

MAE

NEWS

**DEPARTMENT OF MECHANICAL
AND AEROSPACE ENGINEERING**

COLLEGE OF ENGINEERING
NORTH CAROLINA STATE UNIVERSITY | SPRING 2017



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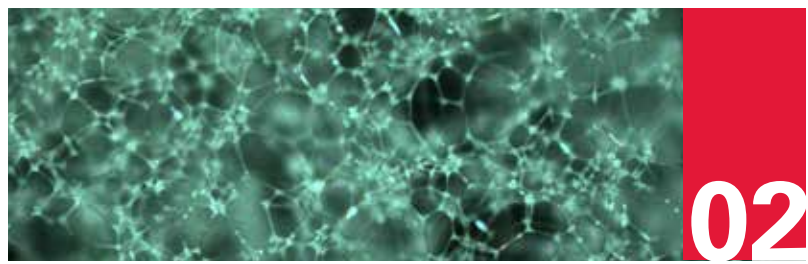
PROFESSOR EMERITUS HERBERT ECKERLIN: PAGE 06

One of the fathers of NC State's Solar House, Herbert Eckerlin is a pioneer in the area of renewable energy.



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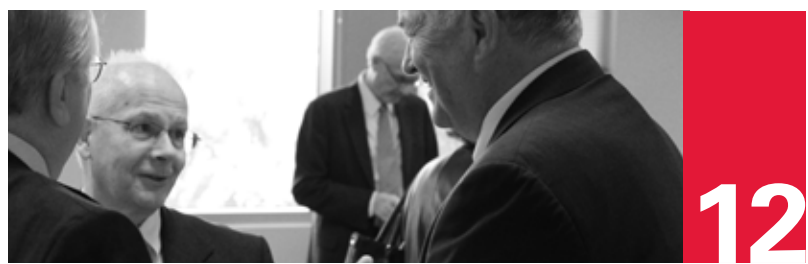
MAE researchers are driving improvements in rotorcraft aerodynamics and ultrasound imaging.



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UPDATE FROM THE DEPARTMENT HEAD



Richard D. Gould

DEAR FRIENDS AND ALUMNI,

Greetings from your home department at NC State!

I'd first like to thank our students, alumni and colleagues for the privilege of serving as department head over the past 13 years. This has been a great experience that has included a once in a lifetime event - moving from Broughton Hall to Engineering Building III on Centennial Campus. I will be stepping down as head and am looking forward to being more active in teaching and research. A search is currently under way to fill the department head position with the goal of having someone in place by August. We have a lot to be proud of in the department. A few noteworthy highlights include the creation of the MAE Hall of Fame, the Corporate Partners Program, the MAE Corporate Advisory Board to supplement the great work of the MAE External Advisory Board, and

the increase in research expenditures from \$4M to \$13M/yr. Additionally, our faculty and students have won many awards and other recognitions over this time. I can't say enough about the caliber of our faculty, staff and students. I am especially gratified that we have graduated more than 2,500 B.S., 750 M.S. and 200 Ph.D. students during my tenure as head, all serving as ambassadors of the department. I am confident that the department will continue to excel and make you proud.

We were fortunate to have hired Dr. Landon Grace this past year whose brief biography is presented in this newsletter. Several faculty members have new appointments: Dr. Marie Muller was reappointed as a second term assistant professor. Drs. Chih Chang, Yun Jing and Brendan O'Connor were granted tenure and promoted to associate professor, while Drs. Tiegang Fang and Yong Zhu were promoted to professor. We also hired Ms. Julia McLean, Kelly Petersen and Aslyn Rau.

Two highly admired faculty members will be retiring. Dr. Eric Klang, who many of you know for his long service as the faculty advisor to Wolfpack Motorsports, the departmental organization that houses the Society of Automotive Engineers (SAE) Formula, the SAE Baja, and the SAE Formula Hybrid competition clubs, will be retiring in June after 31 years in the department. Perhaps the most noteworthy measure of his impact as faculty advisor is the large number of alumni from his teams who have become leaders on professional NASCAR and Formula teams. Dr. Richard Keltie, who joined the department in 1981, was promoted through the professorial ranks and has been recognized as an outstanding teacher, will start phased retirement this July. Dr. Keltie also served in a number of administrative capacities including associate department head, associate dean for academic affairs, and associate dean for graduate programs and research.

In this newsletter we highlight a number of exciting things happening in the department, including our 2016 Hall of Fame ceremony; a feature story on the accomplishments of Dr. Eckerlin; stories on groundbreaking research; outstanding alumni; and honors for our students, faculty and staff. You will also learn more about how an MAE graduate, Erin Henderson, led the flight tests of the Boeing 737 Max.

