

**Testimony to the New York State Senate  
Select “NextGen” Task Force on Economic Development and the Emerging Industries**

**Presented by:  
Douglas P. Merrill, Ph.D., Associate Dean, College of Science  
Rochester Institute of Technology**

**Monroe County Office Building, Rochester, NY  
January 28, 2004**

Chairman Skelos, Senators Alesi, Nozzolio and Robach and other distinguished members of the panel, thank you for this opportunity to speak with you today. Your task, to investigate the business development challenges confronting New York State’s high-technology and biotechnology industries, is both critical and timely. It is only through a careful analysis of the State’s past investments and strategic policies that we will be able to identify our best practices, and then armed with that knowledge, develop a comprehensive plan to provide New York companies with a competitive edge in an increasingly competitive marketplace.

The investments that you have made in RIT – in biotechnology and in our infotonics and microsystems programs – are important steps in addressing many of these challenges, and we appreciate this opportunity to elaborate on RIT’s role and perspectives on this critical topic. We see our university’s role across two key dimensions that will enable New York State to capitalize on the tremendous investments that are being made in its high technology infrastructure. They are:

- The applied research that enables us to identify practical applications, new products and other commercialization opportunities that emerge from basic research investments; and
- The development of a highly skilled, and often highly specialized, workforce that is necessary for new companies spawned by these investments to grow and prosper in a highly competitive global environment.

My remarks will focus primarily on the biotechnology industry, because that is my own particular area of expertise and emphasis at RIT. But I also want to remind you of the fact that RIT has been designated as one of the State’s Strategically Targeted Academic Research (STAR) Centers (a program that you created through the New York Office of Science, Technology and Academic Research). The Center, known as the *IT Collaboratory*, coupled with our new Ph.D. program in Microsystems, are cornerstones of RIT’s participation in the Infotonics Center of Excellence. The contributions that RIT can and will make to the growth of the infotonics industry are very consistent with the roles of applied research and workforce development that I just described, and will parallel in a very synergistic way, our contributions to the biotechnology industry that I will present in more detail this morning.

I will begin by calling your attention to a recently released study by the U.S. Department of Commerce, titled A Survey of the Use of Biotechnology in U.S. Industry, *“Biotechnology will be essential to national long-term economic growth and leadership. From job creation to revenue generation, strength in biotech will be a core building block of America’s national competitiveness in the 21<sup>st</sup> century.”*

I respectfully suggest that any state or municipality wishing to foster the creation and growth of business opportunities in any new high tech enterprise, and this is certainly true of biotechnology, must be willing to make significant investments in what I call the **four pillars of economic development**. They must invest in:

- ***Academic research and technology transfer*** which converts scientific discoveries made in the laboratory into commercial products.
- ***Business incentives and entrepreneurship*** that must both encourage the development of new companies spinning out of academic research laboratories and attract new businesses from other regions.
- ***Education and training programs*** that provide the well educated, highly skilled and technologically proficient workforce for new academic and private sector jobs.
- ***Community programs that promote an awareness and understanding*** of the issues surrounding the development of new technologies.

I speak with you today because of RIT’s long-standing tradition of applied research, workforce and community education and training, and because of our specific efforts in the area of biotechnology. In 1983, RIT became a national leader in biotechnology education when we launched the nation’s first Bachelor of Science degree program in biotechnology, at that time a new field in its infancy.

In 1999, with the support of Senator Jim Alesi, RIT obtained a grant to assess the workforce needs in the biotechnology industry. Very specifically, the focus of this study was to determine the type and level of education needed to create and foster the growth of a workforce capable of responding to the challenges facing the developing biotechnology industry in western New York. This report, which was released in October of 2000, concluded that the workforce was insufficient to meet the demand. Instead, employers were hiring workers without the full set of skills required.

In the words of the President of a small biotech company: *“Many times we end up hiring individuals with a very minimal experience, forcing us to spend time and other resources before we can realize productivity.”* Furthermore, the study identified a significant need for employers to provide on-going professional development opportunities for their employees as the technology advanced, and that there were few places where that type of customized training could be found.

In a study released last year, the New York Biotechnology Association surveyed several New York biotech companies and asked them to rank order a dozen issues in order of importance in considering business location, **and to rate New York State’s performance** on these issues. What were the top three categories identified? They were: scientific staff, senior staff and

specialized staff. In other words, biotech executives stated, in no uncertain terms, that workforce is their top concern when they are deciding on a location for their business.

