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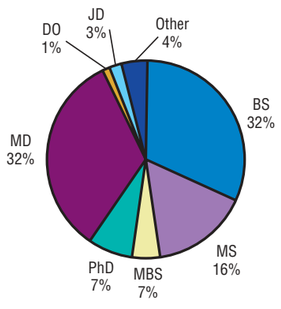
Alumni Survey Results

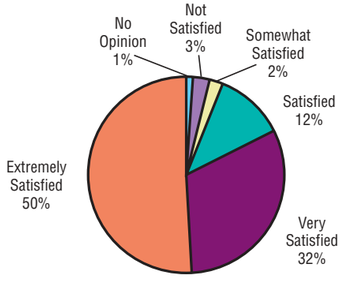
Many thanks for your participation in our BME Alumni Survey. Highlights of survey results that may be of interest to you are shown below.

Higest Degree Earned

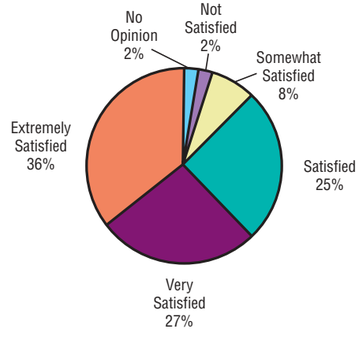


Quality of instruction provided by faculty in

Advanced BMEN courses



Introductory BMEN courses



Tulane BMEN

Spring 2001

Department of Biomedical Engineering

Alumni Newsletter

Tulane University

Recent Awards to Faculty:

Dr. Glen A. Livesay has been awarded a five year NSF CAREER grant entitled "CAREER: Multi-scale mechanics of soft tissues." This grant will run from 6/1/01 - 5/31/06, and will be funded for the full requested amount of $375,000

Dr. Natalia Trayanova has received a four—year National Institutes of Health grant for her project "Virtual Electrode Hypothesis of Defibrillation." Her collaborator is Igor Efimov at Case Western Reserve University. The total award is $1.8 million.

Dr. J-K Francis Suh was awarded a three-year NSF grant entitled "Biphasic Porovisloelastic Behavior of Articular Cartilage". This grant will be funded in the amount of $263,464.

Drs. Kirk J. Bundy and **Paul L. Nunez** have been elected into the College of Fellows of the American Institute for Medical and Biological Engineering (AIMBE). These well-deserved honors are based on the contributions made to biomedical engineering. This addition brings the number of AIMBE fellows in the Department of Biomedical Engineering to four (including Professors Hart and Walker).

Inside this Issue:

Letter from the Chair

Dear Biomedical Engineering Alumni:

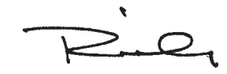
As you may recall, in our Fall 2000 newsletter, we sent copies of our recently adopted Departmental Vision and Mission statements, undergraduate and graduate program objectives, and the new undergraduate curriculum. In addition — with a view toward our upcoming accreditation visit in Fall 2001 by ABET (American Board for Engineering and Technology) — we sent a questionnaire to assess the program "outcomes" so that we could take steps to continuously improve the opportunities we offer students. Thank you for the time you have taken to complete the questionnaire, and for your assistance to helping improve our Department! The responses were generally favorable, and pie-charts with results from a tiny sample of the survey questions can be seen on the back page. One area where alumni (and current students) would like to see us improve is in the general area of interaction with industry - especially by identifying opportunities for summer internships and employment options for BS and MS students. We agree, and would welcome your help in making these kinds of opportunities available for our students and graduates. If you have a potential summer internship or other employment opportunity, please e-mail me (rthart@tulane.edu) and I will post it onto our intranet newsgroup, tulane.bmen, for students to see.

As some of you may know, we have recently had several "Departmental" grant proposals funded that have allowed us to expand our faculty size to reach 'critical mass' in some of our research domains and in our sequences of undergraduate and graduate courses, to upgrade the 'hands-on' component of our undergraduate curriculum with new labs, and to introduce new active learning techniques for our undergraduate and graduate courses. In addition to seeking support from extramural agencies and from the University, we are now seeking your help as we try to establish a substantial departmental endowment fund to "capitalize" the department's operations. This endowment fund, in which the principal is forever preserved, generates returns of which we are allowed to spend 5.5% annually (with the remainder used to build the endowment). We plan to use these funds for a variety of purposes to directly benefit the Department of Biomedical Engineering, its faculty and our students. Included are plans for support of undergraduate summer research internships, faculty and student travel to professional meetings, maintenance and upgrading of computing and laboratory hardware and software, supplemental support for graduate students stipends, startup support for new faculty, etc. Although we have "aimed high" with this initiative-with a university—endorsed goal of $5M—any gift of $100 or more will be added to the principal to provide a truly perpetual gift to the Department. I have enclosed a return envelope with the hope that you will be willing to provide assistance to the Department as we seek a stable source of discretionary funds necessary for implementing our vision of being a "global leader in biomedical engineering scholarship." (Of course, this also provides a perfect "naming opportunity" — so a gift of $3M or more will allow you to help us choose a new name for the Department!)