With the full engagement of the MAE External Advisory Board, the department continued to focus on enhancing alumni relations this past year. Specifically, we held our alumni golf tournament in September, held alumni events in Badin, NC; Hampton, VA; and Spartanburg, SC and held our MAE Hall of Fame ceremony during Homecoming weekend. Finally, we introduced "lunch with alumni" and "MAE Connect" to link alumni with current students. Our alumni have been and will continue to be extremely important to our future. We sincerely hope that you join our efforts to improve our educational programs and student experiences. Your donations support critical activities that are not supported by state funds, including student scholarships and fellowships, endowed professorships, student clubs and organizations, student travel to conferences, and senior design.

I hope you enjoy this edition of our newsletter. If you have any questions or suggestions, or just want to know how you can help us, please contact me at gould@ncsu.edu.

Best regards,

A handwritten signature in black ink that reads "Richard D. Gould". The signature is written in a cursive, slightly slanted style.

Richard D. Gould

R.J. Reynolds Professor and Head

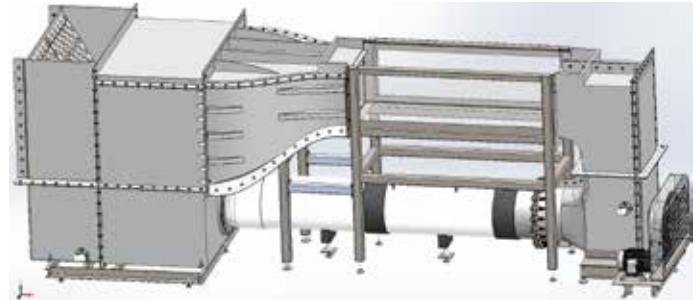
Performance, efficiency from unsteady fluid mechanics

Faculty: Kenneth Granlund, Ph.D.

WIND TURBINES, helicopters, birds and insects experience unsteady aerodynamics effects as a departure from the traditional fixed-wing, constant-freestream conditions of regular aircraft. A large wind turbine blade is subjected to a lower wind speed at the lowest point compared to the highest point due to the boundary layer of the wind; a rotor blade on a helicopter in forward flight experiences a higher velocity toward the tip and on the side of the helicopter where the blade is advancing into the wind. If the forward speed of the helicopter is large enough, the inboard part of the airfoil can even experience flow reversal on the other, retreating side. Birds and insect wings have even more complicated aerodynamics as the wings move up/down, sweep back/forth and pitch in a complicated way to permit forward flight, vertical takeoff, hover, rapid turns and even backward flight.

The rotorcraft aerodynamics problem is commonly referred to as “dynamic stall” where a spanwise element of the blade pitches and plunges such that the airfoil cyclically experiences slight flow separation, but never completely loses lift acting as if the airfoil were held at a fixed angle. Theoretical models for this effect have been extensively explored in both computations and experiments, but never sufficiently experimentally validated with a large velocity variation. Dr. Kenneth Granlund’s Unsteady Fluid Mechanics Laboratory has seen the recent completion of a free-surface, high-speed water tunnel with a multi-degree of freedom motion mechanism to experimentally study these effects and improve the performance and efficiency of helicopters and wind turbines.

Pictured right is a sequence of figures illustrating the flow separation from an airfoil surging back/forth in a freestream



from the left at 50 percent to 150 percent of average velocity, while pitching to a low angle of attack at higher velocity and higher angle at lower velocity in order to maintain constant lift. ■

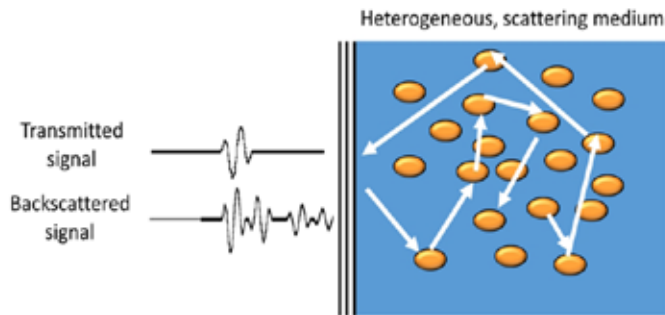
Developing noninvasive ultrasonic techniques for the characterization of biological tissues

Faculty: Marie Muller, Ph.D.

ULTRASONIC IMAGING IS ATTRACTIVE because it is non-invasive and inexpensive. However, ultrasound images lack resolution and cancer diagnosis, for example, has to be

systematically confirmed by an invasive and painful biopsy. Additionally, the use of ultrasound has remained elusive in organs such as bone or the lungs.

