



Fall 2006



# Department of Biomedical Engineering Newsletter

## Meet the New BME Faculty Members



Dr. Yuefeng Han joined the Tulane Faculty as an Assistant Professor in July 2006. Dr. Han received his Ph.D. in Biomedical

Engineering from The City College and Graduate Center of the City University of New York. He completed postdoctoral study in the Biological Engineering Division at Massachusetts Institute of Technology with Professor Doug Lauffenburger. Dr. Han's research interests include Cellular Mechanics, Theoretical Modeling, Bone and Endothelial Cell Mechanotransduction.



Dr. James Eason joined the Tulane Faculty as a Visiting Professor in July 2006. Dr. Eason received his Ph.D. in Biomedical Engineering from

Duke University. Subsequently, Dr. Eason was a post-doctoral fellow at Tulane University (working with Natalia Trayanova), and then became an Assistant Professor in the Physics and Engineering Department at Washington and Lee University. Dr. Eason's research interests include computational Bioelectricity and Cardiac Modeling.

## A Gift from The Whitaker Foundation

The Whitaker Foundation has given Tulane University's Biomedical Engineering Department \$250,000 to help recover from the disastrous effects of Hurricane Katrina and Rita. "All of us here wish you success for a fast recovery, and for a thriving Department of Biomedical Engineering," stated Whitaker President and CEO Peter G. Katona, Sc.D. when making the announcement.

## BE ON THE LOOK OUT

Alumni surveys will be sent out in the near future. Please help us to improve our program by giving feedback on our program.

## Letter from the Chair

Dear Biomedical Engineering Alumni and Friends:

It has been a year since we have sent out a newsletter. Needless to say, what a year it has been! As you may recall, we sent out our last newsletter less than a week before Hurricane Katrina came through New Orleans and literally washed away the semester for Tulane's students, staff and faculty. Of course this had a very difficult personal and professional impact on all of us in the department, but in the meantime many very positive things have occurred that we would like to share with you in this newsletter. After reading this newsletter, I think you'll agree that the Biomedical Engineering Department continues to excel despite the setbacks we have had, and is poised to become an even stronger department than it was prior to Hurricane Katrina.

Early on, one of the brightest aspects after the storm was the manner in which our academic colleagues responded to help Tulane's faculty and students restore their lives. In so many cases this extended beyond simple academic courtesy. Many of these offers came from former Tulane students who are currently in highly successful academic careers. Others came from throughout the United States and beyond to provide the faculty with office space, lab space and housing. As a result, several of us relocated our entire labs, which helped to maintain our academic vitality. Likewise, Tulane's BME students were immediately admitted to programs throughout the nation. Our colleagues at those universities helped to shepherd our students both personally and academically. These acts of kindness and generosity allowed us to continue along our career paths. The generosity was truly remarkable, and provided us with a true sense of the compassion that exists in our community.

We returned to New Orleans late in fall, 2005. While we were evacuated, Tulane's administration had borrowed a huge sum of money to pay external contractors to rebuild much of the university (federal funds remain difficult to receive for this). The department regrouped (as did the rest of the university) and had an excellent spring semester, with approximately 90% of our students returning to Tulane. Our senior class graduated on time with each senior completing an individual senior project and thesis and a group senior design project to aid a disabled member

of the New Orleans community. As always, our students completed excellent projects and, as in Lake Wobegon, the projects were all above average. The fact that we had a highly successful return can be attributed to the hard work of all of the faculty members and staff, who truly worked miracles to keep our students and research on track through a very difficult time.

I would be remiss if I did not mention the personnel losses that the department suffered as a result of Hurricane Katrina. Professor Richard T. Hart, Chair of Biomedical Engineering for the last nine years, has become the Department Chair and Edgar J. Hendrickson Professor in Biomedical Engineering at Ohio State University (OSU), and Professor Natalia Trayanova is now a professor in the Department of Biomedical Engineering at Johns Hopkins University. It goes without saying that the loss of these productive and popular faculty members is a blow to our department. While no faculty member is irreplaceable, these colleagues will be sorely missed. I am very confident that future faculty members will continue in their tradition of research and teaching excellence.

