

Dear Alumni and Friends,

I AM PLEASED TO ANNOUNCE that a Department of Biomedical Engineering is being established at the University at Buffalo. The department will be a joint effort between the School of Medicine and Biomedical Sciences and the School of Engineering, which is led by Dean Harvey Stenger.

Efforts to establish this new department began in the fall of 2006, when both Harvey and I began our tenure at UB and recognized that our schools were well poised to launch such an endeavor due to a significant number of investigator-initiated collaborations already in place between faculty.

Harvey and I then formed a task force made up of faculty and research administrators who provided recommendations about how to design the department. It was subsequently determined that the cost to establish such a program would be \$10 million over the first five years.

In February 2008, the work of the task force came to fruition when the John R. Oishei Foundation responded to a proposal we put forth to them to support this initiative. The foundation announced that it would provide the university with \$2 million initially, and if we could raise an additional \$1 million, it would then provide another million dollars.

This is tremendous support, and I am confident that given the rationale for this new department and the promise it holds for our university and region, we will be successful in obtaining the additional funding needed to launch this as a pilot program and complete the formal accreditation process, which normally takes four to six years.

The creation of this department will not only enhance UB's reputation nationally and internationally and attract an increased number of high-quality students, it will also directly improve our region's economy and health-care industry. Funding levels for peer-reviewed grants in all areas of engi-



neering are high, and research expenditures for biomedical engineering faculty are approximately double that of other engineering fields.

Local and national corporations will be stimulated by their interactions with a robust biomedical engineering program and will benefit from having a steady pool of graduates in this highly competitive field.

Nationally, revenue from biomedical products account for many billions of dollars annually, and one does not have to look far to find examples of how these products have enhanced clinical medicine. In my own field of cardiology I have

seen remarkable devices and procedures, such as implantable cardioverter defibrillators and magnetic catheter guidance, move into the clinic and both improve care and reduce costs.

The new Department of Biomedical Engineering at UB will focus on four fields of research and education: (1) Molecular-Cellular, Cell and Tissue Engineering. In broad terms, this involves the use of engineering tools and principles of cell and molecular biology to develop novel therapeutics that include such things as tissue engineering for organ replacement, and cell-based devices for drug and gene delivery. (2) Computational Engineering and Modeling. This involves the use of mathematical principles and computers to model complex biological systems and networks. Examples of such models are ones that help us simulate how cells talk to one another or how electrical impulses spread from one chamber of the heart to another. Among other things, such models can help us become less dependent on trials that involve humans

and animals. (3) Biomedical Sensors, Instrumentation and Diagnostics. Just as an automobile has built-in sensors to indicate when oil is low or lights are left on, we can design and develop devices that can be implanted in humans to warn of such things as deterioration of kidney function or rises in levels of enzymes that could alert us to early disease. Warnings such as these can lead to early detection and treatment, as well as allow for much more efficient in-hospital and home monitoring of patients. (4) Medical

Imaging and Analysis. Technologies developed in this area will provide new ways for physicians to more precisely image the human body and its biological systems, which is key to the clinical evaluation and treatment of patients.

Over the next five years, our goal is to recruit eight full-time faculty and an internationally recognized chair. (We estimate that about 20 UB faculty would have secondary appointments within the department.) Bachelor's, master's and doctorate degrees will be offered through the department, and an undergraduate curriculum is in the process of being developed.

Currently, there are 42 accredited undergraduate programs in biomedical engineering in the United States. (Similar statistics for MS and PhD programs are not available since they are not accredited.) The growth of undergraduate degree programs in this field has been rapid in the past 10 years, but the number of accredited programs is still quite small compared to other engineering disciplines.

Graduates of biomedical engineering programs are highly employable today, and the U.S. Department of Labor forecasts job growth in this field to increase by more than 31 percent through 2010.

Those of us involved in spearheading this initiative feel that biomedical engineering is a "good fit" for UB for a number of reasons. The university has a culture of interdisciplinary research and is located in a region that has a growing and

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engaged industrial base. Furthermore, the university has leaders at all levels who are supportive of this new program, as well as faculty who are highly motivated to implement it.

This broad support is based in large part on the fact that the new program meshes very well with UB 2020, the university's long-term strategic plan. Three strategic strengths of the School of Medicine and Biomedical Sciences, in particular, integrate well with the new program: (1) Molecular Recognition and Bioinformatics; (2)

Health and Wellness Across the Life Span; and (3) Integrated Nanostructured Systems.

Overall, a Department of Biomedical Engineering will have a very favorable impact on our school. It will enrich the school's core curriculum and will increase the pool of engineering students who apply (available data indicate that one-third of graduates with BS degrees in biomedical engineering enter medical school). In terms of research, it will enrich existing collaborations and facilitate new ones. It will also enhance mentored research training, shorten the time it takes to translate basic-science discoveries into proof-of-concept studies in humans, and, not least of all, it will increase our school's competitiveness for National Institutes of Health training and program grants.

In the months and years ahead, therefore, I look forward to updating you on this new program and the many different ways it will enhance our university and our school as we continue to move forward in our efforts to not only fulfill our educational mission, but also to assist in the rejuvenation of Buffalo, Western New York and beyond.

MICHAEL E. CAIN, MD

Dean, School of Medicine and Biomedical Sciences