As an example, in the lung parenchyma, ultrasound-based techniques have until now been considered unsuitable, because of the large amount of ultrasound scattering from the millions of air-liquid interface interactions due to millions of air-filled alveoli. During ultrasound propagation in tissue, the signals backscattered from the tissue to the sensor can be separated into two components: single scattering and multiple scattering.

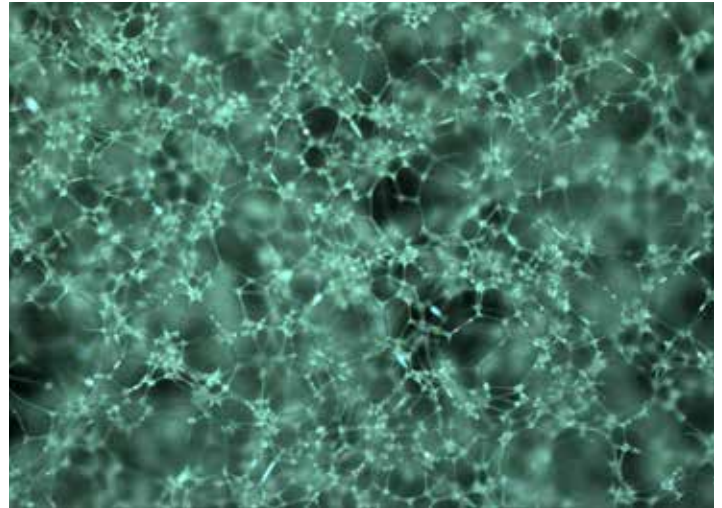


Multiple scattering by alveoli: the wave visits multiple alveoli before returning to the sensor. The resulting signals are complex and embed information on the microstructure.

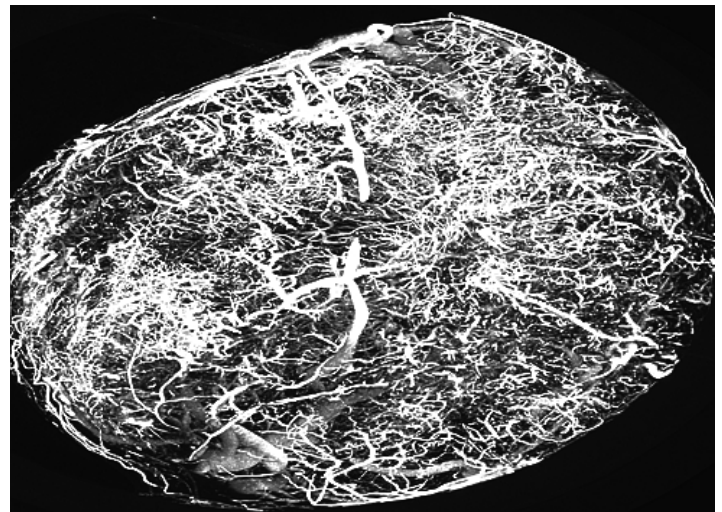
In single scattering, commonly used in ultrasound imaging, the wave undergoes one scattering event (one reflection) before returning to the sensor. In multiple scattering, the wave undergoes multiple scattering events, i.e. it is reflected multiple times by the tissue microstructure before returning to the sensor. In most biological tissues, single scattering is generally dominant and multiple scattering is negligible. However, in highly scattering media such as lung parenchyma, the multiple scattering contribution is large, and ultrasound waves do not propagate in a straight line, which impairs the reliability of conventional ultrasonic imaging methods.

Dr. Marie Muller is taking advantage of this feature. Instead of being an obstacle to imaging, each scattering event can be seen as an opportunity for the ultrasound wave to embed information on the tissue micro-architecture. By exploiting the multiple scattering contribution, Muller has developed techniques enabling the characterization of air-filled alveoli in the lung or in lung-mimicking sponges, which can be used for the diagnosis and monitoring of pulmonary fibrosis and edema.

Another application of this research is the characterization of vascular networks for the diagnosis of cancer. To grow faster, tumors create vascular networks with very specific micro-architectural properties. These angiogenic networks are more dense and isotropic than healthy vascular networks. Characterizing their micro-architecture would enable the



Microscopic image of melamine sponge in its dry state depicting complex network (scale is 500 μm).



CT scan of an angiogenic vascular.

assessment of the tumor aggressiveness, and the monitoring of the response to cancer treatment. In order to create multiple scattering, microbubbles fabricated by the Dayton lab at UNC Chapel Hill are injected in the vasculature. These microbubbles scatter the ultrasound waves multiple times, as the air-filled alveoli in the lung would do. By exploiting the multiple scattering components of the waves, it is possible to assess the vascular density, and therefore the tumor aggressiveness.

