a Decade: from Concept to In Vivo Data with a New TKA Design."

Professor **Hugh Fan** received an international Fraunhofer-Bessel Research Award, given by the Fraunhofer Society and the Alexander von Humboldt Foundation to young, top-rank academics from non-European countries in recognition of their achievements in applied research to date. The Alexander von Humboldt Foundation is a non-profit foundation established by the Federal Republic of Germany for the promotion of international research cooperation. The foundation maintains a network of more than 20,000 Humboldtians from all disciplines in 130 countries worldwide, including 40 Nobel Prize winners.

Professors **Hitomi Greenslet** and **Curtis Taylor** were awarded a 3-year grant from the National Science Foundation to study magnetic field assisted nanomachining. The research objective of this project is to determine the nanoscale material deformation mechanisms induced by magnetic field assisted nanomachining, and to computationally model the nanomachining material removal mechanisms. The multi-disciplinary research plan will provide a stimulating learning environment for both graduate and undergraduate-level students. The investigators will develop a new mentoring program for underrepresented undergraduates to create relationships that lead to an improved support network that better engages the students in the university engineering experience and enhances their long-term retention in engineering careers.

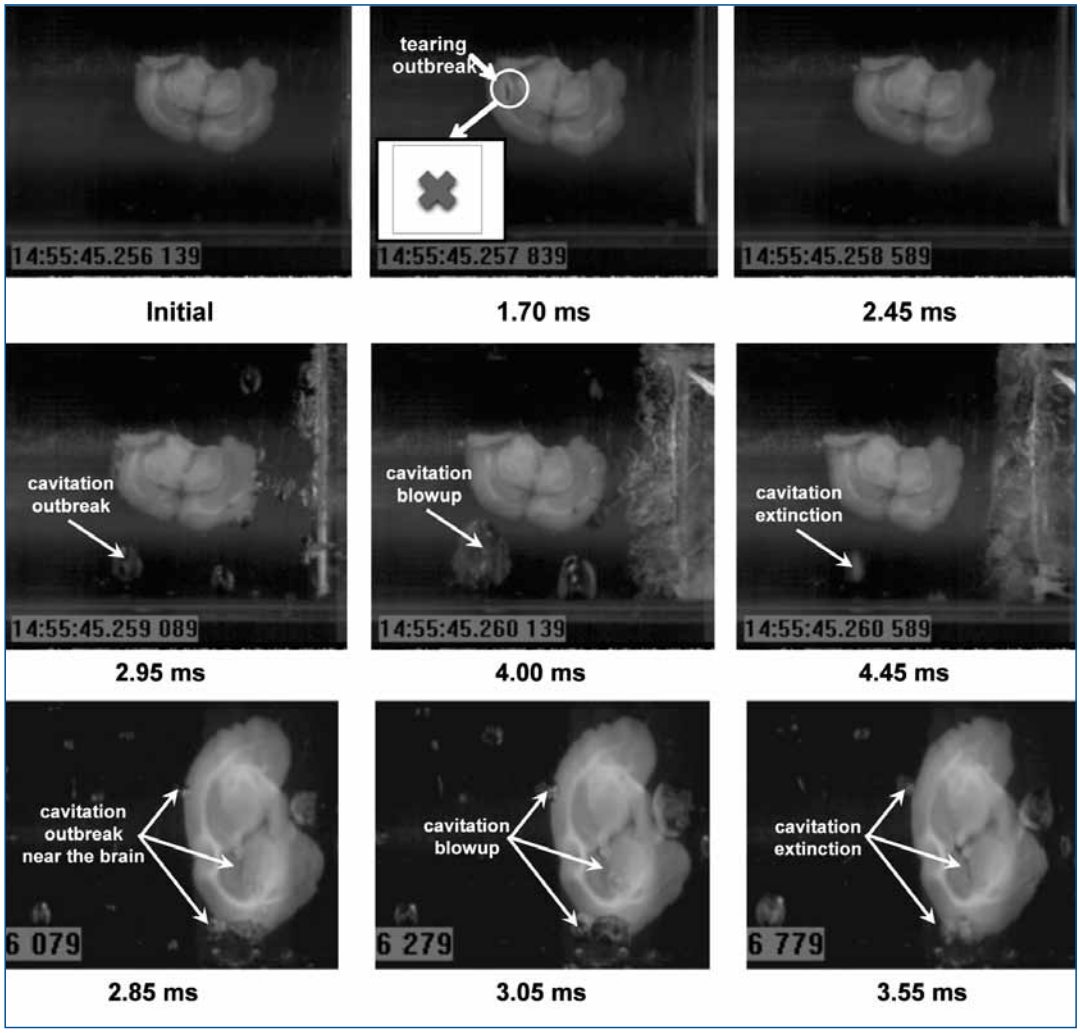
Current Research – Traumatic Brain Injury Research

Professors Ghatu Subhash and Malisa Sarntinoranont, along with their graduate students, are conducting a unique study using novel approaches to determine how mechanical and neuronal damage occurs to live brain tissue.

