Goldstein named director of Biomedical Materials Engineering Program
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August 22, 2000Sue GoetschiusAU names Goldstein to directbiomedical materials engineering program ALFRED – An Alfred University researcher with extensive background in exploring the interaction of materials with living systems has been named director of the University's interdisciplinary program in biomedical materials engineering science (BMES). Dr. Alan Goldstein, who holds the Norman and Evelyn Fierer Chair in Molecular Cell Biology, has been named director of Alfred University's interdisciplinary program in biomedical materials engineering science. He has been charged by Dr. Ronald Gordon, dean of the School of Ceramic Engineering and Materials Science at Alfred University, with implementing the new master's degree in biomedical materials engineering science, which this summer gained State Education Department approval. "I am pleased that Dr. Goldstein agreed to take on this challenging role for us," said Gordon. "We see biomedical materials as an area where Alfred University can really achieve national prominence in the coming years, building upon our nationally ranked program in ceramic engineering and materials science and on the fine Molecular Life Sciences program Dr. Goldstein established here at Alfred."A member of the AU faculty since 1995, Goldstein has spent more than 20 years studying the interactions of living cells with materials. He has used diverse experimental systems ranging from the extraction of phosphate ore by bacteria (biomining) to the interaction of fiberglass with human tissue. The unifying theme has always been the molecular characterization and understanding of the interface between the living and non-living materials."Without that understanding, it would be impossible to develop new biomaterials that are helpful, rather than harmful, to living systems," said Goldstein, who over the years has been the principal investigator on federal grants, totaling more than $1 million, from the National Science Foundation, the National Institutes of Health, the Department of Energy and the Department of Defense. Among his current projects is an NIH-funded program to determine how changing the shape of an enzyme alters its ability to catalyze a chemical reaction. This type of "protein engineering" is the key with which biotechnologists expect to unlock the secrets of the cell and, in the process, develop tools to improve the human condition through advances in health care, agricultural production, and many other areas, explained Goldstein."The focus of the AU program is, of course, development of new strategies for biomedical materials engineering through an understanding of what is occurring at the biomaterials' surface," said Goldstein. "As new materials are developed, it is necessary for us to understand the surface interactions of biomolecules, such as DNA, with materials such as glass and ceramics. In the end, the unifying language is chemistry. That's how living cells communicate, and that's how they 'see' and react to a material's surface."One of Goldstein's biomedical materials projects is funded by NSF through Alfred's Industry-University Center for Biosurfaces. This research looks at the interaction of glass fibers and the macromolecular coating that surrounds lung tissue. This coating, which surrounds virtually all human cells, is called the extracellular matrix (ECM), he explained. By developing a microscale in vitro system, Goldstein has been able to identify and characterize ECM proteins adsorbed to the surface of the glass fibers, giving insight into what occurs at the interface of glass fibers and lung tissue. In the long term, Goldstein hopes that his in vitro system will provide the fiberglass industry with new ways to assess their products. At the same time, the project is generating a wealth of basic knowledge about how proteins interact with glass surfaces. Goldstein is also considered the world's foremost authority on bioprocessing of rock phosphate ore, and has conducted pioneering work on the use of naturally occurring soil bacteria to convert rock phosphate ore into soluble phosphorus for agricultural crop production without harming the environment. This fall, he will present an invited technical paper at the International Fertilizer Association's World Conference in New Orleans.He has taught graduate and undergraduate courses in biochemistry, cell biology, advanced cell biology, molecular genetics, molecular diagnostics, genetic engineering and tissue culture.A graduate of New Mexico State University with a degree in agronomy, Goldstein earned his Ph.D. in genetics from the University of Arizona.