BIOENGINEERING DIVISON

ASME
SETTING THE STANDARD

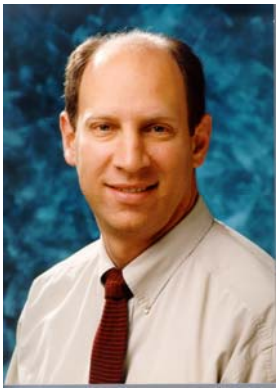
NEWS

ASME INTERNATIONAL BIOENGINEERING DIVISION

SPRING 2007

SPRING NEWS 2007

MESSAGE FROM PAST CHAIR



Louis Soslowsky

It has been both a pleasure and an honor to serve the Bioengineering Division as Chair in 2005-2006. The pleasure has been in working closely with BED colleagues in a collaborative atmosphere and to enhance the reputation of the Division, not only within ASME but also nationally within the bioengineering community At present, the BED represents an extremely exciting, energetic, and thriving group. The honor has been to provide leadership for such an impressive group. My year as chair was an exciting one for BED, and I would like to take this opportunity to share some of the highlights with you.

Our flagship event has become the Summer Bioengineering Conference (SBC) which is now held annually (2006 was the first "even" year for this meeting). The conference, led by Vijay Goel (Conference Chair) and Sohi Rastegar (Program Chair), along with the other organizing committee members developed an exciting program in a beautiful and enjoyable venue. We thoroughly appreciate the feedback obtained from many of you and we look for more as we strive to better serve our membership. Based on this feedback, the BED Executive Committee has decided to continue the

(Continued on page 15)

EDITOR'S MESSAGE

I have the distinct honor of bringing you the first newsletter of 2007. The Bioengineering Division has been quite active during the past year and the 2006 Summer Bioengineering Conference was successful with its new format.

In this issue, we have reports from our technical committees, honors committees and the Journal of Biomechanical Engineering, as well as articles on the division's major accomplishments. I would like to thank all of those individuals who have contributed to the news bulletin and welcome input for future issues.

Please send your comments to:

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UPCOMING EVENTS

2007 Summer Bioengineering Conference
Keystone, CO
June 20-24, 2007

See Page 19 for Additional Details

2008 Summer Bioengineering Conference
Marco Island, FL
June 25-29, 2008

MESSAGE FROM CURRENT CHAIR

Gerard Ateshian

This has been a memorable year for the Bioengineering Division of ASME. Our division continues to thrive, in no small part due to the success of our annual Summer Bioengineering Conference. The enthusiasm and support of our members has been a tremendous asset and ensures that our division will continue to be a thriving and leading organization in the bioengineering community.

After a small dip in attendance following the transition from a biannual to an annual meeting, the Summer Bioengineering Conference attendance is rising again in 2007. Over the years, you have expressed an interest in keeping the size of the conference under control in order to promote greater interactions among attendants. You have also expressed concerns about rising costs of the conference, particularly for students. Conference organizers and the Executive Committee of the division have given high priority to these concerns and efforts are made every year to make the SBC affordable to everyone. This requires a delicate balance between finding agreeable venues for the meeting, including as many meals as possible as part of the registration fee, and reducing audiovisual and publication costs. Whenever possible, we have maintained the registration fee constant over consecutive meeting years; when necessitated, increases have been kept as low as possible.

As most of you know, the amount of volunteer effort devoted by the membership to the organization of the SBC is simply tremendous. From abstract submission and review to local arrangements, from the management of the student competitions to the finances of the division, every aspect of these efforts is the result of countless hours committed by our members toward the benefit of our bioengineering community. On behalf of the leadership of the division, I would like to thank you all for your dedication and contributions. Thanks to the efforts of the conference chairs over the past years, we have also been very fortunate to receive funding from the Whitaker Foundation, the National Science Foundation, and the National Institutes of Health. The Bioengineering Division has been held up as a notable success story within our larger ASME society.

I realize that a few nagging issues continue to plague us, most notably, the requirement for submitting a signed and scanned copyright form at the time of abstract submission. This submission is a legal requirement imposed upon us by ASME. It causes untold headaches, not only for corresponding authors who have to scramble to collect signatures from their coauthors under the pressure of a deadline, but also for conference organizers who have to review the completeness of the forms and request revisions when necessary. This process causes hardships and delays in the preparation of the program and the timely notification of authors on the status of their submission. ASME has offered to perform this review for a fee, but the BED leadership has been concerned about the increased cost that would have to be passed along to the conference registration fee. Over the years, the Executive Committee has battled the ASME Publications committee over this matter but we have been countered by legal arguments that we have not been able to overcome. However, I assure you that we will continue to wrestle with this matter to make sure that ASME understands the concerns of its membership and adapts to modern times by creating an electronic copyright form.

To accommodate the increasing interest and member participation in the BED, the Executive Committee was expanded this year to include two new members, bringing the total membership to ten voting members. These are the Member in Charge of Student Affairs and the Member at Large. Furthermore, the position of Secretary Elect has been changed to a voting membership. In addition to providing greater oversight of the various activities of the division, this expansion also allows a larger number of members to assume positions of leadership, thus enriching the division and providing better continuity over the years. The division has also created a Student Paper Competition committee to formalize these student-related activities.

MESSAGE FROM CURRENT CHAIR (CONT)

I am also very pleased to announce that the Executive Committee has selected a new Technical Editor for the ASME Journal of Biomechanical Engineering, to succeed Dr. Frank P. Yin whose term ends in June 2007. Dr. Michael S. Sacks, William Kepler Whiteford Professor of Bioengineering at the University of Pittsburgh, will be assuming the editorship of JBME from July 2007 to June 2012. Dr. Sacks is a preeminent researcher in the field of quantification and modeling of the structure-mechanical properties of native and engineered soft tissues, with a focus on tissues of the cardiovascular and urological systems. He is an upstanding member of the Bioengineering Division, having served in several leadership positions. I am very pleased that he has agreed to serve in this extremely important role for BED, and look forward to his tenure.

I would like to thank Dr. Yin for his excellent leadership and contributions to the journal. During his tenure the impact factor of the journal increased from 1.37 to 1.75; the number of submitted papers increased from 162 to 401 per year; the journal has become more selective, decreasing its acceptance rate from 50% to less than 33%; the time from submission to publication has decreased from 16.4 to 8.8 months; and the international profile of the journal has been raised substantially, with increasing submissions from overseas and greater international representation among Associate Editors. On behalf of the Bioengineering Division, I would like to express our deep gratitude to Dr. Yin for his excellent achievements.

Last but not least, while I have reflected mostly on the positive events and activities of this past year, it is with great sadness that we mourn the loss of a BED member, Kevin Granata, who was a Professor of Engineering Science & Mechanics at Virginia Tech, and was a victim of the senseless tragedy that befell this institution earlier this year. Kevin is remembered by his friends and colleagues as an outstanding biomechanics researcher, specializing in dynamics and controls, a great teacher and mentor, a devoted husband and father, and a fantastic colleague and friend.

