



## **N.C. State University's Centennial Campus: An Emerging Paradigm of Land-Grant Engagement**

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### **The Original Land-Grant Paradigm**

**T**he land-grant ethos arose from a national concern over the plight of the family farmer. The original 1862 and 1890 Morrill Land-Grant College Act legislation (Rasmussen 1989) created a land-grant system of universities to affordably educate sons of those working men and women. In the aftermath of the Civil War, an additional catalyst was needed to promote the economic well-being of the rural farming population. The 1887 Hatch Act created a national system of agricultural experiment stations, aimed at creating new knowledge to help farmers improve their management practices and yields. However, the normal practice of

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communicating those research findings through reports and farm publications was not effective in reaching a rural population with very basic literacy skills and who did not believe in "book farming" (Rasmussen 1989).

The need to effectively communicate research findings emanating from these experiment stations led to the Smith-Lever Act.

This act, passed in 1914, built upon the concept of educating rural adults with research-based knowledge that would give them the practical tools needed to provide for their families and enhance the quality of life in their communities. Out of that legislation came a unique entity known today as the Cooperative Extension Service. Its purpose was to "aid in diffusing among the people of the United States useful and practical information on subjects relating to

agriculture and home economics and to encourage the application of the same" (Rasmussen 1989).

As valuable and worthy as they still are today, the original land-grant mission did not take into consideration the future globalization of the economy or the urbanization and industrialization of America. Nor did it anticipate that many other institutions of higher learning would adopt an extension mission and that to remain relevant and excellent, land-grant universities would need to return to their roots by building upon focused areas of strength and by moving away from the tendency to spread increasingly constrained resources over more and more issues.

Today, to remain relevant, land-grant institutions must change and grow as the demographics of their citizens also change and grow. The Centennial Campus of North Carolina State University is at the leading edge of demonstrating one major way the extension mission of land-grant universities can evolve to remain relevant.

### North Carolina State University's Twenty-First Century Land-Grant

In the mid-1980s, a 1,000-acre tract of state land became available approximately one mile southwest of North Carolina State University's main campus. While highly sought-after for private development, Governor James B. Hunt, Jr. and his successor, Governor James G. Martin, allocated the land to N.C. State in two parcels. In doing so, Governor Hunt cited the need to provide room for future expansion of N.C. State's strong programs in science, engineering and technology and charged the university administration and faculty with using N.C. State's unique strengths to create an innovative economic engine for the state's development. Called N.C. State's "Twenty-first century land-grant" by former Chancellor Larry K. Monteith, it was named Centennial Campus. The central concepts of Centennial Campus are those of an "international model for knowledge-based economic development" (Klein 1997) and an advanced research and learning community/technopolis where "university, government, and industry partners interact in multi-disciplinary programs directed toward solution of contemporary problems" (Place 1999).

### Program-Centered Development

The premise of Centennial Campus is simple: It is a program-driven economic development tool, not a real estate venture. The non-university tenants of Centennial Campus locate there because they are attracted by faculty programs of research in key areas of excellence. These external partners see many benefits to co-location on the Centennial Campus, including the opportunity to collaborate with the best researchers on common leading-edge research interests, potential access to ground-floor licensing of new technologies that will help them remain competitive in a global economy, access to the intellectual power of bright undergraduate and graduate students, and access to the latest research equipment and technology.

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Faculty and students benefit from real-world perspectives on and exposure to addressing the needs of industry through collaborative basic and applied research activities. Faculty also take study leaves to rejuvenate or change direction in research programs, and to take advantage of opportunities to improve the commercialization potential of research, sometimes leading to a spin-off company. Students can benefit from co-op experiences, internships and fellowships with external partners, gain real-world corporate experience for their work portfolio, and, of course, obtain an excellent job with a high-tech company and need little if any additional training to fully function.

To facilitate physical as well as intellectual interaction, Centennial Campus buildings are built in neighborhood "clusters" as defined by strong interdisciplinary programs. These clusters are centered around courtyards which give the feeling of a small campus within the total campus. They also encourage interaction between the residents of buildings within a cluster and are pedestrian-oriented. The interdisciplinary programs around which Centennial Campus neighborhoods are formed include advanced materials, biosciences and biotechnology, advanced communications and networking technologies, environmental technologies, and pre-college education.

To further advance the assertion that Centennial Campus is centered around programs and not real estate, the College of Veterinary Medicine has been designated part of Centennial Campus although it is located several miles northwest of Centennial Campus. The college has areas of research strength in cancer treatments and drug delivery systems which are increasingly attracting the interest of pharmaceutical companies and others who see potential for human treatments in the new technologies developed.

Faculty research programs can reside in buildings which also house corporate and government research programs, young start-up companies which utilize N.C. State-developed technologies, and university extension programs which provide science and technology-based educational programs to K-12 and adult audiences. The benefits from the intellectual integration of these entities are tremendous.

Also under construction on the campus is the Centennial Campus Magnet Middle School, which will contain N.C. State research and development complex. This represents a unique partnership between N.C. State faculty, the Wake County School System, Wake County Board of Commissioners, and corporate partners. It will provide an unusual opportunity to expand knowledge of middle school learning and teaching. The research and extension program is aimed at integrating technology more effectively into pedagogy and curricula for middle-school children, particularly in science and math. Additional research on learning disabilities will enable development of tools and technologies that will facilitate learning.

