

# **University Committee-North**

Report for the  
Review, Planning and Implementation  
Commission on the Proposed  
Restructuring of New Jersey Research  
Universities

October 23, 2003

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For the  
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# REPORT OF THE UNIVERSITY COMMITTEE-NORTH

## EXECUTIVE SUMMARY

The University Committee-North sees significant benefits and opportunities in the proposed restructuring of Newark's research universities. This will create a top-tier autonomous, unified comprehensive research university in Newark, beginning with about 22,000 students and 10,000 faculty and staff. Realization of this opportunity could have substantial positive impact on education, research, economic development, and community service at the new university. For restructuring to be successful, appropriate governance and funding must be in place at the outset, sufficient time must be allowed for planning and implementation, and it must begin simultaneously at all three regional universities.

The Committee developed a vision statement and set of goals for the restructured university. The new university in Newark will fulfill its goals in education, research, economic development, and community service by being:

- **New Jersey's Center for Professional Education;**
- **The site of high quality liberal arts programs that benefit from synergies created by the university's focus on professional education and research;**
- **A major state center for biomedical science (particularly in selected areas including infectious disease, neuroscience, vascular disease, trauma, health security, elimination of health disparities, and clinical trials management);**
- **A major state center for technology and engineering (particularly in bioengineering, information technology and telecommunications, advanced materials, and sustainable systems and infrastructure R&D);**
- **The state's center for urban studies and globalization studies;**
- **The state's center for business incubation;**
- **An engine of Newark's revitalization;**
- **Associated with The University Hospital in a manner that enhances provision of healthcare services to the residents of Newark.**

At least fourteen colleges and schools--ten of which are professional or professionally-oriented--and several advanced research centers could constitute the academic units of the new university at the inception, reflecting the university's comprehensiveness and its strong emphasis on research and professional education. **This Report indicates major areas of existing academic program strength and recommends priority development of a number of "opportunities for excellence" that can quickly propel the new university to national distinction.** These areas include selected biomedical areas (brain adaptability throughout the lifespan, health security in relation to infectious diseases, cellular mechanisms underlying cardiovascular disease and cancer, cellular biodynamics, trauma, stroke and rehabilitation, and clinical trials management education), technology and engineering (nanotechnology and BioMEMS, biomedical imaging, neural engineering, organ/disease specific research, nanomaterials, information technology and communications, and transportation and infrastructure), business incubation, urban studies (including urban education and healthcare, ethnicity and

**immigration, and public security in urban settings), and studies of the causes and consequences of globalization.**

The new university's research and professional education foci have clear implications for undergraduate education, economic development of Newark and the region, healthcare at The University Hospital, and outreach to Newark's public schools:

- **The Northern University would offer first-rate liberal arts and sciences and technology programs** that connect with the research and professional program emphases of the university and with Newark's communities;
- **The new university would be a powerful economic driver in its roles as major employer, developer, and technology center. Newark is already the site of half of the State's business incubator capacity. The university could help attract new science and technology-oriented firms to sites such as University Heights Science Park, resulting in new jobs and new residential development;**
- **The new university could connect The University Hospital to a wider range of faculty expertise, and will attract additional top-flight faculty whose research would be translated effectively into enhanced healthcare;**
- **Restructuring could facilitate creation of an effective, unified set of programs with the Newark public schools aimed at widening the pipeline for K-12 minority students to enter college.**

This report identifies and analyzes some academic areas in which there is an opportunity to reduce overlap among the three research universities in Newark, and suggests potential improvements. Key recommendations are:

- **Create a single Graduate School in Newark**, led by a Graduate Dean, to replace the three different administrative structures now in place to deal with graduate education;
- Under specified conditions, **consolidate the Rutgers Business School and NJIT's School of Management;**
- Under appropriate conditions, **consolidate the Rutgers College of Nursing and the UMDNJ School of Nursing;**
- **Combine NJIT's and Rutgers-Newark's arts and sciences colleges in a new College of Liberal Arts and Sciences;** Under specified conditions, **consolidate overlapping science (e.g., chemistry, physics) and humanities and social science programs at NJIT with their counterparts at Rutgers-Newark;**
- **Offer the MSW at Newark**, either through the Graduate School of Social Work at the Central University, or in a Newark-based program, with expansion of offerings at Newark.

The Report also identifies programs that are multi-campus or state-wide and makes the following key recommendations:

- **Retain the current structure of Rutgers Business School** in which the school provides undergraduate and graduate programs for Newark and New Brunswick; retain the Small Business Development Center at Newark;
- **Retain at Newark all nursing faculty, staff and other resources now based in Newark so that the consolidated nursing school of the Northern University has the assets it needs to become a top-ranked major center of research;**

- **Establish an autonomous, accredited Program in Public Health under the auspices of the Northern University;**
- **Retain the UMDNJ-School of Health Related Professions, the State-wide Network for Oral Health, the Institute for Elimination of Health Disparities, the Informatics Institute, and University Behavioral HealthCare at Newark and maintain state-wide operation of UMDNJ-SHRP, UMDNJ-Network for Oral Health, and UMDNJ-UBHC.**

Restructuring provides the impetus to complete a major, new master plan for the unified university in Newark, concentrated on the University Heights District. This planning would be carried out in close collaboration with City and County governments, the residential community, and the business community, to spur private investment for new housing, services and retail development. The Report focuses on three capital issues: housing, parking and University Heights Science Park. The following recommendations are made:

- There is a need to increase residential capacity of the new university for students, faculty and staff. **The proportion of resident students should increase from the current level of 11% to at least 25%; construction of housing for faculty and staff should be encouraged,** in line with the City's strategy to build more market rate housing in Newark;
- **The permits sold/space available ratio for parking should change from the current level of 1.8:1 to 1:1.** Opportunities for public/private partnerships with the corporate, civic, performing arts and neighborhood communities should be explored to achieve this goal;
- **The new physical Master Plan for further development of University Heights Science Park should be vigorously pursued.** The plan includes a new Science Park High School (located just outside the footprint of the Park), a new Information Technology building, a parking garage, more housing, more commercial and retail space, and further acquisitions for growth over the next several decades.

**A restructured administration for the new university, designed to integrate and develop the academic programs and physical growth of the campus, is suggested in the Report.** Ultimately, the structure is subject to the approval of the appointed President and Board. The senior members in the recommended administrative structure include the President, Provost, Senior Vice President for Administration, Deans of the schools and colleges, and Directors of research centers and institutes. The Dean of New Jersey Medical School would also serve as the Senior Vice President for Health Affairs.

The physical master planning and financial issues sections of the Report bring to the forefront a major concern. **The Northern University must have sufficient funding to meet the costs of academic and administrative restructuring.** It is essential that resources that are normally used to educate students, conduct research, provide patient care, conduct community service and build programs not be redirected to accomplish the restructuring. Unless substantial new funding becomes available to avoid such redirection, the result will be to make New Jersey even less competitive with the top research universities.

Restructuring of the three separate research universities into a single autonomous university will require attention to numerous additional issues (listed, but beyond the scope of the Report to analyze) as the restructuring process proceeds. The process will be complex and time consuming, but the result, if planning and implementation are thorough and systematic,

could be creation of a flagship comprehensive public research university. Establishment of the new university can create the administrative unity and critical mass of faculty, students and staff to achieve national distinction in the four-fold mission of advanced research, innovative and interdisciplinary instruction, impact on economic development of the City, State and nation, and community outreach—particularly in the areas of business development, healthcare and K-12 education. The new university could contribute to, and be enriched by, its location in the State’s largest, remarkably diverse, international gateway city.

# **REPORT OF THE UNIVERSITY COMMITTEE – NORTH FOR THE REVIEW, PLANNING AND IMPLEMENTATION COMMISSION ON THE PROPOSED RESTRUCTURING OF NEW JERSEY RESEARCH UNIVERSITIES**

## **INTRODUCTION**

The University Committee – North is charged with preliminary planning for restructuring of New Jersey Institute of Technology, the Newark programs and campus of the University of Medicine and Dentistry of New Jersey, and the Newark programs and campus of Rutgers University into a single, autonomous research university in Newark.

Newark's three research universities have a tradition of avoiding resource duplication and demonstrated collaboration that extends over a period of about fifteen years. Some notable results of these collaborative efforts are:

- Establishment of the Council for Higher Education in Newark (CHEN, which also includes Essex County College) and deployment of CHEN resources to plan and develop University Heights Science Park, including the International Center for Public Health, a new Science Park High School collaboration with the Newark Public Schools, new jobs in the biomedical area, and affordable, attractive housing;
- Creation of numerous joint academic programs at the graduate and undergraduate levels;
- Development of joint research facilities and sharing of libraries and other support resources for research;
- Expansion of the scope of academic course and degree opportunities for undergraduate and graduate/professional students, as reflected in significant cross-registration of students;
- Submission of joint grant proposals funded by federal and other sources to support research, instruction and educational outreach to Newark's public schools (strengthening the pipeline for minority students to enter and succeed in college, particularly in areas related to biomedical science and technology careers).

With sufficient investment, the restructuring of Newark's research universities can result in a significantly expanded capacity for professional and liberal arts education, research, economic development, and service to the Newark community, state and nation. The restructured university can:

- Enhance the quality and scope of academic programs available to students;
- Increase opportunities for established faculty engaged in research and attract a distinguished new faculty to create critical mass in areas at the core of the mission of the unified university, leading to new knowledge, discoveries and technological applications;
- Result in an upsurge in external grant funding, industry collaborations, and other support;

- Stimulate economic, educational, health care, and cultural development to benefit the residential and business communities.

To unify three separate institutions with heretofore different cultures and missions—and three administrative structures—will not be easy or inexpensive, but, if planned carefully, may lead to a significant enhancement of opportunities for students, development of new knowledge and application of new technologies, and expansion of interfaces between the university and the communities it serves.

This report identifies and analyzes the most salient academic, research and master planning issues that must be addressed and then makes preliminary recommendations to unify the three separate institutions successfully. The report is not intended as a blueprint for restructuring higher education in Newark. Ultimately, the key decisions about academic priorities, programs and structure of the new university in Newark will be made by the president, administration and board of the new university once they have been appointed. Moreover, restructuring will require resolution of a large number of organizational and policy issues—listed in Section VIII-- beyond the scope of this report.

The Committee suggests that, if properly funded and restructured, the new entity may bring significant benefits to students, the City of Newark, and the State. However, these potential improvements will be realized only if the following conditions are met:

- The State provides significant and consistent financial resources to plan, implement, sustain and nurture the restructured university and its mission at Newark so that it has the means to maintain and develop high quality, nationally competitive, academic, research and service programs;
- Appropriate governance structures are in place from the outset that ensure operational autonomy and accountability of the restructured university at Newark;
- Sufficient time is given after restructuring legislation is enacted for thorough and systematic planning and implementation to make a successful transition to a unified research university at Newark;
- Restructuring of the research universities must begin simultaneously at all three regional locations. Piecemeal restructuring according to region would effectively create a monopoly at one location and result in inequitable resource distribution across the three regional locations of the public research universities.

## **I. THE NORTHERN UNIVERSITY: THE MISSION AND THE VISION**

### **A. THE MISSION**

The mission of the Northern University (*name to be determined*) is to be one of New Jersey's flagship comprehensive research universities. Strategically located in the heart of Newark, the Northern University provides comprehensive undergraduate and graduate studies in the arts and sciences as well as graduate programs focusing on the social (e.g., architecture, business, law, urban systems), technological (e.g., engineering, information technology, mathematics, sciences), and healthcare

professions (e.g., allied health, dentistry, medicine, nursing, public health). Specifically the mission of the Northern University is to:

- **Provide an outstanding education** to New Jersey's and the nation's best students in a strongly diverse environment, preparing graduates to be leaders in their professions and their communities and meeting New Jersey's workforce needs;
- **Conduct state of the art research** which furthers discovery of new knowledge through basic, applied, and clinical research;
- **Improve the lives of New Jersey citizens** by: providing health care services through The University Hospital and the university's medical, dental and behavioral health facilities; fostering economic growth; providing community service; developing innovative ways to address urban issues; and, providing opportunities for New Jersey's diverse population.

## **B. THE VISION**

The Northern University should be a university with a distinct character based upon its location, its demographics and its academic strengths and thus should provide extensive opportunities for the citizens of New Jersey.

**The Northern University will have a unique strength in professional and graduate education.** With an exceptional array of graduate and professional schools – Architecture, Business, Computing Sciences, Criminal Justice, Dentistry, Engineering, Medicine, Health Professions, Law, Nursing, and Public Health – the Northern University will be the place for graduate and professional education in New Jersey. The Northern University will also have a wide array of PhD and Masters programs in arts and sciences. Currently, 45% of students enrolled in the three research universities in Newark are in post-baccalaureate programs.

**The Northern University will have a major emphasis on biomedical sciences and technology.** With schools of medicine, dentistry, nursing, health professions, engineering, architecture and computing and with PhD programs in all the basic sciences, the Northern University is positioned to distinguish itself for its research and academic programs in biomedical sciences and technology.

**The Northern University will have highly rated liberal arts programs.** Strong programs in the liberal arts and sciences are the core of any great university. We will build on our current strengths and provide extensive opportunities for undergraduate and graduate students to benefit from faculty who are engaged in cutting edge research. The Northern University will take full advantage of the artistic, cultural and governmental institutions that are so heavily clustered in Newark and in the metropolitan region.

**The Northern University will have a strong urban mission.** The Northern University will take full advantage of the rich resources that Newark and the metropolitan area have to offer in their academic programs, and in service to the urban population. Newark's superb transportation system, its airport, and its port facilities provide tremendous opportunities for the new university.

**The Northern University will take full advantage of its racial, ethnic, and religious diversity.** Located in a region with extraordinary ethnic, racial and religious diversity, the home to millions of immigrants from across the world, the Northern University will be one of the most diverse in the nation. The university will build on this diversity in its academic programs, student life and community outreach.

**The Northern University will be a global university.** Located in the New York/Northern New Jersey metropolitan area, the nation's center of global trade and communications, adjacent to Newark port and airport, a region connected to all corners of the globe by its immigrant and international population, the Northern University will take full advantage of these resources. It will build on the strong global programs already present in the three universities.

**The Northern University will be the state's center for business incubation.** Technology business incubators are not only a place for university-based inventions to grow into commercial firms, but also a place where innovators external to the university can draw on the intellectual and physical assets of the university. While many universities are learning the process of incubation, Newark has a fifteen-year track record. The three NJIT incubators represent about half of the state's total capacity and have graduated over fifty firms with a five-year survival rate over 85%.

**The Northern University will be an engaged, interactive university, closely connected to the external community.** Classical universities have often viewed themselves as places apart from the workaday world. This university will fully engage with its community, and view the resources and problems of the community as an opportunity to enrich its research and teaching missions.

**The Northern University will enhance the provision of health care.** The University Hospital and the university's medical, dental, and behavioral health facilities are critically important to the people of Newark, the surrounding community and the entire state. The Northern University will enhance wellness and provision of health care by facilitating access to care and by increasing the pace of research discovery by university scientists.

**The Northern University will be an engine of Newark's revitalization.** Revitalization of University Heights and the rest of Newark will be one of the new university's top priorities. The university will be involved in building extensive student and faculty housing, retail, and in developing cultural and recreational facilities. With its extensive cluster of scientific and technological expertise, it must also play a major role in attracting science-related companies to the area.

## **II. SCHOOLS, COLLEGES AND CENTERS OF THE RESTRUCTURED UNIVERSITY**

### **Schools and Colleges**

We recommend that the Northern University begin with at least fourteen schools and colleges:

College of Computing Sciences  
College of Engineering  
Graduate School  
Honors College(s)  
New Jersey Dental School  
New Jersey Medical School  
School of Architecture  
School of Business  
School of Criminal Justice  
School of Health Related Professions  
School of Law  
School of Liberal Arts and Sciences  
College/School of Nursing  
School of Public Health

All current departments within schools should remain in their respective schools, unless specifically discussed elsewhere in this report.

### **Centers and Institutes**

Those Centers and Institutes which do not now report to deans, departments or colleges in their respective institutions but to the provost, vice president or president, should continue to report in that manner.