I have been honored to serve as Chair of the Bioengineering Division over this past year. This unique opportunity has been an enriching experience and I have been especially touched by the dedication and commitment of all the division members toward the good of our community. It is with great expectation that I pass the baton to Professor James E. Moore of the University of Texas A&M, who will be assuming this position in July 2007.

Gerard A. Ateshian

HONORS COMMITTEE

The Honors Committee is responsible for administering the awards activities of the Bioengineering Division (BED) of the American Society of Mechanical Engineers (ASME). These duties include the awarding of the ASME H.R. Lissner Medal, ASME Van C. Mow Medal, ASME Y.C. Fung Young Investigator Award, BED Richard Skalak Best Paper Award (ASME Journal of Biomechanical Engineering), BED Student Undergraduate and Graduate Paper Awards and ASME Fellow Awards. At the 2006 Summer Bioengineering Conference held on Amelia Island, Florida, awards were presented to the following individuals: H.R. Lissner Medal was presented to Peter A. Torzilli, Hospital for Special Surgery-Weill Medical College of Cornell University, for outstanding accomplishments in the area of bioengineering; Van C. Mow Medal was presented to Robert Lie-Yuan Sah, University of California, San Diego for contributions to bioengineering research, education, mentoring, leadership and society service; Y.C. Fung Young Investigator Award to Beth Ann Winkelstein, University of Pennsylvania, for substantial contributions to the field of bioengineering; Skalak Best Paper Award (JBME, v.127, 2005) to Thomas B. Owatverot, Sara J. Oswald, Yong Chen, Jeremiah J. Wille and Frank C-P Yin, Washington University, for their paper *Effect of Combined Cyclic Stretch and Fluid Shear on Endothelial Cell Morphological Responses;* ASME Fellow to Barry Lieber, University of Miami. Winners of the Student Paper Awards can be found elsewhere in the Newsletter.

Peter A. Torzilli, Chair

Front: Albert King, Dawn Elliot, Beth Winkelstein, Bruce Simon, Back: Gerard Ateshian, Peter Torzilli, Louis Soslowsky

Peter Torzilli and Van C. Mow

Louis Soslowsky, Vijay Goel, Sohi Rastegar

Photographs from the banquet at the 2006 Summer Bioengineering Conference.

2006 H.R. LISSNER MEDAL

1977 Robert W. Mann
1978 Y.C. Fung
1979 Robert F. Rushmer
1980 F. Gaynor Evans
1981 Max Anliker
1982 R.M. Kenedi
1983 Henning E. von Gierke
1984 Perry L. Blackshear
1985 Richard Skalak
1986 Albert H. Burstein
1987 Van C. Mow
1988 Alf Louis Nachemson
1989 Robert M. Nerem
1990 Albert B. Schultz
1991 Savio Lau-Yuen Woo
1992 John C. Chato
1993 Don P. Giddens
1994 Sheldon Weinbaum
1995 Robert E. Mates
1996 Albert I. King
1997 Ajit P. Yoganathan
1998 Malcolm H. Pope
1999 Stephen C. Cowin
2000 Morton H. Friedman
2001 W. Michael Lai
2002 Kenneth R. Diller
2003 Vijay K. Goel
2004 John M. Tarbell
2005 Steven A. Goldstein
2006 Peter A. Torzilli

Peter A. Torzilli

The H.R. Lissner Medal recognizes accomplishments in the area of bioengineering in the form of: significant research contributions; development of new methods of measuring; design of new equipment and instrumentation; educational impact in the training of bioengineers; or service to the bioengineering community and/or the ASME Bioengineering Division. The award was established by the Bioengineering Division in 1977 and operated as a division award until 1987 when it was elevated to a Society award.

Peter A. Torzilli, Ph.D., is a Senior Scientist in the Research Division in the Hospital for Special Surgery and Professor of Applied Biomechanics in Orthopaedic Surgery, Department of Orthopaedics, Weill Medical College of Cornell University. He received an associate's in applied science degree in engineering science from Nassau Community College in 1965, his bachelor's of engineering degree in engineering science from the SUNY at Stony Brook in 1967, and his master's of science and doctorate degrees in mechanics from Rensselaer Polytechnic Institute, Troy, NY in 1970 and 1974, respectively. Dr. Torzilli's principal research interest is in studying the mechanobiology of articular cartilage in health and disease, and the role of mechanical stimuli in the development of osteoarthritis. Current areas of research activity include studying the interaction between mechanics and inflammation and how matrix deformation affects enzyme kinetics. He has more than 100 publications in these areas and has made significant contributions to joint biomechanics which led to improved techniques for the clinical diagnosis and treatment of soft tissue injuries resulting from sports trauma. He received numerous awards including the O'Donoghue (American Society for Sports Medicine) and Neer (Shoulder and Elbow Surgeons) Awards. A Fellow of ASME, Dr. Torzilli has had a long history of service to the Bioengineering Division. He has chaired numerous committees, served as editor for the BED Newsletter (1977-1983) and Joint Biomechanics Symposiums (1987, 1989), and as an Associate Technical Editor for the Journal of Biomechanical Engineering (1992-1998).

Albert I. King, Chair

Albert King, Peter Torzilli and Louis Soslowsky

2006 VAN C. MOW MEDAL

2005 Kyriacos A. Athanasiou

2006 Robert Lie-Yuan Sah

Robert Sah, Van C. Mow, and Peter Torzilli

Robert Lie-Yuan Sah

The Van C. Mow Medal is bestowed upon an individual who has made significant contributions to the field of bioengineering through research, education, professional development, leadership in the development of the profession, as a mentor to young bioengineers, and with service to the bioengineering community. The individual must have earned a Ph.D. or equivalent degree between ten and twenty years prior to June 1 of the year of the award. The award was established by the Bioengineering Division in 2004.

