Department of Bioengi-

BULLETIN

THE UNIVERSITY OF TEXAS AT ARLINGTON

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Joint Biomedical Engineering Program

UT SOUTHWESTERN MEDICAL CENTER

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BIOENGINEERING BULLETIN

Message from the Chair of Biomedical Engineering at UTSW:

The past few months have seen an increase in collaborative activities between our two campuses. These range from teaching- plans have been laid for innovative programs in nanotechnology, to research- with joint projects in Imaging submitted to NCI and new programs on image-guided tissue biopsy and sensing being delineated. For the future we see a growing emphasis on molecules, nanoparticles and nanodevices. There will be a greater emphasis on organic and inorganic chemistry, with the development of biocompatible imaging sensors and molecular reporters. New opportunities are opening up in this area. Highlights:

FACULTY: Dr X. Sun, a radiochemist from Wash. U., has in a short time won sufficient grants to run his entire laboratory. Dr. Richard Briggs, an MRI scientist, has been on board for two years and has won major support in neuroimaging. Dr Eberhart continues his cutting-edge research and was named Inaugural Fellow of Biomedical Engineering Society.

STUDENTS: Dr. Eberhart also reports that students presented at the Surgery Research Conference, June 7, 2006, at UTSWMC. Our students continue to grow in quality and numbers. Perhaps the star this year is Priya Ravikumar, whose mentor is Dr Connie Hsia and whose poster was judged overall best at the graduate level at the annual celebration of excellence by students (ACES) in research at UT Arlington. Ph.D. student Che Xu will present two papers at the Voice Foundation's 35th Annual Symposium: Care of the Professional Voice in the Westin Philadelphia Hotel. His mentor, Dr. Roger Chan, is well known in this field and is the PI of an NIH grant R01 DC006101, to benefit the research communities of otolaryngologists, speech pathologists and voice scientists.

New Faculty Member at UT Arlington: Dr. Alexandrakis

Dr. George Alexandrakis performed his undergraduate work in Physics at Oxford University, UK. He then obtained a Master's and a Ph.D. degree in Medical Physics from McMaster University in Canada.

After completing his graduate work, Dr. Alexandrakis was a postdoctoral fellow at Massachusetts General Hospital / Harvard Medical School where he worked on quantitative intravital two-photon microscopy techniques for the analysis of barriers to drug delivery in tumor-bearing mice. He constructed a Fluorescence Correlation Spectroscopy (FCS) system for *in vivo* transport measurements of macromolecules and gene therapy vehicles in tumors. Dr. Alexandrakis then pursued further postdoctoral work at UCLA where he contributed to the development of a combined optical/PET mouse imaging system and was also exposed to clinical multi-modality imaging.

Dr. Alexandrakis is the recipient of a number of awards including the Scholars in Oncologic Molecular Imaging postdoctoral grant at UCLA and the Richard Fuller Memorial Scholarship for Science at McMaster University.

Dr. Alexandrakis' current interests are focused on the non-invasive monitoring of molecular transport dynamics at the sub-cellular level. In collaboration with faculty at UT Southwestern he proposes to develop a multi-parameter two-photon microscopy suite to probe the trafficking of physiologically important molecules between different cell compartments at a spatial resolution that goes beyond the currently accepted classical limits.

Dr. Alexandrakis is also actively pursuing research projects on tomographic biolu-

Reception Honoring Dr. & Mrs. Eberhart

The Bioengineering Department held a reception on April 21 to honor Dr. and Mrs. Eberhart for their establishment of a scholarship for an Outstanding Bioengineering Student and for their continuous support

Dr. and Mrs. Eberhart with Mr. Sato, the first recipient of the Eberhart' Outstanding Bioengineering Scholarship.

Dr Hanli Liu Recognized as "Super Mentor"

Dr. Hanli Liu was given an appreciation gift from the UT Arlington Chapter of the Society of Sigma

Xi in recognition for being a 'Super Mentor' for ACES 2006.