Currently, Centennial Campus is home to the university, and corporate and government partners as shown in Table 1:

**Table 1**

- Centennial Campus Resident Partners
  - N.C. State University
  - College of Textiles
- Engineering Graduate Research Center
- University Research Centers, Institutes and Laboratories (CILs) or Programs
  - Center for Research on Thermal Protection and Comfort (TPACC)
  - Non-Wovens Cooperative Research Center
    - Constructed Facilities Laboratory
    - Analytical Instrumentation Facility
  - Center for Advanced Computing and Communication (CACC)
- Engineering Research Center for Advanced Electronic Materials Processing (AEMP)
  - Intellimedia Project
- Microelectronics System Laboratory (MSL)
  - Multimedia Laboratory
- N.C. Engineering Research Institute (NCERI)
- Power Semiconductor Research Center (PSRC)
  - Software Systems Laboratory
- Kenan Center for the Utilization of Carbon Dioxide in Manufacturing
- The William R. Kenan, Jr. Institute for Engineering, Technology and Science
  - Center for Integrated Pest Management
- Small Fruit Research, Education and Propagation Center
  - Precision Engineering Center
  - Materials Research Center
- Computational Chemistry Programs
  - Diamond Deposition and Analysis Laboratory
  - NASA Mars Mission Research Center (MMRC)
  - NASA North Carolina Space Grant Consortium
- Real-Time Diagnostics and Control Laboratory
  - Wide Band Gap Materials Program
  - Air-Sea Interaction Laboratory
- Center for Research in Scientific Computation (CRSC)
- Facility for Ocean/Atmosphere Modeling and Visualization (FOAMv)
  - Mesoscale Dynamics and Modeling Laboratory
- NC-STAR: Storage Rings for Technology and Applied Research
  - State Climate Office for North Carolina (SCO)
  - Wake Vortex Project
- Animal Waste Management Programs
- Center for Transportation and the Environment (CTE)
  - Collaborative Benchmarking Lab (CBL)

- Industrial Extension Service
- Institute for Transportation Research and Education (ITRE)
  - NCSU Water Quality Group
  - The Science House
- Technology Education and Commercialization Program (TEC)

### Corporate

- ABB Power Transmission and Distribution Co.
  - Advanced Energy Corporation (AEC)
    - Applied Mathematics, Inc.
    - Atlantic Pharmaceuticals, Inc.
    - Optex Ophthalmologics, Inc.
    - Gemini Technologies, Inc.
    - Channel Therapeutic, Inc.
    - Bayer Corporation
  - Digital Mapping Technology, Inc.
    - Eastman Kodak Company
- Electric Power Research Institute (EPRI) Fiber, Apparel, Carpet and Textile Office
- Lucent Technologies Optical Networking Group
  - Materials Analytical Services, Inc. (MAS)
    - MESO, Inc.
    - Paradigm Organics, Inc.
    - Plexus Technology Group
      - Pulsecom, Inc.
      - Serotec, Inc.
      - 3TEX, Inc.
- Understanding Systems, Inc.

### Government

- National Weather Service Regional Forecast Office
- U.S. Department of Agriculture Animal and Plant Health Inspection Service (USDA-APHIS)

To cement the concept of a learning/living community, the campus will also contain residential housing projects, a town center, greenways, a privately developed executive conference center and hotel, N.C. State Alumni Center, and a golf course for recreation and environmental research purposes.

### A New Paradigm of Engagement

N.C. State University, as do all land-grant institutions, faces a challenge to remain responsive in addressing the complex issues facing society and its citizens while overcoming traditional disciplinary divisions. This institution must transform itself to what is called an "engaged" university, according to the Kellogg

Commission on the Future of State and Land-Grant Universities. In its recent report, engagement is defined as "institutions that have redesigned their teaching, research and extension and service functions to become even more sympathetically and productively involved with their communities, however communities may be defined" (Kellogg Commission 1999).

The Kellogg report further characterized engagement as enriching student experience "by bringing research and engagement into the curriculum and offering practical opportunities for students to prepare for the world they will enter" (Kellogg Commission 1999). Last, the report encouraged land-grant institutions to continue applying new knowledge to address critical issues not only facing traditional land-grant emphases such as agriculture, but to expand into new areas of need such as health care, urban revitalization, education of a competitive workforce, and the environment.

Centennial Campus is a new paradigm of engagement that emphasizes this critical continuum of research, teaching, and extension. By blending together a diverse, multidisciplinary group of students, faculty, and corporate and governmental partners in an atmosphere that is conducive to collaboration and innovation, the pay-offs to society become quickly apparent. Solutions to critical societal problems occur through the university's knowledge creation (research), transmission (teaching), and application (extension) (Klein 1997). Students graduate prepared for a high-tech future and their leadership role in it, as well as appreciating their role in addressing societal needs through their work. Faculty become even better teachers and researchers through the synergy of collaborative interaction, and their research discoveries can drive economic development of the state and problem-solving. External corporate and governmental partners gain knowledge through their collaborations that keep their businesses competitive in the global marketplace and can act as a catalyst for new business ventures that spur economic development in poor rural or inner city areas. ■

## References

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## About the Author

June M. Brotherton (MPA, North Carolina State University), is associate vice chancellor for extension and assistant to the chancellor for Governmental Relations at North Carolina State University. She is responsible for coordinating extension and outreach throughout the university. She also develops strategies to encourage extension program partnerships within the university as well as the University of North Carolina system, which include

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From 1994-1996, she was head of the Department of Agricultural Communications. From 1992-94, she served as assistant to the chancellor. Previously, she was editor/ communications specialist with the Department of Agricultural Communications at N.C. State.

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