## **III. THE POTENTIAL IMPACT OF RESTRUCTURING ON EDUCATION, RESEARCH, ECONOMIC DEVELOPMENT AND COMMUNITY SERVICE**

Restructuring would provide opportunities to strengthen and integrate existing programs among the three research universities, which are currently structured differently by design, each with its own mission. The restructured university would create new interdisciplinary programs with the critical mass of intellectual and physical resources to achieve national and international recognition. Several of these new “opportunities for excellence” were the subject of proposals submitted to the New Jersey Commission on Jobs Growth and Economic Development (see Appendix I for a listing of all JGED proposals submitted by the three universities in Newark). In this section we explore eight areas of education, research, and economic development and public service which would be distinguishing features of the restructured university. The Northern University would fulfill its goals by being:

- **New Jersey’s Center for Professional Education;**
- **The site of high quality liberal arts programs that benefit from synergies created by the university’s focus on professional education and research;**
- **A major state center for biomedical science (particularly in selected areas including infectious disease, neuroscience, vascular disease, trauma, health security, elimination of health disparities, and clinical trials management);**

- **A major state center for technology and engineering (particularly in bioengineering, information technology and telecommunications, advanced materials, and sustainable systems and infrastructure R&D);**
- **The state's center for urban studies and globalization studies;**
- **The state's center for business incubation;**
- **An engine of Newark's revitalization;**
- **Through The University Hospital and the university's clinics, an enhancer of health care services to the residents of Newark and the surrounding communities.**

## **A. OPPORTUNITIES**

### **OPPORTUNITIES FOR EXCELLENCE IN EDUCATION**

#### **Professional Education**

Although there are already many joint programs or other activities in place among the various professional schools of the three research universities in Newark, there are untapped opportunities for interaction among the professional schools. New opportunities for excellence in professional education could arise in areas such as:

Clinical Trials Management Education, which would have special relevance to the clinical trials activities of the UMDNJ-NJMS Clinical Research Group and UMDNJ-NJDS's initiatives in this area; Biotech, Pharmaceutical, Engineering and Entrepreneurial Activities, which would provide new internship and training opportunities for professional students in planning and operation of business incubators at University Heights Science Park; Health and Pharmacoeconomic Studies, which could be of particular benefit to The University Hospital; Supply Chain Management, which could interact with NJIT-based efforts at University Heights Science Park; Professional Ethics, which would have especially strong interaction with liberal arts undergraduate programs in Philosophy. These business education initiatives, highly relevant to the workforce needs of the State, would not only involve a number of professional schools, but would also involve key industrial partners in the pharmaceutical and biotechnological areas.

Other possible areas to broaden the scope of professional education include: intellectual property rights, forensic medicine and dentistry, health and information security, land use in relation to environmental and health protection, and a host of others.

#### **Liberal Arts and Sciences**

Strong undergraduate liberal arts programs encompassing the humanities, the social sciences, and the sciences must be central to the mission of any major comprehensive university. Exposure to significant ideas and achievements in literature, philosophy, history, music, art, and the sciences allows students, regardless of their majors, to acquire rigorous intellectual training, critical and analytic skills, and the ability to construct reasoned arguments. Equally important are effective oral and written

communication, adaptability to change, and an appreciation for diversity, as well as solid interpersonal and collaborative skills. Such fundamental training provides superior preparation for any profession and, most importantly, for a future as an intelligent citizen in today's complex and increasingly global world. Undergraduate liberal arts at the Northern University would further benefit from the synergies created by the university's focus on professional education and research. Undergraduate students would have the opportunity to study and work (e.g., through internships, CO-OPS, and community service) with faculty researchers exploring new knowledge and applying the tools of technology and the social sciences to local urban issues as well as global ones.

The Northern University is structured to emphasize interdisciplinary, experiential learning. The rich liberal arts programs, coupled with the broad range of strong professional programs should encourage innovative programs that blend concepts and approaches from such areas as business, engineering, health professions, law, and architecture with liberal arts and sciences undergraduate curricula. Several such cross-disciplinary initiatives already exist, but restructuring would greatly enhance this potential as deans from the various professional schools interact on a regular basis with deans from the liberal arts and sciences. Experiential learning, already a significant component in the undergraduate curricula, through internships and through extensive use of Newark as a learning resource would be further emphasized.

Restructuring creates an intriguing opportunity to explore new interdisciplinary initiatives, e.g., the possibility of a college of architecture, media and the arts. This initiative could build on longstanding collaborations between NJIT's School of Architecture and Rutgers-Newark's Department of Visual and Performing Arts. Merger of the two units to form the new college might produce a unique program that interweaves fine, applied, performance and media arts with applications of digital technology at undergraduate and graduate levels. Of course, the faculties of both units would need to be consulted and considerable dialogue is required before such a merger can be undertaken.

### **OPPORTUNITIES FOR EXCELLENCE IN RESEARCH AND DEVELOPMENT**

The restructured Newark-based public research universities would foster increased sponsored research in the state, and provide greater affinity with the technology-based industries in the state's commercial sector. The strong basis of professional schools that would constitute the Northern University create an appropriate environment for fostering new research at the interface of physical and biological sciences, technology and policy, information technology, and the arts to cite several.

One important feature considered in estimating the level of a research university is the university's status in the Carnegie Classification of Institutions of Higher Education. The highest category in this classification system is Doctoral Research Extensive. Universities in this category must award an average of 50 or more doctoral degrees per year across at least 15 disciplines. After restructuring, the Northern University would offer a total of 31 PhD programs (see Appendix II for list), spanning the sciences, technology and engineering, business, nursing, social sciences,

and humanities. The combined annual graduation count of PhD's would be over 150, using 2001 graduation rates (and assuming half of the total UMDNJ PhD graduates are based in Newark). This would easily place the Northern University in the Doctoral Research Extensive category. In fact, based on statistics collected in a University of Florida study, this combined PhD output would place the Northern University about 95<sup>th</sup> in the nation. This is a very striking consequence of restructuring.

Another important factor in comparisons among research universities is the level of external funding to support research and development. Such funding provides tuition and stipend support for graduate student researchers, salary relief for research faculty (that in turn allows for a larger faculty base than sustained by tuition revenue and state appropriations alone), funding for advanced research equipment, and recovery of facilities and administrative expenses. Considering that such funding comes primarily through some form of peer review process, the level of research funding is a measure of the perceived quality of the research program. Using information collected in the University of Florida study, Table 1 shows that the Northern University (based solely on the arithmetic sum of sponsored research funding at the three Newark universities, and estimating the UMDNJ-Newark component to be half of the UMDNJ total across all locations) would have ranked 75<sup>th</sup> in the nation in sponsored research funding in FY2000. The Northern University would tie with Carnegie-Mellon University on this measure, and would outpace Princeton University, Rockefeller University, Oregon Health and Science University, and the University of Texas Health Science Center-Houston, among others. Sponsored research funding increased remarkably steeply at UMDNJ-NJMS between FY2000 (\$55.4 million) and FY2003 (\$88.8 million). The aggregate figure for external funding for the three universities in Newark for FY2003 is about \$199 million. Because of this rapid rate of increase in external funding over the past three years, it is highly likely that the Northern University would now rank substantially higher than 75<sup>th</sup> in the nation.

Institution	R&D \$K	Rank	Type
Rutgers, The State University of New Jersey	200,489	45	Public
UMDNJ	140,951	72	Public
Oregon State University	140,751	73	Public
Yeshiva University	139,618	74	Private
<b>Northern University</b>	<b>138,645</b>	<b>75</b>	<b>Public</b>
Carnegie Mellon University	137,980	75	Private
Indiana University-Purdue University - Indianapolis	136,642	76	Public
University of Nebraska - Lincoln	136,023	77	Public
Princeton University	134,875	78	Private
University of New Mexico - Albuquerque	133,980	79	Public
Georgetown University	133,211	80	Private
Mississippi State University	132,503	81	Public
Oregon Health & Science University	131,486	82	Public
Rockefeller University	124,138	83	Private
University of Texas Health Science Center - Houston	119,587	84	Public

A similarly dramatic consequence of restructuring, in terms of how the Northern University would be perceived with regard to sponsored research funding, is the trajectory of this funding. Table 2 shows the change in research funding over the last decade relative to 1991 levels for a select group of universities.

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Rutgers the State University of NJ - New Brunswick	9,571	8,624	19,470	36,426	30,054	28,216	55,628	55,628	65,801
Case Western Reserve University	14,192	20,492	29,073	36,890	39,236	57,626	78,133	78,133	88,858
Virginia Polytechnic Institute and State University	5,738	10,515	23,057	23,245	18,559	44,552	43,994	43,994	67,416
Iowa State University	-2,077	13,802	21,325	20,275	17,257	20,776	26,644	26,644	40,901
Wayne State University	11,130	15,630	24,635	36,143	42,154	54,386	76,835	76,835	86,817
<b>Northern University</b>	<b>7,490</b>	<b>6,002</b>	<b>18,529</b>	<b>25,950</b>	<b>34,560</b>	<b>39,916</b>	<b>52,889</b>	<b>52,889</b>	<b>68,168</b>
Carnegie Mellon University	7,541	15,231	19,550	22,629	33,484	31,924	39,144	39,144	34,950
Princeton University	1,956	3,559	7,285	12,155	20,378	22,547	32,235	32,235	42,873

The magnitude of the growth (roughly \$68 million from 1991 to 2000) and the notable trajectory of increased funding from FY2000 to FY2003 place the Northern University on par with several outstanding research universities. This suggests a strong basis for sustained growth even without the additional synergies that are anticipated to result from reconfiguration. Extrapolation of the current growth rate for these programs is encouraging. With a growth rate exceeding the national average, the aggregated programs would project out to over \$250M of funding by 2008, and move the Northern University up in the national standings relative to the current placement of the total for the three schools. The increase in extent of research would have secondary benefits—there is a perception that size is equated with quality when competing for the best students, recruiting faculty, and soliciting industrial sponsorship and general philanthropy.

Nevertheless, the premise of reconfiguration is that facilitation of cross-university research (relative to the current configuration) would be achieved by common academic leadership and shared infrastructure. In particular, fostering research at the interface among the existing colleges and the disciplines they represent should lead to non-linear increases in research productivity. Clearly, the potential of intermingling medical research with engineering and physical science, business and law is at the core of the reconfiguration, but other dyads among the current universities in Newark also present interesting opportunities for sponsored research growth.

Because the pattern of sponsored research funding at the Northern University will reflect the university's emphasis on professional training – in 2001, 58% of the funding was in life sciences and 36% in engineering and applied sciences – it is clear that the major opportunities for accelerating growth of grant funding in the restructured university will lie with these areas. In the next two sections we describe several exciting opportunities for major research activity, based on current faculty

strengths and an expressed interest in developing new collaborations across the research universities at Newark.

Research centers are a reflection of academic research strengths at the universities in Newark. These centers vary in size and source of funding but represent a focused activity that has distinguished itself from smaller single investigator projects in the scale of funding or public visibility. The existing centers are listed in Appendix III. Restructuring would lead to new opportunities for creation of research centers that could attract additional major external funding.

### **Biomedical Science**

**Major existing faculty strengths in biomedical science at Newark cluster in neuroscience, infectious diseases (including an emphasis on health security), vascular/cardiovascular diseases, trauma, clinical research, and elimination of health disparities. These potential areas for growth are further reinforced by considerable capabilities in basic research in cellular and molecular biology and in technology and engineering.**

**Neuroscience research:** Neuroscience has been a major strength at Newark for over fifteen years, and there are over 60 faculty members engaged in various areas of neuroscience research in Newark. Although a major focal point for this activity is the Center for Molecular and Behavioral Neuroscience at Rutgers-Newark, there are numerous other units which contribute to this area of strength, including: the Departments of Psychology and Biological Sciences at Rutgers-Newark, UMDNJ-NJMS (with faculty based in Neuroscience, Neurosurgery, Radiology, Pharmacology and Physiology, Psychiatry, Physical Medicine and Rehabilitation, and Biochemistry and Molecular Biology), and NJIT (with faculty based in Biomedical Engineering, Applied Mathematics, Biological Sciences, and Health Technology). There are also active collaborations with researchers at the Kessler Institute for Rehabilitation and the VA Hospital. Current funding for the combined group of investigators from agencies such as NIH, NSF, DOD, and VA (and funding from private foundations) exceeds \$100 million. This assemblage of faculty talent has the opportunity to address one of the most important fundamental themes of neuroscience of the past decade: throughout the entire lifespan, the brain retains a remarkable plasticity in response to experience. This concept has powerful implications for enhancing the efficacy of learning, for healthy aging, and for development of new technologies to enhance human potential. The Newark neuroscience researchers could approach this topic through collaborative projects focused on: Learning, Education and Rehabilitation; Brain Imaging; Neuroinformatics, Technology and Modeling; and Cellular and Pharmacological Neuroscience.

Restructuring would further facilitate not only this research collaboration in neuroscience, but would also build on neuroscience education interactions that have already been established. For example, Rutgers-Newark's Center for Molecular and Behavioral Neuroscience and UMDNJ-NJMS's Neuroscience program operate a joint PhD program in Integrative Neuroscience. NJIT and Rutgers-Newark offer a joint MS in Computational Biology, and Rutgers-Newark and NJIT have a federated Biological Sciences Department, which offers a track in Computational Biology in its PhD program (there is particular faculty strength in computational neuroscience at

Newark). The Northern University could offer a new undergraduate specialization in Neuroscience and would be able to expand laboratory internship opportunities for undergraduate students.

**Infectious disease research (including health security and public health issues):** A very large group of well-funded research scientists and research active social scientists are working collaboratively to address issues related to intentionally-caused and naturally occurring infectious disease outbreaks. This group, led by UMDNJ-NJMS's Center for Biodefense, includes researchers from multiple programs in UMDNJ-NJMS and NJDS, Rutgers-Newark's Center for the Study of Public Security, Center for Global Change and Governance, Center for Information Management, Integration and Connectivity, and Law School, and the Public Health Research Institute. This group can combine laboratory-based expertise in infectious disease study with research on policy issues such as public health training, health economics, health security, and legal aspects of public health and counterterrorism. The potential that this collaborative group has for obtaining significant sponsored research funding was recently demonstrated when UMDNJ-NJMS was awarded a NIH grant of almost \$21 million to establish a regional biocontainment laboratory at the International Center for Public Health in University Heights Science Park. The announcement of this award follows NIAID's designation of a Regional Center of Excellence for Biodefense and Emerging Infectious Disease Research in the Northeast; UMDNJ-NJMS and the Public Health Research Institute are members of the Northeast consortium. Current scientific research expertise (and further anticipated development) of the group is in the following areas: Bacterial and Viral Pathogenesis (including development of antimicrobials and immunomodulatory molecules as therapeutic agents, studies of biofilms, molecular epidemiology studies and small scale production of novel materials); Variations in Host Response (including immunogenetics and individualized medicine); Human and Experimental Immunology (including pathogen-host interface studies and research on innate immunity); and Advanced Rapid Diagnostics (including further development of molecular beacon technology and microarray analysis). Restructuring would facilitate the group's efforts to expand further and to establish an ***Institute of Health Security*** to engage in multi-disciplinary study of threats from bioterrorism (e.g., as in the anthrax attacks of 2001) and naturally occurring infectious diseases (e.g., TB, HIV/AIDS, SARS). This initiative has very positive implications for expanding the scope of educational opportunities for undergraduate and graduate students in science, public health and public policy.

**Cardiovascular/vascular disease research:** Another area of substantial research strength at Newark is vascular disease, including research on cardiovascular disease, stroke and rehabilitation. Although the focal points for this research are in the UMDNJ-NJMS Cardiovascular Research Institute and Department of Neuroscience, there are additional contributors to the effort from UMDNJ's Radiology Department and Stroke Program, NJIT (with faculty based in Biomedical Engineering and the Micro Flow Control Center), Rutgers-Newark (with faculty based in the Center for Molecular and Behavioral Neuroscience), and the New Jersey Hospital Cardiology Consortium. The participating researchers are recipients of major grants; indeed the Cardiovascular Research Institute is currently among the best funded programs in the United States. An important theme of the research is to study novel molecular signaling pathways, focusing on molecules that regulate cell proliferation, cell

growth, cell death, and angiogenesis. Two diseases that account for 60% of total causes of mortality—heart disease and cancer—rely on these biological processes, but in almost diametrically opposed manner. Because of this, the heart can become a model to investigate cancer, and reciprocally, cancer research may open new avenues for cardiac salvage. A second important theme is medical device design. The aim of these research efforts is to facilitate the flow of research advances from the lab bench to the patient's bedside.

**Trauma research:** The lead entity in this effort is the UMDNJ-NJMS Department of Surgery (Trauma Division), which has major funding from NIH, the National Highway Traffic Safety Administration, Soros Foundation, Robert Wood Johnson Foundation, and industry. Collaborators would include faculty from UMDNJ-NJMS's Departments of Orthopaedics, Preventive Medicine and Community Health, Physical Medicine and Rehabilitation, Neurosurgery, and Violence Institute of New Jersey and faculty from Rutgers-Newark's Center for Molecular and Behavioral Neuroscience; participants would also include New Jersey Department of Health and Senior Services, New Jersey Division of Disability Services, and New Jersey Department of Labor, Division of Vocational Rehabilitation as well as Pfizer and Pharmacia. The main research thrusts would be in the areas of: Epidemiology and Injury Prevention; Molecular Studies of Organ Failure, Tissue Injury and Repair, and Genetic Bases of Biologic Responses to Injury and Critical Illness; Rehabilitation Strategies and Outcome Studies. Restructuring might bring NJIT technology and engineering expertise to bear on design of computerized systems, analysis of movement disorders caused by trauma and design of medical devices for rehabilitation. Because of the preparedness and response issues involved with terrorist threats, the team of trauma researchers would have extensive connections with the Institute for Health Security.