Dr. Liu (second from left) her participating students, Provost Dunn (left center) , President Spaniolo (center), Vice President Elsenbaumer, (center right), Graduate School Dean Cohen (behind Dr. Elsenbaumer), and Associate Dean of Engineering

RECENT FACULTY ACTIVITIES

Dr. Hanli Liu

Publications

- Harsha Radhakrishnan, **Hanli Liu**, Arun Kumar Senapati, and Yuan Bo Peng, "Determination of hemoglobin oxygen saturation in rat sciatic nerve by in vivo near infrared spectroscopy," *Brain Research Protocols* accepted for publication (2006).
- Jianzhong Su, Hua Shan, **Hanli Liu,** and Michael V. Klibanov, "A Reconstruction Method with Data from A Multiple-Site, Continuous-Wave Source for 3 Dimensional Optical Tomography," *Journal of the Optical Society of America A* accepted for publication (2006).
- Mengna Xia, Vikram Kodibagkar, **Hanli Liu**, and Ralph Mason, "Tumor oxygen dynamics measured simultaneously by near-infrared spectroscopy and ^{19}F magnetic resonance imaging in rats," *Physics in Medicine and Biology* 51, 45-60 (2006).

Invited talks

- **Hanli Liu**, "Non-invasive Imaging for Cancer Prognosis and Therapy Monitoring for Stroke," University of North Texas Health Sciences Center at Fort Worth, March 13, 2006.
- **Hanli Liu**, "Near infrared tomography for cancer prognosis and therapy monitoring," *SPIE Medical Imaging International Conference*, San Diego, California, 11 - 16 February 2006.

Honors:

- Recipient of the Research Excellence Award, University of Texas at Arlington (cash award), April 2006.
- Recipient of the Faculty Developmental Leave Award to conduct research at the University of Texas Southwestern Medical Center, University of Texas at Arlington, January -May, 2006.

Grants

- "Novel Approach to Measurement of Hot Flashes by Near Infrared Spectroscopy," $15,000,01/06-12/06, UTA/UNTHSC research seed funding for collaborative development.
- "Microcirculatory Dysfunction: Potential Therapeutic Target of Estrogen Against Ischemic Stroke," $12,500,01/06-12/06,UTA/UNTHSC research seed funding for collaborative development.

Presentations:

The following papers were presented at the *Biomedical Optics Topical Meeting*, Fort Lauderdale, Florida, March 19-23, 2006.

- Manan Goel, Harsha Radhakrishnan, Liping Tang, and **Hanli Liu**, "Application of Near Infrared Multi-spectral CCD Imager to Determine the Hemodynamic Changes in Prostate Tumor."
- Dheerendra kashyap and **Hanli Liu**,

RECENT FACULTY ACTIVITIES (*continued)*

Reduced Scattering Coefficients from Turbid Media using Steady State Reflectance Spectroscopy with Single Source-Detector Separation."

- Vikrant Sharma, Pradheep Raman, Anna Ratka, and **Hanli Liu**, "Application of Near Infrared Spectroscopy to Study Hot Flashes in Women."
- Jianzhong Su, Hua Shan, **Hanli Liu**, and Michael V. Klibanov, "A Simplified Globally Convergent Reconstruction Method for 3 Dimensional Optical Tomography."
- Jae G. Kim and **Hanli Liu**, Dawen Zhao and Ralph P. Mason, "Acute effects of combreatastatin A4 phosphate on breast tumor hemodynamics monitored by near infrared spectroscopy."
- Mengna Xia, **Hanli Liu**, Ya Ren, Ralph Mason, Benjamin Levine, "Simultaneous monitoring of tumor vascular and tissue oxygen tension under hyperbaric oxygen exposure."
- Manan Goel, Harsha Radhakrishnan, **Hanli Liu**, and Yuan Bo Peng, "*In vivo* detection of intrinsic optical signal changes in rat spinal cord due to formalin using a multi-wavelength CCD camera."

Harsha Radhakrishnan, **Hanli Liu**, Arun K Senapati, Christopher E Hagains, and Yuan Bo Peng, "Detection of changes in rat spinal cord due to peripheral stimulation using NIR reflectance spectroscopy."

Dr. Liping Tang

Presentation:

- "Development of tissue-targeted nanoparticles for treatment of eye diseases," JSPS Symposium on Nanoscale Materials for optoelectronics and biotechnology at University of North Texas, Denton, TX., February 2, 2006.
- "Nanoparticles for drug delivery," BioNano meeting at University of Texas at Dallas, Dallas, TX., April 10, 2006

Publications:

- **Liping Tang**, L Zou "Hydrogel nanoparticles for targeting retinal tissue," Transaction of the Society for Biomaterials, 85, 2006.
- M Goel, H Radhakrishnan , **Liping Tang** , H Liu "Application of near infrared multi-spectral CCD imager to determine the hemodynamic changes in prostate tumor," Biomedical Optics 2006 Technical Digest (Optics Society of America, Washington DC), SH10.
- H Weng , L Zou , J Zhou , Z Hu , **Liping Tang** "Development of tissue-targeted nanoparticles for treatment of eye diseases," Transaction of JSPS-UNT Joint Symposium on Nanoscale Materials for Optoelectronics and Biotechnology : 83-84, 2006.