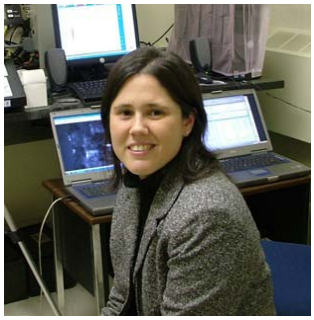
Dr. Sah joined the faculty of the University of California, San Diego in 1992, and he is currently Professor and Vice Chair of the Department of Bioengineering. Dr. Sah received his S.B. and S.M. degrees in electrical engineering in 1983 and his Sc.D. in medical physics in 1990, all from the Massachusetts Institute of Technology. He received the M.D. from Harvard Medical School in 1991. Dr. Sah's group has elucidated load-bearing and low-friction properties of articular cartilage, contributed to the emerging mechanobiology-paradigm of joint lubrication, and introduced the design of cartilaginous tissue implants with a biomimetic lubricant-secreting surface zone. Over the past ten years, he has been a faculty advisor to the UCSD undergraduate student chapter of the national Biomedical Engineering Society (BMES) which received recognition from BMES for Meritorious Achievement in 2004 and 2005, and it held the first ever Bioengineering Quiz Bowl in 2006 at UCSD. Dr. Sah received the 2005 UCSD Outstanding Mentor Award in Sciences and Engineering. Dr. Sah is the recipient of the Arthritis Foundation Hulda Irene Duggan Investigator Award, the National Science Foundation Young Investigator, and the Anne Doner Vaughan Kappa Delta Award as well as the Young Investigator Kappa Delta Award from the American Academy of Orthopaedic Surgeons. In 2006, he was named Professor of the Howard Hughes Medical Institute. Dr. Sah served as Chair of the Gordon Research conference and he is on the executive board for the International Cartilage Repair Society and editorial advisory boards for Arthritis and Rheumatism and Journal of Orthopaedic Research.

John M. Tarbell, Chair

2006 Y.C. FUNG YOUNG INVESTIGATOR AWARD

1986 Mark H. Holmes
1987 Steven A. Goldstein
1989 David N. Ku
1990 Jay D. Humphrey
1991 Michael Kwan
1992 Cheng Zhu
1993 John A. Frangos
1994 Mehmet Toner
1995 Cheng Dong
1996 Antony Keaveny
1997 Gerard A. Ateshian
1998 Louis J. Soslowsky
1999 Rebecca Richards-Kortum
2000 Farshid Guilak
2001 David F. Meaney
2002 Jeffrey A. Weiss
2003 Sangeeta N. Bhatia
2004 Richard E. Debski
2005 Jeffrey W. Holmes
2006 Beth Winkelstein

Bruce Simon, Beth Winkelstein, and Louis Soslowsky



Beth Winkelstein

The Y.C. Fung Young Investigator Award is given to a young investigator who is under 36 on or before June 1 of the year of the nomination, and has received a Ph.D. or equivalent bioengineering degree within seven years prior to their nomination. The individual must be committed to pursuing research in and have demonstrated significant potential to make substantial contributions to the field of bioengineering. Such accomplishments may take the form of, but are not limited to, design or development of new methods; equipment or instrumentation in bioengineering; and research publications in peer-reviewed journals. The award was established by the Bioengineering Division in 1985 and operated as a division award until 1998 when it was elevated to a Society award.

Beth A. Winkelstein is an Assistant Professor of Bioengineering at the University of Pennsylvania and holds an appointment in the Department of Neurosurgery. She received her BSE in Bioengineering from the University of Pennsylvania in 1993, earned a PhD in 1999 from Duke University (Biomedical Engineering) and joined the faculty at Penn in 2002, following a post-doctoral fellowship at Departments of Anesthesiology, Pharmacology and Toxicology of the Dartmouth Medical School. Dr. Winkelstein's research interests include spine biomechanics, mechanisms of painful neck injuries, mechanical and cellular mechanisms of pain onset and persistence, CNS neuroimmune responses of pain, and defining the relationship between tissue injury mechanics and the physiology of pain. She has received research grants from the Whitaker Foundation, NSF, NHTSA, CDC, and NIH. She has published over 25 full-length scientific papers, 36 abstracts and 6 book-chapters, and served as primary research mentor for 27 undergraduate and graduate students, and medical fellows. Dr. Winkelstein's research has been recognized by awards from the Stapp Association and the Medtronic Sofamor-Danek Award given by the International Society for the Study of the Lumbar Spine. She has served as the faculty advisor for the student chapter of the Society of Women Engineers since 2003. Dr. Winkelstein has been involved in organization of scientific sessions for meetings of the ASME-BED, BMES, and World Congress of Biomechanics.

Bruce R. Simon, Chair

SBC2006—STUDENT PAPER COMPETITION

The 2006 Student Paper Competition at the Summer Bioengineering Conference again presented a significant number of strong research projects from our students. Papers were submitted by 146 students – with the submission deadline being set before the general abstract deadline. 132 papers were accepted for the conference and were divided into groups based on student level (BS, MS, and doctoral) as well as technical area. All papers received an initial review, and the top papers were then judged on site to determine the final award recipients. Both the written and the oral scores were factored into the final rankings. $7800 in award money was made available for this competition by the Bioengineering Division of ASME.

In addition to the strong student participants, a large team of 55 judges were key to the success of these competitions – both in the pre-conference review of the written abstracts and in the on-site evaluation of the students' presentation skills. These judges were led by a great team of student competition co-chairs:

Doctoral Level
Beth Winkelstein (University of Pennyslvania) and James Iatridis (University of Vermont)

Master's Level
Matthew Gounis (University of Massachusetts)

Bachelor's Level
Sheldon Wang (New Jersey Institute of Technology)

The review of the 2007 student paper competition entries will begin soon after the abstracts are submitted in June. If you would like to volunteer to participate as a judge – during the pre-conference evaluation, at the conference, or both – please contact Matthew Gounis, 2007 Student Paper Competition Chair, at:

Matt.Gounis@umassmed.edu.

We encourage past student award winners to volunteer and participate in order to give back to the program that supported you in the past.

Michele J. Grimm, Chair

Doctoral Level Podium Competition – Biofluids and Imaging		
1st Place	Rashmi Raghu	Stanford University
2nd Place	Rui Zhao	Carnegie Mellon University
3rd Place	Lingli Liu	University of Colorado - Boulder
Honorable Mention	Rui Wang	University of Colorado - Boulder
Honorable Mention	Hyun Jin Kim	Stanford University
Honorable Mention	Devesh Amatya	University of Minnesota
Doctoral Level Podium Competition – Solid Mechanics, Design, and Rehabilitation		
1st Place	Raymond Hubbard	University of Pennsylvania
2nd Place	Jennifer Currey	University of Pennsylvania
3rd Place	Stephanie Perry	Renssellaer Polytechnic Institute
Honorable Mention	Simon Tang	Renssellaer Polytechnic Institute
Honorable Mention	Craig Duvall	Georgia Institute of Technology
Doctoral Level Podium Competition – Tissue Engineering and Cellular Biomechanics		
1st Place	Christopher Wilson	Georgia Institute of Technology
2nd Place	Stefano Oberti	Swiss Federal Insitute of Technology - Zurich
3rd Place	W. David Merryman	University of Pittsburgh
Honorable Mention	Triantafyllos Stylianopoulos	
Honorable Mention	Megan Oest	Georgia Institute of Technology
Honorable Mention	Charles Anderson	Stanford University