**Clinical Research:** Billions of dollars are spent each year in conducting clinical research. The Clinical Research Group has been formed to facilitate and coordinate clinical research at the UMDNJ-New Jersey Medical School and other schools on the Newark campus of UMDNJ. This service supports investigators conducting clinical and translational research, provides interested business partners centralized access to University investigators, educates research subjects about clinical trials at UMDNJ, in-services clinical staff and investigators about Good Clinical Practices guidelines, and delivers legal and fiscal oversight. A focus of the Northern University will be to build our clinical research capacity so that the university can increase the number and scope of federally and industrially funded clinical trials. UMDNJ schools are already actively engaged in clinical research. However, a clinical research infrastructure can facilitate rapid growth in this area. Current therapeutic areas include: Allergy & Immunology (Raynaud's Phenomenon), Behavioral Science (Quality of Life), Critical Care (Severe Sepsis), Endocrinology (Type II Diabetes), Gastroenterology (Inflammatory Bowel Disease; Virtual Colonoscopy), Infectious Diseases (Caries, HIV/AIDS, Periodontal Disease, Tuberculosis, Smallpox Vaccine), Obstetrics/Gynecology, Ophthalmology (Optic Neuropathy; Sarcoidosis), Physical Medicine & Rehabilitation, Pain Control, Psychiatry (Electroconvulsive Therapy; Autism; Severe Depression), Restorative Dental Materials, and Urology.

**Elimination of Health Disparities:** Vascular diseases (heart disease, stroke), infectious diseases and neurological diseases are an enormous drain on the economy of the City and the State. For example, vascular diseases are the leading cause of

death; in 2001, 41% of deaths in New Jersey were due to vascular diseases. Infectious diseases represent another massive public health problem for New Jersey and its inner cities. The incidence of these diseases can be reduced significantly by public health measures, but Newark lags far behind the rest of the nation in taking advantage of recent advances in public health. This is a striking manifestation of health disparities that affect minority populations, and one which can be addressed in a restructured Northern University by an autonomous program in Public Health at Newark, by the Institute for the Elimination of Health Disparities, and the Department of Preventive Medicine and Community Health working in collaboration with an expanded faculty base. For example, educational seminars and workshops in community centers, schools and hospitals in Newark could be offered to inform the public about risk factors and preventative measures for heart attack, stroke, infectious diseases, and trauma. Early detection and diagnosis of learning disorders is another field that is moving forward, but Newark's children are not benefiting as much as they could. The neuroscience research group could contribute to alleviating this situation, with potentially positive effects on educational outcomes.

These potential "opportunities for excellence" in biomedical research can advance important economic development goals. First, they provide an impressive array and depth of faculty expertise that can be a resource for start-up technology companies and other potential private sector entities interested in locating at University Heights Science Park. Second, these selected initiatives would be significant training sites for future scientists, engineers, and technical and support personnel in workforce areas relevant to private sector needs. Third, this constellation of research specialties would possess state-of-the-art equipment, the presence of which would help attract technology start-ups with would otherwise not have access to these resources. Some of this equipment is already present; the Northern university would make it a priority to seek funds to obtain additional equipment to support target areas of research, including: advanced imaging equipment (e.g., 4T human MRI and 9T animal MRI, Polestar iMRI, magnetoencephalograph, NMR enhancements, X-ray crystallography), microscopy (e.g., laser confocal, atomic force, fluorescence and electron microscopy) and spectroscopy equipment, advanced equipment for genomics, proteomics laboratories, virtual environments (e.g., CAVE), supercomputing resources, specialized facilities for patient care and specialized facilities for research with animals. In the restructured university, these advanced equipment items and facilities would be located in spaces that can be used effectively by large numbers of investigators for interdisciplinary research and for training of students; this equipment would be important for attracting additional superb faculty and supporting applications for external funding.

### **Engineering, Physical Science and Technology**

By restructuring some of the state's largest engineering, science and technology academic units and attendant research centers under one administrative structure, opportunities would be created that result in new and expanded collaborative and integrated research, teaching (including increased integration of the research into the classroom and expanded student internship opportunities in areas such as computational biology) and public service. The integration of the basic and medical sciences, applied engineering and technology with clinical research should significantly accelerate the research and inform the professions which are the current

foci of the Newark universities. In this section, several examples of these opportunities for synergy between biomedical research and engineering and technology are provided, and priorities for research growth in engineering and technology areas independent of biomedicine are also outlined. The existing and to be developed faculty strengths in engineering and technology, advanced technology facilities, student abilities, and industry partnerships of this restructuring should be focused on:

- Bioengineering and Applied Life Sciences, including initiatives in computational biology and chemistry, biomaterials, molecular modeling, public health, physical and learning disabilities, biomedical engineering, and pharmaceutical engineering;
- Information Technology and Telecommunications, encompassing multimedia research, signal processing, wireless telecommunications, secure information systems, bioinformatics, simulation and modeling, data mining, and software engineering;
- Material Science and Engineering, encompassing, microelectronics, optoelectronics, micro-electromechanics, nanotechnology, microfluidics, particle processing, and macromolecular process technology;
- Sustainable Production Systems and Infrastructure with programs ranging from hazardous substance management, airborne organics and membrane separation technologies to building sciences, industrial ecology, green manufacturing, and wastewater, power and transportation systems.

***Biomedical Engineering:*** Restructuring would strengthen and expand several ongoing or planned joint activities that combine engineering with biomedical sciences. Given existing local faculty interests, engineering involvement with biomedical and clinical research in Newark is likely to focus in four areas: Nanotechnology and BioMEMS; Biomedical Imaging; Neural Engineering; and Organ/Disease Specific Programs. These foci are at the forefront of biomedical engineering research world-wide; an integrated Newark effort could produce widely recognized successes.

***Nanotechnology and BioMEMS:*** Northern New Jersey has the potential to become a national focus for biological applications of nanotechnology and micro-electro-mechanical systems (MEMS). This is due to the presence of unique engineering facilities including microfabrication centers at NJIT and at Bell Laboratories (Lucent). Applications of such micro- and nano-technologies can be made to neuroscience, drug delivery, and ion channel research.

***Biomedical Imaging:*** UMDNJ and Rutgers-Newark jointly purchased a 3-Tesla fMRI scanner for human neuroimaging, and (as reflected in proposals to the New Jersey Jobs Growth and Economic Development Commission) have made it a very high priority to greatly expand the scope of biomedical imaging capability at the restructured university. At NJIT, techniques for terahertz imaging are being actively developed, as well as novel optical techniques for application to ophthalmology (jointly with UMDNJ).

***Neural Engineering:*** Neural engineering applies concepts and tools that complement those used by neuroscientists, to approach clinical problems in neural

function. Bioengineers, members of the Center for Applied Mathematics and Statistics, and members of College of Computing Sciences at NJIT would focus on computational analyses to understand the behavior of networks of neurons and on development of devices (e.g., MEMS and nanoscale electrode arrays) for neural recordings from these networks. They could collaborate with neuroscientists at Rutgers-Newark and UMDNJ to find ways to use the brain's properties of plasticity to develop effective rehabilitation treatments after stroke or trauma. The concentration of neuroscientists, applied mathematicians and neuroengineers at Newark -- arguably the strongest in the State—would be enabled to interact much more powerfully in the framework of a unified university.

*Organ/Disease Specific Research:* NJIT is working with the Cardiovascular Research Institute and the Department of Cell Biology and Molecular Medicine at UMDNJ to study effects of aging on diastolic cardiac function and systemic vascular stiffness. Plans are also being developed to involve NJIT engineers in UMDNJ's orthopaedics centers focusing clinically on implants and rehabilitation therapy, and on biomaterials applications in basic research.

Graduate education in this area would be centered in the Biomedical Engineering (BME) Doctoral Program jointly developed by NJIT and UMDNJ.

*Advanced Materials:* There is already faculty strength in selected areas of materials science and its technological applications at Newark. For example, well-funded researchers from Rutgers-Newark and NJIT plan to synthesize, characterize and model hybrid nanomaterials composed of heterogeneous organic, inorganic, polymeric and biomolecular components. The main foci of the work include: hybrid supramolecular-semiconductor assemblies, ultrafast laser spectroscopy, surface modified nanoparticles and solar energy conversion materials, quantum nanowires, ultra-high resolution surface imaging, carbon nanotubes for sensors and fuel cells, conducting polymers, green catalysts, nano- and micro-fluidic studies of aggregation of nanoparticles. This initiative would include graduate and undergraduate components to develop a well-trained workforce for New Jersey's high-technology industry.

Additional areas of strength at NJIT that could be more tightly associated with faculty interests at UMDNJ and Rutgers-Newark include Directed Molecular Engineering, Advanced Engineering of Nanoparticles, and Macromolecular Process Science and Engineering to create novel polymer systems.

*Information Technology and Communications:* Through its existing centers (e.g., Center for Communications and Signal Processing, New Jersey Center for Wireless Networking and Internet Security, New Jersey Center for Wireless Telecommunications) NJIT plans to expand wireless technology research in areas such as radiofrequency components, antennas, communications systems, adaptive arrays and wireless optics. The opportunity exists to create a *New Jersey Center for Secure Information Systems* that combines the expertise of NJIT's Electrical and Computer Engineering Department and School of Computing Science with Rutgers-Newark's Center for Information Management, Integration and Connectivity. Researchers in these units are well funded and NJIT was recently designated as a

NSA Center of Excellence in Information Assurance Education. Among focal areas of research are secure digital multimedia, multi-level dynamic security protocols, intrusion and anomaly detection, network management and security, and secure electronic transactions. With NJIT's experience with business incubation, the proposed center could lead to technology transfer and entrepreneurial activities in cyber-security.

**Transportation and Infrastructure:** NJIT is the Congressionally mandated International Intermodal Transportation Center. At NJIT, the Transportation Economic Land Use System is a federally funded effort to use computerized tracking of the progress of transportation and gauging land use and economic impacts. NJIT is host to the North Jersey Transportation Planning Authority that oversees transportation improvement projects and has been designated a National Center for Transportation and Industrial Productivity, charged with the task of developing technology to speed movement of freight and passengers at domestic and international gateways. NJIT also has related faculty strengths in the area of monitoring, detection and optimized control of critical infrastructure processes. There are opportunities to pair these strengths at NJIT with the interests of faculty in Rutgers-Newark's Center for Information Management Integration and Connectivity (including its Meadowlands Research Institute and NASA-designated Regional Validation Center with direct satellite data feed for environmental monitoring), Department of Earth and Environmental Sciences, and Department of Public Administration.

Faculty strengths and advanced technology facilities already exist in Newark in biomedical engineering, advanced materials, information technology and telecommunications (including cyber security and information assurance), sustainable production systems and infrastructure. These technological resources interlock not only with the basic and applied sciences at Newark, but also with the State's major university-based site for business incubation.

### **Urban Issues and Globalization**

Restructuring of the three research universities in Newark would promote new interactions that enhance and enlarge existing programs in various areas of urban and globalization studies and facilitate interaction between targeted areas of applied social science and the sciences and technology.

**Metropolitan Studies:** Rutgers-Newark, NJIT, and UMDNJ have each established research and public policy institutes to study and contribute to strengthening Newark and region. The *Joseph C. Cornwall Center for Metropolitan Studies* was established to be the center of social research and public policy analysis at Rutgers-Newark. At Rutgers-Newark, the *Institute on Ethnicity, Culture and the Modern Experience*, the *Law School Clinics*, and the School of Business's *Small Business Development Center* all play vital roles in this effort. The recent development by UMDNJ, Rutgers-Newark and NJIT of a collaborative doctoral program in *Urban Systems* (with specializations in Urban Health Systems, Urban Education, and Urban Architecture and Infrastructure) testifies to the synergies possible among the various faculties. A particular result of restructuring of the three Newark research universities would be

the facilitated development of programs that address urban education and health concerns. For example:

**Urban Education and Pre-College Programs:** Rutgers-Newark, NJIT, and UMDNJ have extensive and well-funded Pre-College Programs serving Newark and surrounding communities. For over fifteen years, they have collaborated in the Consortium for Pre-College Education in Newark. Restructuring would strengthen the involvement of the research university in the education of the region's youth, especially in the areas of science, math, technology and health education. The Department of Education and Academic Foundations, currently at Rutgers-Newark, is building faculty expertise in urban education. In the future, the leaders of the Northern University might decide to expand this program to a School of Urban Education.

**Program to Promote Well-Being of Children:** The Northern University could develop a focus on community services and technology interfaces that promote physical and mental health. A multi-disciplinary team of healthcare practitioners (doctors, dentists, psychologists, public health care specialists, nurses, dietitians, physician assistants, physical therapists, respiratory therapists, etc.) from UMDNJ, teachers, urban systems specialists and policy experts from Rutgers-Newark and technology and architecture experts from NJIT could design, implement and evaluate systems to create better environments for children. The focus would be on immunizations, nutrition and exercise, self-esteem, smoking and violence prevention, and improvement in school based outcomes. UMDNJ's Institute for the Elimination of Health Disparities could play a major part in this effort.

**Ethnicity, Immigration and Cultural Change:** Northern New Jersey is especially affected by current population shifts both from immigration and regional migration. Restructuring would provide a good opportunity to make the Northern University a center for research about these changes. *Rutgers Institute on Ethnicity, Culture, and the Modern Experience* regularly sponsors important public programs, funds faculty research and colloquia, and hosts post-doctoral fellows in these scholarly fields. The new *PhD and Master of Arts in American Studies*, with concentrations in ethnicity and urban culture could foster cross-disciplinary research on these subjects. Faculty from UMDNJ's Schools of Medicine and Health Related Professions could contribute vital expertise on health issues related to ethnicity and gender.

**Public Security in the Urban Setting:** Situated in the New York metropolitan area, New Jersey is keenly concerned with increased security. The State's residents, law enforcement community, governments, businesses, and health communities are aware that preparedness, prevention and mitigation of terrorist threats require a multidisciplinary approach. The unified resources that a restructured university in Newark could bring to bear on this need are impressive. In the section on biomedical science research we have already indicated clear advantages of combining laboratory research from UMDNJ and the Public Health Research Institute with social science research from Rutgers-Newark in the area of health security. The technology and engineering expertise of NJIT (e.g., the College of Computing Sciences in areas such as human-computer interactions, information retrieval and decision support systems and Newark College of Engineering in areas such as border and transportation security, protection of critical infrastructure, drinking water safety, and protection of

buildings and other structures) could, in a restructured university, be paired with Rutgers-Newark's expertise in monitoring drinking water safety and studying border control technology, and with UMDNJ's considerable resources in health security. A restructured university at Newark would provide an excellent opportunity to assemble the critical mass of faculty needed to focus on prevention, preparedness and response activities; provide significant technology transfer activity; and engage a variety of agencies in multidisciplinary problem-solving to assist in preparing for and responding to terrorist attacks.

***Global Affairs:*** Rutgers-Newark's *Center for Global Change and Governance* studies the vast changes in the global political, economic, and cultural orders brought about by the forces of globalization, shifting relations of power in the post-cold war era, challenges to the nation state from social movements, transnational economic formations, and increasing influence of international governmental and non-governmental organizations.

Because of the importance of telecommunications and other areas of technology, environmental science, and chemical/biological weapons in all aspects of global affairs, development of research synergies with engineering and medical school faculty could prove particularly fruitful. The Center has already presented and is planning colloquia on subjects such as Globalization and Disease, Technology and Border Control, Technology and Homeland Security, and Technology and Terrorism. By further expanding research into technology studies, environmental sciences, and international health issues, the Northern University could develop a program of globalization studies of unequalled breadth and quality.

## **OPPORTUNITIES FOR ECONOMIC DEVELOPMENT AND COMMUNITY SERVICE**

An important goal of restructuring is to increase the connection between academic pursuits and regional economic development. There are many ingredients that create a climate of innovation and entrepreneurial growth and many of these are concentrated in Newark. Technology-based economies depend upon universities in many ways.

### **Business Incubation**

Technology business incubation is one modality in which universities partner with the private sector. Incubators provide a place where university based inventions may grow into commercial firms, and also where innovators external to the university can draw on, and contribute to, the intellectual and physical assets of the university. While many universities are learning the process of incubation, Newark has a fifteen-year track record. The Enterprise Development Center (EDC) founded by NJIT is the home of New Jersey's oldest and largest business incubator program (constituting half of the state's total capacity). There are currently three buildings in the program, all of which are located in University Heights Science Park. Since its inception in 1988 EDC has provided, on a non-exclusive basis, reasonably priced office space, shared services to reduce overhead costs, and business, technical and financing assistance, leading to "graduation" of over 50 companies in a variety of industries

(e.g., engineering services, biotechnology, chemical synthesis and information technology). An interesting example of a start-up located in NJIT's EDC is Supertron Technologies, Inc. This is a UMDNJ/NJIT/Columbia start-up launched in 2000 to commercialize high temperature superconductor technology designed to dramatically improve the performance of magnetic resonance imaging scanners. Coils developed by Supertron for MRI scanners would be used in the proposed *NJ Center for the Adaptive Brain* as a beta site for fMRI research. The business incubators can provide an excellent opportunity, particularly for engineering, science, computing science, and business students to engage in a variety of entrepreneurship activities and to build networks of business contacts even before they graduate.

Another modality by which universities partner with private sector technology is through technology parks. The concept of a technology park with some university affiliation is growing in acceptance as a means for attracting a cluster of related industries. Newark has a head start in this important aspect of commercial development. The University Heights Science Park project has been in operation for a decade. The park is poised for growth that will add over 1 million square feet of high-tech office and laboratory space in a fifty-acre parcel bordered by UMDNJ and NJIT and proximate to Rutgers Newark.

