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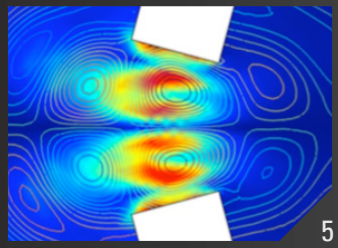
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UPDATE FROM THE DEPARTMENT HEAD

Dear Friends and Alumni,

The MAE department moved to our new home, Engineering Building III on Centennial Campus, in July 2010. This was quite an experience which required 10 solid days to move faculty, staff and student offices. In addition, a rigging crew was busy for 30 days moving our departmental machine shop, senior design lab equipment, research equipment, and our two windtunnels. The later required removing block walls in Broughton hall. Although we will miss historic Broughton Hall and being on the main campus, our new building, a 248,000 ft2 state-of-the-art facility, provides our faculty and students with greater opportunities and experiences. Seeing our students working and meeting in the atriums and common areas gives the building an energy and life that we did not experience in Broughton hall. We will have completed our second semester in EB III by the time you read this and are grateful to the leaders and citizens of North Carolina for their commitment to Engineering at NC State. We are delighted to share EB III with the Biomedical Engineering Department. If you are in the Raleigh area, please stop by for a tour.

This past November marked the date of our ABET accreditation review. This accreditation process occurs every 6 years and involves the documentation of program educational objectives and our learning outcomes as well as a continuous improvement process. It is a rigorous review that requires assessment of student work, survey information from alumni and industry and an assessment of faculty credentials and facilities. We appreciate your participation in University and Departmental surveys, as we use this data in our accreditation process. We will not receive the final result of this review until the accreditation board meets at their annual July meeting, but I am pleased to share with you that the program evaluators were very complimentary of our undergraduate degree programs. In fact, we were asked if we would allow our assessment report to be used as a model for other programs.

Although the department has had to deal with the economic downturn, like many departments throughout the nation, we continue to be strong and in high demand as indicated by the strong interest from students who request to matriculate into our programs. In 2009–2010 we graduated 63 BSAE, 14 MSAE, 6 PhDAE, 211 BSME, 44 MSME, and 4 PhDME students for a total of 342 graduates. Despite the challenging economy, three new faculty joined the department this past year; Drs. Xiaoning Jiang, Shadow Hsiao-Ying Huang, and Brendan O'Connor. These new hires will strengthen our research and teaching in the areas of ultrasonic sensors and transducers, biomechanics and high density battery technology, and organic solar cells, all areas of future growth. I am pleased to announce that Dr. Mohammad Zikry was named the Zan Smith Distinguished Professor. Three faculty were promoted to Full Professor this past year; Drs. M. K. (Ram) Ramasubramanian, Greg Buckner and Fen Wu. Dr. Gracious Ngaile was promoted to Associate Professor. Also during this period, Dr. James Leach and Dr. Michael Boles retired. Dr. Boles served the department for 30 years and was a favorite teacher amongst our students. He won the ASME student society Carnot Award 15 times and the ASME Impact Award 5 times. He has been a member of the NCSU Academy of Outstanding Teachers since 1983. Dr. Boles is coauthor of the most highly adopted Engineering Thermodynamics textbook now in its 7th edition. Dr. Leach served the department for 31 years. He was Assistant Director of the Industrial Assessment Center in the MAE department in 1992 and became Director in 1993,

SEE PAGE 17 FOR OVERFLOW, LETTER MUST BE CUT (550 WORDS)

MAE NEW HOME – EB III

North Carolina State University has opened a new building on Centennial Campus that provides a state-of-the-art platform for NC State students and faculty to make the next generation of mechanical, aerospace and biomedical breakthroughs. More than 200 people attended an event marking the opening of Engineering Building III on September 15, 2010. The event included a reception and student-led tours of the 248,000-square-foot building, which houses the Department of Mechanical and Aerospace Engineering and the Joint NC State-UNC Department of Biomedical Engineering. Speakers included Rep. Joe Hackney, speaker of the NC House of Representatives; Lawrence Davenport, chairman of the NC State Board of Trustees; NC State Chancellor Randy Woodson; COE Dean Louis Martin-Vega; and NC State mechanical engineering alumnus Jim Yocum, a former student body president who is now executive vice president for DestinationRx, Inc., which specializes in healthcare decision-support software.

The new building contains about 80 laboratories, two wind tunnels, a flight test cell, an anechoic chamber, research labs, engine dynomometer and classrooms and offices for faculty and graduate students.

NC State mechanical engineering alumnus Jim Yocum, a former student body president who is now executive vice president for DestinationRx, Inc., was the featured speaker at the Engineering Building III opening celebration.

Much of the space vacated by engineering on Main Campus will be renovated for use by other NC State academic programs.

