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Title: NC State's Centennial Campus – An Experiment in Public/Private Engagement

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Introduction

In a span of 25 years, NC State's Centennial Campus (<http://centennial.ncsu.edu/>) has developed a reputation as a unique and national model bringing teaching, research and engagement together in public/private partnerships to stimulate economic development. With its 18 startups in the Technology Incubator, as well as 26 companies who have graduated from the Incubator, and its eight new corporate partners, the campus is home to firms, faculty and university programs. The sixty corporate and government partners employ over 2,300 workers, connect to 3400 students, interact with 1350 faculty, postdocs and staff, and have high-quality collaborative partnerships.

The Centennial Campus (<http://www.ncsu.edu/about-nc-state/centennial-campus/index.php>) is both a science research park and an educational campus. As a mixed use academic community, it integrates living arrangements, offices and laboratories for work, and settings for play. A uniqueness of the campus is that it is organized into educational neighborhoods (a concept introduced by Thomas Jefferson) that stimulate creativity and innovation.

The Centennial Campus has invested nearly \$1 billion in facilities, with 3.0 million square feet currently occupied. Additional facilities are under construction, with plans to grow to 9 million square feet when fully built out. It also has 60 townhomes/condos and a magnet middle school with 600 students, so for families, school age children, college students and adults, the Campus has the vitality of a small city with many neighborhoods.

Education is at the forefront, but research, economic development, and new business growth and support are the outcomes. In 2007, the Biomanufacturing Training and Education Center (BTEC) opened on Centennial Campus (<http://www.btec.ncsu.edu/>). It is the largest pilot plant facility of its kind in the nation and provides hands-on training for professionals in biomanufacturing and biopharmaceutical industries.

In the educational neighborhood, Centennial Campus houses a magnet middle school, conveniently situated next to a learning technologies think tank, the William and Ida Friday Institute for Educational Innovation (<http://www.fi.ncsu.edu/>), College of Education.

History

Prior to the establishment of the Centennial Campus, NC State was bounded on three sides by Pullen Park, a railroad track, and major highways. See the Interactive Map: <http://centennial.ncsu.edu/centennial-interactive-map.php> In 1984, North Carolina Governor James B. Hunt, Jr. decided to expand NC State's campus to give it vacant land formerly used for farms of the Dorothea Dix Mental Hospitals. At the same time he proposed to leverage the University's capacity to stimulate regional economic development. The underutilized land became the Centennial Campus and, in addition, the College of Veterinary Medicine became the Biomedical Centennial Campus.

Together, these sites totaled 1334 acres and gave the University the capacity to grow beyond its original boundaries (<http://centennial.ncsu.edu/centennial-3d-map.php>). State officials, business leaders, and university leaders won enactment of legislation that gave the University the legal flexibility to create LLCs, to lease real estate to its partners, and to direct income from the property to paying off bonds that were needed to build facilities and infrastructure (NC General Statutes. GS§§116-36.5 and 116-198.31).

A master plan was developed for a set of neighborhoods that would combine academic programming, with corporate and governmental tenants, residential and food service facilities, recreational facilities including Lake Raleigh, the new Lonnie Poole Golf Course, and partnerships with Wake County Public Schools through the magnet middle school and a proposed Early College High School with a STEM focus.

The first academic units were the College of Textiles (<http://www.tx.ncsu.edu/>) and the College of Veterinary Medicine (<http://www.cvm.ncsu.edu/>), respectively located on the Centennial and Biomedical Centennial Campus. Under the long range plan, the College of Engineering (<http://www.engr.ncsu.edu/>) will completely move its departments and all programs with the exception of the Nuclear Engineering facility to the Centennial Campus. Currently, Engineering I, II and III are completed. Engineering IV and V are in design. Although the emphasis is on engineering, every NC State College has a presence through faculty or programs on Centennial Campus.

Additionally, private companies, nonprofits, and governmental agencies, such as the North Carolina Wildlife Resources Commission and the USDA Agricultural Plant Health and Inspection Service, are located in their own buildings or in jointly held facilities.

Major Research and Outreach Units

In addition to the colleges, the Centennial Campus is home to some of NCSU's major research and extension education units, such as the Institute for Transportation research and Education, with its \$5.8 million in sponsored research, training, and technical assistance programs. The Industrial Extension Service, (IES) <http://www.ies.ncsu.edu/>, College of Engineering, manages the NIST Manufacturing Extension Partnership and demonstrated a \$1.0 billion impact on North Carolina manufacturing firms in the last four years through its technical assistance, training, and extension services to companies to increase productivity, efficiency, quality, and profits expertise.

Other units include The Science House <http://www.science-house.org/index.html> which provides and promotes statewide the use of hands-on inquiry based learning in science and math and annually reaches over 4,430 teachers and over 27,232 students from six offices spread across the state; The North Carolina Climate Center, and the Capital Regional Offices of the Small Business and Technology Development Center (SBTDC) are also located on this campus.