Doctoral Level Poster Competition – Biofluids and Imaging		
1st Place	Jaehoon Seong	University of Miami
2nd Place	Alex Barker	University of Colorado - Boulder
3rd Place	Sarah Vigmostad	University of Iowa
Honorable Mention	Taehong Kim	Texas A&M University
Honorable Mention	Kevin Johnson	Georgia Institute of Technology
Doctoral Level Poster Competition – Solid Mechanics, Design, and Rehabilitation		
1st Place	Paul Briant	Stanford University
2nd Place	Srinidhi Nagaraja	Georgia Institute of Technology
3rd Place	William Francis	Southwest Research Institute
Honorable Mention	Niamh Nowlan	University of Dublin - Trinity College
Honorable Mention	Heather L. Guerin	University of Pennsylvania
Doctoral Level Poster Competition – Tissue Engineering and Cellular Biomechanics		
1st Place	Michael Evans	University of Minnesota
2nd Place	Louise McMahon	University of Dublin - Trinity College
3rd Place	Victor Nirmalanandhan	University of Cincinatti
Honorable Mention	Margaret Julias	Rutgers University
Honorable Mention	Tao Jiang	University of Virginia

Master's Level Competition – Biofluids and Tissue Engineering		
1st Place	Thanh Huynh	University of Alabama - Birmingham
2nd Place	Koustubh Ashtekar	University of Cincinatti
3rd Place	Ariel Hanson	North Carolina State University
Honorable Mention	Dilek Tansoy	Northeastern University
Honorable Mention	Michael Wybenga	University of Waterloo

Master's Level Competition - Design		
1st Place	Kyle Bialczak	University of Louisville
2nd Place	Angela Knight	University of Louisville
3rd Place	Vega Lee	University of Western Ontario
Honorable Mention	Jiali Wang	Florida International University
Honorable Mention	Nicholas Jardine	North Carolina State University

Master's Level Competition – Solid Mechanics		
1st Place	Cathryn Peltz	University of Pennsylvania
2nd Place	Angela Kedgley	University of Western Ontario
3rd Place	Cheryl Dunham	University of Western Ontario
Honorable Mention	Aoife Connolly	University College - Dublin
Honorable Mention	Joseph Iaquinto	Virginia Commonwealth University

Bachelor's Level Competition – Biofluids, Imaging, and Cellular Biomechanics		
1st Place	An Nguyen	University of Pennsylvania
2nd Place	Allison Finger	North Carolina State University
3rd Place	Andrea Para	Georgia Institute of Technology
Honorable Mention	Philip Bransford	University of Minnesota
Honorable Mention	Piyush Bajaj	Purdue University

Bachelor's Level Competition – Solid Mechanics, Design, and Rehabilitation		
1st Place	Timothy Ficklin	Cal-Poly San Luis Obispo
2nd Place	Michael Anderson	University of Pittsburgh
3rd Place	Tara Hansen	Michigan Tech University
Honorable Mention	Harsha Tummala	University of California - Berkeley
Honorable Mention	Jami Saffioti	Rowan University

PROMOTION TO ASME FELLOW

Barry B. Lieber, Ph.D. – 2005

Dr. Lieber's career spans more than 18 years during which he published 45 refereed journal papers, more than 140 conference proceedings, three book chapters, is on the editorial board of Critical reviews of Biomedical Engineering and a co-editor of a book series on neurovascular disease. Dr Lieber secured more than $8M in research funds from private and federal sources as a PI and co-investigator. Dr. Lieber holds two patents and in addition applied for 4 more patents that are at various stages of processing and is serving currently or served in the past as consultant to various medical device companies such as Embolic Protection Inc, Cordis Neurovascular, Target Boston Scientific and Microvention. Dr. Lieber has been an active ASME member since 1987. He was active in the Bioengineering technical committees of Fluid Mechanics, Honors, and Education the last 18 years and helped organize technical sessions. He was the Chair of the Fluids committee of the Bioengineering division of ASME from 2001-2003; was the Bioengineering program Representative to IMECE in 2001; and chaired the Bioengineering IMECE program committee in 2003.

Gerard A. Ateshian, Ph.D. – 2006

Gerard Ateshian is a leading authority in the field of cartilage mechanics and biotribology, joint mechanics and imaging, soft tissue mechanics and transport, cell mechanics, and tissue engineering. His work spans the range from sophisticated theoretical analyses of biological tissues using mixture theory, to exquisite experimental techniques for analyzing tissues and cells, and engineering tissue constructs. He is a highly active member of the ASME Bioengineering Division, currently serving as the division chair. He also serves on the editorial boards of three major journals in biomechanics and orthopedic research. Columbia University, Ph.D., 1991, Mechanical Engineering

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C. Ross Ethier, Ph.D. – 2006

Has made fundamental contributions to understanding the role of biomechanical factors in the pathogenesis of glaucoma (the second most common cause of blindness), ranging from development of new techniques for studying fluid flow in the eye to finite element modeling of how mechanical factors lead to nerve death in glaucoma. Has made important contributions to computational modeling of blood flow and mass transfer in large arteries, the integration of medical imaging techniques with patient-specific blood flow simulations, and the role of biomechanical factors in arterial disease. Is lead author of a comprehensive teaching textbook in biomechanics. Mass Inst of Technology, Ph.D., 1986, Mechanical Engineering

PROMOTION TO ASME FELLOW

Kai-Nan An, Ph.D. – 2006

Dr. K. N. An's career spans 30 years at the Mayo Clinic. He has used his knowledge and expertise in mechanical engineering and applied mechanics to the research and development of the human musculoskeletal system based on experimental and analytical approaches. He has developed and assessed numerous devices for joint implant replacement, fracture fixation and soft tissue reconstruction. These approaches and devices benefit the diagnoses and treatments of musculoskeletal disorders and injuries.

John C. Bischof, Ph.D. – 2006

The bioheat and mass transfer laboratory at the University of Minnesota under the direction of Dr. Bischof is dedicated to the thermophysical and biological study of systems after thermal manipulations (i.e. heating or cooling). This work is broadly in the scientific areas of cryobiology (low temperature biology) and hyperthermic biology and impacts the following applications: Dr. Bischof's work focuses on basic aspects of thermal injury as well as applied work in the characterization and development of devices for preservation and destruction using heat or cold.

NEW DIRECTIONS COMMITTEE

The New Directions Committee has been revived in the BED. This is a great committee to serve on because it requires brainstorming new ways of both strengthening the BED and enabling the BED to better fulfill its mission. During the past year, the committee has met on two occasions including the recent 2006 Summer Bioengineering Conference and has made a number of recommendations to the Executive Committee.