Traumatic brain injury (TBI) and posttraumatic stress disorder (PTSD) have been identified as the signature injuries for soldiers returning from recent Iraq and Afghanistan wars. Soldiers often experience TBI, a delayed manifestation of brain injury, from two sources: they are thrown out of an armored vehicle due to an explosion causing a direct injury to skull and brain, or they experience a high blast pressure passing through the skull due to an explosion caused by an improvised explosive device (IED) in the vicinity.

When a soldier is thrown out of an armored vehicle it causes sudden acceleration of the entire brain, whereas when a soldier experiences a high blast of pressure stress waves propagate through the skull and the brain. The nature and spatial distribution of damage within the brain are different under these loads. Soldiers with blast-induced TBI have reported many pathological symptoms including muddled reasoning, memory loss, and even more serious long-term neurocognitive deficits. Realizing that the above two loading situations cause different kinds of neuronal damage to the brain tissue, Subhash and Sarntinoranont have adopted novel test platforms to mimic such loading and study how damage evolves in brain tissue.

One of the test platforms is called a polymer split Hopkinson pressure bar that can deliver loads in a few hundred microsecond duration. Rat brain slices of 500 micron thickness are kept alive in artificial cerebral spinal fluid (ACSF) and held in specially designed acrylic container filled with gel. They are then subjected to high acceleration and shock loads. Thus, there is no direct physical impact from the bar but a high acceleration is imparted through gel/fluid combination, which allows the brain slice to deform. Such deformation is expected to mimic typical high acceleration force transfer through the brain and the resulting concussion leading to TBI. A high-speed camera with capabilities to image up to 1.4 million frames per second is used to image the deformation of the brain. The spatial and temporal changes in the deformation fields are captured to assess the strain levels experienced by the brain tissue. The induced neuronal damage is then evaluated using histological methods.



High-speed images of brain deformation due to high amplitude shock reveal induced damage within the brain tissue and initiation of cavitation.

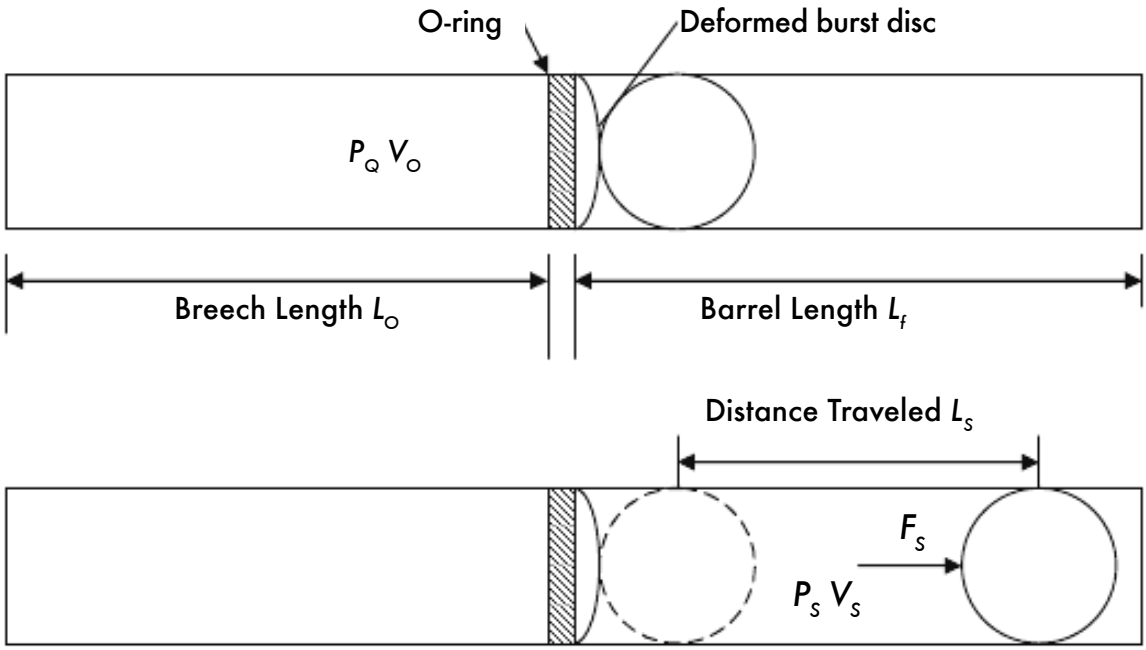
In addition to the structural damage that occurs due to shock loading, Subhash and Sarntinoranont are also investigating new theories such as 'initiation of cavitation' within the brain and cerebral spinal fluid (CSF).

