



President Nannerl O. Keohane's
NCSU Faculty Address
September 17, 2002

It is an honor and a pleasure to be invited to address this faculty. This meeting underscores the ties that have historically drawn our two institutions together -- despite our appropriately fierce sports rivalries. It will also, I hope, help chart a course for even more fruitful partnerships in the future.

Among the great universities that have given this region its intellectual vitality and provided its economic engine, NC State is unique. Where else but State would you look to redesign firemen's uniforms in the wake of 9/11? Who else spins off businesses as diverse and successful as Cree, Red Hat, and SAS? And to whom did Duke turn a month ago to save us from near-disaster when our first-time offering of a core course in Bioinformatics and Genome Technology suddenly found itself without a professor?

And when we think about the leaders who did most to shape the fortunes of this state in the late 20th century, two of NSCU's graduates come to mind: Jim Hunt in government, and Bill Friday in education.

Common History and Existing Collaborations

Our relationships have been here over the years; at the outset, they had a chance to be even closer! In 1890, Trinity College, the precursor of Duke University, was very nearly relocated from rural Randolph County to what is now literally NC State turf. Only a last-minute donation of \$9,361 from the good citizens of Durham tipped the balance and persuaded the institution's leaders to move there instead.

The earliest and best known of the collaborative arrangements between our institutions all involve UNC-Chapel Hill, as well. As I'm sure most of you are aware, our ground-breaking library consortium, now called the Triangle Research Libraries Network, was founded in 1934 as the Committee on Intellectual Cooperation. In the decades since, during which we have been joined by NC Central University, this arrangement has made it possible for our institutions to coordinate our purchases so efficiently that at this point, I am told, only 6.7% of our holdings duplicate each other across all partner institutions.

Over the years, many collaborations between our two schools have been in the life sciences, especially botany, forestry, and environmental issues. For example, today NC State is a member of the Organization for Tropical Studies, a consortium of universities which maintains field research and teaching facilities in Costa Rica. Duke serves as the consortium's headquarters.

During the past decade, most of our collaborations have been in statistics, information technology and bioinformatics. Many of you know that for the last half dozen years or so, we have partnered in the Center for Advanced Computing and Communication. Even more visibly, Duke and State are two of the six "Core Universities" in the operation and governance of the Oak Ridge National Laboratory.

The premier example of our working together from the previous generation of science -- the "physics" generation rather than the "biological" generation -- is the Triangle Universities Nuclear Laboratory, funded by the Department of Energy, which today continues to carry out a great deal of superb research.

Just recently, Duke and State were among the principals behind the launch of the Statistical and Applied Mathematical Sciences Institute, dedicated to a radical synthesis of math, statistics, and applied disciplinary science. We also work closely together in the National Institute for Statistical Sciences; the Triangle Universities Center for Advanced Studies; the Triangle Computer Science Lecture Series; the Triangle Research Data Center; and the Sun Microsystems Center for Excellence.

We both play roles in the governance of the supercomputing and biotechnology centers, and the Research Triangle Institute as well. And every year, dozens of grants housed at State have subcontracts to Duke and vice-versa, involving millions of dollars.

Of course, not all our partnerships are in the sciences and engineering. Your humanities and social sciences faculty have fruitful collaborations with ours, as well.

On October 10, State and Duke are jointly sponsoring a regional roundtable under the auspices of the American Association of Colleges and Universities, whose Campaign for the Advancement of Liberal Learning calls for intense campus-community dialogue about the direction for higher education in the 21st century. We hope this meeting will help us become more engaged partners with leaders in local government, secondary education, civic and business life, and, multiplied by many hundreds of such meetings around the country, help revitalize liberal education.

I understand that this fall we are also teaching a jointly sponsored course on Afghanistan, with interactive videoconferencing that allows students on both campuses to take part simultaneously. Maybe this will finally solve the parking problems at both ends.

But of course, it is the Research Triangle Park that demonstrates our historical relationship at its best. The park was created in 1959 because of the vision of leaders in state and local government, the universities, and industry. Surely one of the great moments in the entire history of North Carolina was when the leaders of the Triangle universities, working cheek by jowl with the governor and the business leaders, agreed to work aggressively to create the Research Triangle Park.

RTP is still the defining feature of our part of the world. It has lifted our region from the relative obscurity of the piney woods to the front page of *Fortune* magazine or the *Wall Street Journal*, and of papers in London, Tokyo, and Sao Paolo. It has put us on the short lists for possible relocation. The Research Triangle adds greatly to our ability to attract and retain strong faculty members, as well as providing many of our students and our graduates with internships and employment. Duke and State both have thousands of alumni still living in the area in large part because of what RTP makes possible.