RECENT FACULTY ACTIVITIES (*contimued)*

Grants

- "Targeted drug delivery nanoparticles for treating uveal melanoma," Advanced Technology Program, Texas Higher Education Coordinating Board, $50,000, 5/15/2006-5/14/2008, Co-Investigator (Consortium Proposal).

Dr George Alexandrakis

Publications:

- **G. Alexandrakis**, F.R. Rannou and A.F. Chatziioannou, "Effect of optical property estimation accuracy on tomographic bioluminescence imaging: Simulation of a combined optical-PET (OPET) system," *Phys. Med. Biol*. 51, 2045-2053 (2006).
- T.D. McKee, P. Grandi, W. Mok, **G. Alexandrakis**, N Insin, J.P. Zimmer, M.G. Bawendi, Y. Boucher, X.O. Breakefield, R.K. Jain, "Degradation of fibrillar collagen in a human melanoma xenograft improves the efficacy of an oncolytic herpes simplex virus vector," *Cancer Res.* 66, 2509-2513 (2006).
- **G. Alexandrakis**, F.R. Rannou and A.F. Chatziio -annou , "3D bioluminescence imaging by use of a combined optical-PET tomographic system: A computer simulation feasibility study," *Phys. Med. Biol. 50, 4225-4241 (2005)* , was selected by the editors of that journal to be part of a special online issue highlighting the best articles of the year.

Honors:

- **Dr. Alexandrakis** received a travel award to present his recent work on bioluminescence tomography at the Academy of Molecular Imaging conference in Orlando, Florida, April 19-25 (2006).

Dr. Kytai Nguyen

Publications:

- H Patel , SH Su , C Patterson, **KT Nguyen** , "A combined strategy to reduce restenosis for vascular tissue engineering applications," *Biotechnology progress* 2006;22:38-44.
- R Kriparamanan, P Chellamuthu, L Tang, **KT Nguyen** "Development of a temperature-sensitive composite hydrogel for drug delivery applications," *Biotechnology progress*. 2006; 22:118-25.

Dr. Karel Zuzak

Paper presentation:

- B.B. Shah, HD Cavanagh, WM Petroll, AD Kothare, P. Gundabhat, K Behbehani, **K.J. Zuzak**, "In-Vivo Microvasculature Visualization Us-

ALUMNI NEWS
Dr. Mehdi Jafari

Dr. Mehdi Jafari was born in Shiraz, Iran. He obtained his B.E. in Electrical Engineering from the American University of Beirut and his M.Sc. in Control Systems Engineering from Sussex University in Great Britain. After working for 10 years, Dr. Jafari joined the Ph.D. program in Biomedical Engineering at UT Arlington in 1985. His research work dealt with a novel methodology for quantification of human performance applied to speech pathology pattern recognition and the effects of age, gender, and Parkinson's disease on speech production.

From 1989 to 1997 Dr. Jafari worked as a research scientist at VA Hospital in West L.A. (in affiliation with the Dept. of Neurology, UCLA) and VA Medical Center in Long Beach (affiliated with Dysarthria Research Lab and UC Irvine Division of Otolaryngology-Head & Neck Surgery). Since then he has been working in the medical device industry (97-03: Respironics; '03-now: Tyco Healthcare Puritan Bennett).

During this time Dr. Jafari has designed and developed breath delivery algorithms and controllers for microprocessor-based critical care and home care ventilators. In addition, he is actively involved with the development of new interna-

STUDENT ACTIVITIES

The BMESS had a busy schedule this spring, actively participating in and hosting a number of events. Members represented the department on Preview Days held in the months of February and April. Guest speakers at seminars organized by the society included Dr. Peter Antich, co-chair of the joint program from UT Southwestern and Drs. Nguyen, Alexandrakis and Dave from the Bioengineering Department at UT Arlington. The society hosted a BBQ in May, when the stu-

dents celebrated the end of the semester.

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