Corporate Partners

The world headquarters of Red Hat is located in a separate facility. Red Hat, co-founded by an NC State graduate, is a leader in the open source software using the Linux operating system.

Another company, MeadWestVaco (MWV), moved all of its research, development and marketing facilities onto Centennial Campus to create its Design Innovation Center. MeadWest Vaco works with faculty and students in five colleges of the University including College of Natural Resources, College of Management, College of Engineering, College of Humanities and Social Sciences, and the College of Physical and Mathematical Sciences. It is this tightly linked interaction that drives the location/co-location of companies on the campus. Unfortunately, with the global recession, MWV has since downsized dramatically and then relocated its remaining Design Center staff to its world headquarters in Richmond, VA.

The Technology Incubator (<http://centennial.ncsu.edu/technology-incubator.php>)

The Technology Incubator on the campus is managed by the Industrial Extension Service. The Incubator provides a number of services to the tenant partners, such as counseling from the Small Business Technology Development Center, access to the Libraries, access to faculty and students, and most importantly an entrepreneurial network and culture within the Incubator in which small businesses learn from one another and often create new businesses out of the joint interaction.

In 2008, the Research Triangle Institute was contracted to conduct an external evaluation of the Incubator and track 26 companies who had graduated from the facility. The graduating companies have had a major economic impact on the state including the creation of 894 jobs, \$75 million annual increase in the growth state product, and \$6.5 million in state and local tax revenues (RTI Economic Impact Analysis, 2008).

Criteria for Partner Engagement.

At a minimum level, any company or agency which desires to locate on the Centennial Campus must have some formal/informal relationship with faculty in departments and colleges. It may expect to use students as part-time workers and hire our graduates, but simply getting access to students is not sufficient reason to locate on the Campus. Access to laboratory and equipment sharing and use increases the value to both parties in a partnering engagement as well as grants and contracts or consulting arrangements with the faculty.

The more sophisticated level of engagement would include joint development and sponsorship of student seminars or lecture series, sponsoring senior design projects, hiring students through the cooperative program, mentoring and volunteering with students, as well as serving as adjunct faculty, members of advisory committees or guest lecturers.

An increased level of engagement would involve joining centers such as the Nonwovens Research Center in the College of Textiles. Most recently, Elmarco, A Czech Republic company that makes equipment for the application of nanotechnology to textile products, joined and initially located its three-person U.S. headquarters in the incubator on Centennial Campus. Elmarco is now in the Research Triangle Park.

Similarly, the donation of space and equipment, collaboration on new standards and protocols would fall into the category of strong partnering engagement.

It is truly the opportunity for joint research, grants and contracts that are collaborative in nature, and partnering on projects that justify location on the campus. Sponsoring research, licensing technology, and spinning out companies clearly justifies such a location.

Some new partners include Pathfinder Pharmaceuticals, Inc., which is a drug discovery company inventing novel therapies for viral infections and related cancers and developing them through the proof of concept. The collaborators are in the Microbiology department. Similarly, Tidhi is developing forensic software for use by state bureaus of investigation and other law enforcement offices. Its collaborators come from the departments of Computer Science and the Forensic Science Center, a recently developed center in the Colleges of Textiles, Humanities and Social Sciences, and Agricultural and Life Sciences. Both of these companies are located in the incubator.

Other examples in which the Centennial Campus has been relevant in recruiting firms include IEM and its 430 jobs from Baton Rouge. Although IEM is not locating on Centennial Campus, at every stage of the recruiting process, faculty and administrators were involved including state and faculty visits to Baton Rouge the co-director of the Digital Research Games Center. Company leaders were hosted at BTEC and invited to consider new facilities under construction. College of Management, College of Engineering, and the College of Humanities and Social Sciences with its communications programs and digital

communication activities, contributed to the interaction with corporate leaders prior to the decision to relocate the firm from Baton Rouge to the Research Triangle Park.

Amenities & Privileges

The benefits to partners include the following:

- Access to laboratories and research equipment
- Partnership opportunities with all colleges
- Access to portfolio of intellectual property thru Office of Technology Transfer
- Ongoing campus-wide programs for employees
- 75-acre public lake
- 18-hole championship golf course
- 9-hole disc golf course
- Restored creek and greenway
- Discounts to NCSU athletic, cultural and arts events
- Access to NCSU Libraries, gym, pool and shared conference space

The Culture of Centennial Campus. The Centennial Campus is the Research Park of the Future in that it creates an extraordinary level of both virtual and real proximity to the university's academic and research strengths and its students and faculties. The open innovation model applied in this setting accelerates technology and knowledge transfer processes from idea to execution, from laboratories to businesses and consumer use, and concept to innovation. See Wall Street Journal insert December 18, 2009 for story about "Research Parks-A Global View into Communities of Innovation" and the Knowledge Economy (<http://www.sciencecenter.org/upload/files/20091218%20WSJ%20Research%20Parks.pdf>).