The park not only brought to the region some of the foremost industrial and biotechnology firms; it transformed the regional culture, and positioned North Carolina as different from any other place in the southeast. Our state leaped from near last in the league to being a viable alternative for a up-and-coming research firms, competitive today with the best that Austin, Boston or Silicon Valley have to offer.

But *nota bene*: the first research enterprise to go to the Park did not come from Duke or from Chapel Hill. It was a statistical project at NC State that laid the foundation for RTI, having been very purposely moved to the Park to assist with recruitment efforts there. You stuck your neck out, and it paid off. Thank you for that, too.

This is only a brief summary of decades of collaboration, enough to give us a flavor of how important this has been for both institutions. What about the future? Are we doing enough together, and if not, why not? Does it really matter whether Duke and North Carolina State University collaborate? My answers would be, no, we are not yet doing enough together; and yes, it does matter greatly that we -- along with Chapel Hill and others -- collaborate well and often. In the remainder of my talk, I'll sketch out a few points to support those answers.

The Importance of Collaboration

Research in Triangle universities has for decades been strongly correlated with new products, new industries, and new jobs in our state. Research universities help develop the high density of talent necessary to support clustered economic growth. We spin off new businesses, and create technically sophisticated jobs as well as the people to fill them. Research universities attract external financial support whose impact is multiplied many times over, and provide expertise of enormous value to state and local governments. We develop the intellectual capital for startups and act as magnets for talent, reversing the brain drain that plagued this region until the 1960s.

We know all this, of course, but we need to be sure that we are engaging proactively in making it happen for the future.

What are the present obstacles to bold new collaborative ventures that would allow us, in our time, to be just as visionary as our predecessors in 1934 or 1959? Although we have shown good will, and although many dyadic and faculty-specific collaborations are engendered all the time, we have not been able to take the next step. Our challenge -- and our opportunity -- is to invigorate our economic climate with some major new infusions of money and talent to take the Research Triangle up one more notch -- and to protect its competitive advantage against would-be RTPs around the world.

When I ask why we have not been more proactive, the answer is not the real estate mantra of "location, location, location" -- we have that pretty well covered; instead, it's the more recent mantras of "show me the money," or "it's the economy, stupid."

It would be pleasant to echo Marilyn Monroe and say, "I'm not worried about the money. I just want to be *wonderful* . . ." But of course we are worried about the money. When our representatives in Raleigh are struggling to balance the budget, and businesses in the Park are steadily laying off workers, it seems a poor time to be talking about a bold surge ahead. We'll be lucky, they might say, just to cover our current bets.

It is useful to recall that when the RTP was launched, our state wasn't rolling in money. Yet our leaders had a vision, and they looked to make investments, even in difficult times -- investments that changed the economic face of our state. North Carolina won't be broke forever, and when the recovery begins to occur, collaboration will be an essential driver for the economy. Public-private partnerships in research fields that are emerging as high-tech leaders must be a top priority if this state is to regain its lead in this very competitive environment. Investments in innovative and cost-effective research will train a generation of scientists and engineers who will be leaders in areas with high potential for growth. State financial support for seeding and promoting innovative research,

will be particularly crucial.

And we need to be planning for that now, laying the groundwork for that collaboration, and doing whatever we can to work towards those goals, even in our present highly constrained environment. Dedicated support for such efforts during tough times is even more critical than when the economy is flourishing, because only then do we have a chance of rebounding. Our predecessors understood that; today's leaders must as well.

I worry that some short-sighted decisions are being made that are going to put North Carolina behind -- not just behind the big players like Texas or California, but behind our near neighbors Maryland and Georgia. Our state has chosen to use the windfall of tobacco money to protect our farmers, and some of it had to be siphoned off to deal with desperate needs after Hurricane Floyd. But many other states used that money for research in promising new fields like biotechnology, fields where North Carolina at present has a competitive edge -- but it's an edge that surely will not last when other better-financed states come roaring up behind us.

In Georgia, Maryland, Michigan and elsewhere, the state government itself is thinking strategically about how to stimulate research, jockeying to make their state the next hot intellectual and business property by fostering collaborations between the public and private sector, and public and private universities. The expected return for the state from the way tax money or tobacco windfall money or any money is spent can be much higher if we think *investment* for the long run rather than just covering our short term needs.

I understand that for the immediate future it would be naive to count on any substantial investments from the state budget. Nor is it realistic to expect businesses that are themselves strapped to pony up a lot of money to support investment in long-term research.