Yet another important structure for university – industrial interaction is the free-standing research or technical organization. Again, Newark has an advantage through having cultivated a number of entities that are in, but not of, its universities. These entities are able to connect the academic community to a community of practice. The Public Health Research Institute is one such organization and represents the first major organization, external to the New Jersey universities, to locate in University Heights Science Park. Its interactions with faculty at all three universities are an important model for future growth. The presence of the Public Health Research Institute creates an important chance for attracting ancillary businesses from both hospitals and other medical facilities that could be capitalized on in the merged environment. The Polymer Processing Institute, Inc. at NJIT is another prototype for industry-focused contract research and development that draws strength from its university affiliation and brings resources normally unattainable to that sector. Together with the collaborative Medical Device Concept Lab, it is broadening its mission to include bio-compatible, bio-relevant and bio-mimetic material process development. Other examples include the NJ Manufacturing Extension Partnership, Inc., and the NJ Higher Education Partnership for Sustainability, which maintain a relationship with an external constituency that would normally find gaining access to the university research community difficult or impossible.

Restructuring could create new opportunities for collaboration between the current Rutgers Business School and the current entrepreneurial activities of NJIT and UMDNJ, opening up new educational opportunities for professional education.

### **Revitalization of Newark**

As a large, administratively unified, component of the urban economy, the Northern University would be a powerful economic driver in its roles of major employer, developer and technology center. The approximately 32,000 students, faculty and

staff of the new university would have a direct impact on the city's economy and act as a catalyst for development.

An example of how the Northern University could act as a catalyst for development in one area of Newark (University Heights Science Park) is the ***Technology-Based Newark Economic Development Initiative***, which proposes construction of new research buildings at University Heights Science Park to create a critical mass of resident research and development by firms and their employees (in collaboration with university researchers) to produce an increased outflow of incubator graduates and to spur additional residential construction. Major areas of technology that would be emphasized in the initiative are: application of state-of-the-art technology devices to education, healthcare, government, transit, utilities, banking and commerce and entertainment; homeland security; value added materials processing; integrated systems and device technology; and molecular engineering. The combined expertise of the universities could also contribute to policy and global business development studies at University Heights Science Park.

### **Health Care**

Although The University Hospital has undergone various name changes and building site changes within Newark, the essential fact about The University Hospital is that it has a 120 year history of providing healthcare services for generations of Newark residents. Restructuring the research universities in Newark would connect The University Hospital to a larger group of faculty, would enhance biomedical research that translates into more advanced patient care, and would attract additional top-flight clinicians and biomedical researchers. This report outlines proposals for significant new research initiatives in infectious disease (including health security), nervous system disease, cardiovascular disease, and trauma that would be of enormous benefit to the patient population of The University Hospital. Restructuring would also better position The University Hospital to capitalize on other opportunities such as:

**Establishment of a Cancer Center in Newark:** The Cancer Institute of New Jersey has grown at an astonishing rate. This growth is due to the vision and direction of the center's director, Dr. William Hait and the investments made by UMDNJ and the State of New Jersey. The institute's first facility was located in New Brunswick. However, investments were supposed to have been made in both Newark and South Jersey to make services readily available to all New Jersey citizens. As all highly ranked medical schools have active cancer programs, it is imperative that the Northern University be given the same opportunity afforded to New Brunswick (and now Southern New Jersey). Investments in building a Cancer Center in Newark would greatly benefit the local community, because patients would no longer have to travel to New Brunswick or to New York in order to receive comprehensive care in one, nearby facility. Development of a Cancer Center in Newark would synergize with cellular and molecular research and education initiatives as indicated in the section on opportunities for excellence in biomedical research.

**Neurological Institute:** Researchers at Rutgers-Newark's Center for Molecular and Behavioral Neuroscience have shown that computer-based programs can be used with children at risk for educational failure due to learning disabilities such as dyslexia. The researchers have also shown that, at just 6 months of age, babies at potential risk

for delayed language development can be identified by their performance on tests designed to evaluate their ability to process rapidly changing sounds. This work is part of the Santa Fe Institute consortium on Enhancing Human Potential (the initiative includes Rutgers-Newark, UMDNJ, McGill, UCLA, University of Washington, and UCSD). Another opportunity that may be presented by restructuring is connection of this set of research findings to UMDNJ's Neurological Institute, with the goals of: a) expanding access to clinical treatments that alleviate learning disorders in children; b) making the Neurological Institute into a primary center for differential diagnostic assessment of children with developmental cognitive disabilities (like the Kennedy Krieger Center in Baltimore or Children's Hospital in Philadelphia). Development of the Neurological Institute in this direction would synergize with neuroscience research and education initiatives as indicated in the section on opportunities for excellence in biomedical research.

## **B. POTENTIAL BENEFITS OF RESTRUCTURING**

The Northern University would be a nationally ranked, comprehensive flagship research university, located in Newark. Organizing the academic programs within a single university creates the potential to foster interdisciplinary initiatives that serve the economic, health, education, infrastructure, social and cultural advancement of the entire State of New Jersey.

### **Economic Development**

- Strengthening an already dynamic educational and research complex in the heart of Newark, the Northern University would expand its role as a major economic asset to the City and help elevate Newark's perception as a vital location for business and residential investment.
- The new university would be a major employer, developer, trainer, and technology center. Its students, faculty and staff would have a direct impact on the city's economy and catalyze development by stabilizing the city's economic base and reinforcing social stability of their communities. This impact would be magnified as larger numbers of faculty, staff, and students become Newark residents.
- The university would contribute to the local and regional economy by knowledge and workforce development. An educated and trained workforce would act further as a lure for new start-ups as well as existing businesses. Continuing Professional Education is key to a technologically prepared workforce and critical to developing businesses and industries.
- The new university would represent a pool of talent and expertise that can be used directly in the service of economic development. Inspired public and private partnerships would simultaneously serve the objectives of private interests, the university, and the city and region at large.
- Increased pure and applied research programs and technology incubators would encourage more spin-offs and start-ups in the Newark area.

### **Education**

- The university's well-respected pre-college, health sciences career, and Educational Opportunity Programs would work to increase educational opportunities for Newark residents, as well as residents across the state, and create further bridges between the university and residents of the city and region.
- The university's Education Department and the doctoral program in Urban Systems would expand their collaborative work with the Newark school system. The coordinated resources of the university's professional schools would increasingly work with the Newark Public Schools, public agencies, and private foundations to improve elementary and secondary education in the city.
- Because of the prominence of professional education at the Northern University, the university would also aim to be a national leader in distance learning for academic and continuing education.
- The new university would augment and improve ties to the community colleges of the region and state by expanding articulation agreements and increasing transfers.

### **Health**

- The university's Medical School, Dental School, Nursing School, School of Health Related Professions, and Public Health programs would develop innovative collaborations with other professional schools and graduate programs (e.g., engineering, business, law, neuroscience) to create interdisciplinary programs that broaden the scope of academic offerings for undergraduate and graduate students and expand "K-16 pipeline" programs that facilitate entry of disadvantaged youth into the health professions.
- The coordinated resources of the new university's professional schools would enhance delivery of healthcare by increasing the pace of research discovery and increasing the level of training of healthcare professionals. The University Hospital and expanded outreach programs to promote well-being of Newark's and the region's children would benefit from these integrated research and training activities.
- The national leadership in distance education for health and healthcare related professionals would be nurtured and expanded through the contributions of interdisciplinary faculty.

### **Professional Expertise**

- The university would be a repository of extensive knowledge and professional expertise that can be used in the service of industries, businesses, national, state, and city governments. It would create and disseminate scholarly research and understanding on a wide variety of urban and metropolitan problems and issues, with particular attention paid to science and technology policies and the development of jobs and economic growth. Collaborative efforts and research would be directed at solving some of the most seemingly intractable urban problems. Of particular value will be the cross-sector approaches to urban issues that would arise out of the conjoining of currently disparate academic programs.

- Members of the University community would develop publications, forums, applied policy analyses, and program evaluations of local and regional issues throughout northern New Jersey. Especially relevant areas of expertise include the disciplines such as law, criminal justice, architecture and planning, public administration, business, engineering, and public health.

### **Citizenship**

- A vital university imparts knowledge, skills, and attitudes. Those attitudes include a sense of civic responsibility and the value of becoming informed citizens. This is of particular importance in a comprehensive research university that offers a significant number of undergraduate and graduate professional programs.
- The university would create distinctive opportunities for faculty, students, and staff to serve the communities of which they are a part. It will support neighborhood revitalization initiatives through active programs of community outreach.
- The university would inform discourse among a broad range of policy stakeholders: academics, students, citizens, elected and appointed officials, and the media. It would engage municipal, school, and civic organizations and the non-profit and private sectors on critical issues such as affordable housing, excellent schools, pervasive medical care, and environmental protection.

### **Cultural Contributions**

- The new university would create a rich cultural environment with art exhibitions, theatrical productions, instrumental and choral concerts, and poetry readings, as well as lectures, symposia, and other forums that would be open to the public and would enrich the cultural fabric of Newark, its surrounding communities, and the state.
- The university would expand existing collaborations and forge new ones with cultural institutions in Newark including The New Jersey Performing Arts Center, The Newark Public Library, The Newark Museum, The New Jersey Historical Society, Symphony Hall, and the city's art galleries and theaters.

## **IV. RESTRUCTURING OF ACADEMIC UNITS IN NEWARK**

Most of the academic programs and schools at the three research universities are intentionally distinct and often complementary, but there are a few areas of programmatic overlap. Consolidation in a few areas would create a larger critical mass of faculty in key areas such as nursing, business, chemistry and physics. In the first part of this section, we provide preliminary analysis about how these areas of overlap could be addressed.

Another set of issues in academic restructuring involves multi-campus and state-wide programs; this set of issues will be discussed in the second part of this section. For both sets of issues, further discussions with the faculty must be undertaken, and final decisions should not be made until a new administration and board are appointed.

## **A. ACADEMIC AREAS OF OVERLAP**

### **1. Graduate School**

We recommend that the restructured Northern University have a single Graduate School led by a Dean. The Dean should have the academic and administrative experience to facilitate coordination of programmatic and research initiatives among all of the university's schools, colleges and centers.

The Graduate School would establish the general academic standards and requirements for all PhD and Master's programs, cross-disciplinary and interdisciplinary graduate programs and graduate certificate programs. This would not impinge in any way on the authority of professional school deans and their faculties to establish standards and requirements for professional doctoral and Master's school degree programs. The Graduate School could allocate teaching, graduate, and research assistantships and graduate fellowships and set university-wide standards for stipends and benefits packages for graduate assistants, graduate fellows and postdoctoral fellows. The Graduate School could also be responsible for various university-wide graduate training programs (e.g., ethics, laboratory safety, teaching skills, English language skills). Through this restructuring, the university could develop common requirements, regulations, standards, and compensation packages which would facilitate collaboration and improve its ability to compete for the best graduate students. Restructuring of a Graduate School-Newark could be one of the key factors in promoting research and training at the new university.

### **2. Business**

The first phases in developing a workable plan to consolidate the Rutgers Business School (RBS)<sup>1</sup> and the NJIT School of Management (NJIT-SOM) are to: (a) identify the issues involved in forming a single academic unit within the Northern University structure; and (b) develop structures and processes best suited to addressing these issues. This discussion is concerned primarily with the former and outlines a general framework for detailing the issues involved in a potential restructuring.

Consolidation of these two academic units would be a somewhat complex process that could occur in well-defined stages within a likely window of three to five years. Planned mission differentiation presents a key challenge for this process. When the NJIT-SOM was founded in 1988, considerable care was taken not to duplicate existing management programs in Newark and in New Jersey. The unique, technology-focused elements of NJIT-SOM's mission and its concomitant skill base can complement RBS's general business focus. As such, a key challenge of consolidation would be to determine how best to preserve the key elements of a technology focused management program while leveraging the resources of an established business school.

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<sup>1</sup> The full name of the school is Rutgers Business School-Newark and New Brunswick. In this report, it will be referred to as Rutgers Business School, or RBS.

The main issues in mission differentiation and long term planning as they relate to restructuring are:

- Rutgers – RBS’s mission is focused on offering a very high quality general business education with a presence in all of the business disciplines and to provide areas of specialization such as entrepreneurship, pharmaceutical management, and supply chain management;
- NJIT- SOM’s focus is primarily on the relationship between technology and business, with emphasis on how established and emerging technologies affect business processes. Majors in traditional business disciplines such as accounting, marketing and international business are not offered;
- NJIT-SOM’s strategic planning efforts are directed toward developing a presence in the technology management niche. This general strategic objective cascades to degree programs, marketing and outreach, development, and recruitment of faculty. Strategic alliances have been formed with technically oriented academic units such as computer science, information systems, and architecture;
- RBS’s strategic planning efforts are designed to gain national prominence as a general business school. Its strategic focus is more heavily on building a limited number of nationally recognized programs, on strengthening its career placement and infrastructural offerings to students, on attracting faculty in the top 5% of scholars, and on moving into the rankings as a top 50 institution. Strategic alliances with other academic units are characteristic of general business schools and include joint programs in law, medicine, biotechnology, and related areas.

Although there are clearly complementary areas between NJIT-SOM and RBS, the mission differentiation from which these areas stem has created differences that need to be resolved. Specifically:

- The structure and focus of RBS and NJIT-SOM’s MBA curricula are different; determining what type of MBA to offer at which locations will require attention. One possibility may be to offer two different types of MBA degrees, but the market viability of this option will need to be explored;
- The strategies of the two institutions would need to be realigned and agreement would need to be reached on priority programs and their allocation within and among campuses;
- In Newark, the two schools are in different physical locations and a plan to relocate them in a single location will require funding;
- The possibility of an accelerated accreditation review from the AACSB needs to be explored and factored into all planning efforts. It should be noted that for the new unit to meet AACSB standards, significant funding in the area of faculty development might be required.

Consolidation of RBS and NJIT-SOM into a single academic unit will be a challenging and extended process but it is achievable. The size of the restructured business unit will be at least 4,400 students and 160 full-time faculty. Depending on the nature of the new admissions requirements and on the addition of new resources,

the combined school could have an enrollment surpassing 5,000 students once the consolidation is completed and efforts are redirected from managing the restructuring.

### 3. Nursing

Both Rutgers-Newark and UMDNJ have colleges of Nursing. Restructuring offers the opportunity to integrate the resources of these two colleges, and to develop a critical mass of faculty sufficiently large to gain national distinction. Nursing must play a critical role in the research mission of the Northern University. The Rutgers College of Nursing in Newark offers the only PhD program in Nursing in New Jersey. The UMDNJ School of Nursing participates in a PhD program in Urban Systems with Rutgers-Newark and NJIT. Both colleges offer extensive Master's programs that prepare nurse practitioners and managers, and both have undergraduate nursing programs.

The combined College of Nursing in Newark should be an outstanding center of advanced research and graduate education, which would be its unique mission in New Jersey. This would help address the shortage of nursing educators, advanced practitioners, and managers. The combined Nursing College must also continue to offer undergraduate nursing programs to help address the nursing shortage, by itself and in collaboration with other institutions.

### 4. Humanities and Social Sciences

Fundamental to the successful establishment a nationally recognized comprehensive research university in Newark is a superb humanities and social science faculty and programs. The Northern University must build on current strengths with expanded support for research, teaching, and service in the humanities and social sciences. Given this foundation, the university can be further strengthened in innovative ways through increased linkage of the humanities and social sciences to professional programs in the health sciences, technology, law, criminal justice, business, and public administration.

We recommend the formation of a new *College of Liberal Arts and Sciences* through merger of the College of Science and Liberal Arts at NJIT and the Faculty of Arts and Sciences at Rutgers-Newark. This reconfiguration would offer greater synergies among all humanities and social sciences disciplines with interdisciplinary programs such as the Joseph C. Cornwall Center for Metropolitan Studies, the Institute on Ethnicity, Culture and the Modern Experience, the Center for Global Change and Governance, the joint PhD Program in Urban Systems, the newly approved PhD in American Studies, and the Women's Studies Program.

### 5. Sciences

In the restructured university at Newark, the basic sciences (biology, chemistry, physics and earth and environmental science) and mathematics would remain, with humanities and social sciences, within a single College of Liberal Arts and Sciences.

The Biological Sciences Department is already a joint department of Rutgers-Newark and NJIT, with laboratory facilities for all biology faculty located in Boyden Hall on

the Rutgers-Newark campus. An interdisciplinary Center in Cellular and Molecular Biodynamics (CCMB) is currently being developed. The focus of the CCMB is the structure and dynamics of biological macromolecules and *in vivo* biodynamics of macromolecules and cellular organelles. The Newark-wide program would include faculty and students from Rutgers-Newark, NJIT, UMNDJ, and the Public Health Research Institute.