By finding different sources of contrast for ultrasonic imaging than those exploited in conventional ultrasound, Muller hopes to extend the limits of ultrasound for the complete characterization of tissues.

Muller's research is currently funded by the NIH. ■



Aerospace engineering alumna returns to campus to talk about her role on the Boeing 737 MAX by Darsee Heath



Erin Henderson

ERIN HENDERSON, a flight test engineer with Boeing and 2002 NC State aerospace engineering (BSAE) graduate, visited NC State's campus on November 10 to speak with students and faculty members in the MAE Department.

During her visit, she spoke about her time at

Boeing and her work on the 737 Max.

Henderson has been a part of the Boeing team since 2005, where she started off in Boeing's Commercial Aviation Services organization. In 2006, she moved to Experimental Flight Test, where she currently leads a team of six engineers.

During her time at Boeing, she has mostly worked on the 737. She was the lead flight test engineer on the 737 ecoDemonstrator, a flight test platform dedicated to demonstrating low noise and environmentally friendly technologies for future commercial airplane programs — a project that, according to Henderson, will make a difference to the world and is the future of aviation. She has also worked on the Performance Improvement Program for the 737NG, and spent nearly three years directly supporting testing for the 737 Delivery Center.

Henderson's team has many job functions, which include controlling the modifications to the flight test airplane to ensure it fulfills the requirements of each test, interfacing directly with

mechanics and various engineering disciplines, and preparing the airplane for each flight test. Her job requires meeting demanding test schedules while keeping the safety of the pilots and crew at the forefront.

Henderson was assigned as the lead of the first 737-8 MAX in 2013, and she was part of the test planning process, which took almost two full years. Her test team was active throughout the airplane's initial build; they readied the airplane for its first flight, and then completed 10 months of testing before returning the airplane to the 737 Delivery Center to prepare for its entry into service. During this journey, she interacted with structural engineers, systems engineers, flight controls specialists, numerous test pilots and mechanics, and even Boeing marketing and communications personnel.

Recalling that January 29th first flight at 9:48 am, Henderson said it was "crazy, terrifying, and a great moment." The Boeing 737 Max flight lasted 2 hours and 47 minutes and went very smoothly.

"It's a 24/7 job," said Henderson. "You spend so much time working continuously on a project, but it's so rewarding to know everything went well and you did your part."

Thanks to a love of math and aviation, Henderson says her time at Boeing has been amazing, and she feels her AE degree from NC State not only helped her in preparing for her career, but also prepared her for life.

"My AE degree has taught me a way of thinking," said Henderson. "It has helped me in making decisions, and in how I approach and solve problems — these are skills that have also translated to my daily life."

Henderson also holds a Master of Science in Aeronautics from Embry Riddle Aeronautical University (2005). ■



New hotel and convention center is part of Centennial vision

NC STATE CENTENNIAL CAMPUS expects completion this summer of the new StateView Hotel, a Marriott Autograph Hotel and Conference Center, located next to the Alumni Center on Main Campus Drive. The hotel will feature 164 guestrooms and suites, a signature restaurant and bar with private dining, fully equipped business and fitness centers as well as an outdoor pool and reception area. The hotel will also offer more than 22,000 square feet of first class, high-tech meeting and function space as well as outdoor event terraces. The StateView Hotel was designed to deliver exceptional experiences that incorporate innovative technology and interactive spaces. The hotel will feature unique collaborative hubs and a sustainable living and learning environment that will allow guests unique access to each other and the world. Operating under the Marriott Autograph Collection, a group of independently designed, high-personality boutique hotels, the university and the developers will have the flexibility to design a property that reflects the NC State spirit while leveraging the Marriott brand and reservation system.

The university envisions using the hotel to attract regional, national and international conferences, particularly related to education, science and technology. The new facility will also serve as a resource to help enhance the development of industry, government and academic partnerships that foster the unique learning and living environment on Centennial Campus. “This hotel is the latest exciting addition to Centennial Campus. Not only will it be a place of learning and collaboration but it will also serve as an important amenity for the campus,” said Chancellor Randy Woodson.

The hotel and conference center is another addition to the campus, which has seen significant growth in the last five

years. According to Mike Harwood, associate vice chancellor of the Centennial Campus Development Office, the amount of space developed on campus has grown 65 percent since 2010. That includes the newest office building, Alliance One, and the award-winning James B. Hunt, Jr. Library. NC State’s Centennial Campus is renowned globally for its mix of academics, technology, research and partnerships in an amenity-rich environment. The campus is home to the university’s Colleges of Engineering, Education, Textiles and Veterinary Medicine, many interdisciplinary centers and institutes, more than 60 corporate, government and non-profit partners and 75 NC State research and academic units – along with thousands of students, faculty and staff. A magnet middle school, residential housing, 18-hole championship golf course, restored watersheds, recreational amenities and this hotel and conference center weave the 1,334-acre campus into a true community.