As you will see, we are retaining many of the traditions that have helped us to develop a top-rated department for undergraduate and graduate education and research. This includes an intensive required year-long research experience (with thesis) for all undergraduates. We are also expanding our students' training in physiology and quantitative physiology, with a one-of-a-kind required class in Human Anatomy and Physiology that includes a Gross Anatomy laboratory. We are modifying our research base and developing new collaborations with our colleagues in the science departments at Tulane University, which will allow us to enrich our research with stronger interdisciplinary interactions. Even though we have had to face enormous challenges, the department is thriving and re-building itself to be better than ever before. I welcome direct communication by email to [donald.gaver@tulane.edu](mailto:donald.gaver@tulane.edu).

Sincerely yours,

Donald P. Gaver, Ph.D.  
Department Chair

## John & Elsie Martinez Endowed Chair in Biomedical Engineering

We are very pleased to announce that Tulane University has established an endowed chair in biomedical engineering in honor of Emeritus Professor John Martinez and his wife, Elsie Martinez. Professor Martinez has had an extraordinarily diverse and productive career at Tulane University, serving as a professor and associate dean in the School of Engineering from 1958-1976, dean of admissions for Tulane College and the Schools of Architecture and Engineering, and the director of planned gifts for central development. Elsie Martinez is a Newcomb College graduate who is a co-author of a book on New Orleans culture and has been an active volunteer for Tulane University, Newcomb College and many New Orleans institutions.

The Martinez Chair was funded through a generous donation by the Schlieder Foundation, with a match by the Louisiana Board of Regents. This chair will be used to recruit a nationally prominent scholar, who will enhance the department's teaching, research and commercialization of new and innovative technologies. We are honored to have this chair dedicated to the Department of Biomedical Engineering, and we are eager to fill this position with an eminent scholar in the near future.

## The "New" School of Science and Engineering

As many of you already know, Hurricane Katrina resulted in fundamental changes to the structure of Tulane University. Biomedical Engineering is now in the new School of Science and Engineering (SSE), which is divided into six divisions. Dr. Nicholas Altiero has remained at the Dean of the SSE. We are a part of the Division of Biological Sciences and Engineering with the Department of Cell and Molecular Biology. This new Academic structure is enormously beneficial to the Department of Biomedical Engineering because of the emphasis on interdisciplinary interactions, and an administrative structure that reduces the overhead associated with these interactions. The sense of engagement in reconfiguring our research and education missions is palpable and we are presently engaged in a strategic planning process to determine "cross-cutting" themes from which to build the SSE. For interdisciplinary science, this unique environment will be far superior to that which existed pre-Katrina. Additional information regarding the School of Science and Engineering can be found in the SSE Annual Report.

## Human Anatomy & Physiology Course

The School of Science and Engineering has developed a new "Independent Learning Center for Anatomical and Movement Sciences" that is an autonomous learning center available to all Tulane students. The Biomedical Engineering Department has modified its curriculum to require each student to take a four-credit course (taught by Professor Mic Dancisak) in Human Anatomy and Physiology that is offered by this center. This course includes a gross anatomy laboratory with hands-on cadaver dissection. The Anatomy and Physiology course precedes the Quantitative Physiology course that is taught by faculty members from the Department of Physiology in the School of Medicine. Together, these courses provide our students with an unparalleled experience for learning anatomy and physiology that we believe will create a foundation for their studies of Biomedical Engineering.

## Research Grants Awarded

### Dr. Darryl R. Overby, Assistant Professor

The American Health Association Foundation (AHAF) has awarded funding to Dr. Darryl R. Overby for his research proposal titled "How Does Segmental Outflow Affect Outflow Resistance?" The two-year award is for \$90,000. The proposed research seeks to investigate whether altered hydrodynamic patterns of aqueous humor outflow from the eye are to blame for elevated intraocular pressure as occurs during glaucoma.

### Dr. Donald P. Gaver, Alden J. 'Doc' Laborde Professor and Chair

The National Institutes of Health's National Heart, Lung and Blood Institute has awarded Dr. Donald P. Gaver a four-year \$1.5 million R01 research grant. This grant will allow Dr. Gaver to use computer simulation tied to experiments to predict low-volume ventilation breathing patterns that can protect the lung from damage in cases of acute respiratory distress syndrome (ARDS). Dr. Gaver will conduct flow experiments in biomimetic pulmonary airways and examine dynamic surfactant transport in model airways using particle image velocimetry (PIV) techniques.