The Earth and Environmental Science Department faculty of Rutgers-Newark already have their laboratories located at the Otto H. York Center for Environmental Engineering and Science at NJIT, in close proximity with environmental research scientists and civil engineering faculty of NJIT. In environmental science and ecology, strengths exist in geophysics and geochemistry, remote sensing and environmental assessment, environmental toxicology, evolutionary ecology, plant ecology, microbial ecology, and environmental policy. Rutgers-Newark and NJIT share both undergraduate and graduate programs in environmental science in which faculty from the Departments of Biological Science (Rutgers-Newark/NJIT), Earth and Environmental Science (Rutgers-Newark), Chemistry and Environmental Science (NJIT), and Policy Science (NJIT) participate.

Where there are two basic science departments (e.g., Chemistry at Rutgers-Newark and Chemistry and Environmental Sciences at NJIT; Physics at both NJIT and Rutgers-Newark), they should be combined. These consolidations would help bring the Chemistry and Physics disciplines to a size comparable with that of departments at leading universities. Both relocations would require funding for addition/renovation and outfitting of laboratories and offices.

In the area of materials science, current strength exists in particle technology, polymer engineering, molecular electronics, and tissue engineering. Nanotechnology represents a more specific interdisciplinary area of materials science that depends on the expertise of chemists, physicists, biologists, electrical engineers and computer scientists (Rutgers-Newark and NJIT). Detection at the single molecule level by optical spectroscopy, particularly Raman spectroscopy, is being explored in the Physics and Chemistry departments at both Rutgers-Newark and NJIT. In the physical sciences, there are particular strengths in solar physics and in optoelectronics and imaging of all kinds (Departments of Physics at NJIT and Rutgers-Newark). NJIT operates world-class solar observatories in Big Bear, CA, and Owens Valley, CA. The solar physics group has recently been funded to build the world's largest solar telescope. In optoelectronics and imaging, the Newark scientific community has the capacity for the development of imaging science and technologies that are common to numerous imaging modalities and the development of innovative imaging devices. Forward-looking imaging technologies such as terahertz (THz) imaging or X-ray backscatter imaging being developed (Physics Department at NJIT) show considerable promise in security imaging of concealed explosives and fundamental science discoveries in nanomaterials.

## **6. Mathematics**

The Department of Mathematical Sciences is one of the largest departments at NJIT. Its focus is on applied mathematics, computational biology, and actuarial science. The Department operates the Center for Applied Mathematics and Statistics (CAMS),

which supports the Mathematical Sciences Computation Laboratory and holds a weekly seminar series. The faculty in the Department of Mathematics and Computer Science at Rutgers-Newark has a research focus on pure mathematics.

Both departments offer undergraduate majors and both provide service to the undergraduate populations at the two universities by offering mathematics courses that fulfill curriculum requirements. Although the research foci of the two departments are distinct, the two departments share PhD and Master's programs, including some 30 doctoral candidates, and approximately 20 Master's students.

Because these two strong departments already have a history of collaboration, we recommend that they explore the possibility of forming a single department in a common location. A combined department of mathematics may foster further collaboration between the pure and applied mathematicians in the two departments. Such collaboration could include application for federally-funded training grants, development of innovative undergraduate curricula, streamlining of undergraduate mathematics course offerings, development of mathematics proficiencies for various levels of study, and establishment of interdisciplinary research initiatives. It should be emphasized that merger of the two departments can only be built on the consent of the faculty of the two departments, and would require extensive dialogue among departmental faculty and leadership.

## **7. Computing and Computing Sciences**

NJIT's College of Computing Sciences is the newest academic unit in Newark. It is charged with responsibility for leading NJIT's academic programs and research activities in the core computing disciplines (computer science, human-computer interaction, information systems, and information technology), for building bridges to disciplines that make use of sophisticated levels of computing and computing science (e.g., engineering, biology, cognitive science) and for developing interdisciplinary courses or programs (e.g., in bioinformatics, information security).

We recommend that the majors in Computer Science and Information Systems currently offered jointly through Rutgers-Newark's Department of Mathematics and Computer Science and NJIT (and taught predominantly by NJIT instructors) be offered exclusively at the College of Computing Sciences.

## **C. MULTI-CAMPUS AND STATE-WIDE PROGRAMS**

Some of the schools and colleges at Rutgers and UMDNJ offer programs on multiple campuses. With restructuring to create autonomous institutions in Newark, New Brunswick/Piscataway, and Camden/Stratford, the administrative structure for these programs would be greatly altered. In this section, we address those programs based in, or with substantial presence in, Newark.

The Committee feels strongly that multi-campus and state-wide programs based in Newark should continue to function as multi-campus and state-wide programs operated from their base in Newark. Creation of new competing programs in Central New Jersey in areas such as business or nursing would be unnecessarily expensive and should not be a priority in regional reconfiguration. To dismantle state-wide

programs in areas such as health-related professions and oral health would be enormously disruptive to the education and public service activities delivered by these programs.

## **1. Business**

Currently, RBS, located in Newark and responsible to the Newark Provost, provides business education at both the undergraduate, MBA, specialized Master's and PhD levels to the Newark campus, and an undergraduate program as well as specialized Master's programs and first year only courses for the MBA at the New Brunswick campus. The expectation is that this relationship will continue. The relationship resulted from a merger that took place in the 1990s; it has been quite effective, as illustrated by the strong movement upward in the school's national rankings. Synergies of the merged RBS have resulted in an improvement in the quality of companies associated with the business school, in improved and less internally competitive recruitment, and in enhanced opportunities for fundraising. These activities have benefited faculty, students, and the business community. We anticipate that the merger would strengthen the position of RBS further, enabling it to continue along the path toward being a top 50 nationally ranked institution.

It should be noted that the New Jersey Small Business Development Center (SBDC) is part of Rutgers Business School at Rutgers-Newark, with offices on campuses throughout the state. The SBDC would remain in Newark after restructuring.

## **2. Nursing**

Rutgers University College of Nursing offers the only nursing doctoral program in the State of New Jersey. It also offers in Newark the basic baccalaureate and the RN to BS/MS; the Master's program with the following specialty options: Advanced Practice in Pediatric Nursing, Advanced Practice in Women's Health, Primary Care of the Adult and Aged, Acute Care of the Adult and Aged, Family Nurse Practitioner, Psychiatric/Mental Health Nursing, and Community Health Nursing; and post-Master's certificate programs in: Acute Care of the Adult and Aged, Advanced Practice in Pediatrics, Advanced Practice in Women's Health, Community Health Nursing, Family Nurse Practitioner, and Psychiatric Mental Health Nursing. It offers a Master's program in Camden and baccalaureate and baccalaureate completion programs in New Brunswick. The RN to BS and RN to MS program and graduate coursework are offered in Western Monmouth (Freehold).

The UMDNJ School of Nursing offers a joint PhD program in Urban Systems with Rutgers-Newark and NJIT, a Master of Science (MSN) program at Newark and Stratford, with specialties in Acute Critical Care Nurse Practitioner/Clinical Nurse Specialist, Women's Health Nurse Practitioner, Nursing Informatics, Nurse Anesthesia (Stratford only), and Nursing Education (Ramapo only), a post-Master's certificate program, and an MSN completion program. The UMDNJ School of Nursing also offers a Bachelor of Science in Nursing (BSN) program - a generic program offered jointly through academic partnership with Ramapo College of New Jersey (RCNJ) and a clinical partnership with Englewood Hospital and Medical Center (EHMC), an RN/BSN program jointly with RCNJ and NJIT, and an Associate

of Science (AS) program with a major in nursing—a joint degree program with Middlesex County College (MCC).

The school or college of nursing at a restructured university in Newark should be the State's center for nursing research, graduate study and education. It can continue to provide nursing programs across the state as it does now, including programs on the campuses of the central and southern universities. We understand that the committees planning the central and southern universities may recommend establishment of nursing colleges in those locations. Given the importance of nursing to the well-being of New Jersey citizenry and the critical shortage of nurses, multiple colleges of nursing within the research university system may be appropriate if resources are available. However, the faculty, staff and other resources now based in Newark must remain in Newark so that the nursing school in the Northern University has the assets it needs to become a top-ranked, major center of advanced research, which is consistent with restructuring goals.

### **3. Social Work**

The Graduate School of Social Work at Rutgers-New Brunswick offers the MSW degree at Rutgers-Newark to approximately 120 students. In addition, all northern New Jersey MSW students enrolled in the Graduate School of Social Work in New Brunswick do their field placements through the Newark MSW program, and other students are advised by Newark staff. The Faculty of Arts and Sciences-Newark at Rutgers offers an undergraduate social work major through the Department of Social Work.

Social Work is a crucial program for an urban university, and can contribute a great deal to the goals of the Northern University, with its foci on urban programs, outreach to the community, and graduate professional education. The state's largest urban center is a natural home for a strong social work program. The MSW program should be continued and expanded in the Northern University. This could be accomplished by having the graduate Social Work school at the Central University offer the MSW in Newark, as it does now (just as the Northern University offers Nursing and Business programs for the Central University). Alternatively, the resources of the Graduate School of Social Work can be divided between the Northern and Central universities, with the current graduate and undergraduate social work faculty combined in either a department or school of Social Work.

### **4. Health-Related Professions**

The UMDNJ-School of Health Related Professions was conceived as a coordinating and collaborative entity for provision of allied health education and training at the undergraduate level. However, since its inception the School has been authorized to offer post-baccalaureate educational programs and has done so. To meet the needs of the health care marketplace, the School has developed a statewide network of academic and clinical partnerships. There are 45 separate academic partnerships with two and four year colleges and universities, both public and independent. Many of the most acutely needed health care workers are educated at the associate degree level as the sole route of entry into practice. National trends in enrollments over the past ten years have helped foster increased inter-institutional collaboration to graduate a

sufficient number of practitioners to meet the health care marketplace. The School has also developed over 500 clinical partnerships to assure that our students will have the best possible exposure to, and practice in, clinical settings.

Of particular note is the school's physician assistant program. This program, as an allied health program, should remain part of the Northern University's School of Health Related Professions (SHRP). It can continue to be offered in either Piscataway, as a satellite of SHRP, or can be moved to Newark with little difficulty. The current physician assistant program with 12 faculty and 4 staff is part of SHRP's Department of Primary Care that is based in Newark. Historically, SHRP operated two programs, one in Newark and one in Piscataway, but the programs were consolidated in the Spring 2003 to eliminate duplication and improve program efficiencies.

Strong inter-institutional arrangements are needed to address the mounting and critical shortages in several allied health specialties, because no single institution can fill the relevant classes. The School offers its programs throughout the State (and beyond), sometimes as stand-alone programs and sometimes as extension programs through distance education technologies. This state-wide configuration of programs under one administration makes fiscal and educational sense, because students can crisscross county borders to attend programs of their choice. As needs arise in communities distant from the Newark/Scotch Plains campuses, the School has been able to respond quickly to marketplace needs either through discrete programming or distance education offerings. Typically, allied health schools throughout the nation offer only five to ten programs, a circumstance often dictated by large geographic distances. The School of Health Related Professions offers 34 programs of education under one administration. In a state the size of New Jersey, it does not make fiscal sense to create separate administrative entities to offer a handful of programs.

There are, moreover, compelling reasons to secure the network of academic affiliations throughout the State at the associate and baccalaureate levels. The School's Tech Prep Program in Health Sciences has created a large pool of students (currently 1,200) who, in a restructured university, would have the benefit of applying directly to the new university. At the new university, they can complete their general educational requirements before entering their chosen health professions programs. In the restructured university, students from the School's joint associate degree programs would, in effect, be transfer students as they complete their professional and career studies at the School. They can then pursue their Bachelor of Science in Health Sciences program at the School, completing their general educational requirements either on-line or on campus at the new university, and thereafter matriculate into one of the School's graduate programs. Given that the School's faculty teach in programs regardless of their campus, maintaining the School as a state-wide resource would assure student access to a continuity of programming and would create the new university at Newark as the locus for allied health education.

## **5. State-Wide Network for Oral Health**

The New Jersey Dental School has a network of dental clinics distributed throughout New Jersey to meet the oral health care needs of the state's underserved populations while providing educational venues for students in the Dental School's predoctoral

and post graduate programs. Currently, dental clinics are located in Cape May, Atlantic, Camden, Somerset and Essex counties with additional sites in other counties being considered. To ensure standards of care, maintain operational efficiencies, and take advantage of the expertise in development and management of these facilities, the State-Wide Network for Oral Health should continue to operate under the auspices of the New Jersey Dental School at the Northern University.

## **6. Public Health**

If restructuring occurs, the committee recommends the establishment of an autonomous, Accredited Program in Public Health under the auspices of the Northern University.

About 25 faculty members from UMDNJ-NJMS and NJDS, Rutgers-Newark and NJIT (also including scientists from the Public Health Research Institute) are already working together to present a curriculum that emphasizes epidemiology, biostatistics, dental public health, and urban health administration (with new divisions in health education and infectious diseases being planned). All Newark faculty have primary appointments in the partner universities. The Newark campus consistently admits about 50 students a year in the Master's program, and currently enrolls about 160 students (this could easily grow substantially in future years). The student body is the most diverse of any public health school in the nation.

It is particularly important for Newark to have a thriving, autonomous program in Public Health because Newark has not benefited from the major advances in public health enjoyed in many other parts of the United States. The academic program in Public Health will lead to enhanced training, research and provision of services for Newark and its environs, and help improve the public's health and reduce the economic consequences of early death, disease and disability for residents of the region.

Additional resources will be needed to establish the Accredited Program in Public Health and to ensure that it succeeds and grows (currently the participating faculty teach, advise students and serve on committees without extra compensation, and the entire administrative staff consists of four persons). The autonomous Accredited Program should be free to explore the possibility of establishing an independent, Newark-based School of Public Health.

## **7. Institute for the Elimination of Health Disparities**

Newark is not only New Jersey's largest city, but also one of the State's most diverse. Many of the issues facing Newark's minority communities revolve around health and health service disparities. It is therefore imperative to keep the Institute for the Elimination of Health Disparities in Newark as part of the restructuring plan. Restructuring presents an opportunity to connect the Institute for the Elimination of Health Disparities closely to other Newark-based centers, particularly the Joseph C. Cornwall Center for Metropolitan Studies and the Institute on Ethnicity, Culture and the Modern Experience, both of which are especially interested in advancing interdisciplinary initiatives for the well-being of Newark's children. An autonomous Master in Public Health program at Newark, which emphasizes infectious diseases

(because of the research expertise on site) and issues of special importance to urban, underserved populations, should emerge from restructuring. This degree program should be closely connected to the Institute for the Elimination of Health Disparities.

## **8. Informatics Institute**

Approximately 3 years ago, UMDNJ formed a state-wide Informatics Institute. The institute builds upon the informatics program that was jointly developed between two Newark based schools, UMDNJ-SHRP and NJIT. A UMDNJ University-wide IAIMS grant funded the growth of the Newark based informatics program into a university-wide, state-wide center of excellence. Given Newark's strengths in infectious disease, molecular biology and pharmacogenetics and the fact that the Northern University would continue to offer the MS and PhD degrees in bio-informatics, the UMDNJ State-Wide Informatics Institute should remain as part of the Northern University.

## **9. University Behavioral HealthCare**

University Behavioral HealthCare is a state-wide division of UMDNJ, and is one of the largest providers of behavioral healthcare services in the nation. It provides academically-based clinical programs and services while furthering clinical teaching, research and training missions of UMDNJ and provides support for New Jersey State initiatives and public sector programs as well as employers and the corporate community. UHBC offer treatment services in 13 languages and cares for about 30,000 persons annually. UHBC includes a number of institutes and programs (e.g., Violence Institute, Behavioral Research and Training Institute, Managed Care Programs). The committee recommends that UHBC be located in Newark and remain a state-wide entity.

## **V. MASTER PHYSICAL PLANNING**

Today, Rutgers-Newark, NJIT and UMDNJ-Newark comprise a total of approximately 22,000 students and 10,000 faculty and staff. By 2010, the Northern University is projected to have grown by about 20%, and to consist of more than 29,000 students and more than 10,500 faculty and staff, for a total university community of 40,000. If Essex County College were included, that number would grow to more than 50,000. This academic community, concentrated in a single Smart Growth planning district, would be larger than most municipalities in New Jersey and approximately the same size as the projected Central University.

The total net assignable square footage in the proposed Northern University approaches 6.5 million, and represents a sizeable investment by each of the constituent universities, the State of New Jersey, and the federal, corporate and philanthropic sectors. From these data alone, it is clear that physical consolidation of Rutgers-Newark, NJIT, and UMDNJ-Newark into a single Northern University will be a challenging process that will take a long time.

Adding to the complexity of the task, each of the universities already has a well thought out academic and physical master plan, which restructuring plans must

assimilate. A workable strategy is to focus on a common physical theme in a well-defined geographical area—the *University Heights District* (UHD). Created more than twenty years ago to provide the necessary framework for area planning to revitalize a major portion of the City, the UHD boundaries were originally set as Market St. and South Orange Ave. (South), Littleton Ave. (West), Rt. 280 (North), and Washington St. (East). Since the original conception of the District, the eastern boundary has moved one block further eastward to Halsey St. The universities, county government, commerce, and residential neighborhoods could work together to develop the UHD systematically.