The facility also has the first "green" roof on Centennial Campus. The unique feature, which tops the building's high bay annex, features drought-resistant plants and is projected to save an estimated 25-50 percent on heating and cooling costs. The roof is part of a university-wide effort to reduce greenhouse gas emissions.

With the building's opening, approximately two-thirds of the College of Engineering is now located on Centennial Campus, a 1,334-acre site adjacent to NC State's main campus that is home to a unique combination of education, research, industry, government and community spaces.

Perkins+Will and Skanska USA Building were the architect and construction manager for the new building, respectively. ■

SI NANOWIRES FOR STRETCHABLE ELECTRONICS

Feng Xu and Yong Zhu

Dr. Yong Zhu's group (Nanomechanics and Nanoengineering Lab, www.mae.ncsu.edu/zhu) has recently created the first coils of silicon nanowire on a substrate that can be stretched to more than double their original length, moving us closer to incorporating stretchable electronic devices into clothing, implantable health-monitoring devices, and a host of other applications.

Devices that exploit bio-inspired designs or require intimate integration with the human body require curvilinear shapes and/or elastic responses to large strain deformations. This technology will open new, exciting applications in broad areas. For instance, it will enable the integration of multi-functions such as threat detection, health monitoring, energy harvesting and communication into clothing, resulting in increased mobility and significant weight and cost savings. In order to create stretchable electronics, it is necessary to put electronics on a stretchable substrate, but electronic materials themselves tend to be rigid and fragile. Dr. Zhu's team tailored the electronic materials into a coiled shape to improve their stretchability without harming the electric functionality of the materials.

Other researchers have experimented with "buckling" electronic materials into wavy shapes, which can stretch much like the bellows of an accordion. However, the maximum strains for wavy structures occur at localized positions – the peaks and valleys – on the waves. As soon as the failure strain is reached at one of the localized positions, the entire structure fails. An ideal shape to accommodate large deformation would lead to a uniform strain distribution along the entire length of the structure – a coil spring is one such ideal shape. As a result, the wavy materials cannot come close to the coils' degree of stretchability. It is noted that the coil shape is energetically favorable only for one-dimensional structures, such as wires.

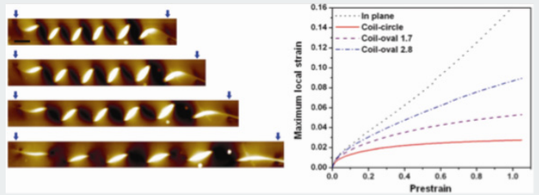


Fig. 1. (L) Atomic force microscopy (AFM) images of a 3D buckling-induced nanowire coil under different levels of stretching; (R) The maximum local strain as a function of the prestrain for different shapes including coils and waves.

Zhu's team put a specific rubber (Polydimethylsiloxane, PDMS) sheet under strain and used very specific levels of ultraviolet radiation and ozone to change its mechanical properties, and then placed silicon nanowires on top of the substrate. The nanowires formed coils upon release of the strain. Other researchers have been able to create coils using freestanding nanowires, but have so far been unable to directly integrate those coils on a stretchable substrate.

While the new coils' mechanical properties allow them to be stretched an additional 104 percent beyond their original length, their electric performance cannot hold reliably over such a large range, possibly due to factors like contact resistance change or electrode failure. The team is currently working to improve the reliability of the electrical performance when the coils are stretched to the limit of their mechanical stretchability, which is likely well beyond 100 percent, according to their analysis. This work was supported by the National Science Foundation (NSF) and published in a high-impact journal ACS Nano. It was highlighted in an invited interview with ACS Nano and on the NSF website as well. ■

NON-CONTACT MANIPULATIONS OF MINIATURE OBJECTS BY ACOUSTIC LEVITATION

Joong-kyoo Park and Paul I. Ro

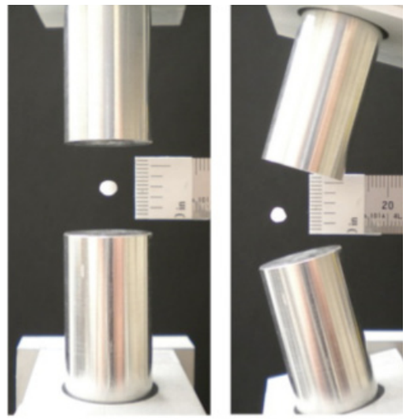


Figure 1. Object levitated between two activators.

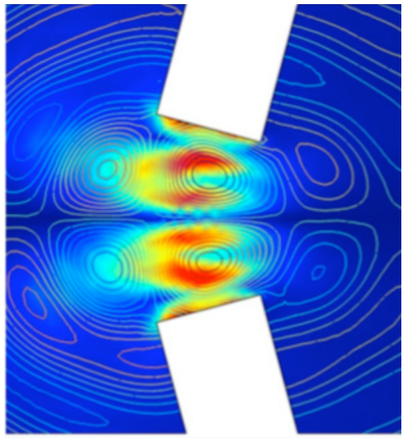


Figure 2. Simulation of pressure field between tilted activators.