## Alpha Eta Mu Beta Teacher of the Year Award

The undergraduate and graduate students in the Biomedical Engineering Honorary Society, Alpha Eta Mu Beta, annually vote for a faculty member in the department of biomedical engineering to be recognized as the "Teacher of the Year." The 2005-2006 "Teacher of the Year Award" was presented to Associate Professor, Jun-Kyo Francis Suh.



## Welcome New Ph.D. Students

Michael Bambino - BSE 2006  
Cooper Union for the  
Advancement of Science and Art



Steve Folz - BSE 2006  
Case Western Reserve University



Megan Morris - BSBE 2004  
Louisiana State University



Minhua Qiu - BE 2002/MEG 2005  
Fudan University



Ashley Reed - BSE 2005  
Cooper Union for the  
Advancement of Science and Art



Ana Maria Saaibi - BSE 2006  
Tulane University



Heather Vinet - BSE 2006  
Tulane University



## Thank You Dr. Harvey T. Swanson



At the School of Engineering award banquet this past Spring, the department presented a one-time award for outstanding teaching and service to Dr. Harvey T. Swanson. Dr. Swanson was a Professor in the Department of Physiology at the Tulane School of Medicine. He led our undergraduate and graduate course in Quantitative Physiology from 1997-2006. As the course director, Dr. Swanson developed, taught, and coordinated a rigorous sequence to show how the body functions using physics, control theory, systems modeling, biochemistry, and biology. He required the highest standards of performance from himself, his teaching staff, and the students. His dedication to novel pedagogy and the personal touch, energy, and dedication to teaching were hallmarks of this keystone course. Dr. Swanson's career has taken him to new endeavors. We miss him and wish him well.

## *In Memory of Kenneth H. Kuhn, Sr.*

Each year an award is given to recognize the efforts of our biomedical engineering seniors who have participated in a year-long team design project. Under the direction of Professor David A. Rice, design teams are assembled with three or four students who meet with a disabled client from the New Orleans community. During their senior year, each team works to design a device, process, or procedure to help improve the quality of life for their client. From 1993-2005, the teams have been able to count on the assistance of Kenneth H. Kuhn, Sr., our biomedical engineering lab supervisor and teacher. Kenny provided invaluable assistance to our students as they sought to take their ideas and make them into workable devices. We were terribly saddened on December 20, 2005 when Kenny - our friend and colleague - passed away suddenly. In recognition and as a way to remember and honor Kenny's enormous contribution to our students, we have named the senior team design award for him. The "Kenneth H. Kuhn, Sr. Memorial Award" is given annually to the outstanding first place winners of the biomedical engineering senior team design project that integrated the scholarship of discovery, learning and service by applying biomedical engineering to improve quality of life. The recipients of the 2005-2006 Kenneth H. Kuhn, Sr. Memorial Award were Megan Bevill, Tal Drori, Grey Nuttall and Jordan Sangerman, who designed the "Spoon Support and Orientation Device," a feeding device for a ten year old girl with cerebral palsy that will allow her to feed herself with minimal assistance.



*Tal Drori, Jordan Sangerman, Dr. Richard Hart, Megan Bevill and Grey Nuttall*

## *Awards in Biomedical Engineering*

Each Spring, the Tulane School of Engineering and the Society of Tulane Engineers Alumni Association host an awards banquet. The following awards were presented to students in the field of biomedical engineering.

The Tulane Biomedical Engineering Society sponsors a scholastic award that is given to the senior with the highest scholastic grade-point average in Biomedical Engineering. This award recognizes individual achievement in scholarship and service to the department.



**The 2005-2006 honor for the highest grade-point average went to:**  
**Nathaniel C. Lawson**



Alpha Eta Mu Beta, The Biomedical Engineering Honor Society, annually presents an award to the student with the highest scholastic achievement at the end of their junior year.

**The 2005-2006 co-winner of the Outstanding Junior Award were: Emily Florine and Jonathan N. Byrd**

Each year the senior class votes for a member of the class that has contributed most to their class, their school, and their department, which is named after the 1986 recipient Nissim Nathan Cohen.