In this section of the Report, we focus on the UHD in addressing three specific issues posed by the Northern University Steering Committee: **housing, parking, and University Heights Science Park.**

**Student housing** is widely recognized as a critical element of public research universities around the country. High quality and sufficient undergraduate and graduate student housing fosters a greater sense of community and affords the institution the opportunity to connect growth in the student body with improved program expectations. Housing programs at NJIT and Rutgers-Newark started well after most others in the early and mid-1980s (UMDNJ has no on-campus housing). As a result, NJIT and Rutgers-Newark house only about 11% of the on-campus student population of nearly 20,000 at the two universities. Nationally, university academic planners and physical master planning professionals suggest a resident student population for a public research university of no less than 25% of its student body. The CHE is studying enrollment capacity issues in order to come to grips with the increasing cohorts of high school graduates. One of the widely recognized strategies to deal with the increase is to build more on-campus housing. An opportunity exists in the proposed Northern University to address this important issue through a major planning effort aimed at increasing the residential capacity of the new university.

**Housing for faculty and staff** has become a significant issue at major research university campuses around the country. None of the constituent universities in Newark offers any college housing for faculty and staff, although the interest in developing faculty and staff housing on or near campus is growing. Housing for faculty and staff is also being encouraged in the City's strategy to build more market rate housing. Restructuring presents an opportunity to jointly plan such housing within or near the UHD (e.g., in the James Street Commons neighborhood and adjacent to the UMDNJ) for faculty and staff, teaching and graduate assistants, and postdoctoral fellows who prefer living closer to campus to support their teaching and research efforts.

**Parking** for faculty, staff, students, and patients remains a significant challenge for each of the constituent universities in the Northern University. As the UHD continues to grow economically, possibilities for development of public/private partnerships with the corporate, civic, performing arts, and neighborhood communities have begun to present themselves. There are significant opportunities to plan for new parking structures in or near the UHD (e.g., in the James St. Commons neighborhood, in adjacent CBD areas, near St. Michael's Medical Center, and in University Heights Science Park).

**University Heights Science Park (UHSP)** was first incorporated by the Council on Higher Education in Newark (CHEN) in 1993. The original vision for UHSP modeled itself after many successful parks around the country including University Science City in Philadelphia. One of the goals of the Park was to provide a place in which scientific discoveries and technology advancements by Newark university faculty could be transferred to the corporate sector for commercialization. Because the Park would encompass nearly a 50-acre site, the vision included a broad goal statement about neighborhood revitalization, which was interpreted to include residential, educational, and retail development. Several buildings have been constructed in the Park including the CHEN building (by NJIT), two incubators and a 100-child day care center (by NJIT), and the International Center for Public Health (by UMDNJ), which includes the Public Health Research Institute and two academic departments of UMDNJ. In addition, the Park has sponsored 20 units of new housing.

Future plans include the construction of a 1,000-student Science Park High School adjacent to UMDNJ (but outside the actual footprint of the Park), a new Information Technology building and parking garage, more housing, and more commercial and retail space. A recent federal grant of almost \$21 million to UMDNJ-Newark will permit construction of a regional biocontainment laboratory. A new physical Master Plan has been developed to guide further acquisitions to encourage even more growth in the Park over the next several decades. There is the potential at the Park to expand housing opportunities for those who are employed there, and for faculty and staff of the universities. In addition, the Park presents opportunities to expand services available to Park employees and residents, as well as students, faculty and staff of the universities. New retail, commercial space, and parking could significantly change the quality of life in the University Heights District, as well as in the Park.

The UHD has the potential to provide significant opportunities for further collaborations across the universities and further coordinate the area's development with the City. A clearly defined sense of place that extends throughout the UHD should be engendered using well established urban design principles that will address land use and density issues as the basic land resource becomes increasingly scarce and more expensive. The "college town concept" well underway in Newark will have to be taken to the next level to integrate area needs for commercial and residential construction with university needs for housing for faculty, staff and students, as well as the resultant need for new retail and services in the UHD. The development will involve the university, the State, as well as the private sector to take the concepts from the drawing board to reality.

Each research university has also been actively engaged in City development that goes well beyond the boundaries of the University Heights District (UHD). For example, the City Business Administrator recently convened a working group of city development staff along with representatives of the corporate community, and representatives of Rutgers-Newark, NJIT, and UMDNJ. This working group meets on a monthly basis to facilitate housing and economic development in Newark through a better understanding of the City's needs, and helps to prioritize the implementation of individual projects. The universities are now "at the table" for

major discussions about the City's future that help to promote growth in Newark, and wherever possible, on or near the university campuses.

There will very likely be significant transitional costs to launch the restructured university in physical terms. It is critical to provide funding for a renewed master plan and building for the restructured universities as well as the University Heights District that takes into account the landscape as it has developed and the new landscape in a restructured Northern University. Such a document, prepared in the finest tradition of quality urban planning, would set the stage for the new university to address the significant opportunities and challenges it will confront, and move to take its place quickly among the finest urban university centers in the country. And, **once completed, funding to implement the master plan will need to be available.**

The full report of the Physical Master Planning Sub-Committee is contained in Appendix IV.

## VI. FINANCIAL ISSUES IN RESTRUCTURING

It is imperative that the Northern University has substantial resources for its creation and operations and that standard operating procedures include financial policies which reward success and foster growth. Until the financial costs of restructuring and operating the universities are known, the effort cannot move forward.

The restructuring of the senior public research institutions has, as one of its aims, the creation of a world-class research university in Newark. In order to ensure success in meeting this goal, sufficient capital investment, operational resources and incentive programs need to be developed. For ease of discussion, funds required have been classified as: funds to accomplish the transition; operational funding; investment funding; investments; and debt obligations. In addition, a short discussion of opportunity costs have been included should insufficient funds be made available to accomplish the merger. To determine these costs, the Northern University Committee strongly recommends that it be provided resources to **immediately hire a consulting firm** with experience in this type of cost estimation.

- **Funds to accomplish the transition:** This refers to both the merger of the administrative functions and the merger of similar academic departments. Examples of merger costs include converting to one administrative information system, merging operations such as security and human resources, and planning for and building a unified university campus in Newark. A determination of these costs has not yet begun. This analysis needs to begin as soon as possible in order for the university in Newark to be successfully formed.
- **Operational funding:** Operational funding allows universities to conduct their educational, research, patient care, and community service programs. A determination of the appropriate level of funding required to operate our universities during the early years still needs to be made.

While work has been done to begin to identify existing revenue and expenses by campus, much work remains to be done. As budgeting at Rutgers and UMDNJ is

not by campus, there is much room for negotiation. An open process with sufficient time needs to be created to allow for all University Committees to evaluate and agree upon all allocation methods used.

- **Investment funding:** Investment in New Jersey universities must be accomplished to be successful in recruiting world-class faculty, building a research infrastructure and initiating programs that are competitive with the best public research institutions. This is being partly addressed by the Commission on Jobs Growth and Economic Opportunity. Comparisons of states with life-sciences and other targeted initiatives could provide valuable information in understanding the costs associated with meeting this investment with funds coming from multiple sources including the corporate community, the philanthropic community and local, state and federal governments. This type of analysis would greatly assist New Jersey citizens in understanding the magnitude of this required investment.
- **Endowment Investments, Non-endowment Investments, Unrestricted Capital Accounts, Assets and Accounts Receivable:** Each University has endowment investments, non-endowment investments, unrestricted accounts, intellectual property, other assets such as facilities and equipment, and accounts receivable which will need to be assigned to a University. Allocation formulas will be extremely important and need to be very carefully developed. Here again, the University Committee-North recommends that an open process with sufficient time needs to be created to allow for all University Committees to evaluate and agree upon all allocation methodologies used.
- **Debt, Debt Service and Accounts Payable:** Each University also has debt obligations and other accounts payable which will need to be addressed at the time of the merger. Again, allocation formulas are likely to be developed to allocate these obligations to each University. Thus, the University Committee-North recommends that an open process with sufficient time needs to be created to allow for all University Committees to evaluate and agree upon all allocation methodologies used to assign financial obligations to each University.

**If the new Northern University does not have sufficient funds to perform the administrative steps required for the merger, then resources that normally could be used to conduct research, educate students, provide patient care, conduct community service and build programs would need to be redirected to accomplish the merger. This would result in New Jersey becoming even less competitive with the top public research universities. These costs could be significant, given recent budget cuts that have resulted in minimal staffing. Thus, opportunity costs are a significant issue given the importance of “institutional and other subsidies that are required to pay for the costs” of university research programs.” [Lombardi 2002]**

Financial policies will need to be developed which ensure accountability, reward success and encourage growth. To accomplish these objectives, each school dean needs to be responsible for all of its revenues and expenses. Good fiscal management should be rewarded by allowing each school to reinvest savings into its programs. Innovative programs which result in increased revenues should again be allowed to

remain in the school so these programs can continue to grow or new programs be developed. Likewise, the majority of revenues generated through grant overhead recoveries should be returned to the school to foster continued research program growth.

## **VII. SUGGESTED ADMINISTRATIVE STRUCTURE OF THE NORTHERN UNIVERSITY**

**(Subject to President and Board Approval)**

The Northern University's senior management team should consist of a President, Provost and Senior Vice President for Administration. To facilitate accountability, budgetary responsibility for the university's administrative functions should be managed by the Senior Vice President for Administration and budgetary responsibility for the university's schools, centers and institutes should be managed by the Provost. Where appropriate, deans would be responsible for patient care and ancillary activities. For example, the Dean of the Medical School should have responsibility for The University Hospital. This relationship between the Dean of the Medical School and The University Hospital is critical to ensuring that the strategic directions of the hospital and the medical school are in congruence.

The President, provost and senior vice president for administration should have the flexibility of developing their administrative structure to carry out their responsibilities.

**President:** The president would be the chief executive officer of the university. Direct reports to the president include the provost and the senior vice president for administration. Additionally, the president's office should be responsible for strategic planning, promotion and tenure decisions, government affairs, legal affairs and public relations, including affirmative action, community relations and fund-raising.

**Provost:** The provost would be the chief academic officer of the university, to whom all deans report. The provost would be responsible for all schools, centers and institutes of the University. In addition, the provost would be responsible for academic administrative functions such as library, registrar, student life, admissions, contract and grants management, and institutional research.

**Senior Vice President for Administration:** The senior vice president for administration would be responsible for supporting the University's educational, research, patient care and service activities. Services to be provided include information services, security, facilities, accounting, and human resources.

**Dean:** Each school in the University would have a dean who is the school's chief executive and chief academic officer (this includes the Dean of the Graduate School, who would administer programs that cut across disciplinary and school boundaries). All deans would report to the provost. It should be noted that certain deans would have additional responsibilities. For example, the Dean of the New Jersey Medical School will also serve as the presiding officer of The University Hospital and University Physician Associates. The Dean of the Dental School will serve as the presiding officer for its intramural and extramural clinical practices and the Dean of the Law School will serve as the presiding officer for the Law School's legal service clinics.

As the presiding officer for The University Hospital, the Dean of New Jersey Medical School should also serve as **Senior Vice President for Health Affairs**, reporting directly to the President. Thus the Dean of New Jersey Medical School would have a dual reporting relationship – to the Provost for academic activities and to the President for activities of The University Hospital.

**Senate:** While each school would have its own faculty assembly, a University wide Senate could be created for the entire northern campus.

**Student Government Associations:** In addition to school based student government associations, consideration will be given to creating college and University wide Student Government Associations for undergraduate and graduate students, to provide a forum for developing activities and services responsive to student needs. The Associations' structure should be devised by representative students from the various schools and colleges.

## **VIII. ISSUES TO BE ADDRESSED FOR EFFECTIVE RESTRUCTURING OF NEWARK'S RESEARCH UNIVERSITIES**

This report focuses primarily on academic issues and opportunities, and some key administrative issues. Consolidation of three separate institutions into a single university will require attention to many important details. Below we provide a catalogue of issues that will need to be addressed as restructuring in Newark proceeds.

### **A. Organizing Administrative & Academic Issues (including, but not limited to):**

- Accreditations
- Admissions
- Advancement, Fundraising & Foundations
- Alumni Relationships
- Animal Care
- Audit
- Business/Economic Development
- Business Services
- Budget
- Campus Communication/Public Information
- Campus Planning
- Campus Safety
- Career Development Services
- Comptroller
- Computing Services
- Distance Learning, Instructional & Media Services
- Enrollment Management
- Environmental Health & Safety
- Financial Aid
- Financial Management

- General Counsel
- Grants Management
- Human Resources/Personnel
- Institutional Research
- Institutional Review Board
- Intellectual Property (Patents, Royalties, etc.)
- International Faculty and Students
- Library Services
- Physical Plant/Facilities/Transportation
- Public Relations, Communication and Marketing
- Purchasing
- Registrar
- Vending Services

**B. Undergraduate Education Issues (including, but not limited to):**

- Development of University-Wide Policies and Procedures for Awarding Merit and Need-Based Scholarships
- Development of University-Wide Academic Rules, Standards for Satisfactory Academic Progress, Probation, etc.
- Development of a University Calendar
- University-Wide or College-Based Mission Criteria.
- University-Wide General Education Requirements or General Education College-Based Requirements
- University-Wide Honors College (as at NJIT) or College-Based Honors College(s) (as at Rutgers)
- University-Wide or College-Based Academic Support Programs.
- University-Wide or College-Based EOF Programs.
- Organization of Summer and Winter Sessions.
- Organization of Articulation, Joint Admission, Joint Degree, and Transfer Relationships
- Student Programs, Curriculum Revisions/Adjustments

**C. Graduate Education Issues (including, but not limited to):**

- Development of University-Wide Policies and Procedures for Financial Awards, Research and Teaching Assistantships
- University-Wide or College/Department-Based Admissions Criteria.
- Organization of Graduate Studies
- Organization of Continuing Professional Education

**D. Issues of Organizing Student Life/Student Affairs (including but not limited to):**

- Athletics Programs
- Cultural, Social and Leadership Programming
- Dining Services
- Greek Life
- Residential Life

- Student Centers, Recreational Facilities, and Student Activities
- Student Clubs
- Student Conduct/Judicial Affairs
- Student Governance
- Student Health/Mental Health Service

**E. Community Relations (including but not limited to):**

- Community Service
- Community Services (Health and Legal Services, etc.)
- Outreach to Local Government, Community Organizations and K-12 Schools
- Pre-College Programs

**F. Faculty Issues (including but not limited to):**

- Establish Standards, Policies and Procedures for Faculty Appointment, Tenure and Promotion
- Establish Policies and Procedures for Faculty Sabbaticals, Faculty and Staff Leaves
- Establish Policies and Procedures for Faculty Post-Tenure Review
- Establish Policies and Procedures for Faculty Termination, and for Award of Faculty Emeritus Status
- Establish Policies and Procedures for Title Chairs, Faculty Awards and Other Honors
- Faculty Governance
- Faculty Collective Bargaining
- Policies on Intellectual Property
- Policies Regarding the Appointment and Authority of Department Chairs
- Policies for Promoting Faculty Diversity
- Teaching Loads

**G. Issues of Administrative and Support Staff (Including but not limited to):**

- Policies for staff recruitment and retention
- Policies for staff leaves and benefits
- Policies for staff promotion and performance awards.
- Policies dealing with staff diversity.
- Policies for staff collective bargaining.