I hope you enjoy reading about our efforts and successes, that you will take the opportunity to keep current via the network and e-mail as described below, and that you'll stop by to visit us.

Thanks, in advance, for you help and interest in the department — and keep in touch!

Sincerely yours,



Richard T. Hart, Ph.D.
Department Chair

Stay In Touch: Continuing Bi-directional E-Mail Contact

While many of you have joined or plan to use the Tulane alumnae email service (http://alumni.tulane.edu/forlife/emailforlife.html), this does not make it simple to contact the members of your class. The BME Department has established an email list server for recent graduating classes (http://www.bmen.tulane.edu/alumni/) .
To email the class, send email to the list (e.g. bmeclassof99@tulane.edu). Replies to such email go back only to the originator unless the reply is also copied to the list. The messages are unmoderated, but Tulane has set up a fairly good spam deflection system. Email addresses on the lists that go bad will be purged automatically.
The lists are self-serve: You can remove yourself or sign on as many lists with as many identities as you like. We plan to keep these lists viable indefinitely. Lists in use in '98 or prior are gone, but we'll reestablish or add new ones on request.
To find out about a list, or to change your status on a list, go to (http://www.bmen.tulane.edu/alumni/). If that doesn't work, send email with your query or request to admin@bmen.tulane.edu. D. Rice

TULANE UPGRADES BIOMEDICAL ENGINEERING PHYSIOLOGY LABORATORIES

One of the most important responsibilities of biomedical engineers is to possess a quantitative understanding of physiological systems.

We provide our students with a strong background of physiological systems in the junior-level course *Medical Science for Engineers*. This two-semester course covers the structural, chemical and functional characteristics of the human organism with an emphasis on normal integrative mechanisms that maintain homeostasis. This course is taught by faculty members from Tulane's Medical School, allowing our students to learn physiology from physiologists, and provides our students with a quantitative physiology course that can be a model for peer BMEN departments nationwide.

One of the best ways for students to learn about physiology is to perform active experiments by making "hands on" noninvasive measurements on themselves or direct measurements on animal subjects. In the last year, the Department of Biomedical Engineering has been awarded grants by the Louisiana Board of Regents and the National Science Foundation to support the development of active 'discovery-based' learning in our undergraduate curriculum. As part of this initiative, we have incorporated BioPac Student Laboratory hardware and software (Biopac Systems, Inc., Santa Barbara, CA) into the laboratory component of *Medical Science for Engineers*.

The Biopac Student Lab is an integrated set of hardware, software, and documentation that guides students through a set of lessons that illustrate fundamental physiological principles. This provides a "turn-key" system for laboratory studies in physiology that allows a set of experiments to be taught immediately and maintains the flexibility to add animal experiments as they are developed by the faculty.

Each Biopac Student Lab includes a Biopac Systems MP30 Hardware Unit. The MP30 is a high performance data acquisition system that is easy to use. Electrode leads and transducers plug into the front of the MP30 unit and four auto-sensing amplifiers detect which type of electrode or transducer is being plugged into which channel. Real-time digital filtering capability is incorporated into the MP30 so filters for different kinds of physiological data collection can be set very accurately. Optical isolation circuits protect the input channels to insure electrical safety when connecting electrodes and transducers to subjects. We have purchased the "Advanced Lab" that includes electrodes and transducers for measurements of Electrocardiography, Electroencephalography, Electromyography, Electro-Oculograms, Galvanic Skin Response,

Discovery-based learning made possible by grants from the National Science Foundation and the Louisiana Board of Regents.

Pulse, Airflow, Respiratory Effort, Lung Volume, Reaction Time and Skin Temperature. With this equipment, our students are able to conduct physiologic experiments without spending time on complex setup tasks, and thus focus on learning physiology.

D. Gaver

Department of Biomedical Engineering Staff

(clockwise from right)

Rene Salmon, Systems Programmer
Maggie Wittke, Program Coordinator
Jackie Smyth, Executive Secretary
Kenny Kuhn, Engineering Lab Coordinator

The Tulane University chapter of Alpha Eta Mu Beta, the national Biomedical Engineering honor society, inducted the 2001 class of honorees on February 14, 2001.

Honored for their scholarship, leadership, and exemplary character were:

Sarah Cohen
Valerie E. Franz
Anne-Marie Jacob
Daniel Jung
Samuel R. Kuo
Andrea N. Lay
Christopher J. Rintalan
Edward A. Sander
Ashley Schneider
Daniel Andrew Shimko
Nader A. Shourbaji
Bryan Smith
Hoang T. Tran
Vanessa Veronique Vanderpool
Torrence D. J. Welch

BIOMEDICAL ENGINEERING FACULTY, 2001

Front row (left to right) Donald P. Gaver, David A. Rice, Natalia A. Trayanova, Richard T. Hart, Kay C Dee, J-K Francis Suh.
Back row (left to right) Glen A. Livesay, Cedric F. Walker, Eric A. Nauman, Kirk J. Bundy, Paul L. Nunez, Ronald C. Anderson.