However, not all businesses in the Park are strapped, and new ones are being created every day, many of them from folks on our own campuses. And most important, I would argue that during this time in our history, in terms of the triadic partnership of government, business and academia, it's up to us to take the lead and show the way. It's not that any of us are flush with money, to be sure, but we *are* rich in ideas, in people, in technologies, and in dreams that are only a step or two away from realization.

Short-term collaborative steps

Let me begin with the easy part: we can do an even better job on some of the collaborations we engage in every day, or others that are easily within our reach. We can improve our financial condition and management practices by taking advantage of opportunities to consolidate services and programs. We can enhance academic quality for both of us by using the attractions of the Triangle to lure the best and brightest, and we can think strategically about matched hires and partnerships.

It could be quite attractive to potential faculty recruits to be offered the opportunity to get to know colleagues on both campuses and work with more graduate students. We could coordinate our hiring of experts in a variety of fields, to make sure that advanced course work is offered, particularly in relatively esoteric disciplines, without duplicating one another's efforts. It is much easier to have faculty members teach one semester on one campus and the other on the neighboring campus than to confront the logistics of transporting and scheduling undergraduates. This seems in some ways a parallel to our library consortium, with the same obvious advantages.

However, people are not texts or software, and joint hiring gets much more complex than joint purchasing of books. There are issues of criteria for hiring, promotion and tenure, of credit given for university service, of multiplying committee and departmental obligations, of how to decide which courses will be taught, in what sequence, with what specific content. These are thorny issues, but they are surely not insuperable, if we have the *will* to act. I'm happy to say that our provosts are pursuing this, meeting together at least once a month. There is a lot of low-hanging fruit, much that we can accomplish with only a small degree of incremental planning and encouragement. The last time our provosts got together, they talked about a 10-year strategic vision for collaboration. The benefits would be enormous both for our institutions and ultimately for our state.

And when it comes to securing grants and contracts, our universities sometimes prove to be more successful when we collaborate than when we don't.

Let me give an example. For SAMSI, an external visiting committee came to town to evaluate our joint application, meeting with the provosts or chancellors of Carolina, Duke, and State. The committee commented that it had been deeply impressed by the fact that not only did our top people show up at the same time, but we actually seemed to know each other, knew what we were talking about, knew what each other's faculty were doing. And that, they said, greatly strengthened the proposal.

The same comments were made by the team that came to the Park recently to do a promotional video advertising RTP to firms around the world. They were to film Chancellor Fox, Chancellor Moeser and me, and the head of the team later confessed that she was very worried that we'd have nothing to say to each other and would simply each try to promote our own campuses. Instead, as soon as the three of us got there, we began an intense conversation about a totally different matter that was on all our desks while they tried to attach our mikes. They had to shut us up to begin the filming, and then we kept talking to each other, building on each other, mentioning strengths on each other's campuses. The film folks said they'd never seen anything like it.

Colleagues, such relationships are in many ways as good as gold, and they are powerfully productive in making partnerships happen. We must not squander this opportunity.

Some Bolder Steps

What are some of the steps we might take? Faculty members and administrative leaders on our campuses have already identified many areas for productive cooperation, where bolder moves are promising: from photonics to genomics, environmental sustainability to biomedical engineering, nanotechnology to information technology, bioinformatics to marine sciences. Some are underway, some are still on the drawing board, and all are worth talking about.

As the complexity and cost of scientific and technical research has continued to increase dramatically, the physical proximity of collaborating universities becomes a bigger and bigger differential advantage. Not everything can be done through cyberspace, and air travel gets more difficult all the time. Given this precious proximity, it makes no sense to duplicate, say, highly sophisticated genomics labs and other facilities -- a costly independence indeed.

Discussions have been underway for several years about the exciting possibilities for collaboration in genomics, still a work in progress. Combining Duke's strengths in law, business, public policy, clinical research and the basic sciences in the medical school with State's substantial investments in plant genomics, genome technology, and bioinformatics would let us work together across the

continuum from plants to animals to humans. Engineering, veterinary medicine, the ag school -- all would figure prominently. This is truly a natural, a win-win that we would be profoundly foolish not to pursue. Imagine the synergies in studying animal models of human disease, or of a combined training program that would allow NCSU vets to take a Ph.D. training in transgenic animal models at our end.

Once we finish our new Center for Human Disease Models facility at Duke and get a permanent director on board, our transgenic mice will have a decent hotel, and our institutions will have even more to talk about. Already, of course, we are both members of the North Carolina Genomics and Bioinformatics Consortium, formed by the Biotechnology Center to promote public, private, and foundation partnerships so that all our genomics, bioinformatics and proteomics efforts will thrive.