Acoustic levitation is an important physical phenomenon which has potential applications in many areas like robotics, microfluidics, and manipulation of nano/micro objects. Specifically, the acoustic non-contact manipulation can be used to prevent contamination of samples, to handle micro particles while overcoming adhesive forces, to filter bio-particles, and to manipulate objects in special environments, for instance, micro-gravity, clean-rooms, or electromagnetic sensitive areas. The acoustic levitation can be observed in air or a fluid when standing waves trap small objects at pressure nodes. This standing wave acoustic levitation method is limited by the weight of the object but it can accomodate a variety of shapes. The phenomenon is due to nonlinear near-field effects of the acoustic radiation waves. In order to produce the standing waves, generally one actuator and one reflector are required. However, in this research, two actuators generate two travelling waves in order to create the standing waves as shown in the figure. Due to the interaction of the two travelling waves, an object is trapped by modulating the frequency, amplitude, and phase difference between the two actuators.

Aligned angles between two actuators also play an important role to manipulate a trapped object with other modulation parameters. If an object is moved between angled actuators, resultant waves are no longer simple plane waves. Furthermore, gravitational force affects the direction of the object movement. Therefore, when the actuators are tilted with an aligned angle of 150° (as shown on the simulation figure), unusual movements of the object are observed. Under phase modulation at an angle of 150°, a zigzag path of an object is produced. This phenomenon can be explained by reflected waves from the surface of the other actuator. When combined with amplitude modulation, the same object traces an elliptic path. Study of control variables and parameters that produce such behavior and other motions of the object are underway. ■

PASSIVELY VARYING PITCH PROPELLER

Stearns Heinzen and Charles Hall

In the past decade the flight hours flown by unmanned systems in the military arena have grown at an unprecedented rate; the next decade will see a similar pattern in the civilian realm. Small unmanned aerial systems in the 5-350 lb range fall into a region where, although navigation, control, and many avionics systems have become sophisticated, the propulsion systems largely utilize retrofitted R/C and ultralight equipment. Consequently, new high performance airframes often rely on relatively primitive propulsive technology. This trend is beginning to shift with the recent advances in small turboprop engines, fuel injected reciprocating engines, and improved electric technologies. Although these systems are technologically advanced, they are often paired with standard fixed pitch propellers. To fully realize the potential of these aircraft and the new generation of engines, small propellers which can efficiently transmit power over wide flight envelopes and a variety of power settings must be developed.

Stearns Heinzen, Aerospace Engineering Lecturer and Principal Investigator, and Charles Hall, Associate Professor, are doing just that by designing a propeller which passively adjusts to the incoming airflow. This allows the propeller to operate in an efficient configuration and can prevent blade stall in low-velocity / highly-loaded thrust cases, and over-speeding at high flight speeds. The propeller incorporates blades which pivot freely on a radial axis and are aerodynamically tailored to attain and maintain a pitch angle yielding favorable local blade angles of attack, matched to changing inflow conditions. This blade angle is achieved through the use of reflexed airfoils designed for a positive pitching moment, comparable to those used on many tailless flying wings. By setting the axis of rotation at a point forward of the blade aerodynamic center, the blades will naturally adjust to a predetermined positive lift 'trim' condition; then, as inflow conditions change, the blade angle will automatically pivot to maintain the same angle with respect to the incoming air.

Computational and experimental results indicate that the extent of efficient propeller operation can be increased dramatically as compared to the fixed pitch propellers currently used on most small unmanned systems, making significant improvements in aircraft performance possible. These improvements may yield aircraft with reduced takeoff distances, improved climb rates, increased range and endurance, and higher top speeds, without sacrificing on-design performance. ■

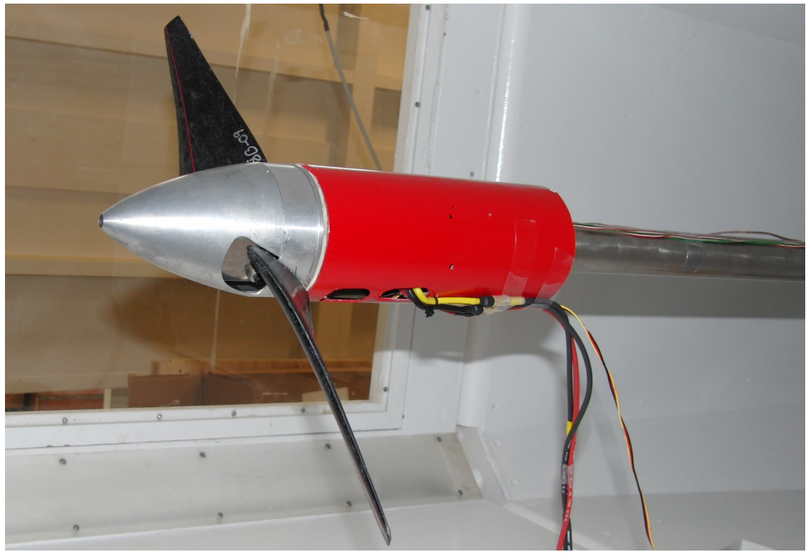


Figure 1. Variable pitch propeller in NC State's low speed wind tunnel.