One primary recommendation is to strengthen the Journal of Biomechanical Engineering. Arguably our main competitor is the Journal of Biomechanics. There is some dissatisfaction with this journal because of an unrealistically low mandatory word count of 3000 words and lack of consistency in categorizing papers with technical content. Accordingly this presents JBME with an opportunity. To capitalize on this opportunity, the committee recommends making JBME more attractive by decreasing turn around time, increasing the page count, and allowing manuscripts with primarily technical content to be published as full-length articles.

Another recommendation is to broaden the scientific content of the now Annual Summer Bioengineering Conference. One means of accomplishing this is to give each technical committee the ability to invite a keynote speaker who would talk on a subject which is complementary, but not directly related, to the activities of that technical committee. This would promote 'cross pollination' of ideas outside the technical committee discipline.

With the launch of the new Journal on Medical Devices, it seems important to establish stronger ties with industry because many devices are developed in an industrial setting. To establish stronger ties, the BED could organize an outreach program to industry which might consist of workshops sponsored by BED at industry events such as trade shows. Also the BED could invite high level industry executives as keynote speakers.

As a final note to the membership, if anyone has any ideas for either new directions or changes in the operations of the BED, then please pass them along to this committee. The input of all is encouraged and will be appreciated.

Maury Hull, Chair

MEMBERS AFFAIRS

The member affairs representative to the executive committee is responsible for supporting member activities within the division. The current membership of the Bioengineering Division is 2269 ASME members who consider it their primary division.

During my tenure as member affairs representative, I hope to see more Bioengineering division members promoted to ASME fellow grade. The Fellow Grade is the highest elected grade of membership within ASME, the attainment of which recognizes exceptional engineering achievements and contributions to the engineering profession. The basic requirement is a minimum of 10 years of active service to ASME. The nomination form is easy to fill out. If you know of someone who qualifies please go to the ASME fellow website at http://www.asme.org/Governance/Honors/Fellows/Fellows.cfm

In addition, please let me know of your nomination so that I can follow up with an announcement of the members upgrade in the newsletter and at the Annual Summer meeting.

Rita Patterson, Chair

MESSAGE FROM PAST CHAIR (CONT)

recent tradition of alternating conference sites between mountain and beach venues. Therefore, we return to the mountains this year for the SBC that is being organized by Jimmy Moore, Conference Chair, and Ross Ethier, Program Chair. The 2008 SBC will be held back at the beach on Marco Island, Florida (our first time on the Gulf Coast of Florida) on June 25-29, 2008 and will be Chaired by Barry Lieber. Please see the initial Call for Papers for these meetings in this Newsletter and I hope to see you there!

At the 2006 SBC, we initiated a new event called the BED Leadership Development Lunch. Members of the Executive Committee and the Chairs of all of our various Committees were asked to nominate junior individuals, just a few years beyond their PhD degrees (or similar), who had the potential to become future leaders in our field. Twenty such individuals, on a first-come first-serve basis, were invited to lunch with four current members of the Executive Committee where truly inspiring discussions on the current state and future plans for the BED were discussed. The ideas brought forth and discussed were really exciting and innovative. The Executive Committee has been discussing these ideas and is developing some initiatives based on the input and advice and of these junior leaders. Ideas ranged from mentoring programs to educational initiatives, to career guidance and fairs, to collaborative opportunities. We expect to hold this event again next year, so please think about individuals you'd like to nominate. We should be proud that we are the bioengineering society that provides forums and leadership opportunities for junior members of our community in an active manner.

Another new and exciting initiative from this past year was the development of a new journal in collaboration with the Design Division, the Journal of Medical Devices. The initial Co-Editors will be Art Erdman from the University of Minnesota and Jerry Miller from Virginia Commonwealth University, both active members of BED over the years. The area of biomedical devices is rapidly exploding and the need for a journal focused in this area was deemed a high priority. The first issue of this new journal will be published in 2007 with Volume 1! Please submit your best papers in this area to our new Journal.

The discussions on restructuring of ASME continues. Our society continues to decentralize and division structures are being re-evaluated with some joining forces to form self-managing groups called Institutes. Over the past year BED has kept its options open about joining an Institute. We will continue to monitor developments carefully in the coming year so that the Division is best positioned to serve the membership, while remaining a strong functioning entity within the greater ASME and bioengineering communities.

My service as Chair has been particularly rewarding because of the important programs and opportunities we have been able to initiate and implement. As I passed the leadership to my successor Gerard Ateshian, I am profoundly grateful to all of those who served in the many capacities to make our Division so successful. It has been my privilege to serve along side each one of you.

Louis J. Soslowsky

FLUID MECHANICS COMMITTEE

At the 2006 Summer Bioengineering Conference held at Amelia Island Plantation, FL, the Biofluids Committee organized sessions under 5 programmed themes. At the conference the Biofluids Committee hosted 6 sessions with a total of 34 abstracts. Two sessions were jointly hosted with the Solids Committee of BED. Nine posters from the Biofluids Committee were included in the poster session. The Biofluids Committee also contributed to all levels of the student paper competition.

The Committee members continue to show interest in diverse areas of biofluid mechanics, including those related to:

- Imaging in biofluid mechanics
- Fluid mechanics of prosthetics
- Cardiovascular mechanics
- Fluid mechanics in healthy and pathological states
- Cellular and molecular fluid mechanics
- Biotransport and drug delivery

The programming for the coming 2007 Summer Bioengineering Conference is arranged according to these overarching themes. In addition, efforts are being made to increase our programming with other technical committees, including the Solids Committee and the K-17 Technical Committee, by jointly sponsoring fluid/structure interaction, mass transfer, and other pertaining sessions/symposia. To that end, a significant number of the Biofluids Committee members serve as liaisons between our committee and other technical committees with whom we share interests. These members report on other committees' plans and help in developing coordinated efforts.

Elections were conducted for a new Vice-Chair of the Committee, and David Steinman was elected for the position.

We are continuing our efforts to increase the active membership of the Biofluids Committee, especially our newer colleagues (postdocs and new investigators) to ensure a strong future. We invite all with interests in biofluid mechanics to participate in our next Committee meeting, which will be held during the 2007 Summer Bioengineering Conference. Please contact Danny Bluestein (danny.bluestein@sunysb.edu) for further details.

HEAT & MASS TRANSFER IN BIOTECHNOLOGY COMMITTEE

The final SBC 2006 program had 4 themes which resulted in 6 podium sessions organized by K17 (33 papers). In addition 7 papers were accepted as posters in the general poster sessions and 5 papers were in the Ph.D and 1 in the M.S. Student Poster Competition. The podium sessions were: Mass Transfer in Cells and Organs, Biological Flows and Biopreservation, Modeling in Biothermal Therapy, Biothermal Therapy, Thermal/ Chemical Processes Mass Transport in Biosystems, Drug Delivery and Biotherapeutics.