Graduate Program Instructional Objectives

Dr. Anderson will return to the Department full time in July, after serving as the Associate Dean for Undergraduate Studies for the past five years. His research interests continue to encompass experimental and computational aspects of biomechanics and orthopaedic materials.

Dr. Bundy teaches a series of courses related to biomaterials and their applications. His research is focused in three areas—deterioration of implant materials in body fluids and the consequences for biocompatibility, adhesion of cells to biomaterial surfaces, and environmental science studies (related to detection of pollutants using biosensors, determination of pollutant concentrations, and assessment of the associated toxicity).

Dr. Dee has research interests in cell and tissue engineering, with ongoing collaborative projects investigating how the lungs of premature infants may be injured during ventilation, designing and characterizing tissue-engineered ligaments and bone, and chemically modifying dental/orthopedic biomaterials to control the functions of surrounding bone cells. She teaches courses on fundamental and state-of-the-art tissue engineering, cell and tissue mechanics, bioethics, and the theories/practice of teaching.

Dr. Gaver 's research focus is biofluid mechanics, with a particular interest in interfacial fluid mechanics related to the lung. These studies may be valuable for the treatment of respiratory distress syndrome of premature infants. He teaches courses in biofluid mechanics and mathematical modeling of biological systems, and was recently selected as a member of the NASA Discipline Working Group (DWG) that is charged with providing guidance to NASA's Microgravity Research Division in Fluid Physics, and is responsible for identifying fluid mechanics investigations that may assist our human exploration and development of space.

Dr. Hart is serving in his 5th year as Department Chair. He teaches the Freshmen introductory biomedical engineering course (with the primary purpose of helping the students find out "What is biomedical engineering?" and "Do I want to do this?"), and a graduate course in finite element analysis. In March 2001 his summary of research concerned with bone's functional adaptation was published in the new CRC reference, *Bone Mechanics Handbook*, edited by former faculty member, Steve Cowin. The use of the finite element method to study glaucoma is funded by NIH in a joint project with Dr. Claude Burgoyne at the LSU Eye Center.

Dr. Livesay works with undergraduate and graduate students in experimental testing of soft tissues, micro structural modeling of crimp, and time-dependent phenomenon, as well as investigations at the soft tissue/bone interface. He teaches exciting courses in Experiments and Experimental Design, Biomechanics, Soft Tissue Mechanics, and (with Dr. Dee) Cell/Tissue Mechanics.

Dr. Nauman investigates the structure-function properties of tissues, both natural and engineered, in an effort to develop a better understanding of degenerative processes, damage repair mechanisms, and tissue adaptation to mechanical and chemical stimuli. In particular, he is using bone marrow stromal cells, a kind of adult "stem" cell, to develop engineered bone, ligament and nervous tissue.

Dr. Nunez's scientific interests encompass theoretical and experimental aspects of neuroscience, including nonlinear computational models of large-scale neocortical dynamic behavior, electroencephalographic (EEG) signal processing, computational methods to improve EEG spatial resolution, cognitive studies, and medical applications in neurology and neuropsychiatry. He teaches Mathematical Modeling and Analysis of Biologic Systems, Advanced Engineering Mathematics, Biomedical Signal Processing, Electric Fields of the Brain, Interactions of Electromagnetic Fields with Humans, and Nonlinear Phenomena and Chaos.

Dr. Rice's main research interests are medical instrumentation, biosystems modeling, and engineering design. He teaches the senior design course sequence, and a graduate course in Biomedical Acoustics. He is continuing work on the sensory capabilities of an angioplasty catheter.

Dr. Suh 's primary research objectives are: 1) To understand the engineering aspects of soft tissue injuries; 2) To improve our understanding of healing processes of damaged soft tissues; 3) To find ways for repair of damaged soft tissues. He teaches Mechanics of Materials, Mechanics Lab, and Advanced Soft Tissue Biomechanics.

Dr. Trayanova's research focuses on the mechanisms for arrhythmogenesis and defibrillation of the heart. She teaches Bioelectricity, Cardiac Electrophysiology and Advanced Topics in Excitable Media, and occasionally, Research and Professional Practice I. She has been awarded a 2001-02 Fulbright Distinguished Scholars Research Award to support 4 months of sabbatical leave that she will spend working with the Mechano-Electric Feedback Group in the University Laboratory of Physiology at Oxford.

Dr. Walker 's research interests are in the areas of telemedicine and implantable electrical devices. He teaches upper level specialty courses in embedded microprocessor control and in data acquisition, as well as the ever-popular Biomedical Electronics.