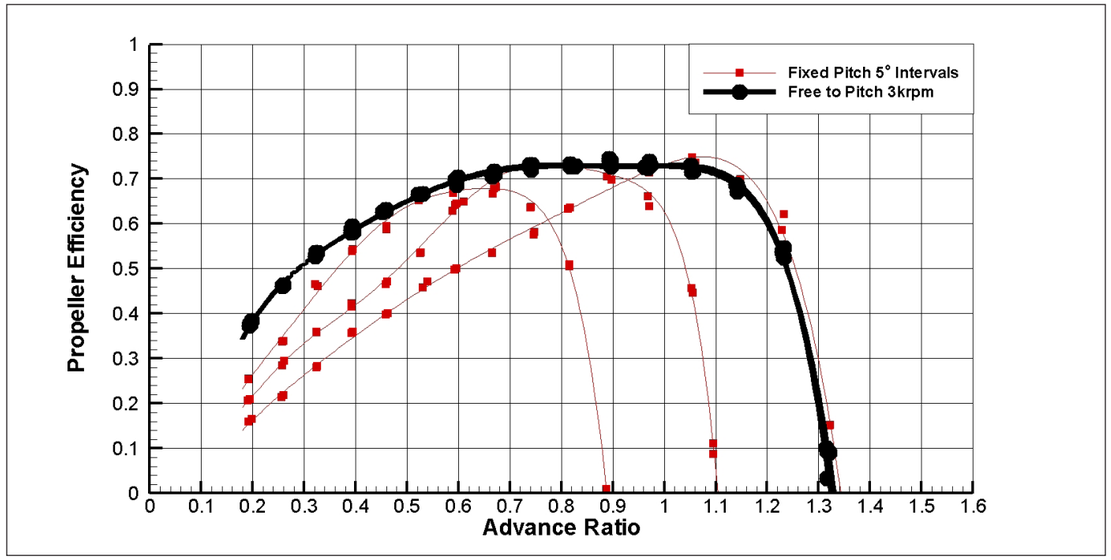


Figure 2. Wind tunnel data of the passively varying test article 'A' – blades free to rotate and at fixed pitches.

AN EXPERIMENTAL STUDY OF THE EFFECT OF FUEL BOUND OXYGEN ON NOx PRODUCTION IN GLYCEROL COMBUSTION

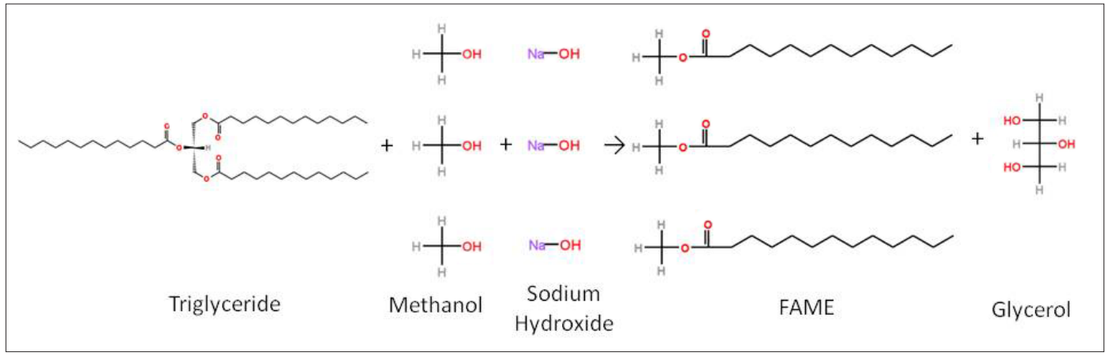


Figure 1: Transesterification to produce FAME from fats and oils.

Myles Bohon and William Roberts

Glycerol, or glycerin, is the largest byproduct in the production of biodiesel, comprising approximately 10% of the initial mass of the feedstock. In the transesterification process, a triglyceride molecule is broken down by an alcohol and a catalyst into three fatty acid methyl esters (FAME) and a glycerol backbone as shown in Figure 1. The polar material is composed of glycerol, excess methanol and catalyst, and MONG (material organic non-glycerol) which is typically composed of soaps, unreacted free fatty acids and mono- and di-glycerides. In this state, this crude glycerol waste stream has few uses and its disposal is often a liability. As a result of increasing interest in alternative energy sources such as biodiesel, the supply of crude glycerol has increased significantly and subsequently reduced the cost of crude glycerol, thereby spurring interest in finding alternative uses for this waste stream.