## **APPENDIX I**

### **PROPOSALS SUBMITTED TO THE COMMISSION ON JOBS GROWTH AND ECONOMIC DEVELOPMENT**

#### **NJIT**

- Center for Homeland Security Systems Technology
- Center for Secured Cyber Networking and Communications (with Princeton University, Rutgers-New Brunswick, Stevens Institute of Technology)
- Design Center for Nanotechnologies (with Princeton University)
- e-Jersey Initiative
- Institute for Directed Molecular Engineering
- Institute for Global Business Development
- Institute for Policy Studies
- Institute for Sensor System Technology
- Value Added Material Processes Consortium

#### **RUTGERS-NEWARK**

- Center for Cellular and Molecular Biodynamics (includes UMDNJ, NJIT participants)
- Institute of Health Security (joint with UMDNJ)
- Newark Center for Nanomaterials and Ultrafast Spectroscopy (includes NJIT participants)
- New Jersey Center for the Adaptive Brain: Enhancing Human Potential Through Innovative Technologies (includes UMDNJ, NJIT participants)
- New Jersey Institute for Pharmaceutical and Biotechnological Entrepreneurship (includes UMDNJ, NJIT participants)

#### **UMDNJ**

- Center for Integrative and Translational Cardiovascular Research (includes Rutgers-Newark and NJIT participants)
- Center for the Study of Carbohydrate and Mineral Nutrition
- Clinical Research (New Jersey Dental School)
- Institute for Bone and Joint Restoration (includes Rutgers-Newark and NJIT participants)
- Institute for Health Security (joint with Rutgers-Newark)
- Institute for Molecular Diagnostic Technology (includes Rutgers-Newark and NJIT participants)
- Master of Science Program in Clinical Research Management (School of Nursing)
- Newark Vascular Institute (NVI)
- Ocular Laser and Imaging Applied Research Center
- The New Jersey Trauma Institute (includes Rutgers-Newark participants)

**APPENDIX II**  
**PhD PROGRAMS**  
**2001-2002**

**RUTGERS NEWARK GRADUATE SCHOOL**

<b><u>Doctoral Programs</u></b>	<b><u>Degree</u></b>	<b><u>Joint/Cooperative</u></b>
Biology	PhD	NJIT
Chemistry	PhD	
Criminal Justice	PhD	
Environmental Science	PhD	NJIT
Global Affairs	PhD	
Management	PhD	NJIT
Mathematical Sciences	PhD	NJIT
Neuroscience, Integrative	PhD	UMDNJ (NJMS)
Nursing	PhD	
Physics, Applied	PhD	NJIT
Psychology	PhD	
Public Administration	PhD	
Urban Systems	PhD	NJIT-UMDNJ
American Studies (pending)	PhD	

**NEW JERSEY INSTITUTE OF TECHNOLOGY**

<b><u>Doctoral Programs</u></b>	<b><u>Degree</u></b>	<b><u>Joint/Cooperative</u></b>
Biology	PhD	Rutgers-Newark
Biomedical Informatics	PhD	UMDNJ
Chemical Engineering	PhD/D.Eng.	
Civil Engineering	PhD/D.Eng.	
Computer Engineering	PhD	
Computer and Information Science	PhD	
Electrical Engineering	PhD/D.Eng.	
Environmental Engineering	PhD	
Environmental Science	PhD	Rutgers-Newark
Industrial Engineering	PhD	
Management	PhD	Rutgers-Newark
Materials Science and Engineering	PhD	
Mathematical Sciences	PhD	Rutgers-Newark
Mechanical Engineering	PhD/D.Eng.	
Physics, Applied	PhD	Rutgers-Newark
Transportation	PhD	
Urban Systems	PhD	UMDNJ,Rutgers-Newark

**UNIVERSITY OF MEDICINE AND DENTISTRY OF NEW JERSEY**

<b><u>Doctoral Programs</u></b>	<b><u>Degree</u></b>	<b><u>Joint/Cooperative</u></b>
Anatomy, Cell Biology & Injury Science	PhD	
Biochemistry & Molecular Biology	PhD	
Biomedical Informatics	PhD	NJIT
Health Sciences	PhD	
Microbiology & Molecular Genetics	PhD	
Neurosciences, Integrative	PhD	Rutgers-Newark
Pathology, Experimental	PhD	
Pharmacology & Physiology	PhD	
Psychiatric Rehabilitation	PhD	
Urban Systems	PhD	Rutgers-Newark & NJIT

## APPENDIX III

### CENTERS AND INSTITUTES

#### Research Centers at NJIT

##### **Bioengineering & Applied Life Sciences**

- Center for Computational Biology and Bioengineering
- Collaborative Telemedicine Environments
- Human Movement Dynamics Laboratory
- Personalized Weapons Technology Project

##### **Information Technology**

- Center for Applied Mathematics and Statistics
- Center for Communications and Signal Processing Research
- Center for Next Generation Video
- Computerized Conferencing and Communications Center
- Hypermedia Information Systems Research
- Microelectronics Research Center
- New Jersey Center for Wireless and Internet Security
- New Jersey MEMS Initiative
- New Jersey Center for Wireless Telecommunications

##### **Sustainable Systems & Infrastructure**

###### Architecture and Building Sciences

- Center for Architecture and Building Science Research
- Concrete Testing Laboratory
- Structural Testing Laboratory

###### Environmental Science and Engineering

- Center for Environmental Engineering and Science
- Center for Airborne Organics
- Geo-environmental Engineering Laboratory
- Multi-lifecycle Engineering Research Center
- Hazardous Substance Management Research Center
- Northeast Hazardous Substance Research Center Sustainable Green
- Remote Sensing/Geographic Information Systems Laboratory

###### Solar Physics

- Big Bear Solar Observatory
- Center for Solar Research
- Owens Valley Solar Array

###### Transportation

- Center of Excellence for Airworthiness Assurance
- International Intermodal Transportation Center
- National Center for Transportation and Industrial Productivity
- New Jersey Transportation Information and Decision Engineering Center
- North Jersey Transportation Planning Authority
- Transportation, Economic and Land Use System

## **Materials Science and Manufacturing**

Center for Membrane Technologies  
Electronic Imaging Center  
Ion Beam and Thin Film Research Laboratory  
Keck Laboratory for Electro-Hydrodynamics of Suspensions  
New Jersey Center for Engineered Particulates  
New Jersey Center for Microflow Control  
Non-linear Nanostructures Laboratory  
Polymer Processing Institute  
Smart Coatings Research Initiative  
Waterjet Technology Lab

## **NJIT Research Partnerships Centered at Other Institutions**

Center for Applied Genomics (NJIT, UMDNJ)  
Center for Embedded System-On-a-Chip Design (Princeton, Rutgers, NJIT)  
Center for Ultra-fast Laser Applications (Princeton, Rutgers, NJIT, UMDNJ)  
Collaborative Telemedicine Environments (Rutgers, NJIT, UMDNJ)  
Micro-chemical Reactor Systems (Stevens)  
New Jersey Center for Biomaterials and Medical Devices (Rutgers, UMDNJ, Princeton, NJIT)  
New Jersey Center for Optoelectronics (Princeton, NJIT)  
New Jersey Center for Pervasive Computing (Princeton, NJIT, Rutgers)  
Particle Processing Research Center (Rutgers, NJIT)  
Phytoremediation of Dredge Spoils Using Living Plants / Associated Micro-organisms (Rutgers, NJIT)  
Software Engineering for Distributed Computing and Networking (Stevens, Rutgers, NJIT)

## **Research Centers at Rutgers-Newark**

### **Centers Reporting to the Provost**

Center for Global Change and Governance  
Center for Information Management, Integration and Connectivity  
Center for Molecular and Behavioral Neuroscience (dual reports to FASN dean)  
Center for the Study of Public Security  
Joseph C. Cornwall Center for Metropolitan Studies (dual reports to FASN dean)

### **School-Based Centers**

#### **Faculty of Arts and Sciences-Newark**

Center for Molecular and Behavioral Neuroscience (dual reports to Provost)  
Joseph C. Cornwall Center for Metropolitan Studies (dual reports to Provost)  
Institute on Ethnicity, Culture and the Modern Experience  
National Center for Public Productivity

#### **School of Criminal Justice**

Center for Justice and Mental Health Research  
Police Institute

### **Rutgers Business School**

Center for Entrepreneurial Management  
Center for Governmental Accounting Education and Research  
Center for Middle East/North Africa Business  
Center for Research in Regulated Industries  
Center for Supply Chain Management  
Rutgers Accounting Research Center  
Rutgers Prudential Business Ethics Center  
Small Business Development Center  
Technology, Management Research Center  
Whitcomb Center for Research in Financial Services

### **Law School Centers and Clinics**

Center for Institutional Governance  
Child Advocacy Clinic  
Community Law Clinic  
Constitutional Litigation Clinic  
Environmental Law Clinic  
Federal Income Tax Clinic  
Program in Global Legal Studies.  
Special Education Clinic  
Urban Legal Clinic  
Women's Rights Litigation Clinic  
Domestic Violence Assistance Program

### **Nursing School Centers**

Center for Professional Development  
Minority Nurse Leadership Institute  
New Jersey Collaborating Center for Nursing  
Nursing Center for Bioterrorism and Infectious Disease Preparedness

### **Library Center**

Institute for Jazz Studies

## **Research Centers at UMDNJ**

### **Major Sponsored Research Centers at UMDNJ**

Cardiovascular Research Institute  
Center for Human & Molecular Genetics  
Center for the Study of Emerging and Re-emerging Pathogens  
Dental Research Center at NJDS  
Institute for Ophthalmology and Visual Sciences  
NJMS Hispanic Center for Excellence  
National Tuberculosis Center at NJMS  
Neurological Institute of NJ  
Trauma and Multiple Organ Disease  
UMDNJ Center for Bio-defense

### **UMDNJ University-wide/State-wide Centers/Institutes**

Center for Continuing and Outreach Education  
International Center for Public Health, Inc.  
New Jersey AIDS Education and Training Center  
New Jersey Center for Biomaterials  
UMDNJ Informatics Institute  
UMDNJ Institute for Clinical Research and Training

### **New Jersey Medical School and The University Hospital**

Asthma and Allergy Center  
Center for Childhood and Neonatal Surgery  
Center for Family Partnerships  
Center for Health Care Ethics  
Center for Human and Molecular Genetics  
Center for Macular Degeneration Treatment and Research  
Center for Neuromuscular Disorders  
Center for Rehabilitation Services  
Center for Reproductive Medicine  
Center for Skull Base Surgery  
Center for Vascular Disease  
Center for Ventilatory Support Alternatives & Pulmonary  
Rehabilitation  
Center for Excellence in Autism  
Chronic Fatigue Syndrome Center  
Cochlear Implant Center  
Comprehensive Neurological Care Center  
Cornea and Laser Vision Institute  
CPR Training Center  
Cystic Fibrosis Center  
Diabetes Center  
Eye Institute of New Jersey  
Francois Xavier Bagnoud Center  
Francois Xavier Bagnoud International Pediatric HIV Training Program  
Geriatric Education Center  
Headache Center  
Hypertension Research Center  
Institute for Ophthalmology and Visual Science  
Multiple Sclerosis Diagnosis and Treatment Center  
Muscular Dystrophy Center  
National Pediatric and Family HIV Resource Center  
National Tuberculosis Center at UMDNJ  
Neurological Institute of New Jersey  
Neurooncology Center  
New Jersey Breast Center  
New Jersey Medical School Center for BioDefense  
New Jersey Medical School Hispanic Center of Excellence  
New Jersey Medical School Homecare Institute  
New Jersey Medical School Liver Center  
New Jersey Medical School Sports Medicine Center  
New Jersey Spine Center

New Jersey State Trauma Center  
New Jersey Orthopaedics Institute  
Northern New Jersey Spinal Cord Injury Center  
Northern New Jersey Traumatic Brain Injury Center  
Ophthalmic Center for Minimally Invasive Treatment  
Ophthalmic Clinical Trials Center  
Pain Management Center  
Pancreatic Biliary Institute  
Pediatric Advanced Life Support (PALS) Training Center  
Pediatric Comprehensive Epilepsy Center  
Peripheral Nerve Center  
Psychiatric Outpatient Center  
Psychiatric Screening Center  
Ruy V. Lourenço Center for the Study of Emerging and  
Re-emerging Pathogens  
Ruy V. Lourenço Student Health Advocates for Research and Education (SHARE)  
Center  
Sickle Cell Disease Center  
University Center for Plastic and Reconstructive Surgery  
University Craniofacial Center of New Jersey  
University Family Practice Center at Vailsburg  
University Institute for Children's Health  
University Transplantation Center  
University Women's Health Care Center  
Vascular Biology Center  
Women's Wellness Center  
Young Fathers Program

#### **New Jersey Dental School Centers**

Advanced Technology Education Center  
Center for Dental and Oral Health  
Center for Pharmacogenomics and Complex Disease Research  
Center for Treatment of the Handicapped  
Dental Research Center  
Northeastern Minority Oral Health Research Center  
University Craniofacial Center of New Jersey

#### **School of Health Related Professions**

Center for Advanced and Continuing Education (with Center for Continuing and  
Outreach Education)  
Center for Health Informatics  
Center for the Study and Promotion of Recovery from Severe Mental Illness  
Institute for Complementary and Alternative Medicine  
Integrated Employment Institute  
Multimedia Health Care Teaching Center

#### **UMDNJ School of Nursing**

Stanley S. Bergen, Jr. Center for the Study of Urban Health Systems

**School of Public Health**

Center for Education and Training

Institute for the Elimination of Health Disparities

**University Behavioral HealthCare**

Behavioral Research and Training Institute

Institute for Alzheimer's Disease and Related Disorders

Institute for Chemical Dependency

Mercer Trenton Addiction Science Center

Technical Assistance Center

Violence Institute of New Jersey at UMDNJ

## **APPENDIX IV**

**Northern University Steering Committee  
Sub-Committee on Physical Master Planning  
Rutgers-Newark, NJIT and UMDNJ-Newark**

**Re-structuring Issues**

**October 1, 2003  
Revised October 15, 2003**

## **Rutgers-Newark, NJIT and UMDNJ Physical Master Planning Re-structuring Issues**

### *Overview*

In developing a workable plan to physically consolidate Rutgers-Newark (R/N), NJIT, and UMDNJ-Newark, two primary issues need to be addressed: identify the issues involved in forming a single physical/geographical entity within the Northern University structure; and to develop structures, plans and processes that would be best suited to addressing these issues. This report is primarily concerned with the former and outlines a general framework for detailing the issues involved in a potential re-structuring. In addition, this report addresses three specific areas posed by the Northern University Steering Committee: housing, parking, and University Heights Science Park.

While re-structuring will be a somewhat complex process, the necessary elements for planning the physical campus seem to be reasonably well defined within the geographical area known as the University Heights District (UHD).<sup>1</sup> The UHD (see Appendix E) is an informal district, however, that crosses over several political sub-divisions in the City of Newark (see Appendix F); it was created more than twenty years ago to provide the necessary framework for area planning, including the four public campuses (with Essex County College), realizing the strength of the higher education community as a major economic engine of growth. The UHD was recognized as an opportunity to revitalize a major portion of the City, which at that time still suffered from the aftermath of the city's riots of 1967. The UHD, with the universities taking the lead in planning, was affirmed by then Mayor Gibson, and subsequently by current Mayor James. Clearly, the universities, county government, commerce, and residential neighborhoods could develop systematically and symbiotically because of their close proximity and their mutual interest in developing partnerships and collaborations.

The bounds of UHD reflect in part, the location of the institutions. The eastern most campus is R/N, while the western most campus is UMDNJ-Newark. Accordingly, the UHD eastern boundary was established at initially at Washington Street and moved east to Halsey Street, which is near the Central Business District. Similarly, the western border is just west of the UMDNJ-Newark campus.

It was expected that significant partnerships could be established across the planning districts that would encourage growth and re-investment in business and commerce, and in the local neighborhoods as well. This appears to have spurred further development of shops and residential apartments.

### *Issues in Restructuring*

The issues involved in restructuring can be divided into two primary areas:  
a) issues involving Mission, Vision, and Goals; and b) Focused issues that are tied to structures, processes and operations.

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<sup>1</sup> The UHD boundaries were originally set as Market St. and South Orange Ave. (South), Littleton Ave. (West), Rt. 280 (North), and Washington St. (East).

## **Mission, Vision, and Goals**

In discussing the development of a physical plan for the three institutions, the Sub-Committee quickly came to the conclusion that its work would have to depend largely on an aggregation of the demographic makeup of the three universities as we know them today. Each of the three has its own distinct mission and vision for the future, and each of the constituent master plans reflects those missions. However, for planning purposes, the sub-committee had to assume that the three constituent colleges and schools would remain in some form. So, the sub-committee aggregated enrollments, faculty and staff complements, net assignable square footage, and other physical assets like housing beds, parking spaces, and hospital beds. Appendix A displays enrollment projections over the first decade of the new century, in keeping with the recent capacity request of the NJ Commission on Higher Education (CHE). In addition, faculty and staff complements are projected through 2010. (See Appendix B)

Together, the three institutions would consist of approximately 22,000 students and 10,000 faculty and staff. This university community of more than 32,000 individuals provides a sound basis for further physical planning and development in the UHD by the constituent units, but also by private business interests that thrive on the disposable incomes of students, faculty and staff in urban centers. Based on recent responses to CHE, the three institutions will grow to more than 29,000 students and 10,500 faculty and staff, which results in the potential growth in this academic community of more than 20%.

For planning purposes, the sub-committee also looked at the impact of growth in ECC since there are many articulation agreements and joint services between the county college and each of the constituent units of the proposed Northern University. The County College is an integral part of the “College Town” and should continue to be considered as plans for the development of University Heights District. With ECC’s enrollment factored into the 2010 projections, the UHD would be home to more than 39,000 students and more than 11,000 faculty and staff. These data are reflected on page two of Appendices A and B. This aggregate academic community of approximately 50,000 individuals would be larger than most municipalities in New Jersey (including New Brunswick) but would be concentrated in one planning district in a Smart Growth community.

For preliminary benchmarking purposes, the sub-committee aggregated the net assignable square feet (NSF) of each of the constituent universities. Appendix D displays the individual and total NSF by standard HEGIS category across the three universities. Taken together, the total NSF for the three universities approaches in excess of 6.5 million, and represents a sizeable investment by each of the constituent universities, the State of New Jersey, and the federal, corporate and philanthropic sectors.

The sub-committee further determined the rough deficiency/surplus across the key academic and service components of the aggregated NSF. Because space standards and drivers for space are different across the three universities, the sub-committee was only able to project gross deficits in the Classroom & Service category, Instructional Labs & Service category, and in the Research Labs & Service category at each of the constituent universities; however, each of them are considered to be conservative estimates based on enrollment projections and the emphasis being placed on research capacity.

Some key findings and conclusions can be presented to inform the Steering Committee's work in relation to the Physical Master Plan.