The long term goal of the researchers is to map the deformation field and the level of injury at various locations of the brain tissue. These studies are also useful to validate more complex 3D numerical models being conducted by other research groups. Subhash and Sarntinoranont and their students are currently collaborating with researchers at MIT, Walter-Reed Army Medical Center, and the Malcom Randall VA Medical Center in Gainesville to understand what changes occur within the brain due to blast-induced TBI. Subhash and Sarntinoranont have been invited to present their research in front of a Department of Defense Brain Injury (Computational) Modeling Expert Panel meeting from August 12-13, 2010 in St. Pete Beach, Florida.

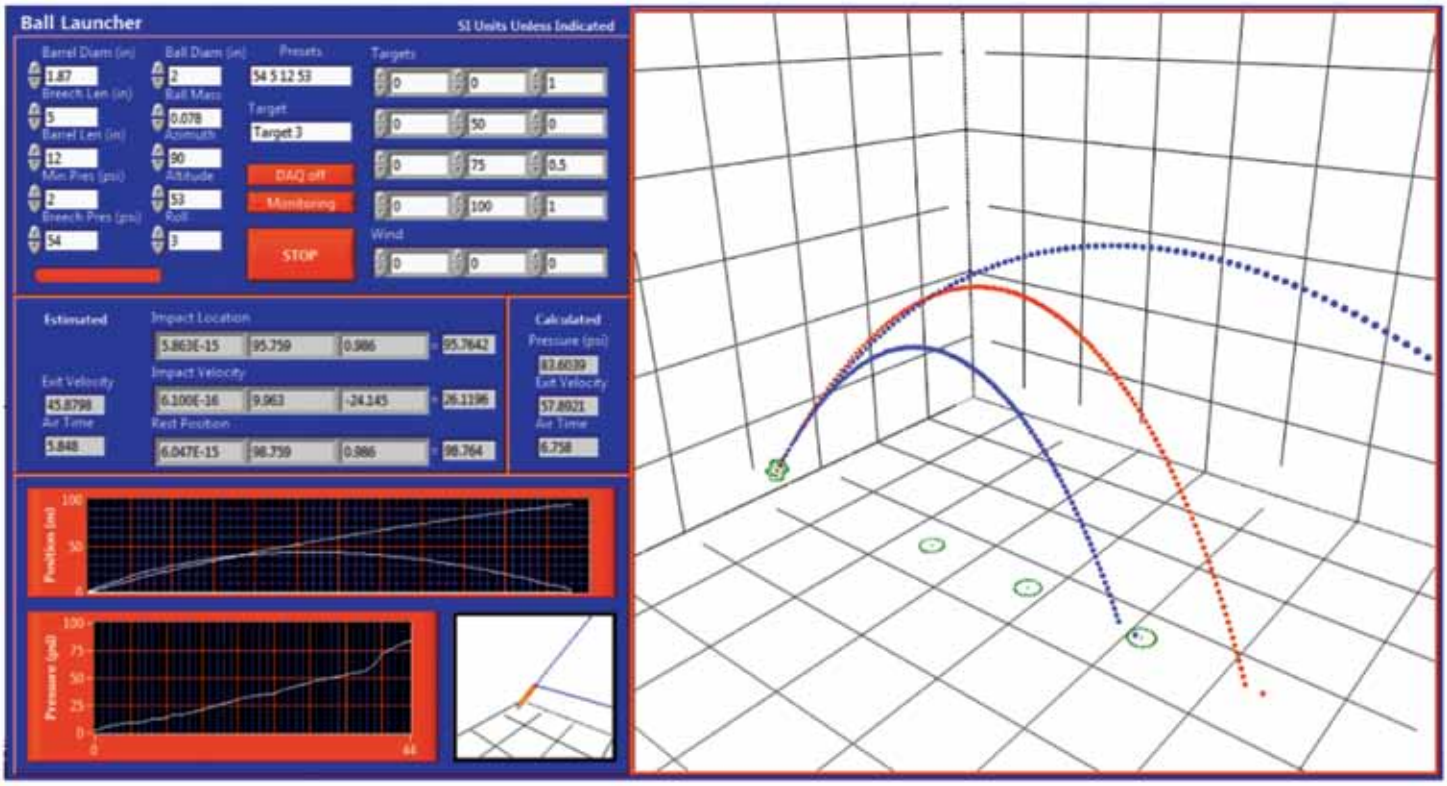
In the Classroom

Students in EML3301C -Mechanics of Materials Laboratory were asked to select and instrument a burst disc diaphragm whose purpose was to trigger a pneumatic cannon. The students were also tasked with calculating the trajectory and landing point of the projectile. The radial distance away from the target determined how many bonus points on the mid-term exam the students could receive.