Pure and crude glycerol samples were combusted in two different burner systems and several gas-phase and particulate matter emissions were measured. The researchers noticed interesting NOx emissions in a 7kW high swirl burner combusting pure glycerol. It was seen that pure glycerol produced approximately a factor of 20 lower NOx when compared with other traditional fuels, namely propane and diesel fuel. While the peak flame temperature for glycerol is slightly lower than for the other two fuels and may contribute to slightly lower NOx formation, it cannot account for a factor of 20 difference. This may indicate that the thermal NOx mechanism is not the dominate mechanism in the glycerol case. This current work pursues the hypothesis that the high fuel bound oxygen content of the glycerol (~52% by mass) is inhibiting NOx production.

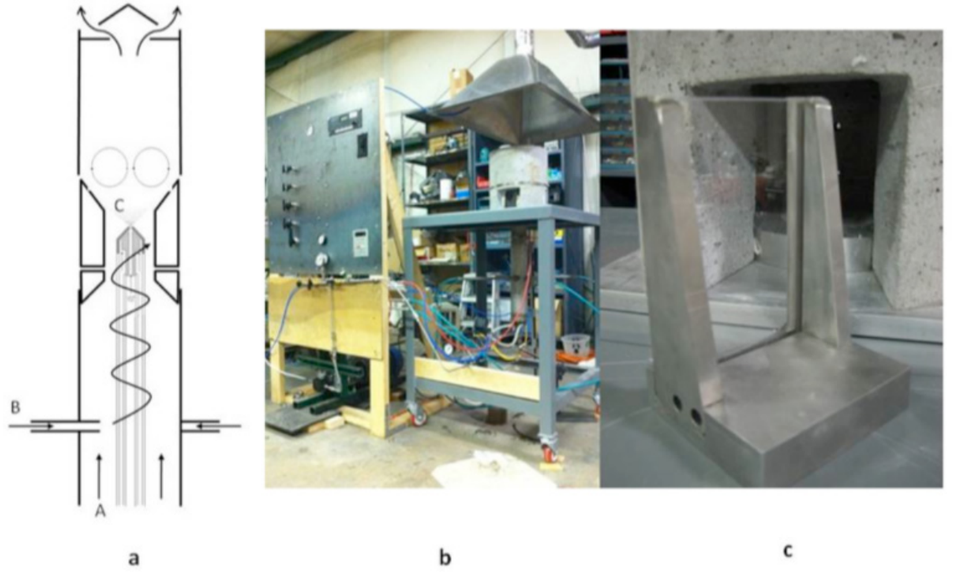


Figure 2: Cross-sectional view of the burner (a), actual experimental set-up (b), and close up of the viewing window (c).

The primary difficulty in the combustion of glycerol is the high activation energy and auto-ignition temperature coupled with a very high viscosity. Therefore, extra measures must be taken in order to produce a stable glycerol flame. Figure 2a shows a cross-sectional view of the 7kW burner developed for burning glycerol.

The burner is designed to address the unique properties of glycerol and consists of a mixing chamber in which axial air (A) and tangential air (B) mix and swirl up through a venturi.
As the swirling mixture expands through the venturi, a low pressure zone is created in the center of the swirling flow, establishing a recirculation zone into which the glycerol is sprayed using an air atomizing nozzle designed for viscous fuels.
Immediately following the venturi is a refractory lined combustion chamber. The refractory remains very hot throughout the burning process, which helps to provide a great deal of thermal feedback into the fuel glycerol. The coupling of the hot refractory with the recirculation zone bringing hot combustion gases into contact with the fuel allow the glycerol to overcome the high activation energy hurdle and create a stable flame. During start up the system must be preheated using a more traditional fuel (propane) and then switched over to glycerol. ■

Achievements:

■ **Dr. Scott Ferguson won an NSF Career Award from the CMMI division for his proposal entitled: CAREER: Giving You "Almost" What You Want – Customizing Products Through the Integration of Market Modeling and Engineering Design.**

■ **Zikry appointed Zan Prevost Smith Distinguished Professor**
Dr. Mohammed A. Zikry, professor in the Department of Mechanical and Aerospace Engineering at North Carolina State University, has been appointed the inaugural Zan Prevost Smith Distinguished Professor in Mechanical Engineering.

■ **Cheryl Tran Wins Blessis Undergraduate Advisor Award**
The College of Engineering Teaching and Advising Awards Committee has awarded Cheryl Tran the Blessis Undergraduate Advisor Award this year.

