



The William R. Kenan, Jr. Institute for Engineering, Technology & Science

2008-2009 Annual Report to NC State University



The Kenan Institute for Engineering, Technology & Science has leveraged significant intellectual, human and financial resources to support programs in ways that demonstrate economic, educational and social benefits. During fiscal year 2008-2009, we continued to develop our four strategic focus areas: high technology research, science and math K-12 education, technology commercialization and entrepreneurship, and science and technology policy.

A major portion of our resources was used to support the *Kenan Fellows for Curriculum and Leadership Development* program. In addition, we supported several other initiatives and efforts that are likely to pay significant dividends in enhancing North Carolina's stature as a center for science and technology innovation and economic growth.

The Institute is convinced of the importance of encouraging multidisciplinary teams involving government, university, and corporate partners to solve scientific and societal problems, generate technology-based economic development, and bring together the public and private resources necessary to tackle successfully the emerging issues of our time.

It is my hope that Institute support and leadership can enable researchers, at NC State and at other institutions, to attract high levels of funding for the world-class research and scholarship that characterizes the Research Triangle region.

Ruben G. Carbonell
Frank Hawkins Kenan Distinguished Professor and Director

I. PROGRAMS

The Kenan Institute for Engineering, Technology & Science continues to support innovative programs in its four strategic focus areas: high technology research, K-12 science and math education, technology commercialization and entrepreneurship, and science and technology policy. The progress of a few key Institute supported programs that represent NC State's five focus areas (producing leaders for the state and nation, creating educational innovation, improving health and well being, fueling economic development, and driving innovation in energy and the environment) is described below.

The Kenan Fellows Program expanded its effort across North Carolina for the Class of 2011 through the use of an on-line application and nomination process. Kenan Fellows recruitment reached across all 115 local education agencies and specifically targeted twenty-two North Carolina School districts. Fifteen fellows were selected for the Class of 2011 with projects range from integrating arts in the classroom to working on curriculum that demonstrates the impact of global climate change. Details for all of the Kenan Fellowships for the Class of 2011 can be found at the Kenan Fellows website (www.kenanfellows.org). An aggressive resource development strategy for fiscal year 2008-2009 leveraged support from corporations, government entities, universities, foundations, and individual gifts. Funding for the incoming class was primarily from the National Science Foundation through an NSF-ITEST award, NSF Career Grants and NSF-RET Supplements. In addition, foundations and companies such as the Goodnight Educational Foundation, NORTEL and GlaxoSmithKline provided support for the Kenan Fellows Class of 2011. Also, a \$1.5 million proposal to NSF/ NOYCE II to support eighteen Kenan Fellows was awarded in June 2009 to establish fellowships for the most outstanding K-12 teachers in the 11-county Base Realignment and Closure/Regional Task Force

(BRAC RTF) area.

The Kenan Institute has been working for the past several years to encourage and help the Gordon Research Conferences identify a site for future conferences in North Carolina. In November 2008, the Gordon Research Conferences Board of Trustees approved Davidson College as a site for future conferences in North Carolina beginning in the summer of 2010. This will be the first time that the Gordon Research Conferences will be held in the southeastern United States. It is anticipated that having some of the most respected scientists in their fields from around the world visiting North Carolina will have a significant long-term impact on our State and provide North Carolina tremendous exposure to a broad international scientific community. In addition, having Davidson as a Gordon Research Conference site will make it easier and more attractive for scientists in our state to take leadership in establishing new Gordon Research Conferences.

As part of the Institute's Bioseparations/Bioprocessing Development Center Initiative, on September 18, 2008, Institute Director Professor Ruben Carbonell hosted a technical meeting at the Biomanufacturing Training and Education Center (BTEC) facilities in collaboration with the Bioprocessing and Process Development (BPD) group of the North Carolina Biotechnology Center. This meeting allowed over 100 industry participants and other guests to interact with university students and faculty who were presenting papers and posters on their work. Professor Carbonell also organized a *Workshop on the Grand Challenges in Biomanufacturing* in order to organize faculty and staff from BTEC, as well as faculty throughout the university, to address the most important problems in this field. Also, given the intensive focus in biotechnology and biomanufacturing both at NC State and at several major universities in Brazil, the Kenan Institute helped facilitate a visit by several Brazilian faculty members from December 6-10,

2008. The purpose of this visit was to enable dialogue between NC State University faculty and Brazilian faculty with the goal of developing linkages that would lead to opportunities for joint academic, research and training programs. Linkages are also being established with the University of Puerto Rico at Mayagüez and the Biomanufacturing Development and Training Center located in that city. Finally, Dr. Cristiana Boi of the Chemical Engineering Department at the University of Bologna, Italy will be appointed as a Visiting Scholar at BTEC during the summer of 2009.