On April 23rd, 2010 the students met at Flavet Field on the University of Florida's campus to test their strain-gauge instrumented burst discs in the cannon. Dr. Dan Dickrell and student teaching assistant Brad Farrar (pictured on opposite page) administered the event and recorded the results. The closest distance achieved was 1.3 meters away from the 100 meter target.



A student schematic of the operational basics of the project. Before bursting, pressure is built up inside the breech. When the burst disc fails, the pressurized air is dumped into the barrel and projects a ball outward. The students were responsible for material selection (among several potential choices), instrumentation with a strain gage, and ballistic projection calculations in order to hit a target down-range. The targets were worth bonus points on the mid-term exam.



A screen shot of the best student program. Students were asked to read the strain gauge data using LabVIEW and display the information on bursting pressure and potential trajectory.

A burst copper disc with strain-gage still attached.

The air cannon on the day of competition.

A burst copper disc after rupture.

Dr. Dickrell and Teaching Asssistant Brad Farrar shooting the air cannon.

STUDENTS ATTEND NASA CONFERENCE AND PRESIDENTIAL VISIT

Dante Buckley and Dr. Buzz Aldrin

Bill Nye the Science Guy showcases a SwampSat replica while meeting Jimmy Lin and Dante Buckley in the Visitors Complex

Space Systems Group (SSG) graduate student research and teaching assistants Dante Buckley and Tzu Yu (Jimmy) Lin were invited, through the Florida Space Grant Consortium, to participate in the NASA Conference on the American Space Program for the 21st Century held April 15 at the Kennedy Space Center. Buckley, president of the UF Small Satellite Design Club (SSDC), and Lin, SSDC vice president of internal affairs, were in attendance as President Barack Obama delivered remarks on the bold new course the Administration is charting for NASA and the future of U.S. leadership in human space flight and beyond.

Not only did Buckley and Lin get to participate first-hand in this historically-significant Presidential visit and conference, but they also got to meet and mingle with the VIP's in attendance. In addition to shaking President Obama's hand, Buckley and Lin spoke with Dr. Buzz Aldrin, Bill Nye (the Science Guy), Chris Koehler, director of the Colorado Space Grant Consortium, Dr. Neil DeGrasse Tyson, host of PBS's NOVA ScienceNOW, Damon Wells, political analyst, and even UF's own Winn Philips, VP of Research, among many others.

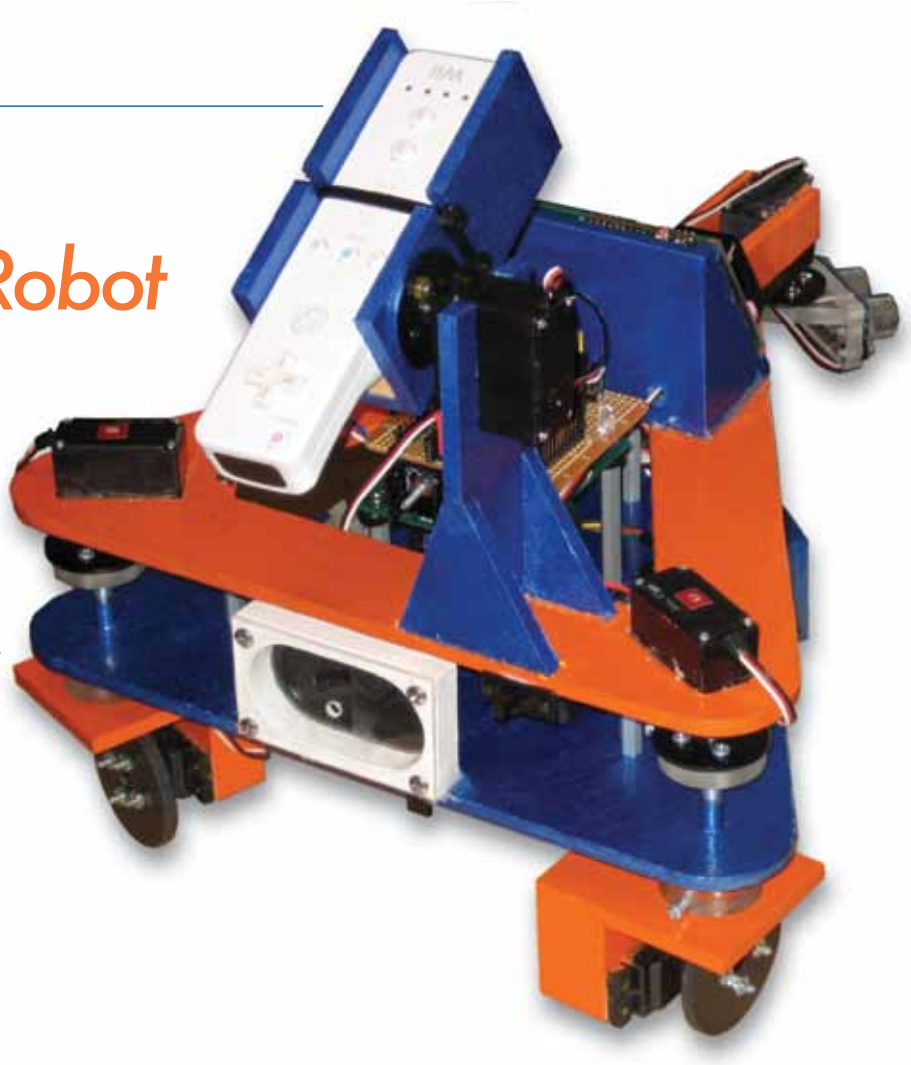
Describing the event, and how it relates to his work with SSDC and SwampSat, the UF pico-satellite currently in development, Buckley commented, "We have experienced many challenges to put a UF satellite in space, both political and technical. It turns out that NASA faces similar challenges to those that we have faced. It was a relief to hear the reassurance of the President's speech to set forth on a bold new direction while recalling historical facts and lessons learned."