■ **Lohmeyer receives Women in Aerospace Foundation Scholarship**
Whitney Q. Lohmeyer, an aerospace engineering senior at North Carolina State University, has been named the recipient of the inaugural Women in Aerospace (WIA) Foundation Scholarship.

■ **Calvin Phelps '09 Elected National Chairperson of the National Society of Black Engineers**
As the newly elected national chairperson of the National Society of Black Engineers (NSBE), Calvin Phelps BSAE '09 has big plans to advance the organization during his term in office. "Our mission IS the mission," says Phelps. His primary goal for the upcoming year is to fulfill the mission set forth by the membership of NSBE: "to increase the number of culturally responsible Black Engineers who excel academically, succeed professionally and positively impact the community."

■ **Stephen Furst Wins Prestigious Award**
Stephen Furst, MAE PhD student working with Dr. Seelecke, won a prestigious Graduate Student Award at the European Materials Research Society Spring Meeting, which took place in Strasbourg, France, from June 7-11th, 2010. The paper titled "The Effect of Thermal Boundary Layers on SMA Actuators" was presented in the "Shape Memory Materials for Smart Systems" symposium. The work presented a fully coupled thermo-mechanical analysis (experimental and numerical) of an SMA actuator. It received acclaim because it helped bridge the gap between predictions from standard models assuming constant temperature and real experiments/applications where the mechanical attachment/clamping points also serve as heat sinks and lower the wire temperature locally. The paper was co-authored by MAE PhD student John Crews (MAE PhD advisor Dr. Buckner).

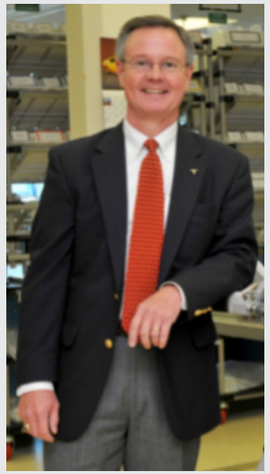
■ **Pearce Wins 2nd Place in IAC Collegiate Competition**
Brett Pearce, AE/ME double major, won 2nd place in the IAC Collegiate Competition. Collegiate individual winners must be full-time undergraduate students, compete in the Sportsman category or above, and compete in at least three (3) IAC-sanctioned competitions during the contest season.

■ **Students Win First Place and "Best Flight" in Unmanned Aircraft System Competition**
The 2010 8th Annual Student Unmanned Aircraft System (UAS) Competition, sponsored by the Association of Unmanned Vehicle Systems International (AUVSI), is designed for undergraduates with only one graduate student allowed per team. NCSU won first place overall with a prize of $9,700. They also received the "Best Flight" award that recognizes best performance in the flight mission section. NCSU placed well in the paper and safety components also.

■ **AIAA Teams Bring Home First, Second and Third Place in Design**
The AIAA 61st Region II Student Conference for the southeastern region was held in Destin, FL on April 8-9, 2010. NC State was among the 14 universities that participated with 54 students representing NC State. Fourteen presentations were made by our AE students (some were team presentations) ranging from the freshman year through the MS degree. NCSU won first, second and third places in the undergraduate Design Team Division. The winning teams are:
First: NCSU Biologically Inspired Flight Vehicle Design Advisor: Dr. Fuh-Gwo Yuan
Second: NCSU Aerospace Senior Design Team Air Support Advisor: Dr. Andre Mazzoleni
Third: NCSU Aerospace Senior Design Frictionless Utility Nanosatellite Concepts Advisor: Dr. Andre Mazzoleni

■ **MAE Students Win Third Place, Rookie Award at NASA Competition**
Mechanical and aerospace engineering students at North Carolina State University won the rookie award and third place overall at the 2009-2010 NASA University Student Launch Initiative competition.

RICHARD REED: *LICENSE TO LEARN*



Richard A. (Rick) Reed. *President Triumph Actuation Systems, LLC*

My own personal experience of attending NC State was absolutely wonderful. In fact, my experience in the Department of Mechanical and Aerospace Engineering was so good that in almost every speech I make, I make sure to let the audience know that I graduated in the top ten in my class. I also am very quick to clarify that I was in the top ten because *we only had ten* in my Aerospace Engineering class. Yes, we were a small class in 1977 and I'm very fortunate I didn't end up finishing 11th in those days.

Things were quite different in my days at NC State in 1973 through 1977. I navigated my way through those years with no desktop computer, no laptop computer, no email, no voice mail, no Internet, no cell phone, no meal plan, no air conditioning, no iTunes, and, worst of all, no Facebook. Somehow I survived, completely confident that my future was secure in aviation and aerospace.