The Kenan Institute helped lead the development of the North Carolina Aerospace Initiative (NCAI) in collaboration with the Vice Chancellor for Research and Graduate Studies, the Vice Chancellor for Extension, Engagement, and Economic Development, the Industrial Extension Service, and the College of Engineering. The mission of the NCAI is to ensure North Carolina's competitive advantage as a leader in the aerospace industry by educating and enabling a diverse and highly skilled workforce, developing a rich technology and research infrastructure, and promoting strong industry awareness and growth.

The Kenan Institute partnered with the North Carolina Biotechnology Center (NCBC) on the Collaborative Funding Grant (CFG) Program, which is designed to encourage collaboration between academia and industry, helping to move technology from the lab to commercialization. The CFG program supports a postdoctoral fellow in a university research laboratory who performs a project of commercial interest under the guidance of a faculty principal investigator. Current CFG grants include research by faculty from NC State University, NC A&T, UNC-CH, Duke, and Wake Forest. NCBC also reported that many CFG grants continue to receive follow-on funding for years after the initial research, and reports that the current cumulative average ratio of follow-on funding for all grants through 2008 is approximately \$51 per dollar awarded.

In addition, 89 publications and 23 patents have been published as a result of the CFG program.

The Kenan Institute supported the Research Triangle Environmental Health Collaborative (RTEHC) which held the Environmental Health Summit on November 10-11, 2008 to host candid discussions and to provide advice on the most significant issues facing environmental health and related public policy. The summit explored the research needs and possible health consequences of contaminants in our water supply from the use of pharmaceutical products. Equally important, the Summit focused on innovative solution-oriented recommendations that emphasize research needs, policy changes, education, prevention/intervention programs and other public health solutions/action.

II. COMPACT PLAN PRIORITIES

The achievement of appropriate leverage is one of the metrics of the Kenan Institute's success as articulated in the Institute's compact plan. In seeking to attract complementary support of its programmatic initiatives, the Institute continued to use a target minimum leverage ratio of three-to-one to measure project value in terms of the validation inherent in the successful solicitation of third party extramural support. This leverage ratio serves as an inherent, early measure of "project worthiness" that tests the ability of the project to attract the tangible, financial support of an interested third party. The Institute's goal is to report a reasonable, conservative and supportable figure for each of our programs and partnerships that reflects the leverage achieved by our core resources. The core budget for the Kenan Institute for Engineering, Technology & Science, derived from investment income earned by the Kenan Fund for Engineering, Technology and Science, was \$1,350,000 for the 2008-2009 fiscal year. This core support was invested in partnerships and programs that leveraged approximately \$8.9 million in complementary funding from university, government, and industry partners. In

addition to leverage, the Institute also carefully considers the following measures to evaluate the potential for program development and partnership: impact (technical and societal), program sustainability, multi-disciplinary aspects, multi-institutional nature, state/national/international scope, and diversity.

It is a goal of the Institute to be of service to NC State by facilitating proposal development for centers and institutes that will be multi-institutional and multi-disciplinary, and will engage the very best investigators in our region in high-impact, high-visibility work. Through the contingent provision of matching funds and fellowships, the Institute may also be able to increase the competitiveness of these proposals. The growth and expansion of the influence and impact of the Kenan Institute remain key considerations as Institute resources are allocated to respond to the challenges and opportunities in major areas of technological development for the 21st century. The Institute has initiated some of its new programs through the engagement of “pinnacle” faculty and multi-disciplinary research teams who are expected to start centers and programs focused on a diverse agenda that impacts the public welfare through innovative research, education, technology commercialization, and public policy and economic development initiatives.