The \$28 million project will be privately funded and developed by NF II/CEI Raleigh, LLC, a partnership of Concord Eastridge Inc. and Noble Investment Group, the same company that completed the Marriott Raleigh City Center Hotel in downtown Raleigh in 2008. NC State will lease the land to the developer, who will build, own and operate the facility. BB&T will provide the debt funding for the project. Concord Eastridge is serving as development partner along with general contractor, W.M. Jordan, and architectural firm, Cooper Carry.

“We’ve always had a vision. This hotel project has been part of that vision since the beginning. It’s a critical piece for creating a campus that really embodies creating a place where people live, work and play, where they do research and where they collaborate.” ■



IN THE SPOTLIGHT

Herbert M. Eckerlin, Ph.D., P.E.

Renewable energy pioneer and industrial advocate extraordinaire

WHEN YOU'VE BEEN ON the campus of North Carolina State University for more than 45 years, one might expect to be recognized in the halls, on the Brickyard, or in and around any number of energy-producing facilities on campus. Dr. Herbert Eckerlin is a mainstay, an icon if you will, in the world of energy efficiency/conservation, boilers and solar/renewable energy systems. His contributions in these fields are not limited to the university, however, but extend across North Carolina and the nation.

After graduating from Virginia Polytechnic Institute (B.S.), he worked in industry for 10 years, gaining valuable experience with VEPCO, Combustion Engineering and Corning Glass Works. His contributions with these companies led to 11 patents in boiler design and fluidics. While working full time, he did his graduate work at Rensselaer Polytechnic Institute and NC State, completing his M.S. (1968) and Ph.D. (1972). He joined NC State in 1968 as an extension specialist with a joint appointment in engineering science and mechanics and the Industrial Extension Service (IES). In 1976, he was promoted to associate professor and was transferred to the Department of Mechanical and Aerospace Engineering (MAE). He became a full professor in 1994.

Two camps

While teaching and conducting research in MAE, Eckerlin spent 20 percent of his time affiliated with IES extending the resources of the university to the people of North Carolina. This work is in line with NC State's land-grant mission. While

some might find it difficult to straddle the two very different, yet potentially complementary worlds, Eckerlin seized the opportunity and by so doing built a program that remains a model for using applied research to assist industry in improving its energy efficiency. This work continues to this day.

Eckerlin found the dual appointment invaluable. "We were able to bring the problems of industry into the classroom," said Eckerlin. "This allowed us to serve industry while simultaneously helping students learn in a real-world setting."

He has been in hundreds of industrial, commercial and institutional facilities across North Carolina and the nation, helping to improve their utilization of energy. The Energy Solution Program that he led recommends \$7 million in energy saving annually.

Addressing the energy crisis of the 1970s

In the late 1970s, Eckerlin in collaboration with two other solar energy pioneers, Professors A.S. Boyers and R.F. DeBruhl, conceived of the idea of designing and building a Solar House on the NC State campus for education, demonstration and research purposes. They believed that solar energy could make a contribution in helping the nation lessen its dependence on foreign oil. Furthermore, they believed that a Solar House on campus could serve as a valuable demonstration tool for educating North Carolinians on the benefits of solar energy, as well as serving as a research facility for faculty and students. With these goals in mind, they obtained funding from five different agencies to design and construct a Solar House.

Construction was completed during the summer of 1981. The Solar House was dedicated by Governor Jim Hunt in September 1981 and has been visited by thousands of North Carolinians since that time. Research studies have shown that the passive solar features in the Solar House reduce its winter heating bill by 70 percent.

In 1987, Eckerlin founded the North Carolina Solar Center, a research and public service organization designed to extend the research results and solar information and knowledge beyond the Triangle to the rest of the state. The Center has had a major impact in this regard. Eckerlin served as faculty chair of the Solar Center from 1987 to 2003.

Honing the mission

In 1992, Eckerlin collaborated with Dr. James Leach in MAE to establish the Industrial Assessment Center (IAC) at NC State. The NC State IAC is one of 26 such centers located at universities across the United States. Its mission is two-fold:

- 1) Assist small-to medium-size industrial facilities save energy and improve their utilization of energy resources
- 2) Educate the next generation of energy engineers.

Under this program, a team of NC State faculty members and students travel to 25 to 30 industrial plants each year to conduct energy assessments. In the process, they closely examine the plant processes to identify energy saving opportunities. Upon returning to campus, the team analyzes test data, identifies recommendations, calculates the potential energy savings and payback period and writes a comprehensive final report. In addition to doing important analytical work, the students gain valuable hands-on experience and are exposed to a variety of industrial settings.