And now for the bad news: On a scale of 1 to 5, with one being the lowest, New York's performance in this important category was rated only between 2 and 3. Clearly, the supply does not meet the demand.

Another important study, The Current and Future Workforce Needs of California's Biotechnology Industry, was conducted by the California State University Program for Education and Research in Biotechnology (CSUPERB) and published in November of 2001. The study was commissioned to *"identify key roadblocks to the evolution of the state's biotechnology industry, including those related to the current and future workforce."*

This study is particularly important because California is the state with the most mature and established biotechnology industry, with roughly 50% of the nation's total biotechnology presence. This exhaustive report has important implications for all states, including New York, that are seeking to build a bioscience economy.

The study identified workforce development as the second or third largest hurdle to commercialization and economic success, and recommended invest in its biotech workforce on a scale consistent with its investment in basic research training, with a particularly emphasis on educational programs that were shorter, faster, and more focused. The study concluded with a clear cautionary note: *"If the working people of California are to enjoy the benefits of those investments, we must address the critical issue of workforce production...California has not addressed such workforce issues in the past, and they must be attended to before it is too late."*

In a recent speech to San Diego biotech executives, Assistant Labor Secretary Emily Stover DeRocco affirmed that the Bush administration *"has identified biotechnology as an emerging sector that promises to provide valuable technology and create thousands of high-paying jobs."* She went on to remark that: *"The challenge now is to create a trained workforce so workers are ready to fill manufacturing jobs as they become available."* She concluded: *"If a suitable workforce isn't available, the jobs may move elsewhere in the world."*

Secretary DeRocco is correct in identifying an important shift in the biotechnology landscape. After nearly 25 years of intensive investments in research and development, the industry must now turn its attention increasingly to building capacity in biomanufacturing. According to the Biotechnology Industry Organization, there are currently 370 new biotech drug products and vaccines currently in clinical trials. The rapid rate of approval of new drugs and biomolecules during the past few years, coupled with the large number of drugs in the clinical trials pipeline, have created a crisis in manufacturing. **Currently, the industry is working at 100% capacity but this will be sufficient to meet only 25% of the predicted need during the next decade.** There is a dramatic need for new biomanufacturing and bioprocess facilities, and for workers with the education, highly specialized skills and the training to work in these facilities once they become operational.

I believe this is good news for New York. Why? Because we are well positioned to **accelerate** our ability to capture these jobs! According to a recent report by the New York State Business Council's Public Policy Institute titled, A Pharm State, New York ranks third among the states in overall pharmaceutical employment, with 26,300 jobs. The report notes that employment in this industry has grown 22 percent over the past 25 years, while overall manufacturing jobs have declined by 41 percent. These are the kinds of high-paying, high-value-added jobs that the State needs to continue to grow and nurture in order to effectively capitalize on its high tech investments and stimulate an economic resurgence that will make our State one of the leading forces in the new economy. Importantly, each job in the pharmaceutical industry generates another 2.71 jobs for the economy.

Nevertheless, competition for a share of the biotech economy is fierce. According to a recent report by the Brookings Institution, 83 percent of the 113 state and local economic agencies surveyed nationwide listed biotechnology as either their first or second strategic target, and they found that 41 states were developing and investing in biotechnology programs. It is no secret that several states are launching major campaigns to lure start up biotech companies emerging from academic research medical centers in other states. None of these states, however, have the academic resources that exist or are being developed in New York State, especially in the Rochester and Western New York region.

Last year, in the Gen\*NY\*sis program you included RIT's Center for Biotechnology Education and Training among your economic development priorities, and I want to take this opportunity to thank the Senate, and particularly Senator Alesi, for your vision in embracing this initiative. With an additional grant of \$4 million from the Assembly's RESTORE NY program and another \$4 million in RIT funds, we are building a 38,000 square foot, state-of-the-art facility dedicated to providing the education and training for the type of workforce needed to support this State's bold and aggressive programs for building a vigorous biotechnology economy.

