

AU's new program in biomedical materials engineering unique in nation

4/02/03

A new baccalaureate degree program in biomedical materials engineering science (BMES) is the first of its kind in the nation, said Dr. David Szczerbacki, provost and vice president of Academic and Statutory Affairs for Alfred University. The University has just received approval from the New York State Education Department to offer a B.S. degree in biomedical materials engineering science, to be offered through the School of Engineering at AU. "This undergraduate degree program is unique, because it is the first in the country to focus on development of materials for biomedical applications," explained Szczerbacki. "Most programs, even at the graduate level, concentrate on development of devices, while our programs focus on the materials that are used to manufacture those devices." Alfred University has offered a master's degree in biomedical materials engineering science for three years, and earlier this year was granted approval to offer a Ph.D. in materials science, with emphases on biomedical materials and photonics. "This new undergraduate degree program complements AU's graduate degree programs and helps to solidify Western New York's position as a leader in education and research in biotechnology," said Szczerbacki. "Our program capitalizes on one of Alfred University's traditional strengths - ceramic engineering and materials science - and combines it with our program in molecular cell biology," said Dr. Alan Goldstein, BMES program director, professor of biomaterials and the Fierer Professor of Molecular Cell Biology. "In the future, we will engineer biological materials just as we currently engineer metals and ceramics," explained Goldstein. "We already see this concept at work in instruments such as the DNA microarray and medical devices designed to work inside the human body." Physicians and scientists have long envisioned replacement "parts" for human bodies, from implantable devices to artificial organs and hard tissue (teeth and bones) but the limiting factor has been the materials used to manufacture them, Goldstein explained. For years, researchers assumed that chemically inert materials such as ceramics and glass did not react within the human body and therefore were safe to use for implants and other medical devices. In fact, said Goldstein, "a whole series of reciprocal complex reactions were occurring on the surface of both the material used in the device, and in the cells and tissues in contact with the material. In the past, interactions between implanted materials and body tissue were mainly viewed as something to be avoided. However, part of the biotechnology revolution has been a quantum leap in our understanding of how cells and tissues communicate by physical contact and chemical signaling. In the future, biotechnology will merge with materials science so that engineered biomaterials will enhance the function of medical devices and implants. The drug-eluting stent is one of the first examples of next-generation medical devices that use these types of advanced biomaterials." Alfred University has had a nationally recognized research program in biosurfaces for over a decade. Long before biomaterials emerged as a separate field, Alfred was recognized as a leader in developing medical applications for materials such as ceramics for applications in hard tissue such as teeth and bone, Goldstein noted. "This leadership position in research, coupled with an emphasis on undergraduate education made a BS degree in biomedical materials engineering science the next logical step," he said. "We are now moving into an era where we will engineer biological materials, just as we now engineer metals, polymers and composites for a wide array of high-technology applications," said Goldstein. The program has been developed so that courses in electrical engineering, mechanical engineering, computer science and business can be integrated into the BMES curriculum to give graduates a variety of career options. "We think this will give our students an unlimited range of options," said Goldstein, "from biomedical engineering, biotechnology and research to medical school, law school or a career in business." Students will also have the ability to enter a 4+1 program so that they can earn a master's degree in biomedical materials engineering science in five years, said Goldstein. "Medical devices companies understand that materials will become more and more important as time goes by," Goldstein said. "I am confident that the graduates of our BMES programs, from the undergraduate to the Ph.D. level, will be in high demand."