

VIRGINIA TECH – WAKE FOREST UNIVERSITY
SCHOOL OF BIOMEDICAL ENGINEERING AND SCIENCES
EXECUTIVE SUMMARY

GOAL

The goal of this proposed effort is the establishment of a Virginia Tech – Wake Forest University School of Biomedical Engineering and Sciences (SBES) with joint academic degree programs, collaborative research efforts, and a common administration.

RATIONALE

Biomedical Engineering (BME) is directed towards improving human health through cooperative advancements in engineering and medicine. The NIH has recognized the importance of this field through the recent establishment of the National Institute of Biomedical Imaging and Bioengineering (NIBIB). During the next five years, support for the NIH as a whole is expected to increase dramatically – by as much as a factor of two – and NIBIB could well be a recipient of much of this growth. Currently, the NIH funds almost 50% of all basic research supported by the federal government.

Virginia Tech (VT) and the Wake Forest University (WFU) School of Medicine have recently declared ambitious goals to increase their national stature. Last year, Virginia Tech's President Charles Steger issued a challenge to his university to place within the top 30 research universities in the U.S. by the year 2010. Virginia Tech's 2000 Annual Report noted that only 6% of the university's funding came from DHHS (including NIH), a traditionally underused resource at VT. Considering that only one of the top 30 research institutions in the U.S. does not have a medical school or a BME program and that over 90% of the top 40 Colleges of Engineering¹ have a BME program, being able to access this funding is critical to VT's goals. Likewise, the WFU School of Medicine (WFUSM) has defined seven goals in its Strategy Position Paper. Three of these goals are pertinent to the BME initiatives: to rank within the top 20 recipients of NIH direct research funding and have at least 10 programs in the top 10 in their area of study, to rank within the top 20 recipients in total extramural research funding, and to rank within the top 30 academic health centers in annual licensing revenue. Currently, all of the top 20 NIH-funded institutions have an engineering school or BME department, and most have both. We seek to address the goals of both institutions through the establishment of a joint Virginia Tech – Wake Forest University biomedical engineering program, which will provide VT with the benefits of a School of Medicine and WFU with the benefits of a College of Engineering.

ADVANTAGES

The advantages to be realized through a Virginia Tech – Wake Forest University collaborative effort are numerous. Well known for its overall excellence, WFU is ranked 28th among the best national universities¹ and was selected as one of the 50 most competitive schools in the country in Barron's *Profiles of American Colleges*. Wake Forest University Baptist Medical Center offers Virginia Tech unique opportunities, including affiliation with a top-50 medical school¹ that ranks 40th among 123 U.S. medical schools in NIH funding, a medical center with top-50 rankings¹ in 10 of 16 specialties, close proximity, and a wide range of research interests, such as aging, genomics, cancer, pulmonary diseases, women's health, stroke, hypertension, and diabetes. Virginia Tech offers WFU the resources of a comprehensive university with a large technological emphasis and over \$190 million in research expenditures. The College of Engineering (COE) at VT houses a 17th ranked undergraduate program with more than 5,000 students, a 25th ranked graduate program¹ with 1500 students, research programs with expenditures exceeding \$80 million per year, and its Center for Biomedical Engineering (CBME) with more than 20 active faculty members. Within the COE, expertise already exists in numerous related research areas, including Fiber & ElectroOptions, Human Factors Engineering, Composite Materials and Structures, Wireless Telecommunications, and Smart Materials. Strong research programs related to BME are found throughout the University and include Polymer Chemistry, Biochemistry and Molecular Biology, the Center for Gerontology, and the Virginia Bioinformatics Institute. Finally, the Virginia-Maryland Regional College of Veterinary Medicine (VMRCVM), located at VT, has the capabilities for testing and monitoring advanced biomedical technologies in animals before their application to human patients. Collaboration between VT and WFU will provide a needed regional biomedical engineering resource spanning southwest Virginia, northwest North Carolina, and portions of Tennessee and Kentucky.

¹ According to *US News and World Report*

IMPLEMENTATION

The current focus is upon the organization of the school administration, the development of appropriate degree programs, and the initiation of joint research projects. WFUSM has received commitments for approximately \$1.5 million over a three-year period from the following departments: Anesthesiology, Internal Medicine, Medical Engineering, Neurology, Pediatrics, Radiology, Cardiothoracic Surgery, General Surgery, Neurosurgery, Ophthalmology, Orthopaedics, Plastic and Reconstructive Surgery, and Urology. These initial participants will form the WFU Center for Biomedical Engineering as a counterpart to the CBME at Virginia Tech. WFU and VT continue to work closely to develop a comprehensive plan that will clearly define the operation of the SBES. To date we have drafted a plan intended to produce the following results:

- The union of academic and research excellence in medicine and engineering.
- M.S., Ph.D., and M.D./Ph.D. degrees jointly awarded by VT and WFU.
- A joint administrative and academic structure to be presented for approval to the leadership of each institution in the fall of 2001.
- An oversight committee with equal membership from WFU and VT.
- SBES faculty at each institution holding adjunct appointments at the other.
- A formal policy for sharing patents, grants, indirect costs, and intellectual property.
- Initial participation by VT provided by its CBME.
- Initial funding for WFU participation in SBES provided by various clinical departments at WFUSM; these departments will form a CBME to administer the program at WFUSM.
- An admissions policy requiring approval by both institutions for acceptance of individual students.
- SBES enrollment of 80-100 students, 25%-50% of whom will be resident at WFUSM, within 5 years. Considerably greater growth, perhaps several hundred students, is anticipated as the two universities find new areas of collaboration, biomedical and otherwise.
- Student enrollment at WFU or VT to be determined by each student's advisor, and benefits, tuition, and non-SBES administrative issues to be handled by the campus at which the student is enrolled.
- BME courses taught at one campus and offered via distance learning to the other campus with no tuition exchanges. (This policy is used currently by the NC teleclass system.)
- Entrance of the first students scheduled for the Fall 2002 semester.
- A proposal to the Whitaker Foundation to provide \$1 million to each university over a three-year period.

The development of SBES is aimed at building bridges across departmental, college, and institutional divides to maximize collaboration among educators and researchers in biology, engineering, and medicine. Hence, the joint research and educational programs that are developed will benefit both institutions, will advance fundamental discoveries in medicine and biology, and will lead to improvements in health care technologies. In developing the Virginia Tech – Wake Forest University School of Biomedical Engineering and Sciences, we have the unique opportunity to place ourselves at the forefront of leadership in directing the future of biomedical engineering.