As for the "bigger picture," Buckley summarized his experience by saying, "I learned that the world is unforgiving from this experience, particularly when dollars are invested and livelihoods of those related directly or indirectly to space are in jeopardy. Essentially, companies don't just hire people to keep coming up with great ideas, but they also must hire people who can solve feasible problems and finish what they started (or at least show progression to their end goal) otherwise the tasks at hand get sidetracked or under budgeted. Also, it is apparent that a job done in haste or not to high standards does more damage than good."

Lin echoed this statement, saying, "This opportunity provided me with the chance to realize what our nation is dealing with in the real world, seeing, in person, how much a decision made on Capital Hill can have such a snow ball effect as to impact our contributions to the space program which in turn effects our daily lives."

For more information on SSDC, or to follow or get involved with SwampSat, please visit www.ufsmallsat.com or www.swampsat.com. For a full report on the conference, and Presidential address see www.nasa.gove/multimedia/nasatv/spaceconf.html.

GatorKS:
Fire Extinguishing Robot



Student **Timothy Martin** is interested in building robots. What started as a hobby in the summer of 2008, has now produced seven robots, most-notably the GatorKS (pictured). Martin explained that, while building this latest robot, he used "everything but the kitchen sink," including an ATMEL ATmega640 microcontroller board (designed by Martin), a Nintendo Wii remote, an omni-directional modified 6 Futaba s148 drive system, two additional Futaba 3003 servos, 4 Sharp IR range finders, 2 ping sonar sensors to detect walls, and a speaker blower mechanism to extinguish fire.

The GatorKS has two unique robotic behaviors. It can follow a wall, navigating corners and sharp turns at a uniform distance, and it can detect and extinguish fire. Martin plans to add more features to the GatorKS robot, including human tracking and mapping. Detailed demonstrations of the GatorKS performing functions, and demonstrations of two of Martin's other robots, "Woody" and "Carpet Crawler", can be found on YouTube under the user name: sonictj. Martin is also a member of the Machine Intelligence Laboratory (MIL) and can be reached at martin2560@gmail.com

Anjelica Warren prepares for growth of nanowires.

Anjelica Warren was the winner of the Pi Tau Sigma Research Symposium held on April 2. Runners-up were Brian Hood and William Young. Warren's poster was entitled "Vapor-Liquid-Solid Crystal Growth of Zinc Oxide Nanowires for Novel Photovoltaic and Composite Applications." Anjelica is a junior electrical engineering major who has been working in the Machine Tool Research Center for the past year on the growth and characterization of ZnO nanowires.

Edward McCumiskey's paper, "Nanomechanics of CdSe Quantum Dot-polymer Nanocomposite Films" was accepted for publication in the Institute of Physics Nanotechnology Journal.

Abraham Pachikara, a student of Professor Rick Lind, was awarded a 2010 National Science Foundation Graduate Research Fellowship. According to the NSF, Pachikara was selected based on his "outstanding abilities and accomplishments as well as [his] potential to contribute to strengthening the vitality of the U.S. science and engineering enterprise."