Planning for a Biotransport meeting has begun for 2008. This meeting will take place in Minneapolis, MN in May. The format of this meeting will be patterned after the Allerton Meetings. Briefly, themes for this meeting will center on biopreservation and thermal therapies including talks on Biological Thermodynamics and Fundamentals of Bioheat and Mass Transfer. Request for information can be directed to Dr. John Bischof, bischof@umn.edu.

Announcements:
Virginia Tech a began a Summer Institute for Quantitative and Integrative Bioengineering (SIQIB). More information can be found on the NSF website:

http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0609225

This is a program for both undergraduate and graduate students. Please encourage your students to consider this program.

Charles Lee, Chair

Preliminary Announcement

Mark Your Calendars!

2008 Summer Bioengineering Conference

Marco Island, Florida

June 25-29, 2008

The Bioengineering Division of the American Society of Mechanical Engineers cordially invites you to attend the 2008 Summer Bioengineering Conference. An outstanding scientific program has been planned, including Plenary Lectures, Symposia, Workshops, and Student Competitions. Both oral and poster sessions will be presented in spectacular surroundings. Marco Island is a world-class resort with miles of pristine beaches, archaelogical sites, several National Parks and the Everglades in its vicinity (http://www.marco-island-florida.com/).

Further information about the meeting will be available via: **http://divisions.asme.org/bed/events**

Student Paper Competition: Abstracts are solicited for student paper competitions at the levels of BS, MS and PhD. Students selected for the competition will be able to present their work in sessions where only student presentations are given – both in dedicated student poster sessions and in highlighted PhD oral sessions. Cash awards will be made to the top papers at each level in multiple technical areas. Funds are being sought that would allow for reduced conference registration for Student Paper Competition participants. In addition, conference organizers are currently negotiating for reduced lodging costs for all students attending the conference. Further information and instructions for the submission process is available at: **http://divisions.asme.org/bed/events/stu_comp07.htm**

Important dates:

Anticipated Submission deadline for two-page abstracts: January 31, 2007

Conference Chair:	**Program Chair**:
B. Barry Lieber Ph.D.	David Vorp, Ph.D.
University of Miami	University of Pittsburgh

JOURNAL OF BIOMECHANICAL ENGINEERING

The Journal of Biomechanical Engineering is doing well!

A large increase in the number of submissions occurred last year and the journal published 1230 pages in seven issues, including a special issue on medical devices in November, 2005. ASME increased the Journal's allotment of pages to 1000 last year and it was exceeded by the end of the year.

The average number of pages per article has now exceeded 9 (9.4 last year). However, the net income to ASME from JBME dropped considerably due to the decrease in subscriptions. The impact factor also dropped from 1.62 in 2003 to 1.29 in 2004. No hypotheses have been proposed for this sudden drop, but hopefully it is only temporary. (The impact factor for the *Journal of Biomechanics* also dropped from 2 to 1.91 while the impact factor for *Annals of Biomedical Engineering* increased). In addition, JBME has no significant backlog, unlike the Journal of Biomechanics and the international visibility of the journal has been increased by enlisting more associate editors from overseas.

This year the journal has plans to publish another special issue on medical devices but it might come out as the first issue of a new journal: *Journal of Medical Devices*.

Several associate editors' terms have ended. To handle the workload, some associate editors had their terms renewed and new associate editors have joined the journal.

Frank Yin's term as editor ends on June 30, 2007 and the new technical editor for the Journal of Biomechanical Engineering will be Michael Sacks.

Frank C. P. Yin, Editor

TISSUE AND CELLULAR ENGINEERING COMMITTEE

At the 2006 SBC in Amelia Island, FL, there were a total of fifty-five papers that were presented in six podium sessions and two poster sessions. Sessions ranged from Technological Applications in Cell Engineering to Tissue Engineering/ Biomechanics: Bioreactors.

The Committee is strategizing to become better integrated with the other Technical Committees. Toward this goal, we plan to have an overlap meeting with K17- Heat & Mass Transfer in Biotechnology at the next meeting to plan sessions in areas of mutual interest (including biopreservation and biotherapeutics). Themes for the 2007 SBC include Physical Effects on Cells, Cell Biomechanics, Molecular Biomechanics and Tissue Engineering. We anticipate a workshop in the area of Microfluidics/BioMEMS with applications in cell mechanotransduction and motility.

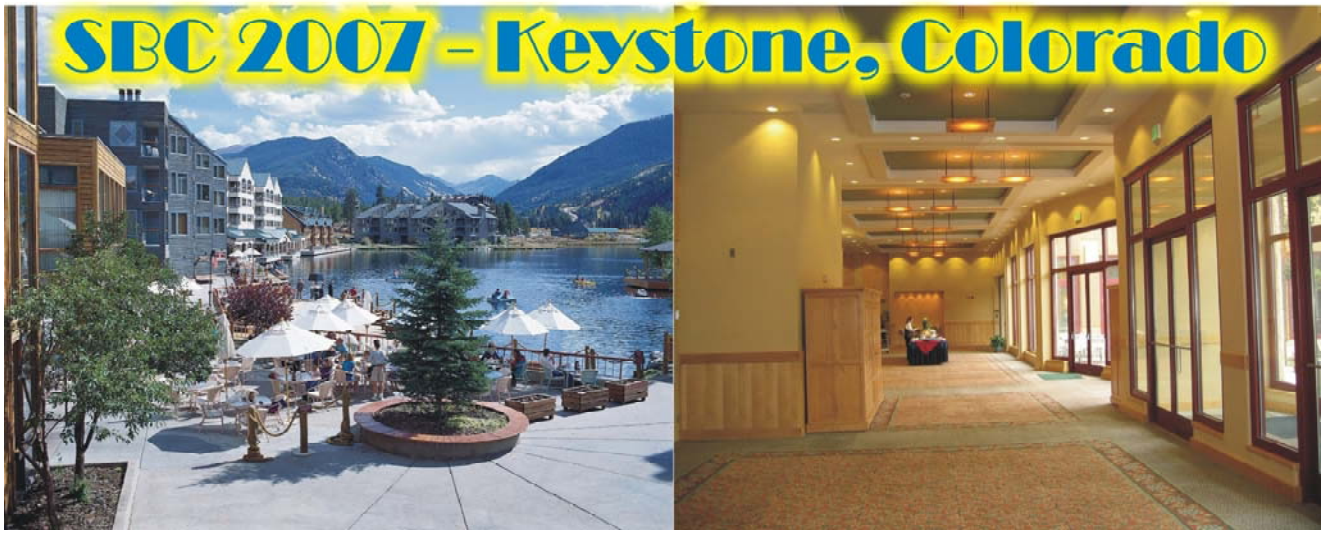
Clark Hung (Columbia University) assumed the chair of the committee and Dan Nicolella (Southwest Research Institute) was elected vice-chair.

