

**MESSAGE FROM THE DIRECTOR OF
BME AT UTA**

Just two days before writing this column, I got the good news that the Biomedical Engineering Program (BME) has received \$600,000 U.S. Congressional Earmark funding toward the establishment of the Metroplex Comprehensive Medical Imaging Center (MCMIC). MCMIC is a proposed three-institution research center involving UTA, the University of Texas at Dallas (UTD) and the University of Texas Southwestern Medical Center at Dallas (UTSW). This is not just a wonderful development for our BME, it has the potential to ignite a much higher and stronger level of collaborative relation among UTA, UTD, and UTSW. These three are major educational institutions in the Metroplex and their collaboration in the area of health care research and technology is a natural and quite promising opportunity to be seized. The proposed MCMIC will be housed on the UTSW campus which will provide an arena equipped with the latest medical imaging equipment for clinical and basic life science research. BME as well as other engineering departments at UTA are to provide the optical medical imaging expertise, while UTD and UTSW will contribute with magnetic resonance and radiological imaging. MCMIC is intended to bring the researchers from the three institutions together to foster more fundamental and rapid breakthroughs in medical imaging.



Another exciting development for BME during this year was the full deployment of the BME's state-of-the-art teaching laboratories in room 111 of Engineering Laboratory Building. The laboratories offer hands-on experience for cell culture and characterization; tissue engineering; physiological measurements; and control of bioprocesses.

While many challenges still lay ahead, a great potential for BME exists to be the focal

**NEW FACULTY MEMBER AT BME:
DR. DIGANT DAVE'**

Dr. Digant Dave' is the new faculty member of the Joint UTA/ UTSW Biomedical Engineering Program. Dr. Dave' earned his Ph.D. in Quantum Electronics from Texas A&M University, College Station in 1994.



Before joining the BME Program, Dr. Dave was at The University of Texas at Austin, continuing his post-doctoral studies and working on Polarization Maintaining (PM) fiber mode systems. He has also conducted studies at the Beckman Laser Institute at the University of California - Irvine's College of Medicine. Dr. Dave' holds a U.S. patent on Optical Tomography and has four additional patent applications pending.

For the past two years, Dr. Dave's work has been focused on the imaging of individual cells for cancer detection using short pulse laser sources. Here at UTA, his primary area of research involves application of Phase Sensitive Optical Coherence Tomography (OCT) to the biomedical fields of retinal imaging, burn depth determination, cancer imaging and blood flow imaging.

Dr. Dave' plans to develop Endoscopic OCT and Functional OCT systems for optical biopsy, which will be capable of producing images with sub-cellular resolution. He is also focusing on the development of PM-fiber-based OCT instrument for *in vivo* imaging and combining multi-photon microscopy and functional OCT.

Dr. Dave's research work here is supported mainly by the start up funds from UTA and a grant from the National Institutes of Health (NIH). He said he is glad to have opportunity to apply his knowledge to the interdisciplinary area of biomedical engineering. He believes one of the biggest challenges in his research was the transition from being a theorist to applying knowledge to practical applications, which he thinks is crucial to becoming a successful re-

BME ACTIVITIES



Fall 2004 Orientation:

Students at the BME orientation for Fall 2004

The BME student orientation for the Fall 2004 semester was held on August 11. Approximately 38 new students attended the orientation, where Dr. Khosrow Behbehani welcomed the students and gave them an introduction about the BME program, described research tracks and designated advisors.

Dr Hanli Liu further elaborated on courses relevant to the tracks, student advising and the differences between thesis and thesis-substitute degree plan for a master's degree. Dr. Kevin D. Nelson addressed the topic of laboratory safety and procedures. Dr. Karel J. Zuzak, the faculty advisor for the Biomedical Engineering Students Society (BMESS), introduced the new students to BMESS and its current executive members. He spoke about the activities of the society and its plans.