Lisa Morin, a student of Professor Curtis Taylor, received the $100 first prize in the nanoeducation presentation category at NanoFlorida 2009, an annual technology symposium hosted by the University of Central Florida. Her presentation, "Experiencing the Nano-World: Touch Based Virtual Exploration of Nanoscale Features," describes HAP/NAN, a virtual reality program that uses touch-based (haptic) and visual computer environments to educate grade-school students on the science and applications of nanotechnology as well as biology on the macro-, micro-, and nano-scales.

2010 MAE AWARDS DINNER

Students, Staff, Faculty and Alumni gathered on April 9, 2010, at the Hilton University Conference Center in Gainesville, for the 2010 Annual MAE Awards Dinner. Receiving the UF Distinguished Alumnus Awards and inducted as Outstanding Alumni of the Department were: Donald C. Daniel, Frank C. Gillette, Andrew H. Hines, Jr., Thomas O. Hunter, William F. Powers and Curtis H. Stanton. Receiving Outstanding Alumnus Awards were: Charles Benedict, Kevin Byrd, Kevin A. Ford, Edward T. Humbert, Munir Sindir, and Kevin Scott Smith.

Minki Hwang received the Graduate Student Teaching Award. Shawn Allgeier received the Teaching Assistant Award. Professor Warren Dixon received the Young Investigator Award and Professor Greg Sawyer was named Teacher of the Year. Sawyer was also the first MAE faculty member to be inducted into the UF academy of Distinguished Teaching Scholars.

Staff Awards were given to Jennifer Brown for 5 Years of Service, Salena Robinson for 25 Years of Service, and to Shirley Robinson and Jeff Studstill for 30 Years of Service. Mark Riedy received the Outstanding Staff Award.

Distinguished Alumnus Award winner Frank Gillette and Dean Cammy Abernathy.

Hyo Soo Kim, who received a Dissertation Award, is pictured with his family at the UF Hilton Ballroom.

"Teacher of the Year," Greg Sawyer (right)

Outstanding Alumnus Award recipient Scott Smith and his wife Jan.

Undergraduate students receiving the EADS/Airbus NA Scholarship.

Department Chair S. Balachandar is pictured with recipients of the UF Distinguished Alumnus Awards.

Outstanding Staff Award winner Mark Riedy.

Staff Member Shirley Robinson receives her 30 Years of Service award.

Staff Member Salena Robinson receives her 25 Years of Service award.

MTRC PICNIC AT LAKE WAHBURG

The Machine Tool Research Center held their annual outing at Lake Wauburg on April 17.

Alumni Updates

We would like to extend thanks to our most recent alumni who updated their profiles via our new on-line form. If you have not had a chance to check out our new MAE web page, which includes our on-line alumni update form, please do so. The web page is at www.mae.ufl.edu, and the form can be accessed directly at **www.mae.ufl.edu/alumni/request/index.php**

Abhijit Bhattacharyya (Ph.D ME '08) received the Employee of the Year award in the Engineering/IT category at the South Florida Manufacturers Association Awards on March 24. Bhattacharyya is employed with the Hoerbiger Corporation.

Dominic LoPresti (BSME '07) was a finalist for the same award and is employed with SV Microwave.

In Memoriam: Bernard M. Leadon Jr.

On December 22, 2009, Dr. Bernard "Bernie" Leadon, Professor Emeritus, passed away at his home in Gainesville, FL. Leadon was a faculty member in the department from 1964 to 1988, and was best known for his groundbreaking research in the field of aeronautical engineering.

Leadon received his BS from the College of St. Thomas, Minneapolis, MN, and his MSAE and PhD from the University of Minnesota.

During World War II, Leadon worked as an airplane designer at the Curtiss Wright research lab in Buffalo, NY, where he helped design an early computer, shortening the time to design airplane wings, which were rushed into the high velocity wind tunnel for testing and into production for the war effort. Leadon's prototype computer is owned by the Smithsonian Museum.

In 1946, Leadon married Ann Sweetser of Minneapolis, and returned to the University of Minnesota where, as a doctoral student, he prompted the University to acquire surplus military land and helped establish the Rosemount Aero Research Lab. From the late 1940s through 1950s, Rosemount held major contracts with most aerospace companies and military services, often doing nearly a million dollars in research each year. During his time at Rosemount, Leadon designed and built a wind tunnel used for research.

Leadon came to UF in 1964 as a professor in aerospace engineering. His innovative teaching methods included using closed-circuit television to teach in satellite classrooms at the Kennedy Space Center, Orlando Central Park and West Palm Beach. Leadon was loved by his students and was named Teacher of the Year numerous times during his tenure.

In Gainesville, the Leadon's made their home across from St. Patrick's Parish, where many of their 10 children attended school. They were a musical family. Bernie was a member of the Saint Augustine Church Choir for several years. Ann played the organ at St. Patrick's church. In addition, several of his children have had successful careers in the music industry, most notably his son Bernie, who was a founding member of the rock band The Eagles, and his son Tom, who was an original member of Tom Petty's first band, Mudcrutch. Leadon was preceded in death by his wife, Ann, in 1994, and is survived by his six sons and four daughters.