Clark T. Hung, Chair

2007 SUMMER BIOENGINEERING CONFERENCE

Keystone Conference Center, Keystone, Colorado

June 20-24, 2007



Start your summer in the mountains and enjoy the stunning scenery and amenities at Keystone, Colorado's most acclaimed Rocky Mountain resort and conference center, and experience a great Summer Bioengineering Conference!

An easy drive from Denver, Keystone offers many recreational activities: golf, mountain biking, hiking, horseback riding, fly-fishing, whitewater rafting, festivals, films, and concerts, to name just a few. Keystone and the surrounding area are well known for their wide array of shops, restaurants and accommodations to suit any taste and every budget.

As in the past, the meeting will feature a student-friendly casual atmosphere with outstanding plenary speakers, original science, Student Paper competitions, educational opportunities, and ample free time to enjoy the venue.

Conference Chair:

James E. Moore Jr., Ph.D.
Texas A&M University

Program Chair:

C. Ross Ethier, Ph.D.
University of Toronto

EDUCATION COMMITTEE

The Education Committee hosted two sessions at the 2006 SBC in Amelia Island. A workshop was held on the first morning of the conference that focused on the NIH/NSF Bioengineering and Bioinformatics Summer Institutes. The workshop featured invited presenters from current and future institutes including those at the New Jersey Institute of Technology, Penn State, and VPI, and generated good interest despite the early bird start. A second workshop was held on problem based learning in biomedical engineering education.

A number of sessions will be held during the 2007 SBC in the following areas: bioengineering ethics in education, industry versus academic perspectives on bioengineering education (to be held in a controlled but confrontational arena!), and new textbooks and other resources for undergraduate education. Stay tuned to conference announcements for more details on these sessions.

As of the 2006 SBC, Dr. Jeffrey Holmes completed his tenure as chair of the Education Committee. Dr. Jeffrey Bischoff, a research engineer at Zimmer Inc. in the area of computational biomechanics, was appointed as new chair, and Dr. Mohammad Mofrad, Assistant Professor of Bioengineering at UC Berkeley in the area of cardiovascular mechanobiology, was appointed as vice-chair.

The committee constitution continues to grow, and we welcome new members. In particular, we are eager to increase undergraduate and graduate student involvement. If you are interested, please contact Jeff (jeff.bischoff@zimmer.com).

Jeffrey Bischoff, Chair

NEW JOURNAL OF MEDICAL DEVICES (JMED)

The new Journal of Medical Devices (JMED) is an exciting new venture offered by ASME with Co-Editors Dr. Arthur Erdman, U of Minnesota, and Dr. Gerald Miller, Virginia Commonwealth University. This journal offers an important opportunity to our biomedical and design community to describe innovative devices used in the clinic and the laboratory, which cannot be easily presented in other journals or venues.

Papers in this Journal are expected to focus on applied research and development of new medical devices or instrumentation. The Journal will publish papers on devices that improve diagnostic, interventional and therapeutic treatments. Of particular interest are novel devices that allow new surgical strategies, new methods of drug delivery, or other devices that are intended to reduce the complexity, cost, or adverse results of health care. Significant biomechanical, clinical, or engineering content is expected. The Design Innovation paper category is encouraged for reporting about novel devices for which there may be less extensive clinical or engineering results. Also, featured in the Journal will be a “medical device news” section.

Papers are invited for submission to the Journal of Medical Devices in the following suggested categories: New medical sensors/ actuators, Orthopedic devices, Cardiovascular devices, Rehabilitation devices, Neurological devices, Bioheat transfer devices, Medical instrumentation, Image guided intervention/treatment, Endoscopic/ Laparoscopic devices, Minimally invasive devices, Human performance/force assessment, Tissue engineered devices, Drug/Cell deliver systems, Medical robotics, Medical device design processes, Medical device manufacturing, Human factors in medical devices and Sports biomechanics related to devices.

We encourage you to submit a paper or subscribe to the journal, please visit www.asme.org

Arthur Erdman, Co-Editor

AIMBEE—FEDERAL SYMPOSIUM

On September 12-13, 2006, the American Institute for Medical and Biological Engineering's Council of Societies (of which ASME-BED is a member) hosted more than 30 scientists and engineers in its inaugural Federal Symposium. The Symposium focused on funding trends and the future outlook for medical and biological engineering across various federal agencies. With federal appropriations bills pending, the symposium, along with the scheduled visits to legislators on Capitol Hill the following day, aimed to greatly influence the final FY2007 funding of the Department of Defense, National Institutes of Health, National Science Foundation and other key research programs.

The program began with attendees undergoing an intensive one-day orientation session on the legislative process and the particular challenges facing their drive for steady, high levels of research funding. A panel of Washington-based experts on science research funding warned them that an increasingly tight overall budget picture – with federal deficits swelling and the Iraq war costing billions weekly, among other factors – combines with lawmakers' traditional focus on short-term results to make advocacy of sustained, long-term funding a formidable task.

Presenters included Mr. William B. Bonvillian, Director of MIT's Washington office, Dr. Michael Huerta, Chair of the Bioengineering Consortium and Associate Director of the National Institute of Mental Health at the National Institutes of Health, Dr. David Stonner, Director of the Congressional Affairs Section of the Office of Legislative & Public Affairs within the National Science Foundation, and Mr. Kei Koizumi, Director of the R&D Budget and Policy Program at the American Association for the Advancement of Science (AAAS).

Though each speaker had a different area of expertise, the overall message was very clear: Research funding in the physical sciences has been stagnant for a decade though currently the Bush Administration is moving to bring it back to the fore, somewhat at the expense of life sciences. Though there are many congressional proposals to address the innovation challenge the problem remains finding financial resources. Further, as long as Congress and the President continue to focus on cutting domestic spending as the primary way to reduce the budget deficit the challenge of securing adequate appropriations will not change. However, many of the symposium presenters expressed optimism that members of both political parties are beginning to fully appreciate the importance of strong research and development to a healthy economy, rather than focusing simply on supplies of labor or capital.

On the second day of the program (September 13) symposium attendees joined with representatives of the Coalition for National Science Funding (CNSF), in visiting more than two dozen House and Senate offices– including those of Sen. Richard Shelby (Chairman, Appropriations Subcommittee on Commerce Science and Justice, R-AL) and Rep. Frank Wolf (Chairman, Appropriations Subcommittee on Science, State, Justice, Commerce R-VA). Multidisciplinary teams of industry and academic researchers traveled to lawmakers' offices on Capitol Hill armed with both an overview of the importance of bioengineering to the nation as a whole and a look at specific research programs taking place in the Representative's or Senator's home region.

As the two-day event came to a close it was evident that the voice of medical and biological engineering had spoken clearly and loudly on Capitol Hill. With new relationships forged between federal offices, legislators and the frontline scientists, the Federal Symposium accomplished its goal of increasing the visibility of and presence of bioengineering. The high marks of praise from presenters, attendees and legislative offices were a clear sign of success.

