A History of the Biomanufacturing Research Institute and Technology Enterprise

The Biomanufacturing Research Institute and Technology Enterprise (BRITE) Center of Excellence was established in 2004 when Dr. James H. Ammons, Jr. served as Chancellor. BRITE is part of the state initiative for workforce development. This effort, named initially Biomanufacturing Pharmaceutical Training Consortium (BPTC), lately changed to NCBioImpact, consists of three entities: BioNetWork (58 community colleges), BTEC (Biomanufacturing Training Education Center at NC State University), and BRITE (NCCU). The goal of this consortium is to develop skilled workers for the biomanufacturing and pharmaceutical industry in North Carolina.

BRITE’s mission is to provide the biomanufacturing industry with skilled scientists who are prepared to pursue careers in biopharmaceutical science and management. The 52,000 square foot state-of-the-art facility was founded by the Golden LEAF Foundation, Inc., which provided a grant of $20.1 million for construction of the BRITE facility. This new facility was completed in June 2008, and is currently operational. The new facility is equipped with $5.6 million in state-of-the-art laboratory equipment to support its academic and research programs. The majority of the funding is from annual state appropriations. The Golden LEAF Foundation has also provided an additional $1.5 million dollars to expand and upgrade the equipment in the next year or two.

As a component of the North Carolina Biomanufacturing and Pharmaceutical Training Consortium, BRITE offers education and training in biotechnology and biomanufacturing for students at the B.S., M.S., and eventually Ph.D. levels. Three curricula with majors in Biology, Chemistry, and Physics and a concentration in biopharmaceutical sciences were developed and approved by the Board of Trustees in 2006. In the fall of 2006, 35 students were enrolled in these programs. The new degree program, Pharmaceutical Sciences, to offer B.S. and M.S. degrees, was approved by the UNC-General Administration in February, 2007. In the fall of 2007, a total of 32 students were enrolled in the BRITE program, and 24 were majors in pharmaceutical sciences. By 2008, the new student enrollment had reached 58. Among them, 38 were from high schools and 20 were recruited from community colleges through 13 signed articulation agreements (2 plus 2 agreements). Currently, BRITE has 9 tenure track faculty members and 33 staff to support its program. Four students who enrolled as juniors in 2006 graduated from this program in the spring of 2008. Two students are currently working at a local biomanufacturing company as scientists, and two entered graduate schools. Currently, the BRITE program has 116 students in the B.S. program and 48 in the M.S. program. BRITE is in the process of preparing a Ph.D. program to be submitted to UNC-General Administration for approval.

Biomanufacturing-related programs will initially focus on bioprocess improvement and bioanalytical and formulation sciences. The university is developing its curriculum to train students to become competitive in working in a biomanufacturing or a biotechnology related company. Course work will include microbiology, cell and molecular biology, biochemistry, instrumentation and analytical chemistry for the first three years. New courses, focusing on biomanufacturing topics, will be added throughout the four-year curriculum. In the senior year, students will participate in specific projects in laboratory modules that will simulate the work environment of the biomanufacturing industry. This
model will build upon NCCU’s successful investment in the Julius L. Chambers Biotechnology/Biomedical Research Institute. In the five years since this state-of-the-art facility opened, it has attracted top scientists who are training students in cardiovascular biology, neuroscience, cancer and genomics in an environment that replicates the laboratories found in industry.

Interdisciplinary biology and chemistry concentrations will provide a solid foundation in the sciences and specialized education in biomanufacturing competencies. Students from community colleges will enter into the BRITE program at the junior level. Many summer courses will be offered to students as a flexible entry into the BRITE programs. Students also will be able to take courses in the schools of business and law in intellectual properties and business ethics that will augment their work in small and medium-sized biotechnology companies.

The BRITE program will provide students with fellowship and internship opportunities on a competitive basis depending on their academic performance and merits.

BRITE’s academic program will provide collaborations and logistical support for biomanufacturing and biotechnology industries.

Goals and Objectives of BRITE:
The goals and objectives of the five teaching laboratories of the Biomanufacturing Research Institute and Technology Enterprise are to train students in North Carolina with modern equipment, scientific competence, and hands-on experience to become competitive employees in biomanufacturing and biotechnology companies.

The General Assembly provided appropriations during its 2004-05 short sessions of $500,000. The 2005-07 biennium budget requests included $2 million for BRITE. In 2006-2007 the funding reached $5 million and was up to $6 million in 2007-2008.

The BRITE program at NCCU has plans to recruit students from all the counties in North Carolina, especially the state’s rural and economically distressed counties, where education can lead the way to economic prosperity for both individuals and their communities. NCCU has developed an integrated marketing plan for the recruitment of BRITE students from precollege and community colleges. The plan includes the use of multimedia strategies and scholarship programs. A colorful brochure and folder to be distributed at workshops, schools and conferences is being developed.

All the scientific programs will be made available to students and trainees throughout the state through synchronous and asynchronous web-based distance education. The incorporation of advanced process analytical and control technologies will enable remote learning and data acquisition by off-site students and trainees.

BRITE is working with the DESTINY program at the University of North Carolina at Chapel Hill and other outreach opportunities. This program has successfully reached more than 16,000 students in middle and high schools in North Carolina since its rollout in 2000 with a traveling bus equipped with laboratories. We believe a program like DESTINY will provide a much needed “spark” of bioscience interest to a greater number of North Carolina students in K6-K12 at the precollege level. If interest in bioscience grows with students at the precollege level, it will provide the BRITE program with the benefits of increased quality and diversity of students and raised awareness of the BRITE program.

Expected Outcomes:
The BRITE program will deliver educational programs that provide essential hands-on training and high-quality students to meet and exceed the current needs of the biomanufacturing, pharmaceutical, and agribiotechnology industries in North Carolina. Professional M.A. degrees and PhD degrees in bioprocess and biopharmaceutical sciences will produce future technical and business leaders, a development ensuring that this industry cluster will remain vital and innovative well into the future.

The BRITE program as part of the state initiative in the North Carolina Biomanufacturing and Pharmaceutical Training Consortium will develop a strong and competent local workforce to attract more biotechnology industry to North Carolina. The increase in the number of biotechnology and biomanufacturing companies will further attract capital investment and create more jobs and revenue for the economic growth of North Carolina.