Recent Invited Talks

- *Identification of Nonlinear Physiological Systems: Recent Advances and Their Applications*, by Georgios D. Mitsis, Post-doc. Research Assoc., University of Southern California, Los Angeles.
- *Neuroprotection for Glaucoma: Opportunities and Challenges*, by Iok-Hou Pang, Ph.D., Assistant Director, Glaucoma Research, Alcon Research Ltd.
- *Cataract Surgery Intraocular Lens: Past, Present, and Future*, by Dr. Chi-Chun Tsai, Ph.D., Principle Engineer, Surgical IOL/Therapeutic, Alcon Research Ltd.
- *Expert Systems for an INS/DGPS Integrated Navigation (Installed in a Bell 206 Helicopter)*, by Roya Rahbari, Ph.D., Research Officer, Institute

RECENT FACULTY ACTIVITIES

Dr. Khosrow Behbehani

Publications: The following papers were presented at the 26th IEEE-EMBS Conference, San Francisco, CA, Sept. 2-5, 2004

- "Time Domain Analysis of R-Wave Attenuation Envelope for Sleep Apnea Detection," Suhas S. R., **Behbehani K.**, Vijendra S., Burk J. R., and Lucas E.A.
- "The Use of R-wave morphology in the Detection of Sleep-Disordered Breathing using the Electrocardiogram – A Comparison between Leads," Vijendra S., **Behbehani K.**, Lucas E. A., Burk J.R., Burlli D. N., and Dao D. H.
- "Kalman Filter Modeling of Cerebral Blood Flow Autoregulation," Masnadi-Shirazi M. A., **Behbehani K.**, Zhang R..
- "EEG Signal Feature Extraction for Classification of Sleep Staging," Estrada Edson F, Nazeran H., Nava P., **Behbehani K.**, Burk J. R., and Lucas E. A.

Dr. Charles Choung

Publications

- "Mechanical characteristics of the mandible after Bilateral Sagittal Split Ramus Osteotomy: Comparing two different fixation techniques," **CJ Chuong**, Borotikar B, Schwartz-Dabney C, Sinn DP, *J. of Oral and Maxillofacial Surgery* (in press).

Invited talks

- "Biomechanical Studies of Maxillofacial Skeleton and Surgical Designs" at the International Symposium on Biomedical Engineering 2004, Bangkok, Thailand, November 16-18.

Dr. Robert Eberhart

Publications

- "Synergistic Improvements in Cell and Axonal Migration Across Sciatic Nerve Lesion Gaps using Bioresorbable Filaments and Herregulin- β 1," Cai J, Peng X, **Nelson KD, Eberhart RC** and Smith GM. *J. Biomed Mater. Res.* 69A:247-258, 2004.
- "Molecular Responses of Vascular Smooth Muscle Cells and Phagocytes to Curcumin-eluting Bioresorbable Stent Materials," Nguyen, KT, Shaikh N, Shukla KP, Su SH, **Eberhart RC** and **Tang L.** *Biomaterials.* 25:5333-5346, 2004.
- "Protein-loaded Bioresorbable Fibers and Expandable Stents: Mechanical Properties and Protein Release," Zilberman M, Schwade ND and **Eberhart RC.** *J. Biomed Mater. Res.* 69B: 1-10, 2004.
- "Molecular Responses of Vascular Smooth Muscle Cells to Paclitaxel-eluting Bioresorbable Stent Materials," Nguyen KT, Shaikh N, Wawro D, Zhang S, Schwade ND, **Eberhart RC** and **Tang L.** *J. Biomed Mater. Res.* 69A: 513-524, 2004.

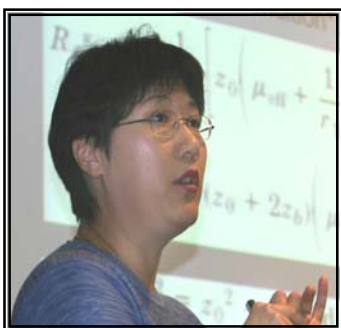
NEW SCIENTIST AT BME:**DR. JINHUI SHEN**

Dr. Jinhui Shen has joined BME at UTA as a Post-doctoral Research Associate and has been collaborating with Dr. Liping Tang. Dr. Shen is a surgeon who received his bachelor's degree in Medicine in 2001 and his master's in Pediatric Surgery in 2004, both from Wenzhou Medical College of China.



Prior to his arrival at UTA, Dr. Shen worked as a resident teacher and as a Medical Intern at the Second Affiliated Hospital of Wenzhou Medical College of China. During his studies, Dr. Shen won many scholarships, including the Guang Hua Scholarship for Academic Achievement. Dr. Shen's research achievements include establishing an ideal method for the primary culture of childhood teratocarcinoma. At UTA, Dr. Shen is performing different tests by changing the composition of the culture medium in order to improve the recovery rate of the frozen stem cells.

DR. LIU IS HONORED AS OUTSTANDING RESEARCHER



Dr. Liu receives the award from
Liu
UTA President James Spaniolo.
UTA Provost Dr. Dana Dunn
is seen in the background.