III. STAFF AND DIVERSITY INITIATIVES

A. Major new appointments for 2008-2009

In January 2009, Ms. Shelley Sutton joined as the administrative assistant for the Kenan Institute. In June 2009, NC State Chancellor Jim Woodward joined as the Chair of the Kenan Institute Board of Trustees. In November 2008, Mr. William L. Burns, a founding member of the Kenan Institute’s Board of Trustees, retired from the Board. The Kenan Fellows Program appointed two new advisory board members including Mr. Dale Carroll, Deputy Secretary for

the NC Department of Commerce, and Mr. Mark Fleming, Senior Director of Government Affairs for Blue Cross/Blue Shield of North Carolina.

B. Kudos, professional activities and recognition

Dr. Ruben Carbonell, Institute Director, served on the College of Engineering Executive Committee, the NC State Research Committee, the Institute for Emerging Issues National Advisory Board and Forum Leadership Committee, BRITE External Scientific Advisory Board NC Bionetwork Advisory Board, and the NC Museum of Natural Sciences Advisory Commission. In addition, Dr. Carbonell presented invited lectures at Manhattan College, Rensselaer Polytechnic Institute, EMD Chemicals, and the NCBC Biomanufacturing Forum. Mr. Rajeev Narayan, Institute Associate Director, served as an Executive Advisor and Special Faculty member with the College of Management's TEC Commercialization program, and served on the NC State Benchmarking Economic Development Indicators Task Force, as well as the Extension Operations Council. Mr. Narayan also participated in the 2008 Eisenhower Fellowships Program. Dr. Valerie Brown-Schild participated on the NC State University Commission for Teacher Education and on the Board of Advisors of UNC's Leadership Center for Mathematics and Science Teachers. Ms. Susan Parry served as a member of the Wake Education Partnership's World Class Education Initiative and as a member of the Board of Directors of the New Voices Foundation. Ms. Ena Meng provided significant in-kind administrative support and guidance to the Institute for Emerging Issues and served on the University Awards for Excellence Committee for the Chancellor's Unit.

C. Diversity

The Kenan Institute continues to support programs that are characterized by the diversity of their participants and scholarly focus. For example, the Institute supported the *Increasing the*

Participation and Advancement of Women in Academic Science and Engineering Careers

(ADVANCE) grant for the development of a series of Summits for Minority Women Engineering Faculty. The summit for senior women engineering faculty held on March 12-14, 2009 at NC State University included NSF program officers, department heads, associate deans and vice provosts in engineering departments from universities across the United States. In addition, the Kenan Institute appointed 15 Kenan Fellows of which four were African Americans and eight female. The Institute seeks to ensure that its continuing and new programs reflect the diverse perspectives and intellectual endowments of a broad population of participants from industry, universities, schools, and the general public.

IV. INSTITUTE OPERATIONS AND FACILITIES

The Institute completed its eleventh year in residence in the Partners I building on NC State's Centennial Campus. The Institute continued to use its office space effectively to enable the growth of the Kenan Fellows Program.

V. RECOMMENDATIONS AND CONCERNS FOR THE FUTURE

Because of the economic downturn, a challenge to the Institute and NC State University has been the reduction in funding from state appropriations that are critical for the growth of important university programs. The Institute experienced a 7% cut to its state support in 2008-2009 and is anticipating a 15% cut in 2009-2010. Notwithstanding cuts to the university's state appropriations, the Institute intends to enable program growth and development by leveraging the intellectual and financial support of other corporate, government and philanthropic partners, and will work with university faculty and staff to identify and solicit additional funds in support of its programs.

In addition, the Institute director will consult with the Chancellor, with the Chairman and

President of the Kenan Fund, as well as with the Institute Trustees in the recruitment of new trustees to guide the Institute in the fulfillment of its mission and program development and support. The Institute will recommend the consideration of appointments to its Board of Trustees and will work closely with the Chancellor, who serves as Chair of the Institute's Board of Trustees, on the process of new Board appointments.

The Institute will continue to coordinate and disseminate information regarding its activities and programs through regular meetings with the Chancellor, the Vice Chancellor for Extension and Engagement, the Vice Chancellor for Research and Graduate Studies, and College Deans and faculty to inform and invite their collaboration in the Institute's current and prospective program development.