Acknowledgements

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BILL TIEDERMAN... *in his own words*

William G. Tiederman, Jr.

When I accepted the position of Chair of the ME Department, I found a faculty of good people. The success of the ME Program was due to all their efforts and I was truly pleased to serve as their Chair.

Over the last 100 years there have been many changes in Mechanical Engineering. The primary focus upon energy utilization and design of mechanical systems remains. However, the introduction of electronics, control strategies and digital computers accelerated the rate of change and significantly influenced our curriculum and research.

Jiri Tlusty was a world leader in bringing control strategies into the practice of high speed machining. Among his achievements were a textbook, Manufacturing Processes and Equipment, and the design and construction of a 5-axis, high speed milling machine. Carl Crane's early entry into the field of autonomous vehicles gave the Department national recognition and a major research group. Carl has continued to update the hardware and software in the computer assisted design laboratory as it progressed from providing a drafting tool to a simultaneous design and manufacturing laboratory.

James Klausner initiated research to desalinate water. Supported by Ford Motor Company, Vernon Roan built a fuel cell research laboratory at the Solar Park. Bill Lear converted the Gas Dynamics lab into a unique gas turbine research facility. John Ziegert used his CAREER Award to develop a hexapod of laser interferometers for precise measurements. Zhuomin Zhang's Presidential Early CAREER Award for Scientists and Engineers supported his research and teaching in microscale heat transfer and led to publication of his textbook Nano/Microscale Heat Transfer. Gregory Sawyer developed a research lab and courses in the tribology area while David Hahn did the same in the area of laser diagnostics. With strong encouragement and help from engineers at Motorola and Harris Corp., Jill Peterson developed a course on packaging electronic components. Ashok Kumar's CAREER award was for research on electrophotographic solid freeform fabrication. With support from Wayne and Lyla Masur, Sherif Sherif established a modern HVAC laboratory.

As need for research space expanded, several labs and offices moved to the third floor of the Nuclear Engineering Building. Skip Ingley designed and supervised the construction of new offices, classrooms and labs in the Mechanical Engineering Laboratory.

ME has always attracted excellent students. In the Fall of 1994, five of our most capable undergraduates (Robert Chronic, Michael Dancel, DeWayne Everage, Michael McGhee, and Mark Wenzel) wrote a winning proposal and became one of 12 programs to receive a 1995 Dodge Neon that was to be converted to a hybrid electric vehicle for a national competition at the Chrysler proving grounds. Gary Mathew became their faculty advisor. They recruited a team of students, raised funds and equipment and built a hybrid vehicle with all the features of a 1995 US vehicle in time to successfully compete in June 1995.

The changing needs of industry and new ABET criteria led to major changes in our undergraduate program and the way we approached and reported modifications in our curriculum. Sherif Sherif successively lead us through the new ABET process and thereby ensured the continuing accreditation of our undergraduate curriculum. John Schueller and James Klausner were the primary leaders in developing the new undergraduate program adopted and implemented in the early 2000s.

When Dean Khargonekar asked what I thought about merging the ME and AEMES Departments, I responded positively immediately. It was obvious there was at least 85% of commonality between these 2 departments. Wei Shyy agreed to chair the merged department and in August 2002, creation of the Department of Mechanical and Aerospace Engineering was complete. I'm pleased to note the ME curriculum and research programs continue to thrive in their new department.

The Jordan Klausner Foundation

Due to complications at birth, when MAE Professor James Klausner's son, Jordan, was born on May 12, 1993, he lost substantial body control as a result of cerebral palsy. Seeking a way to assist Jordan in overcoming his disabilities and to help him freely and openly participate in social and educational endeavors, the Klausner's pursued Conductive Education for their son.

Conductive Education is an effective holistic educational and rehabilitative program for people born with or people who have acquired brain damage. Founded by Hungarian physician Andras Peto, it is an educational approach aimed at helping children with cerebral palsy and other neuromuscular disabilities learn to overcome problems of movement and speech as a way of enabling them to live more active and independent lives.

Jordan received conductive education until his untimely death on December 16, 1997. In his memory, the Klausner's founded the Jordan Klausner Foundation to provide Conductive Education to the North Central Florida community. In addition, the Klausner Foundation is a public charity providing education on laws benefitting children with disabilities, providing help for developing appropriate education plans and acquiring adaptive equipment for people with disabilities, and also providing legal counseling and services for the disabled.