My first engineering job was with Boeing, utilizing my fresh degree from NC State in low speed wind tunnels. This was a short journey for me as I soon received the call to join Piedmont Airlines Engineering team, which I had considered to be the dream job for me. It turned out to be better than a dream as I spent 10 years learning how an airplane and a great company really work. The applied engineering requirements at Piedmont Airlines were very practical and counted every day to bottom line success of running an airline.

Of course things change in business with acquisitions and mergers and I moved into an opportunity to manage and run a general aviation company that included extensive aircraft and component repair and overhaul. For 12 years our management team guided this operation to one of the largest general aviation entities in the country. It was a terrific experience for me, an engineering and technical person, to learn the ins and outs of running and operating a company, and achieving the financial goals that are paramount to any business.

We sold that company in 1999 and through industry contacts, I joined Triumph in 2000. At Triumph Actuation Systems, LLC we design, engineer, develop, prototype and qualify hydraulic actuation systems on commercial and military aircraft and helicopters using state of the art technology and tools. A large group of our Engineering team is from NC State. *I'm sure that comes as no surprise.*

As I look back to my NC State days, I had great respect and positive experiences with most of my professors. They all challenged me to always ask questions, keep digging and keep learning in the process of my education experience. These valuable words of wisdom are ones that stick with me even to this day. Along my way of life I have learned much about engineering, life in general and people. I have learned most of all, that the degree that I earned from NC State, was really a "license to learn." ■

AT A GLANCE:

■ **Richard Reed, President of Triumph Actuation Systems, LLC, joined Triumph in August 2000 as Director of Business Development/Aftermarket Services and in March of 2003, was promoted to President of the company.**

■ **Triumph Actuations Systems, LLC designs, manufactures, and repairs complex hydraulic and hydro-mechanical aircraft components and systems and operates facilities in Freeport, New York and Clemmons, North Carolina. The Company serves a broad, worldwide spectrum of the aviation industry, including commercial airlines and air cargo carriers, original equipment manufacturers of aircraft and aircraft components and virtually all military applications and platforms.**

■ **Prior to joining Triumph, he had been employed with Piedmont Aviation, Inc. for more than 22 years, spending 10 years with Piedmont Airlines in the Maintenance and Engineering Department and then most recently serving as co-owner and Vice President of Aviation Services for Piedmont Aviation Services, Inc., a full service General Aviation company. Mr. Reed started his aviation career with Boeing Commercial Airplane Company in 1977 as a Flight Controls Engineer.**

■ **Mr. Reed completed his undergraduate education at North Carolina State University with a degree in Aerospace Engineering in 1977 and holds a commercial pilot's license with Multi-Engine and Instrument ratings. In addition, Reed is an FAA certified Airframe and Powerplant Technician.**

■ **In May 2009, Mr. Reed was the NC State Mechanical and Aerospace Engineering department commencement speaker.**

■ **In February of 2010, the North Carolina Society of Engineers named Mr. Reed as 2009/2010 Outstanding Engineer of the Year. The award was presented at the 2010 Annual Meeting and Banquet of the Society.**

■ **On March 16, 2011, The Rotary Foundation of Rotary International named Rick Reed a PAUL HARRIS FELLOW in appreciation of tangible and significant assistance for the furtherance of better understanding and friendly relations among peoples of the world.**

■ **Mr. Reed is married and has three daughters. He has lived in the Winston-Salem/Clemmons area almost all of his life and is a graduate of West Forsyth High School, Class of 1973.**

More information about Mr. Reed and The Triumph Group, Inc. can be found at http://www.triumphgroup.com and http://ncsocietyofengineers.org.

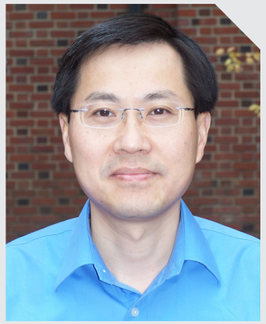
NEW FACULTY AND STAFF

Dr. Huang *Assistant Professor*

Dr. Huang has diverse training in materials science and biomechanics. Her long-term goal is to contribute to the development of the next generation of rechargeable battery materials, and to help develop a better understanding of cell-tissue-organ micromechanics of heart valves. Before joining NC State as an assistant professor, Dr. Huang was a Postdoc associate in Materials Science and Engineering at Massachusetts Institute of Technology. Currently, Dr. Huang is investigating degradation mechanisms in rechargeable battery cathode materials via theoretical and computational approaches. This work could aid in developing safer, higher capacity rechargeable batteries. Dr. Huang is also developing virtual experiments that simulate cell-tissue-organ interactions in heart valves. This work is aimed at improving our understanding of pathologies involving mechanotransduction and in developing tissue-engineering strategies for tissue repair. In addition, Dr. Huang enjoys teaching and has extensive teaching experience. Collectively, she had designed and taught nineteen engineering courses before joining NC State.