**The recipient of the 2005-2006 Nissim Nathan Cohen Memorial Award was: Ryan P. Griffin**



Beginning in the 2003-2004 academic year, the department awarded the Joyous and William Van Buskirk partial tuition scholarship to the outstanding senior who is remaining in the 5th year BS-MS program:

**The co-winners of the Joyous and William Van Buskirk Scholarship Award for the 2006-2007 academic year are Natalie R. Guthrey and Lauren Lipuma.**



*Not Pictured: Lauren Lipuma*



The student chapter of the Biomedical Engineering Society (BMES) honors outstanding service as a Teaching Assistant in Biomedical Engineering.

**Based on the vote of undergraduate students in Biomedical Engineering, the 2005-2006 Outstanding Teaching Assistant Award winner was: Sara Rumancik Hoffman**

The Biomedical Engineering faculty annually honors a graduate student with an award based upon achievement in scholarship, independent research, mentoring of fellow students, and/or leadership. **The 2005-2006 Graduate Student Outstanding Achievement Award recipient is Brock M. Tice.** Brock's achievements included six research presentations and two journal articles as well as his leadership in the relocation of Dr. Trayanova's research laboratory to the Washington University during the Fall 2005 semester.



## *Biomedical Engineering Society - Rita Schaffer Award*



Powell M. Kinney has been awarded the Biomedical Engineering Society's (BMES) 2006 Rita Schaffer Undergraduate Award for "outstanding leadership, service and academic achievement." The award, established in memory of former BMES Executive Director Rita Schaffer, is given annually to one undergraduate student from each ABET-accredited biomedical engineering program for outstanding achievement.

**Donations are a great way to show support for the department (and are tax-deductible). All donations will be directed to the BMEN Endowment fund and will be used to provide opportunities to our students that would not otherwise be available.**

## BMEN Student Achievements and Recognition

### 2006 World Congress of Biomechanics Munich, Germany



This past summer, three biomedical engineering graduate students, Brad Smith, Anne-Marie Jacob, and Jerina Pillert, attended the 2006 World Congress of Biomechanics in Munich, Germany. At this conference, they gave poster presentations detailing research completed in Dr. Gaver's biofluids laboratory. Brad Smith studied a computational model of pulsatile flow during airway reopening; Anne-Marie Jacob investigated the effects of airway reopening on epithelial cell tight junctions, and Jerina Pillert experimentally examined the effects of asymmetric ventilation waveforms on surfactant transport.

### Mary McCarty Class of 2006

Selected as one of twelve finalists for the prestigious David S. Bruce Undergraduate Research Award from the American Physiological Society, Mary E. McCarty, presented the first study to examine carbon monoxide's role in soft-tissue trauma at the 2006 Experimental Biology confer-

ence in San Francisco. Miss. McCarty conducted the study with rats in the lab of Dr. Robert A. Johnson, Associate Professor in the Department of Physiology at the Tulane University School of Medicine. Although the research is still preliminary, the team's current findings indicate that using a chemical to block naturally occurring carbon monoxide in tissues could control traumatic bleeding. Ms. McCarty is currently attending the University Of Cincinnati College Of Medicine.



Photo Taken By Paula Burch

### "Kat-5" in the Mojave Desert at the DARPA Grand Challenge

On October 8, 2005, Tulane engineering students including Biomedical Engineering seniors Powell Kinney and Jorge Nagel (and School of Engineering students Matthew Dooner, Ross Kaplan, and Aaron Lee) successfully competed in the 2005 DARPA Grand Challenge as members of Team Gray, funded by Gray Insurance Co., a Metairie based business. The 2005 DARPA Grand Challenge was a race between autonomous robots through the Mojave Desert along a route of 132.2 miles.



The Gray Team fielded an automated vehicle named "Kat-5" that was successfully developed even though the entire team was displaced by Hurricane Katrina just weeks before the competition! The equipment was purchased by Gray Insurance, Co, and the Tulane students worked alongside the company's IT department to modify the silver Ford Escape hybrid SUV with computers, GPS receiver, sweep sensors and solar panels on the roof to serve as an alternative fuel source. Once the course route was defined, each autonomous vehicle was required to find its way across the difficult landscape without any help from the team. The conditions included sandy, rough, bumpy roads and tunnels and dust storms. Kat-5 finished in fourth place, making their way through the desert course in 7 hours and 30 minutes at an average speed of 17.5 mph. Only five teams out of the twenty-three competitors completed the challenge. Team Gray proved that it was a true contender for the \$2,000,000 prize as it was only 37 minutes behind the leader.