- 1) Each of the universities individually and through the Council for Higher Education in Newark (CHEN) embarked on a major emphasis to raise academic standards, to improve its instructional offerings and its research capacity within each campus's context, but also within a shared vision for the UHD. This broader framework of collaborative physical planning has achieved multiple objectives at the institutional level, across the institutions, and within the City, including the development of University Heights Science Park (UHSP). UHSP will be addressed in the second portion of the sub-committee's report.
- 2) While each of the universities has engaged in mission critical academic and program development, they have worked closely with City government and the residential community to spur private investment in the UHD for new housing, services, and new retail development.
- 3) Each institution has been actively engaged in City development that goes well beyond the boundaries of the UHD. Recently, the City Business Administrator convened a working group of city development staff along with representatives of the corporate community, and representatives of R/N, NJIT, and UMDNJ-Newark. This working group meets on a monthly basis to facilitate housing and economic development in Newark through a better understanding of the City's needs, and helps to prioritize the implementation of individual projects. The universities are now "at the table" for major discussions about the City's future that help to promote growth in Newark, and wherever possible, on or near the university campuses. As an example, the Newark Alliance (a group of corporate and civic leadership) has worked to develop a new physical master plan for the James Street Commons neighborhood, which is adjacent to R/N and NJIT campuses. Each institution has provided input into the plan's development and has been supportive of the developing plan. Each, however, is monitoring very closely the impact that an area in need of re-development designation will have on the individual campuses.
- 4) Success provides the impetus to complete a major, new physical plan for the university community in the context of the other developments being considered in and around the area near the UHD. Newark, like so many other urban centers around the country, has limited land resources for academic expansions. The areas between the campuses provide opportunities for streetscapes, in-fill and other housing and the amenities, including stores, dining and services that are supported by the population, both the residential and commuter bodies. The UHD has the potential to provide significant opportunities for further collaborations across the universities and further coordinate the area's development with the City. A clearly defined sense of place that extends throughout the UHD should be engendered using well established urban design principles that will address land use and density issues more adequately as the basic land resource becomes increasingly scarce and more expensive. The "college town concept" well underway in Newark will have to be taken to the next level to integrate area needs for commercial and residential construction with university needs for housing for faculty, staff and students, as well as the resultant need for more new retail and

services into the UHD. While the magnitude of the costs of such a program have not yet been established, the scope of the development will of necessity involve the university, the State, as well as the private sector to take the concepts from the drawing board to reality.

### **Focused Issues**

In addition to looking at the more macro view of a physical consolidation of R/N, NJIT, and UMDNJ-Newark, the sub-committee was asked to look at three focused issues: housing, parking, and UHSP.

- 1) **Student housing** for both undergraduate and graduate students is widely recognized as a significant and necessary part of public research universities around the country. Unfortunately, housing programs at NJIT and R/N are relatively new, while UMDNJ-Newark has no on-campus housing at all. Having high quality and sufficient student housing fosters a greater sense of community and quality of life on campus, and affords the institution the opportunity to connect growth in the student body with improved program expectations. Together, NJIT and R/N house more than 2,200 students, out of a total on-campus population on those two campuses of nearly 20,000, or only 11% of the student body. Nationally, university academic planners and physical master planning professionals recognize a healthy resident student population for a public research university at no less than 25% of its student body. Therefore, a significant potential exists for the three institutions to address this significant deficiency through a major planning effort to increase the total residential capacity. By way of comparison, the University of Pittsburgh (a public AAU) houses 6,000 students on campus, 25% of its student body of nearly 24,000 undergraduate and graduate students. In addition, Temple University houses 5,000 students on campus out of its total enrollment of 29,000 students, but has embarked on a major development effort to significantly increase its residential capacity. (See Appendix C) University of Maryland – College Park and Ohio State University are two additional examples of AAU universities that have embarked on major development efforts to increase their residential capacity. In New Jersey, many of the state colleges and universities have housing programs that well exceed the available student housing now in Newark, and additional student housing is either planned or funded. The CHE is studying enrollment capacity issues in order to come to grips with the increasing cohorts of high school graduates, and one of the strategies to deal with the increase is widely recognized by building more on-campus housing.
- 2) **Housing for faculty and staff** has become a significant issue at major research university campuses around the country. None of the constituent universities in Newark offers any college housing for faculty and staff, however the demand for and interest in developing faculty and staff housing on or near campus is growing. Recent planning efforts in the James Street Commons neighborhood and adjacent to the UMDNJ-Newark campus could provide the initial impetus to creating housing for new faculty and staff, Teaching and Graduate Assistants, and postdoctoral fellows who prefer living closer to campus to support their teaching and research efforts. Housing for faculty and staff is also being encouraged in the City's strategy to build more market rate housing. As the campuses have grown

in Newark, the interest by new younger faculty has also grown. In cities like New York (Columbia and NYU), Philadelphia (U. Penn.), Columbus (Ohio State Univ.), and Irvine, CA (UC), universities have either invested in or participated in development activities to encourage the growth of more vibrant neighborhoods, and create a real sense of community in and around the campus.

- 3) **Parking** for faculty, staff and students remains a significant challenge for each of the constituent universities. Appendix C displays the total number of parking spaces available, the total number of parking permits sold, and ratios of spaces to permits. Interestingly, both NJIT and UMDNJ have very similar space/permit ratios of 0.63(0.64), or in other words sell 1.56 permits for every available parking space. At R/N, the situation is more difficult with the space/permit ratio being 0.39; R/N sells 2.6 permits for every available parking space. Overall, the ratio approaches 0.55, indicating that 1.8 permits are sold for every available parking space. Parking ratios vary significantly by campus throughout the country, especially among urban universities. However, the sub-committee looked at the parking programs of both the University of Pittsburgh and Temple University, and found a somewhat different picture. Pitt's parking program guarantees parking permits for 4,500 spaces at a 1:1 ratio. Any other demand for parking is met by the commercial parking sector. At Temple, 3,500 parking permits were sold for 3,200 parking spaces, a ratio of 0.91. Because of the scarcity of land, the commuter nature of the campuses, a lower reliance on mass transit, and partially due to the nature of parking as an auxiliary service, the Newark universities have been less successful in meeting the demand for parking. As the UHD continues to grow economically, opportunities to develop public/private partnerships with the corporate, civic, performing arts, and neighborhood communities have begun to present themselves. There are significant opportunities to plan for new parking structures adjacent to the campuses in the James St. Commons neighborhood, in adjacent CBD areas, near St. Michael's Medical Center, and in the UHSP area as well.
- 4) **University Heights Science Park (UHSP)** was first incorporated by CHEN in 1993. The original vision for UHSP modeled itself after many successful parks around the country including University Science City in Philadelphia. One of the goals of the Park was to provide a place in which scientific discoveries and technology advancements by Newark University faculty could be transferred to the corporate sector for commercialization. In addition, four clusters were targeted for development in the Park, namely biosciences and biotechnology, advanced manufacturing technology, information and communication technology, and environmental and energy technology. Finally, since the Park would encompass nearly a 50-acre site, the vision included a broad goal statement about neighborhood revitalization, which was interpreted to include residential, educational, and retail development. The Park is celebrating its tenth anniversary, and has accomplished much. The Park Trustees have been expanded to include the original University sector representatives plus members of the corporate, civic, federal and state governmental, and residential communities. Several buildings have been constructed in the Park including the CHEN building (by NJIT), two incubators and a 100-child day care center (by NJIT), and the International Center for Public Health (by UMDNJ), which encompasses the relocated Public Health Research Institute from Manhattan, along with two

academic departments of UMDNJ-Newark. Programmatically, the Park has been successful in addressing two of the original clusters, biosciences/biotechnology and advanced manufacturing technology. In addition, the Park has sponsored 20 units of new housing.

Future plans include the construction of a 1,000-student Science Park High School adjacent to UMDNJ (but outside the actual footprint of the Park), a new Information Technology building and parking garage, more housing, and more commercial and retail space. A new physical Master Plan has been developed to guide further acquisitions to encourage even more growth in the Park over the next several decades.

UHSP offers many opportunities to address its primary goals and to address some of the longstanding needs of the constituent Universities. The Park has an ability to expand housing opportunities for those who are employed there, but also for faculty and staff of the Universities. In addition, the Park has a real opportunity to expand services available to Park employees and residents, as well as students, faculty and staff of the Universities. New retail, commercial space, and parking could significantly change the quality of life in the University Heights District, as well as in the Park.

Unfortunately, like so many other opportunities recently, the diminished national economy and national security concerns have channeled capital investments away from solid projects like UHSP. In addition, there are challenges of working across many interests and political overlays that make consensus building problematic. A quick tally indicates that the UHD is impacted by at least eight (8) political districts in addition to crossing two ward boundaries (See Appendix F). Nevertheless, UHSP remains an important entity that should be considered, as it relates to the physical expansion and programmatic advances of the constituent colleges and universities.

## **Conclusions**

Physical consolidation of R/N, NJIT, and UMDNJ-Newark would be a challenging process, take a long time, and require significant resources. The size of the restructured University could encompass more than 40,000 students, faculty and staff by 2010. (If ECC were included that number would grow to in excess of 50,000.

It should be noted that there will be significant transitional costs to launch the restructured university in physical terms, both in terms of the specific campus activities and perhaps more importantly, the “university neighborhood”. As a necessary first step to implement the plan, it is critical to identify specific opportunities, options and related costs, and to complete a renewed master plan for the restructured universities. This study, will of necessity include the UHD and surrounding area development plans, the landscape as it has developed and the new landscape in a restructured Northern University. And, once completed, it is critical to have the funding to implement the master plan.

## **APPENDICES**

- A - Enrollment Projections**
- B - Faculty and Staff Projections**
- C - Parking and Housing**
- D - HEGIS square footage inventory**
- E - University Heights District Map**
- F - University Heights District, political district overlay**

<b>Appendix A - Student Enrollment Projections</b>								
	<b>2000/01</b>	<b>2001/02</b>	<b>2002/03</b>	<b>2003/04</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2010</b>
<b>NJIT</b>								
Undergraduate Enrollment	5,639	5,698	5,730	5,800	5,850	5,900	5,900	6,514
Graduate Enrollment	3,183	3,164	3,098	3,100	3,100	3,100	3,100	3,507
<b>Rutgers-Newark</b>								
Undergraduate Enrollment	5,873	6,118	6,614	7,016	7,443	7,896	8,376	10,000
Graduate Enrollment	3,479	3,484	3,732	3,891	4,057	4,231	4,412	5,000
<b>UMDNJ-Newark</b>								
Undergraduate Enrollment	602	620	621	621	621	621	621	621
Graduate Enrollment	1,915	2,022	2,016	2,016	2,016	2,016	2,016	3,755
Undergraduate Enrollment	12,114	12,436	12,965	13,437	13,914	14,417	14,897	17,135
Graduate Enrollment	8,577	8,670	8,846	9,007	9,173	9,347	9,528	12,262
<b>TOTAL - Research Universities</b>	<b>20,691</b>	<b>21,106</b>	<b>21,811</b>	<b>22,444</b>	<b>23,087</b>	<b>23,764</b>	<b>24,425</b>	<b>29,397</b>
<b>Essex County College</b>								
Undergraduate Enrollment	8,868	9,539	8,584	8,721	8,860	9,002	9,146	9,748
Graduate Enrollment	na	na	na	na	na	na	na	na
<b>TOTAL UNDERGRADUATE ENROLLMENT</b>	<b>20,982</b>	<b>21,975</b>	<b>21,549</b>	<b>22,158</b>	<b>22,774</b>	<b>23,419</b>	<b>24,043</b>	<b>26,883</b>
<b>TOTAL GRADUATE ENROLLMENT</b>	<b>8,577</b>	<b>8,670</b>	<b>8,846</b>	<b>9,007</b>	<b>9,173</b>	<b>9,347</b>	<b>9,528</b>	<b>12,262</b>
<b>TOTAL - Research Universities and Essex County College</b>	<b>29,559</b>	<b>30,645</b>	<b>30,395</b>	<b>31,165</b>	<b>31,947</b>	<b>32,766</b>	<b>33,571</b>	<b>39,145</b>

**Appendix B - Faculty and Staff Projections**

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
<b>NJIT</b>							
Full-Time Faculty	404	418	409	410	415	415	420
Part-Time Faculty	226	272	244	250	250	250	250
Full-Time & Part-Time Staff	819	919	1,014	1,115	1,225	1,320	1,425
<b>Rutgers-Newark</b>							
Full-Time Faculty	455	452	450	450	450	450	450
Part-Time Faculty	203	206	208	208	208	208	208
Full-Time & Part-Time Staff	1,017	1,028	1,047	1,047	1,047	1,047	1,047
<b>UMDNJ-Newark</b>							
Full-Time Faculty	866	917	942	942	942	942	942
Part-Time Faculty	191	206	195	195	195	195	195
Full-Time & Part-Time Staff	5,139	5,234	5,828	5,828	5,828	5,828	5,828
Full-Time Faculty	1,725	1,787	1,801	1,802	1,807	1,807	1,812
Part-Time Faculty	620	684	647	653	653	653	653
Full-Time & Part-Time Staff	6,975	7,181	7,889	7,990	8,100	8,195	8,300
<b>TOTAL - Research Universities</b>	<b>9,320</b>	<b>9,652</b>	<b>10,337</b>	<b>10,445</b>	<b>10,560</b>	<b>10,655</b>	<b>10,765</b>

<b>Essex County College</b>							
Full-Time Faculty	160	154	154	154	154	154	154
Part-Time Faculty	370	353	264	264	264	264	264
Full-Time & Part-Time Staff	383	400	389	389	389	389	389

TOTAL FULL-TIME FACULTY	1,885	1,941	1,955	1,956	1,961	1,961	1,966
TOTAL PART-TIME FACULTY	990	1,037	911	917	917	917	917
TOTAL FULL-TIME & PART-TIME STAFF	7,358	7,581	8,278	8,379	8,489	8,584	8,689
<b>TOTAL - Research Universities and Essex County College</b>	<b>10,233</b>	<b>10,559</b>	<b>11,144</b>	<b>11,252</b>	<b>11,367</b>	<b>11,462</b>	<b>11,572</b>

### Appendix C - Comparative Analysis (2003)

<b>University Population</b>	<b>NJIT</b>	<b>RU-Nwk</b>	<b>UMDNJ-Nwk</b>	<b>TOTAL</b>	<b>Univ. Pittsburg</b>	<b>Temple</b>
Undergraduate enrollment	5,800	7,016	621	13,437	16,425	20,597
Graduate Enrollment	3,100	3,891	2,016	9,007	7,476	9,030
<b>TOTAL STUDENT ENROLLMENT</b>	<b>8,900</b>	<b>10,907</b>	<b>2,637</b>	<b>22,444</b>	<b>23,901</b>	<b>29,627</b>
Full-Time Faculty	410	450	942	1,802	3,336	1,222
Part-Time Faculty	250	208	195	653	669	965
Full-Time & Part-Time Staff	1,115	1,047	5,828	7,990	6,776	5,507
<b>TOTAL</b>	<b>10,675</b>	<b>12,612</b>	<b>9,602</b>	<b>32,889</b>	<b>34,682</b>	<b>37,321</b>

<b>Inventory</b>	<b>NJIT</b>	<b>RU-Nwk</b>	<b>UMDNJ-Nwk</b>	<b>TOTAL</b>	<b>Univ. Pittsburg</b>	<b>Temple</b>
Campus acres	45	37	180	262	132	114
Hospital beds	na	na	446	446	560	514
Housing beds	1,536	687	0	2,223	6,000	5,000
Housing / Enrollment Ratio	0.17	0.06	0.00	0.10	0.25	0.17
Parking Spaces	3,544	2,394	4,283	10,221	4,500	3,200
Total Parking Permits	5,537	6,194	6,800	18,531	4,500	3,500
Spaces / Permit ratio	0.64	0.39	0.63	0.55	1.00	0.91

## Appendix D - HEGIS Square Footage Inventory (2003)

<b><i>Net Assignable Space</i></b>	<b><i>NJIT NSF</i></b>	<b><i>RU-Nwk NSF</i></b>	<b><i>UMDNJ-Nwk NSF</i></b>	<b><i>TOTAL NSF</i></b>
Classrooms & Service	126,457	108,308	43,419	278,184
Instructional Labs & Service	124,165	98,211	205,049	427,425
Research Labs & Services	135,903	57,391	92,129	285,423
Office	411,669	276,382	579,612	1,267,663
Library	43,434	127,416	40,188	211,038
Physical Education & Recreation	91,445	52,497	4,826	148,768
General Use (Assembly/Exhibit)	27,907	99,894	177,758	305,559
Support/Cntrl Computing	4,506	13,409	934,448	952,363
Student Health/Health Care Facility	299	1,519	382,710	384,528
Housing	244,993	181,991	0	426,984
Other/Non-assignable	553,136	214,651	1,120,953	1,888,740
<b>TOTAL Net Assignable Space</b>	<b>1,763,914</b>	<b>1,231,669</b>	<b>3,537,673</b>	<b>6,533,256</b>
<b><i>TOTAL GSF</i></b>	<b>2,603,867</b>	<b>2,401,336</b>	<b>3,900,552</b>	<b>8,905,755</b>

Appendix E – University Heights Map



Appendix F – University Heights Map with Districts