Gainesville Conductive Education Academy

"Helping Special Children Help Themselves"

The Gainesville Conductive Education Academy (GCEA) is supported by the Klausner Foundation and is available to school age children in Florida. It is located on the property of St. Michaels Episcopal Church in Northwest Gainesville, and is the only school in the area that exclusively serves children with neuromuscular disabilities such as cerebral palsy.

The GCEA has started a new fundraising project, inspired by the old Pittsburgh Steelers "Terrible Towels." The GCEA's "Terrific Towels" are being sold in either orange or blue, and are highly-absorbent, professional kitchen grade towels sporting the school motto: "Helping Special Children Help Themselves." They can, of course, be used in the kitchen, or used to rally fans and players at Gator sporting events.

For more information on the Klausner Foundation and to find out ways to help the GCEA, please visit www.jordanklausnerfoundation.org.

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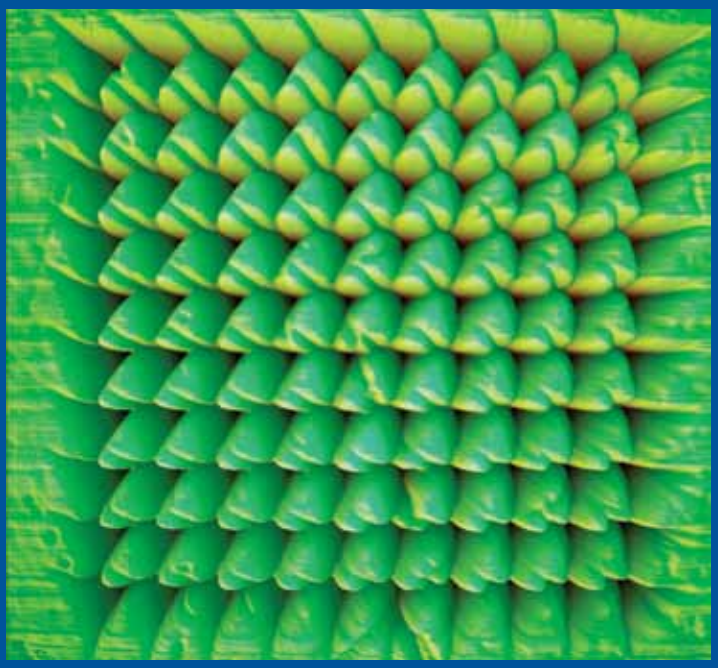
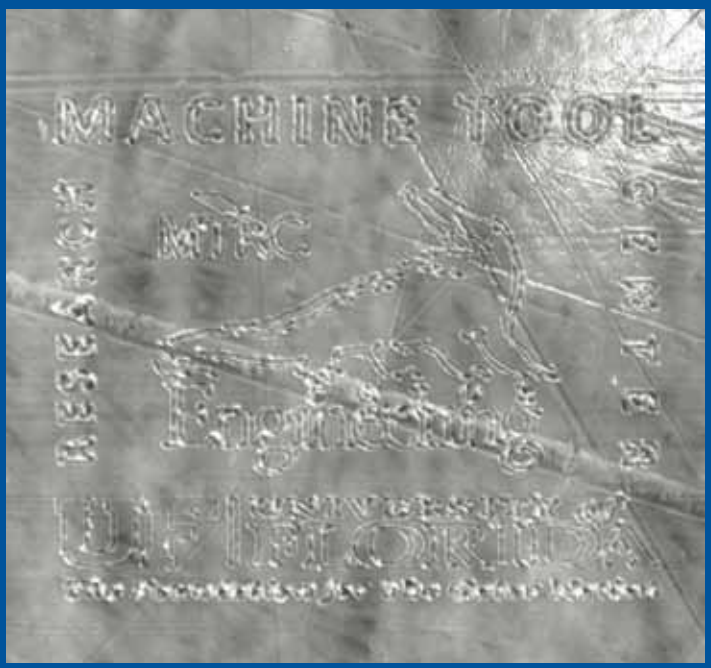
NANOTECHNOLOGY





The creation of nanotechnnologies, and the ability to manipulate matter and to assemble novel structures on the atomic to nanometer scale is currently a goal of many researchers. Professor Curtis Taylor's research explores how nanoscale tool tips can be used as a rapid, low volume method to shape and machine surfaces that form scaffolds for controlled assembly of nanostructures. These atomic force microscope images show surfaces that have been created by an ultrasharp diamond tool with a tip measuring less that 40 nanometers in radius (in comparison, the diameter of a human hair is about 100,000 nanometers). The image on the left shows a nanopatterned glass surface that is being studied to assemble metal nanoparticles by controlled dewetting. The image on the right shows the ability to shape arbitrary features on plastic with the 'writing' of lines as small as 60 nanometers wide and 20 nanometers in depth.