Dr. O'Connor, *Assistant Professor*

Dr. O'Connor received his BS degree in Mechanical Engineering from Marquette University. He then received his MS degree in Mechanical Engineering from the University of Massachusetts and received his PhD degree in Mechanical Engineering from the University of Michigan. Prior to joining the MAE department, he was a postdoctoral fellow at the National Institute of Standards and Technology in the Polymers Division. Dr. O'Connor's research interests focus on the development of organic (carbon-based) electronic devices with emphasis on solar cells, light emitting devices, and transistors. In particular, he is interested in developing relationships between the microstructure of organic semiconductors and their electronic properties. He is also interested in developing novel device structures through low-cost manufacturing methods for the production of flexible and inexpensive electronics.



Dr. Xiaoning Jiang, *Associate Professor*

Dr. Xiaoning Jiang received his Postdoctoral training at the Pennsylvania State University from 1997 to 2001. He received his Ph.D. in 1997 from Tsinghua University. Prior to joining the MAE faculty, he spent 8 years as a Research Scientist, Senior Research Scientist, Chief Scientist and Vice President of Technology at TRS Technologies, Inc., IN State College, PA. Dr. Jiang's current research interests involve micro/nanofabrications with smart materials incorporation; micro/nano-sensors, actuators and transducers and their applications in biomedical and aerospace engineering; ultrasound imaging for medical and industrial NDE/NDT; high power ultrasound; sensors and actuators for extreme environments.

Marilyn Cross

Paula Hubbell

Edie Nowell

Monjula Monica Ramanath

Annie White

We hired 5 new administrative staff in the department in 2009-2010. In February 2009 we transferred and promoted Paula Hubble from the MAE Precision Engineering Center to be our 2nd Contracts and Grants Accountant. As a result of Paula moving, the PEC Center hired Monjula Ramanath as their new University Program Associate in September 2009. In April of 2010 the department hired Edie Nowell as our new Administrative Assistant to the Department Head's Administrative Assistant. In October 2010 we hired Marilyn Cross to manage the front office reception area and support accounting for the senior design labs as well as human resource reconciliation. Our last hire in November 2010 is Annie White. Annie's position is new and was created to assist in the graduate program office. This past year has been a very productive year of office restructuring and has enhanced the departmental administrative functions.

MAKE AN IMPACT

The state of North Carolina has committed funding for new facilities and infrastructure to support growth and additional faculty for the Mechanical and Aerospace Engineering Department. As an Alumnus of our department you have the opportunity to leverage and strengthen these developments by giving. Your gift will help us become a leading department that prepares our students for the work-place, research, and other opportunities that lie ahead. Please join us in transforming the department that helped launch your career.

Giving back benefits you as an NC State engineering graduate. Participation of alumni in giving and in growing our endowments keeps the department competitive with our peer institutions and enhances our reputation as a top rate institution.

Alumni giving accounts for the major support provided to many of our educational programs. For example, the success of our student organizations, labs, senior design, professional travel, and our special projects become possible only through Alumni giving.

There are numerous ways you can make a gift to support the people and programs in the Department of Mechanical and Aerospace Engineering. From simply writing a check for your annual gift in support of the Department's current needs, or the many naming opportunities in our new facility, to providing a major or planned gift for an endowment or a capital project. The options available are divided between ways to give today and ways to give tomorrow. By making your tax deductible gift today you will help the Department of Mechanical and Aerospace Engineering break out from the pack and achieve greatness.

For more information on how to make a gift, how your gift will be effectively used or to arrange a campus tour, please call Daniel Pietrzak, Director of Development, 919/513/1714 or Daniel_Pietrzak@ncsu.edu.

and continued in this capacity until 2007. During his tenure, he chaired over 35 Masters Committees. Dr. Leach is a member of the NC State Academy of Outstanding Teachers and was the 1997-98 recipient of the NC State College of Engineering Outstanding Extension Service Award. With gratitude, we thank both for their long dedi¬cated service to the department. Dr. Stefan Seelecke left the department in January 2011 to be closer to his family in Germany.

As has always been the case, you, our alumni, are key to our future. We are working to continuously improve our programs and student experi¬ences. We hope that these improvements give you a deep pride in your department and that you will stay connected and support us whenever possible. The on-going Brick Campaign recognizes your accomplishments and your support to the MAE department with a personalized brick on the EB III walkway. This supports the department, student clubs, student travel to confer¬ences and student design competitions.

There are many exciting things happening in the department, some of which are highlighted in this newsletter, including current research high¬lights from four core research areas in the department, student, staff and faculty honors, and featured alumni updates. I hope you enjoy this edition of our newsletter. If you have any questions, suggestions, or want to know how you can help, please contact me at gould@ncsu.edu.

Best regards,

Richard D. Gould, R J Reynolds Professor and Head