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**THE WHITAKER FOUNDATION
BIOMEDICAL ENGINEERING SPECIAL OPPORTUNITY AWARDS**

Name of Institution: University of Utah, Department of Bioengineering
Collaborating Institution: Utah Science Center

Project Title: *Bioengineering in Action: From the University to the Community*

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1. SUMMARY

The continued growth and development of biomedical engineering is of great interest to the general public. Bioengineering's new levels of understanding and its new tools engender the public's curiosity—and that public generally insists that those new tools and technologies be used in their personal health care. Though very interested and curious, that same public has little understanding or even appreciation of the science and engineering fundamentals involved, nor of benefits/risks/costs issues.

The Department of Bioengineering is the main regional academic center of an interdisciplinary program of research and training in the broadly defined area of biomedical engineering in the Mountain West. For most of its history, the department has specialized in graduate education and has consistently ranked in the top 15 nationally. The department has built a tradition of strength and international recognition in basic and applied research, and established strong collaborative ties with a number of divisions and departments at the University of Utah and at other institutions.

In early 90's the department was fortunate to receive Whitaker Foundation support for faculty expansion in the form of a Development Award. The award was leveraged to achieve 80% growth in our faculty over the past 9 years. Responding to a strong undergraduate interest in the study of biomedical engineering and a perceived industrial needs, the department established an undergraduate program in biomedical engineering in 1999. The undergraduate program will enter its Senior year in the Fall 2002 and will graduate the first class of 20 (est.) Bachelors of Science in BME in May 2003.

The Department of Bioengineering is now presented with a unique and special opportunity to help public understand the role which biomedical engineering plays in their lives. The Utah Science Center (USC, www.utahsciencecenter.org) in Salt Lake City is being developed with a major commitment to visitor/participant interactivity using the technologies and tools of modern biomedical engineering. The visitor IS the subject, the object, the sample, the specimen. The *YOU!* Theme of USC uses a wide range of non-invasive and minimally invasive bioengineering tools and technologies. *YOU!* are the experiment in this new science center. The USC will open in less than two years in downtown Salt Lake City – just 3 light rail stops from the University of Utah and its Department of Bioengineering.

We propose a major partnership between the Department of Bioengineering and the new Utah Science Center, thereby providing our students and faculty with an efficient means of:

1. directly *interacting* with the general public;
2. *presenting* and *demonstrating* bioengineering research, developments, and tools;
3. *enhancing* our own education, experience, and understanding via the development, implementation, testing, and evaluation of our exhibits and activities with USC staff and with the general public;
4. *providing* the public with background, education, and appreciation of bioengineering R&D, hopefully leading to improved national, state and local support;
5. *motivating* and *encouraging* students to consider majors and careers in bioengineering and in other scientific and engineering fields.

2. BACKGROUND

2.1 History and Mission

The graduate program in Bioengineering at the University of Utah dates back to the early '60s when a Department of Bioengineering and Biophysics was founded by Dr. Homer Warner, a pioneer in computer applications in Medicine. Several pioneers in transplant surgery in the mid-1960s recruited for an outstanding individual to develop a program in "artificial internal organs" to complement the growing activities in surgery. The University recruited artificial organs pioneer, Willem J. Kolff, in 1967. Dr. Kolff rapidly developed an Institute for Biomedical Engineering and a large research program focusing on artificial kidneys (hemodialysis), artificial hearts, and cardiac assist devices. He was already internationally known and recognized as the "Father of Artificial Organs" back in 1967. His presence at the University of Utah immediately attracted many students, scientists, and engineers who wanted to work with him. Willem J. Kolff was a researcher, physician, and inventor and was not particularly interested in academic degree granting programs. Many of the students who came to work with him wanted to earn degrees. Dr. Warner's Department of Biophysics and Bioengineering was not equipped to provide these students with an appropriate degree program. So in 1974 that department was administratively reorganized into the Department of Medical Informatics in the School of Medicine and the present Department of Bioengineering, a department within the College of Engineering.

Bioengineering at Utah has focused on Biomedical Engineering, the application of engineering principles, methods, and tools to problems and needs in medicine and surgery. The first chair of the present Department of Bioengineering was Dr. Curtis Johnson, an electrical engineer/bioengineer recruited from the University of Washington, which already had an active program in biomedical engineering.

Our mission is to provide outstanding educational opportunities for students in biomedical engineering and to conduct research and development in the general area of bioengineering.

About a decade ago we had the opportunity to compete for a Department Development Award from the Whitaker Foundation. The Whitaker Development Award was made to fund the creation and development of the Biobased Engineering Program at the University of Utah, based on the concept of transferring fundamental knowledge from molecular biology, cell biology, and organismal biology to the applied field of biomedical engineering. The Whitaker Foundation Development Award in 1993, together with strong support and commitment from the University of Utah – led to a 80% growth in the faculty over the past 9 years. The Whitaker Foundation and the University of Utah have made substantial investments in a greater biological focus in Utah's bioengineering program and in the research opportunities available to graduate students.

The field of Bioengineering has also changed and matured during this period. The success and popularity of the field has resulted in a strong interest in the study of bioengineering at the undergraduate level. The Department's Industrial Advisory Board and the College and University higher administration encouraged the development of an undergraduate program. We began the planning and development of a full undergraduate