As a sponsor of the symposium, the Council of Societies appreciated the support of the American Society of Mechanical Engineers, Bioengineering Division (ASME-BED) in hosting this event. AIMBE looks forward to partnering with ASME-BED in producing more high quality educational programs and grassroots advocacy events in the future.

For questions about AIMBE's Council of Societies, advocacy policies, or upcoming events, please visit www.aimbe.org or email info@aimbe.org.

NOTE—KEVIN GRANATA

Dear Biomch-L subscribers,

Like all of you, I am saddened by the loss of so many at Virginia Tech and in particular about the loss of Kevin Granata. It is unfathomable how such an event could occur. The world is diminished by their loss.

I was a post-doctoral research associate of Dr. Granata's during his time at the University of Virginia. I learned many things from him during my time there that I thought I would list:

1) Science is fun.

If you ever heard Kevin speak at a conference, one of the things that was most notable was how excited he got when he presented a cool idea or discovery he had just figured out. He was also excited when he read other's work and was inspired by it.

2) To be a good scientist one should look broadly.

Kevin's research is most notable for his ability to cross interdisciplinary boundaries, bringing the techniques of engineering control theory to bear on improving the understanding of the etiology of low back injuries and the neuromotor and musculoskeletal effects of cerebral palsy. He was always looking for new ways to look at the problem, searching the literature of other fields to see how they could be brought to bear on the problem at hand.

3) Creativity in science is important.

The best example of his creativity could be seen in a tour of his lab, which was filled with all sorts of wild and strange devices he and his students had come up with to test various theories. Despite the occasional horror of the physical therapists in the lab at some of the strange devices, he came up with many clever ways to test the theories he was examining.

4) People are important.

My father mentioned a story that I had forgotten about Kevin. When I first came to Virginia, I had been living in Boston where a car is unnecessary. As such my driving skills were weak and rusty. My father had driven my car to Virginia and had come to Kevin's house to meet up with me. When Kevin discovered it had a stick shift, he was concerned that I might not be able to handle it. When I left that night, and had to back down his long dark driveway, he watched me the whole way to make sure I was OK. My father remarked "I remember how gracious Kevin was when I brought the Jeep back to U-Va, how he was concerned that it had a stick shift."

He thought a lot about his students as people and how to encourage them to be the best they could be. He continued to be concerned about me long after I left his lab, contacting me occasionally to tell me about a paper he had read and keeping up on my research directions.

5) Family is important.

Kevin worked long and hard. As a post-doc, I could never beat him in in the morning and he often would work well into the evening. However, he was also careful to reserve time for his family. He was proud of his children and a loving husband and father to his family. I remember one time when his oldest son had gotten into trouble at home. The boy, who was no more than about 8 at the time, had taken it into his head to pack his brother and baby sister into the van (making sure to strap his sister into her car seat) and proceeded to start the van and drive it down a steep embankment behind their house. Their mother, who was at home at the time and had been distracted only for a second, was upset and worried. I am sure Kevin gave the boys a serious lecture at home. However, the next day, when Kevin related the story, it was obvious he was really proud of his son for having figured out how to start and drive the car at such a young age. Kevin regularly included pictures and videos of his daughter in his talks on gait in children and always seemed to beam when he spoke of her.

To conclude, Kevin taught me much of what I know about being an engineering professor. He taught me not only how to write grants, manage research and nurture students, but also how to be a good and balanced person. He will be missed by all of his current and former students and post-docs.

Sara Wilson
Originally posted to Biomch-l

EXTERNAL AFFAIRS

Industrial Advisory Committee

This committee is spearheading efforts to increase the BED's interactions with industry. We feel that the BED in general and the Summer Bioengineering Conference (SBC) in particular do not serve our industrial constituents well enough. This includes doing better at programming at the SBC geared toward industrial attendees, and also at guiding our students and post-doctoral fellows towards careers in bioengineering-related industry. The committee will meet once a year, at each SBC, and be comprised of volunteers from industry or with industry ties. Membership is open and innovative ideas are sought for making it a success. Interested individuals should contact David Vorp, Chair (VorpDA@upmc.edu)

ASME NIH Task Force

This task force traditionally has been spearheaded by the BED and is charged with "keeping an ear to the ground" on NIH funding issues that impact the bioengineering community. Active NIH Task Force members are BED members Jimmy Moore, Texas A&M University, Mohamed Samir Hefzy, Univ of Toledo, and David Vorp, University of Pittsburgh, and ASME staffers Anthony Quinn and Ben Johnston. Individuals with questions or an interest in becoming active with the NIH Task Force should contact David Vorp at VorpDA@upmc.edu. A visit to the National Institutes of Biomedical Imaging and Bioengineering (NIBIB) on the NIH campus was made by the Task Force on February 27, 2007, during which a meeting was held with NIBIB Director Roderic I. Pettigrew, Ph.D., M.D.. We also attended the 5th Annual Engineering R&D Symposium held on May 8, 2007, on Capitol Hill. Some of the most relevant (and sobering) notes from our attendance at these events include:

- Just prior to the budget doubling days, the NIH budget as a whole enjoyed roughly a 7% increase per year, always outpacing inflation.
- The total FY 2008 NIH budget request is $28.85 billion, which represents a $330 million (1.1%) REDUCTION from the $29.18 billion approved in FY 2007.
- Federal funding is increased from FY 2007 to FY 2008 in general for weapons- or defense-related departments (NSF, NASA, and DOD).
- While the overall FY 2008 NIH budget decreased compared to FY 2007, the budgets allotted to some institutes and centers actually increased. The largest increase went to the National Institute of Allergy and Infectious Disease (NIAID), which will receive $4.59 billion, a total that includes a $200 million contribution to the Global Fund for HIV/AIDS.
- The NIBIB has a broad mission and a small pot of money (which is the reverse of most institutes)
- The NIBIB FY 2008 budget request is $300 million, an increase of $4 million or 1.3 percent from the FY 2007 continuing joint resolution. Taking into account the 3.7 percent inflation rate (as estimated by the Bureau of Economic Analysis) this effectively amounts to a decrease in funding by 2.4 percent.
- The number of research project applications to NIBIB continues to grow (a 5% increase was noted in FY 2006 over FY 2005).
- The success rate (i.e., payline) for applications to the NIBIB was 17 percent in FY 2006 versus 20 percent in FY 2005.
- NIBIB has a larger than average (across all institutes) portfolio of SBIR grants
- Quantum projects are being encouraged

David A. Vorp, Chair

http://divisions.asme.org/bed/

BIOENGINEERING DIVISON

Spring 2007

News Bulletin

American Society of Mechanical Engineers

ASME BED ROSTER 2006-2007

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