I want to tell you what this investment will bring. When completed, the CBET facility will contain specialized laboratories for traditional students enrolled in RIT's academic programs, including our newest undergraduate and graduate programs in bioinformatics. This exciting, interdisciplinary field of study uses sophisticated computing and information technologies to address complex biological problems. These new academic programs were developed with support from the National Science Foundation and the Alfred P. Sloan Foundation. Their investments in RIT further affirm RIT's leading role and expertise in this emerging field.

In addition, IBM Corporation provided funding to enable RIT to acquire a powerful parallel computer platform to support our applied research programs in bioinformatics and related fields. And we are actively exploring synergistic opportunities for RIT's academic programs in bioinformatics to collaborate with the Center of Excellence in Bioinformatics at the State University in Buffalo and with researchers at the University of Rochester.

CBET will also house a unique training laboratory geared specifically to address the growing need for expertise in bioprocessing operations and biomanufacturing. The training needs to be afforded by CBET are critical and in tremendous demand. We recently completed the first phase of a training program aimed at turning dislocated workers into contributing members of the

regional biotech workforce. With support from a federal training grant, and in collaboration with the Rochester Works initiative, we identified seven individuals who had been displaced from a local biotech company that had moved out of the area. Working with another local biotechnology company, we developed a short term training program that prepared them with the specific set of skills this company was seeking with a concomitant number of open positions. Today, these individuals are working at the Rochester based company, enabling them to develop and manufacture new biotech products.

The next phase of this effort will involve the development of a 15-week certificate training program specifically targeting displaced workers from New York firms and healthcare facilities who already possess general laboratory or manufacturing skills that can be significantly enhanced through specialized training. These courses will provide an exceptional education and training in the basic theory, principles, terminology and practical applications of modern biotechnology and biomanufacturing operations.

CBET will provide RIT, the region and New York State with a tremendous resource, including a faculty that understands and appreciates the importance of practical applications of knowledge and a talent pool of well-educated graduates who are ready to enter the specialized biotechnology and biomanufacturing workforce and contribute immediately to their employers' productivity and bottom line. The facility that we are building is a key component of CBET's potential contribution, but we have more to do in order to build some of the additional key infrastructure components that this rapidly growing industry will require in the very near future. Specifically, we would like to expand the facilities in bioprocess operations and add additional facilities to expand and accelerate distance learning opportunities so that CBET can extend its reach to other biotech companies throughout the state. Technology enables us to capitalize on, and not duplicate, unique programs and facilities such as CBET at RIT. RIT has also had a long and distinguished track record as a leader in distance learning, and was one of the first universities in the nation to offer full degree programs on-line. We would like to use this expertise to enhance CBET's academic programs and specialized training offerings around the State.

A significant downturn in the economic fortunes of prominent well-established companies in the region has created an increasing population of displaced workers, many with marketable skills in a variety of research and manufacturing areas. The greater Rochester area alone has lost 12,400 jobs in the past year bringing the unemployment rate to 6.3%, the highest level in almost 10 years. Recent news about Kodak's plan to reduce its workforce reaffirms the urgent need to identify new industries that can be successful in our region and to prepare the workforce that will attract them to New York State. In addition, the University of Rochester Medical Center's bold and aggressive strategic plan calls for an investment of \$113 million in new research facilities that will employ nearly 1,100 new and highly skilled permanent workers. Similar growth predictions apply to the biomedical consortium in the Buffalo/Niagara region. All indications are that this trend in industry reconfiguration will continue well into the next decade.

As the biotech industry gears up to address the promises of biotechnology and the challenges of bioterrorism, a growing workforce will be an essential element of success. Graduates of RIT's certificate program will possess the credentials in high-throughput manufacturing and purification of biological products needed for a growing number of entry-level positions with

biotechnology and biopharmaceutical companies, as well as with regional research universities and medical centers. We hope to establish a cluster of resources that no other region in the nation can offer. The combined strengths and assets of these initiatives will give upstate New York a distinct advantage in recruiting new biotech companies, especially in biomanufacturing and bioinformatics, and in fueling the growth and success of companies spawned in our own region.

Can Upstate New York be the community of choice for companies in the new economy? Absolutely! We have many advantages over other communities, including the added value of unparalleled higher education and research resources that offer unique opportunities for partnerships to meet workforce needs. The possibilities are limitless, and once again, we applaud your vision in bringing these issues to the fore with these hearing and the mission of the “NextGen” Task Force.

Thank you for your time and attention, and I look forward to any questions you may have.