Whitaker Foundation Grant Allows AU to Implement New Graduate Program
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Alfred, NY - A nearly $1 million grant from The Whitaker Foundation, announced today (Dec. 7) by the Virginia-based foundation, will enable Alfred University to implement a master's degree program in biomedical materials engineering science (BMES) on an accelerated timetable."These outstanding institutions are at the forefront of the emerging field of biomedical engineering," said G. Burtt Holmes, chairman of The Whitaker Foundation Governing Committee, referring to the 14 institutions that received a total of $26.9 million. "These intensely competitive awards will support exciting new education and research programs that will involve students at the cutting edge of engineering and medicine.""We are pleased that The Whitaker Foundation recognized our outstanding research program in biomaterials, and agreed to help us use that as a base to build a unique graduate-level program in biomedical materials engineering science," said Alfred University President Edward G. Coll, Jr.Receipt of the grant allows Alfred to implement the program immediately, said Dr. William C. LaCourse, professor of glass science, who will be interim director for the BMES program. Initially, the University had planned to phase in the graduate-level program over the next three to five years.The funding, payable over the next three years, will allow the University to begin recruiting faculty for the new program. It will also provide start-up research funding for the new faculty positions.The BMES program is an interdisciplinary program between the School of Ceramic Engineering and Materials Science in the New York State College of Ceramics, and the Division of Biology in the College of Liberal Arts and Sciences, both at Alfred University.While there are other biomedical engineering programs in existence, said LaCourse, the Alfred program will be unique. "We will be the first that focuses on the biomedical materials needed for the diagnosis, treatment and prevention of disease," explained LaCourse who envisions that students enrolled in the BMES program would be working on development of materials for devices such as artificial kidneys; artificial bones; and treatment of cancer. "The impetus for this new program and the grant comes from the Alfred satellite of the National Science Foundation's Industry-University Center for Biosurfaces," said LaCourse, crediting Dr. Alexis Clare, associate professor of glass science and director of the Alfred satellite. "She has built up the research base in this area,"he said. "Without that, implementing the BMES program and securing the grant would not have possible.""There are lots of people who know about materials, but not many who understand the complex reactions that occur at the interface between materials and living systems," said LaCourse.That's an area Alfred researchers have been exploring for several years, noted LaCourse. At the fundamental level, they have been exploring the factors which control the interactions between materials and living systems, and using that knowledge to help design materials and the processes to create those materials. An example is the work of Dr. Clare and Dr. Alan Goldstein on details of the molecular interactions of lung fluids with material surfaces. "The work they are doing will aid in understanding why only certain forms of asbestos are harmful when ingested into the lung, and will help industrial researchers design safer materials." Another thrust will be the development of protocols and standards for testing materials in the physiological environment, said Clare. Once researchers understand what happens at the interface between materials and living systems, and develop protocols and standards for testing, it should be possible to test new materials without actually implanting them in the human body. Some of that work is already under way. LaCourse, in cooperation with industry and other research labs has developed glass-based materials which dissolve at a controlled rate within the body. These materials will replace metals currently used in orthopaedic surgery. They will allow for temporary fixation of broken bones (pins, plates) so that as the bone heals, the glass/polymer composite will dissolve and, when completely healed, the glass will disappear. The advantage, said LaCourse, is that a second operation to remove the pin or plate is unnecessary. This decreases recovery time, and reduces the cost of surgery by up to 40 percent. Another use for such resorbable materials is in the slow release of medicines. Dr. Clare has been working on glass fiber optics that improve the ability to detect various diseases, and is now extending the work to use fiber optics to determine whether meats such a chicken or steak, are safe to buy by detecting molecules produced during spoilage.The School of Ceramic Engineering and Materials Science has a history of pioneering work in biomaterials -- led by researchers such as Eugene Monroe and coworkers who did work on development of materials for dental applications in the 1970s; alumnus Dr. Sam Hulburt, who is now president of Rose-Hulman Institute; Professor Robert Condrate who conducted essential research on the chemistry of hydroxyapatites, and former faculty member Dr. Gary Fischman, who is now with the federal Food and Drug Administration.But it was the hiring of Goldstein as chair of the Division of Biology three years ago that gave Alfred the expertise it needed to move forward with the new program, LaCourse noted.

Goldstein's expertise is in molecular and cell biology with an emphasis on the interface between cells and minerals. "It was a logical building block for this type of program," said LaCourse. Also critical was Goldstein's development of a Molecular Life Sciences (MLS) Core Facility within the Division of Biology. "The MLS Core really allows us to put the 'Bio' in Biomaterials by providing much of the instrumentation necessary to characterize tissues, cells and biomolecules", says Goldstein. "This facility, housed within the Bernsterin Center for the Life Sciences, makes Alfred a real double threat in the area of biomaterials." Goldstein, who will be the associate director of the program, also sees biomaterials as an area where Alfred University can achieve national prominence in both education and research. "Our understanding of cellular processes at the molecular level really provides the basis for a revolution in the field of biomaterials science. In the future we will see more devices like the 'biochip', a hybrid material made of glass and DNA. The key to building such devices is an understanding of the surface interactions of biomolecules like DNA with materials such as glass and ceramics. These devices will play a major role in the biotechnology revolution of the 21st century and Alfred is uniquely positioned to make a signigficant contribution." Another innovative feature of the BMES program will be that students who complete undergraduate work in either biology or materials science can enter the masters degree program. "It's a double-track program," explained Clare, who, together with Goldstein, was primarily responsible for the curriculum development.Students with a background in biology will be paired in teams with those who have a background in materials science and engineering. "They will essentially learn from each other the language of two fields," she said. Goldstein agrees saying, "The interdisciplinary nature of this new program will draw students with diverse backgrounds and career goals. Participation in this program will be a career track onto itself creating a whole new group of trained professionals. In addition, it will make our students more competitive if, after completing the program, they choose more traditional careers in medicine, biomedical research or materials science."Each of the teams will be assigned to work on specific projects in conjunction with area medical doctors and dentists, and will have access to research facilities at Roswell Park Cancer Institute, as well as those at the University of Buffalo, the University of Tennessee at Memphis and Miami University, Alfred's partners in the Center for Biosurfaces.Receiving the Whitaker Foundation grant is "is an historic event, one that presents important opportunities for all of Alfred University," says LaCourse, who predicts the BMES program will open additional avenues in education and research for Alfred University. The NYS College of Ceramics at Alfred University offers B.S., M.S. and Ph.D. degrees in ceramic engineering and glass science, and B.S. and M.S. degrees in materials science. Its graduate programs in ceramic engineering are rated number one by The Gourman Report. For information about The Whitaker Foundation, call Frank Blanchard(703) 528-2430; e-mail: fb@whitaker.org http://www.whitaker.org/n...