A second area with huge potential for collaboration, and where the total is likely to be greater than the sum of the parts, is in research and development related to homeland security. Duke's Fitzpatrick Center for Advanced Photonics and Information Systems is working on sensors for detecting pathogens in living human tissue, while the N.C. State College of Agriculture and Life Sciences is doing the same for pathogens in plants. Why should we not team up in the biomedical area to work on, say, both point and remote detection of biological agents such as anthrax?

At least according to the House version of the Homeland Security Bill, there will be an Undersecretary for Science and Technology who will manage R&D funds through university-based centers. Those funds will go to universities with expertise in agents of biological warfare, emergency medical service, educational outreach, technical assistance, interdisciplinary public policy research, and engineering; with affiliations to the Department of Agriculture as well as animal and plant diagnostic labs; and with established means of outreach regarding science, technology and public policy.

Does that description sound familiar? There's a rumor that Texas A&M is first in line to get all this; why should the Aggies beat us to this punch?

The National Institute of Allergy and Infectious Diseases plans to set up ten centers of excellence to conduct basic and clinical research, train the next generation of biodefense scientists, and help out in case of attack. The centers will require microbiologists, cell biologists, virologists and chemists -- and the institute's director has said publicly that a collaborative and multidisciplinary approach will increase the chance of a successful bid.

If we are in the doldrums in terms of the good stuff for partnerships at the state level, let's take advantage of our strength at the federal level and the money that is being apportioned out rather generously for research projects in which we are best of breed, projects that specifically require collaboration for success. It's like a gold-edged invitation to a party that we miss at our peril.

Marine sciences are another area where we have a unique set of advantages in this state. How can we let Maryland beat us out for federal support in marine sciences when we have one of the longest and most interesting coastlines in the world, with intersections of land, estuaries and deep water that form fascinating areas for research? It's an area where we have worked together, but not nearly enough. NC State scientists in Morehead City regularly use the research vessel, the *Cape Hatteras*, berthed at our Marine Lab in Beaufort for work on diseases of oysters and blue crabs. And our faculty and graduate students are building their own small-scale collaborations, along with colleagues from Chapel Hill. But we could and should be doing so much more.

You will not be surprised to hear that I'm a preacher's kid, and I know I'm preaching to the choir. But I do feel passionate about this, and I worry that we are letting some magnificent opportunities slip away because short-sighted concerns are dominating our choices. If it's not a good time for the state and the businesses in the park to help us big-time, let's do it ourselves as the Triangle universities, with help from businesses in the rest of the world that need our expertise, and with research support from the federal government. The state will benefit enormously, and in good time, our other partners will again be in a position to join us.

Conclusion

They say the planning horizon for some Japanese companies is 100 years out. I had a look at some 100-year-old prophecies during the millennial year, and they did not bode well. H.G. Wells talked of anti-gravity paint that would enable spaceships to break Earth's orbit; the great Lord Kelvin declaimed, "Heavier-than-air flying machines are impossible"; and the director of the U.S. Patent Office pompously announced in 1899 that "Everything that can be invented has been invented."

Fortunately for the research enterprise, he was mistaken; and I am grateful that Duke has a strategic plan for only ten years out.

But last year, a communications industry executive in RTP commented, "Everyone is talking about the current state budget deficit and how to fix it. Nobody, absolutely *nobody*, is looking five years out. These short-term horizons are clouding over the region's ability to plan." If we, and our legislators, and our citizens, do not ask ourselves "*How* do we want to grow?" we may find that we do not grow at all. Where's the smart money? Collaboration.

If I have been optimistic -- or even idealistic -- in thinking about the advantages collaboration offers us, it is because I do not care for the alternative.

You may know the story about the woman who stopped by the fortune-teller's tent at the state fair. The seer peers into his crystal ball and frowns. "The next 15 years of your life," he intones, "will be filled with disappointment, unhappiness, and poverty."

"Then what happens?" asks the anxious customer. "Then you'll get used to it," was the response.

So forgive me, but I'm not going there! And I think that we, our administrations, our faculties, and in the long run our state government and our business partners, too, have the guts and the brains to do the right thing. Our predecessors did and we should, too.

I don't believe in crystal balls. Like Thomas Jefferson I'm a great believer in luck, and as he said, I find that the harder we work, the more we have of it. I'm also a great believer in North Carolina, and in the wonderful advantages and potential of this great state. And finally, as you have heard, I'm a great believer in collegiality, and you have shown collegiality at its best with your kind invitation and close attention.

Thank you.