Eckerlin is quick to point out that IAC graduates are in high demand and generally have no difficulty finding employment. The 100 plus graduates since the program's inception have landed jobs with such well-known companies as Schneider Electric, IBM, Duke Energy and others.

During his tenure at NC State University, Eckerlin has been recognized in a number of ways including:

- US DOE "Award for Energy Innovation" (1984)
- College of Engineering "Outstanding Extension Service Award" (1979, 1984, 1989, 1996)
- Alumni Association "Outstanding Extension Award" (1984)
- American Gas Association "Hall of Fame Award" (1994)
- NCSEA "Solar Hall of Fame Award" (1999)
- NC State University "Sustainable Energy Champion" (2007). ■



AWARDS AND HONORS

Five honored for outstanding service

Steve Cameron, specialty trades technician in the Department of Mechanical and Aerospace Engineering, was one of five NC State employees honored for outstanding service, from saving money to saving lives, at the Awards for Excellence ceremony on June 14. The annual event, at the Talley Student Union, celebrates the efforts of high-performing staff members in each of the university's colleges and units. Chancellor Randy Woodson delivered the keynote address at this year's event, which honored 46 nominees.

Cameron's outstanding contributions in the category of Customer Service were described in detail: Cameron is patient, steady and clear when instructing students in lab safety workshops. He makes significant educational contributions to students by providing valuable insights into the design process that streamline the machining and prototyping, resulting in the fabrication of unique equipment that pushes the bounds of what is possible. He is dedicated and committed to his work and does whatever it takes to complete projects. He produces complex parts that in the past were only available through outside vendors. Cameron enjoys challenges and comes up with brilliant and cost effective solutions.

news.ncsu.edu/2016/06/awards-for-excellence-2



From left, Donna Woolard, Angela Nicholson, Steve Cameron, Melanie Paul, Lindsay Recchie, Chancellor Randy Woodson. Photo by Becky Kirkland.

2016 class University Faculty Scholars: Drs. Xiaoning Jiang and Chih-Hao Chang

Drs. Jiang, professor, and Chang, assistant professor, were selected to the 2016-17 class of University Faculty Scholars. They were among 22 recipients who represent top early- and mid-career faculty members pursuing research to solve society's most pressing problems. University Faculty Scholars carry their

title for a five-year period and receive a \$10,000 annual award for supplemental salary and benefits, or for programmatic support. The Provost's Office oversees the program, which was established by Chancellor Woodson in 2012.

news.ncsu.edu/2016/11/2016-2017-university-faculty-scholars-named

Dr. Yong Zhu, Eshelby Mechanics Award for Young Faculty

Dr. Zhu, associate professor, was awarded the Eshelby Mechanics Award for Young Faculty, awarded at the Applied Mechanics Division Banquet at the ASME-IMECE meeting this year. This award is given annually to rapidly emerging junior faculty members who exemplify the creative use and development of mechanics. The intent of the award is to promote the field of mechanics, especially among young researchers.

www.mae.ncsu.edu/blog/2017/01/23/yong-zhu-receives-eshelby-mechanics-award-for-young-faculty

Dr. Afsaneh Rabiei invited to speak at 6th Annual Brain Mapping Day at the US Congress

Dr. Rabiei, professor, was asked to speak at the 6th Annual Brain Mapping Day at the US Congress. This is a joint event between the Congressional Neuroscience Caucus and the Society for Brain Mapping and Therapeutics (SBMT), the Brain Mapping Foundation and the National Center for NanoBioElectronics aimed at educating policymakers about the state-of-the art diagnostics and therapeutics in clinical translational neuroscience.

worldbrainmapping.org/Legislation-and-Advocacy

Dr. Mohammed Zikry elected Fellow of the Society of Engineering Science

Dr. Zikry, professor, was elected to the position of Fellow of the Society of Engineering Science (SES). He was also honored this year as the inaugural recipient of the University of California, San Diego Mechanical and Aerospace Engineering Alumni Award for Impact, 2016, and the Distinguished Alumni Award from the Department of Mechanical Engineering, University of Kansas, 2017.