The culture of the academic university in multiple relationships is reflected in the Biomanufacturing Technology and Education Center (BTEC). BTEC serves the life science, biotechnology, and bioengineering students at North Carolina State University who are interested in majors and minors as well as it hosts the North Carolina Community College program that trains entry level and transitional workers in the basic protocols of working in a biomanufacturing environment. BTEC provides a combination of lab and class work for high-skilled jobs in North Carolina pharmaceutical companies. It is a state-of-the-art, 82,500 square foot, \$45 million facility that NC State opened in 2007. The Golden LEAF Foundation financed its construction with funds from the tobacco settlement monies in order to help educate and train and retrain workers for the new technologies. It replicates a biomanufacturing operation capable of producing biopharmaceutical products and packaging them in an aseptic environment. The classrooms, labs, and facilities are designed to prepare students to go immediately to work in the private sector (BTEC Annual Report, 2009).

BTEC is a significant investment in direct job training for multiple employers that are based in North Carolina but not on Centennial Campus. It also is a unique university and community college partnership. BTEC operates with a \$6 million annual appropriation from the State and student fees and contracts. In its second year of operation, 215 students took classes and 125 are pursuing a minor. In addition to coursework, BTEC offers consulting and laboratory time to manufacturers who want to test a new process on a small scale before deploying it into a factory, or need short-term access to specialized equipment and/or technical assistance. BTEC is an extraordinary example of a facility to which visitors gravitate to understand the support of the State and the University for the biotechnology, bioengineering, biomanufacturing, and biopharmaceutical businesses.

The Nonwovens Institute (<http://www.thenonwovensinstitute.com/>) at NC State University is another example of public private partnerships. The Nonwovens Institute was established in 2007. The Institute serves the nonwovens and affiliated industries with research, training, education, extension, engagement

and economic development. The Institute is home to the Nonwovens Cooperative Research Center (NCRC), one the first five State/Industry-University Cooperative Research Centers (State-I/UCRC) established by the National Science Foundation (NSF) in 1991. NCRC graduated from NSF. The Institute strives to be the global leader in nonwovens education and research. The Institute has established unique state-of-the-art capabilities for product development, analytical services and materials testing, analysis and evaluation to address the diverse needs of this dynamic industry. The Institute offers services in the form of proprietary testing, analysis and product development.

In addition to the corporate connectivity, Centennial Campus has become the hub for major city and community oriented recreational activities, such as the City of Oaks Marathon, the Polar Plunge, Focus on Fitness, and Ironkids triathlon. In FY 2010, these and 23 other events brought nearly 15,000 people onto the campus.

The Future of Centennial Campus. To honor the vision of Governor James Hunt, NC State requested state appropriated funds to build the James B. Hunt, Jr. Library on the Centennial Campus. This \$110 million facility designed by Snoheeta, is under construction and will be completed in 2012. A new chancellor's residence, called "The Point" overlooks Lake Raleigh, and will be completed in 2011. The Randall Terry Companion Animal Hospital is nearing completion for the College of Veterinary Medicine, with joint funding from a major gift and the state. The Centennial Science Center, funded privately, opened in July 2010. Long range plans include the development of a conference center and adjacent hotel. This facility will be built by the private sector and increase access to the executive education programs. Additional student housing and personal residences are also in planning.

We also have a long range vision for the Centennial Campus that includes a projected 12,500 corporate and government employees, 12,500 university faculty, staff, post docs, and students, and over 7,000 housing residents. Additionally, 2,400 support services personnel will be involved in the day to day life of Centennial Campus.

Major Issues

Although the University is a state agency with significant funding for programs and facilities, the Centennial Campus is still vulnerable to changes in the market as a result of local, national and global economic shifts. The access and value of the partnerships must still compete with market costs for space. The academic calendar and scheduling of classes requires the university to address student issues such as transportation around the entire campus, dining and residence hall facilities, and recreational facilities.

The funding of the facilities and infrastructure came from diverse sources, with the State funding the academic facilities (38%), the university financing 21% of the facilities, agencies funding 8%, gifts and grants funding 8%, for example, the golf course and chancellor's residence, and private partnership sources funding the remaining 25%.

Managing the Centennial Campus has also required creativity in organizational processes, as three Vice Chancellors are connected to the Campus, including the Vice Chancellor for Finance and Business Affairs, the Vice Chancellor for Research and Graduate Studies, and the Vice Chancellor for Extension, Engagement and Economic Development. A team of managers connect the administrative officers through the director of the Centennial campus Partnership Office. Regular briefings of the Chancellor and other executive officers keeps everyone informed of the status of programs and facility construction, as well as updating long range planning. Regular meetings with partner executives, such as Breakfast with the Chancellor, and incubator Lunch and Learn sessions, also keep the lines of communication open.

Recognition

The Association of University Research Parks (AURP) named Centennial Campus the Outstanding Park of the Year 2007. However, as we have noted, the Centennial Campus is not just a research park, it is an educational campus on which students of all ages and fields are taught, and research and public/private partnerships generate new knowledge and communicate that knowledge to students and industry, and create jobs through the creativity and innovation of the faculty and industry (Shaffer and Wright, 2010:9-14).

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