Dr. Hanli

UTA BME Associate Professor Dr. Hanli Liu received the University's award for Outstanding Research Achievement on April 20, honoring her record of important research and scholarly publication. Her research is primarily in the areas of detection and treatment of tumors by using optical characterization techniques. Dr. Liu has also been the recipient of the Outstanding Young Faculty award

STUDENT ACTIVITIES***Research on Cancer Results in Student Grant***

Graduate student and Ph.D. candidate **Mengna Xia** received, with the help of her mentor Dr. Hanli Liu, a \$90,000 research grant in March from the Department of Defense's Breast Cancer Research Program. The grant will help Xia develop research on the treatment of tumors. This is the second consecutive year that a researcher in BME has received this highly competitive grant.

Xia said that Dr. Liu encouraged her to work independently. In her research, Xia noticed a correlation in the levels of oxygen in a tumor and the effectiveness of the treatment. By giving rats more oxygen prior to breast cancer treatment, she was able to study

FACULTY ACTIVITIES:

(continued)

Dr. Robert Eberhart*Other Activities*

- Ad hoc reviewer for NIH Bioengineering, Technology and Surgical Sciences Study Section, June 2004.
- Re-elected to Board of Directors, Advanced Neuro-modulation Systems, Inc. Plano, TX, June 2004.
- Formed Texas Stent Technologies, together with BME Program Graduate Dr. Shih-Horng (Solomon) Su and Dr. Steven Hays, October 2004.

Dr. Hanli Liu*Grants*

- "Noninvasive Monitoring for Optimization of Therapeutic Drug Delivery by Biodegradable Fiber to Prostate Tumor," Department of Defense Prostate Cancer Research Program, 04/04-03/07, \$326,756. Principal Investigator: Yueqing Gu; Co-investigator and Mentor: **Hanli Liu**.

Publications

- "Near Infrared Spectroscopy and Imaging of Tumor Vascular Oxygenation," **Hanli Liu**, Yueqing Gu, Jae G. Kim, Ralph P. Mason. *Methods in Enzymology: Imaging*, ed. by Michael Conn, vol. 385-386, pp. 349-378, 2004.

Dr. Liping Tang*Publications*

- "Tissue Responses to Thermally Responsive Hydrogel Nanoparticles," Weng H, Zhou J, **Tang L**, Hu Z. *J. of Biomaterials Science Polymer Edition* 15 (9):1167-1180, 2004.
- "A Central Role for Plasminogen in the Inflammatory Response to Biomaterials," Busuttill SJ, Ploplis

UTA/UTSW ALUMNI INFORMATION

DR. CHI-CHUN TSAI



Dr. Chi-Chun Tsai is the Principal Engineer at Alcon Laboratories, Inc. in Fort Worth. He completed his Ph.D. in 1991. Since that time, Dr. Tsai has held various positions, including Material Engineer at COBE Cardiovascular, Inc., Arvada, Colorado and Senior Scientist/Project Leader at BARD Urological Division, C. R. BARD, Inc., Covington, Georgia. Since 2002, Dr. Tsai has also been an Adjunct Professor in the BME program, providing guest lectures, seminars and consultations.

Dr. Tsai received his B.S. degree from Tamkang University, Taiwan in 1979 and M.S. degree from New Jersey Institute of Technology in 1986, both in Chemical Engineering. He is a member of several prestigious associations such as Society for Biomaterials and American Society for Artificial Internal Organs. He is also the Technical Director for Biotechnology Group of the DFW Chapter of the Chinese Institute of Engineers and Secretary for the Ophthalmic Special Interest Group of the Society for Biomaterials. Dr. Tsai holds two patents: *Process for the Preparation of Aqueous Dispersions of Particles of Water-Soluble Polymers and the Particles Obtained* and *Antifoaming Device for Extracorporeal Blood Processing and Method for Making the Device*. He has a number of publications to his credit.

CONDOLENCES FROM BME

Ashutosh Atkekar died on August 23 due to complications following a head-on collision in Houston. The 23-year-old BME graduate student was in the front passenger seat of the car when the accident occurred on August 14th.



Chemistry Professor Richard Timmons, with whom Ashutosh served as a Graduate Research Assistant while working on his master's thesis, remembers Ashutosh as a talented, hard-working student who understood experimental work and was always willing to help others. The BME Society held a memorial service on August 30th. The BME department



Joint Program in Bio-
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Alumni: please send notices of your accomplishments for publication in the future issues.

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