NC State teaching and advising awards

MAE was fortunate to have these winners of teaching and advising awards this year. Dr. Jeffrey W. Eischen, associate professor, was the winner of the 2016-17 George H. Blesis Outstanding Undergraduate Advisor Award, awarded by the

College of Engineering. The award recognizes faculty members who consistently and willingly give their time and effort to advising, counseling and mentoring students and assisting student groups. It is also a continuing memorial to George H. Blessis, a faculty member whose interest in undergraduate education and advising serves as an example today. Drs. Katherine Saul, associate professor, and Mark Pankow, assistant professor, were awarded the NC State Outstanding Teacher Award. The Outstanding Teacher Award recognizes excellence in teaching at all levels. Recipients of the Outstanding Teacher Award become members of the Academy of Outstanding Teachers for as long as they remain NC State faculty members. Dr. Gregory Buckner, professor, received the College of Engineering nomination for the Board of Governors Award for Excellence in Teaching. This award is the most prestigious award given to faculty for teaching excellence. Recipients are recognized at the Teaching Awards Ceremony at the Teaching and Learning Symposium in the spring and their names are published in the NC State Bulletin and Commencement Program.



From left to right, Matthew A. Pless, Kaitlin E.D. Crenshaw, and Michael P. Shaddock.



Julia Rao receiving the COE Faculty Senior Scholarship Award at the fall COE faculty meeting. Pictured are: David Parish, Julia Rao, Jeffrey Eischen and Louis Martin-Vega.

2016 Engineering Senior Awards

This event took place at the end of the spring 2016 semester, in early May.

- MAE Senior Award for Citizenship and Service: Kaitlin E.D. Crenshaw
- MAE Senior Award for Humanities: Zachary A. Goodman
- MAE Senior Award for Leadership: Michael P. Shaddock
- MAE Senior Award for Scholarly Achievement: Matthew A. Pless

MAE student wins the IEEE IUS 2016 Student Paper Competition Award

The annual IEEE International Ultrasonics Symposiums (IUS 2016) was recently held on September 18-21, 2016 in Tours, France. Jinwook Kim, an MAE Ph.D. student from Prof. Xiaoning Jiang's group, won the student paper competition award. The paper titled "Laser-Generated-Focused Ultrasound Transducers for Microbubble-Mediated, Dual-Excitation Sonothrombolysis" was authored by Jinwook Kim (NC State), Brooks D. Lindsey (UNC and NC State), Wei-Yi Chang (NC State), Xuming Dai (UNC), Paul A. Dayton (UNC and NC State), Joseph Stavas (UNC), and Xiaoning Jiang (NC State). There were more than 1,000 papers entered into the competition, and 23 papers from five topic groups were selected as finalists. The six final winners were announced on Sept. 20, 2016 during the conference banquet. Kim was the only winner from the Transducers and Transducer Materials group.

www.mae.ncsu.edu/blog/2016/09/26/mae-student-won-ieee-ius-2016-student-paper-competition-award



Six award winners (Kim, third from the left) with the Conference General Chair (Dr. Ayache Bouakaz, last from right) and Technical Chair (Dr. Ton van der Steen, second last from the right).

AWARDS AND HONORS

Wolfpack Motorsports at Baja SAE competition

The first Baja SAE competition for 2016 was held in Cookeville, Tenn. Registration was limited to 100 schools with a wait list of about 60. Teams came from all over the world, including powerhouses from India, Mexico, Canada and the US.

Eighty-eight teams were able to pass technical inspection and start the final endurance race (four hours of wheel-to-wheel racing). Wolfpack Motorsports placed 5th in that race and 8th overall. It was an excellent showing by our students!

www.mae.ncsu.edu/blog/2016/08/04/wolfpack-motorsports-baja-sae-competition



The Wolfpack Motorsports team at the Baja SAE competition.



Wolfpack Motorsports competes at the Baja SAE competition.

Retirees



Dr. Eric Klang

Dr. Eric Klang, whose expertise is in the areas of composite materials, design and automotive engineering, will be retiring in June of this year. He joined the MAE department in 1986 and spent his career teaching and mentoring students in the classroom, lab and workshop. He has been inducted into the NC State Academy of Outstanding teachers, and has won the George H. Blesis advising award three times and is the recipient of the Society of Automotive Engineers (SAE) Ralph Teetor Engineering Award. Klang became the faculty advisor in 1998 for the SAE Formula and Baja teams – later named Wolfpack Motorsports. He also served as faculty advisor for the GM EcoCar team and the SAE Formula-Hybrid team. Perhaps the most noteworthy measure of his impact as faculty advisor is the large number of alumni from his teams who have become leaders on professional NASCAR and Formula teams. Klang also served as director of undergraduate programs and as course coordinator for MAE 416 capstone senior design.



Dr. Richard Keltie

Dr. Richard Keltie joined the department in 1981 and will begin the phased retirement program, where he will work half-time, starting in July. His areas of expertise include mechanical vibrations, acoustic radiation and machined design. Keltie has taught 11 different courses in the department and is a member of the NC State Academy of Outstanding Teachers. He is a Fellow of the American Society of Mechanical Engineers (ASME), has authored more than 132 publications, has directed 29 research projects, and has served as the associate editor for the ASME Journal of Vibrations and Acoustics. Dr. Keltie also served in a number of administrative capacities including: associate department head from 1994-1995, associate dean for academic affairs from 2003 - 2008, associate dean for administration and academic planning from 2008 – 2009, and associate dean for graduate programs and research from 2009 - 2012.



Landon Grace, Ph.D.

Dr. Landon Grace received B.S. and Ph.D. degrees in mechanical engineering from the University of Missouri and the University of Oklahoma, respectively. Prior to joining the MAE faculty, he was an assistant professor in the MAE department at the University of Miami, where he was

awarded the distinction of inaugural Junior Faculty Scholar. Grace is a former Palace Acquire Fellow with the U.S. Air Force, where he spent five years as an aerospace engineer prior to transitioning to academia. He primarily studies the response of polymeric materials to adverse environments, namely the complex interactions between absorbed fluids and a polymer host. Recent examples include studying and mitigating the effects of lipid-rich in vivo conditions on the stability and longevity of polymer implants, and the effects of extreme environments on the X-band radar transparency of advanced aerospace composites.



Jill Whitfield

Jill Whitfield is executive assistant to the department head. A life-long Cakalacky, Jill has a B.S. in mathematics from Wake Forest University. On a personal note, Jill and her husband, John, will celebrate their 30th wedding anniversary in May. Together they enjoy mountain biking

the trails around Umstead and Lake Crabtree and traveling to see their adult daughters in DC.



Gail Gaston

Gail Gaston is an administrative support specialist and serves as the departmental receptionist. Gaston is a graduate of The Culinary Institute of America. She and her husband of 30 years moved to North Carolina four years ago from Cincinnati, Ohio. Prior to joining the MAE staff, Gaston

worked with NC State Campus Enterprises as an administrative assistant. She enjoys gardening, spoiling her two dogs and spending time with her children, a son in Columbus, Ohio, and a daughter, recently married, in Minneapolis, Minn.



Julia McLean

Julia McLean is the graduate programs coordinator for the department. She holds a B.S. in organizational communication and a certificate in nonprofit management from Western Michigan University and is pursuing an M.S. in communication at NC State. Prior to joining NC State, she worked

as a human resources assistant at MAHLE, an industrial manufacturing facility in Grand Rapids, Mich. Outside of work, McLean often volunteers in the Raleigh area and runs a project called VolunteerWarrior. She also enjoys hiking and camping.

MAE 2016 HALL OF FAME INDUCTEES

The MAE Hall of Fame was established to inspire our current students and to celebrate the accomplishments of those extraordinary graduates who have used their education to excel in a profession, career or service. The nomination is based on professional and service achievement, entrepreneurship and contributions to professional societies.

The MAE department would like to congratulate the 2016 Hall of Fame Inductees. Learn more at: www.mae.ncsu.edu/alumni/2016-alumni-hall-fame

Congratulations to the following MAE Hall of Fame inductees for 2016!

John W. Kiker

BSME '51

J. Ronald Bailey

BSME '66, MSME '68

Alan W. Wilhite

BSAE '73, Ph.D. AE '85

Michael C. Goff

BSAE '83, MSME '85

Lloyd M. Hedgepeth

BSME '58

C.H. "Buddy" Cline, Jr.

BSME '68

Gerald D. Walberg

Ph.D. ME '74

W. Gil West

BSME '84

Joseph L. Dunn

BSAE '65

David W. Dove

BSAE '69

D. Keith Hollingsworth

BSME '80, MSME '82

Franz W. Kellar

BSME '85

John W. McCulloch

BSAE '65, MSME '67
Ph.D. ME '69

Lawrence R. Fishman

BSME '70

Adnan Akay

BSME '71, MSME '72
Ph.D. ME '76

Jeffrey E. Williams

BSME '85

We are now accepting nominations for our 2017 Hall of Fame class. Please go to mae.ncsu.edu/alumni to submit your nomination today!

MAE alumni events

The department has planned several events in 2017.

- March 23rd - Alumni event in Hampton Roads, Va.
- April 6th - MAE PDH event
- May 6th - MAE Advisory Board golf outing in Beaufort, NC (Contact Frank Schreier, afschreier@alumni.ncsu.edu for details)
- September 15th - MAE Golf Tournament at Lonnie Poole Golf Course
- November 3rd - MAE Hall of Fame Ceremony (Now accepting nominations - please contact Mike Walsh for more details)

For more information on these events, please contact Michael Walsh, MAE director of development, at **919.515.7237** or mpwalsh2@ncsu.edu.



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To learn more about supporting the Department, contact Michael Walsh.



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