Higher Education Technology and Research:

Creating Excellence Through State Investments

A Report by the Commission on Higher Education
March 2004

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COMMISSION ON HIGHER EDUCATION

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March 23, 2004

Dear Colleagues:

Colleges and universities in New Jersey play a critical role in building and sustaining economic prosperity and quality of life in the state and beyond. Through advancements in technology and research, higher education helps to create new jobs, improve the workforce, develop new knowledge, and boost the overall economy.

The New Jersey Commission on Higher Education is pleased to provide this report, *Higher Education Technology and Research: Creating Excellence through State Investments*. The report summarizes the primary state investments in higher education technology and research since fiscal 1998 and highlights the substantial returns that have been realized. I want to extend thanks to all who contributed to this document.

New Jersey's targeted investments in technology and research at its colleges and universities have proven to be both astute and cost-effective, as the following examples indicate:

- Technology infrastructure improvement and upgraded equipment have significantly advanced opportunities for students, faculty, and interinstitutional collaboration.
- Research capacity has been expanded to better serve the needs of the private sector.
- Targeted research and instructional programs have been enhanced and expanded to be more competitive nationally.
- New technologies and products have been commercialized.
- New jobs and spinoff businesses have been developed.
- Additional technologists, scientists, and engineers have been prepared for the future.
- Hundreds of millions of dollars in external funding have been garnered.

As we look to the future, there is the promise of university, business, and government collaborations through Innovation Zones and the New Jersey Institute for Stem-Cell Research recently proposed by Governor McGreevey.

This report is provided as both a resource to inform future state planning and support for technology and research and a showcase for accomplishments in creating excellence through state investments. I hope you will find it useful.

Sincerely,

Laurence M. Downes

Laurence M. Downes, Chairman

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INTRODUCTION

The State of New Jersey has made substantial investments in higher education technology and research to enhance teaching and learning and the overall competitiveness of the state. Since fiscal 1998, over $300 million in state support has been provided for technology infrastructure and interinstitutional connectivity, scientific and other equipment, technology-based economic development initiatives, renowned faculty and programs in targeted high-tech disciplines, scientific discovery, and funds to attract federal research grants and contracts. These investments have already paid significant dividends to New Jersey, and they will continue to provide long-term returns to the state and its citizens for many years to come.

For example, new technological capabilities and methodologies have a profound and transformational impact upon the work and methods of scientists, engineers, and educators as they create new forms of collaborative innovation. By facilitating real-time communication throughout the state and around the world, new technology infrastructure supports global partnerships and new resources for information and knowledge. At the same time, investments in cutting-edge equipment for research helps scientists break new ground and bring to market important new discoveries with commercial and medical applications.

In addition, the creation of optimal new environments for teaching and learning are changing the fundamental manner in which professors teach and students learn. At both the undergraduate and graduate level, there are new opportunities for student research, investigation, and collaboration that extend far beyond campus boundaries. Distance learning, including online and other technology-mediated courses and programs, enables students to work toward degrees, enhance job skills, or pursue lifelong learning interests wherever and whenever their schedules permit. Investment in higher education technology has also significantly strengthened linkages with preschool-to-grade-12 schools and created new professional development opportunities for teachers.

This report provides an overview of the considerable and far-reaching benefits of the state's investments. Interspersed throughout the report are quotes from higher education leaders, reflecting on the importance of higher education technology and research. Without the state investments described herein, along with state support for facility renewal, replacement, and expansion on campuses, New Jersey's system of higher education would have fallen seriously behind that of other states. And New Jersey's economic competitiveness would have been seriously diminished.

HIGHER EDUCATION TECHNOLOGY INFRASTRUCTURE FUND

Recognizing that rapid advances in technology had the potential to reshape academic teaching, learning and research, the Commission on Higher Education created a Technology Task Force in 1996 to consider New Jersey's current and future needs. The task force saw a growing need to enhance the higher education system's technology infrastructure in order for colleges and universities to engage more fully in technology-mediated instruction, expand research capabilities, and utilize other benefits of emerging technologies.

The work of that task force led to the 1997 enactment of the $50 million Technology Infrastructure Fund. This fund was established to enhance the technology infrastructure within and among New Jersey's institutions of higher education. Its purpose was to provide effective and efficient access to information, educational opportunities, and workforce training and to further develop the connectivity between higher education institutions, libraries, and elementary and secondary schools.

The bond initiative allocated a total of $45 million directly to individual institutions and set aside $5 million specifically for connectivity among New Jersey's colleges and universities. The Educational Facilities Authority issued bonds to fund the program, and the state financed all of the debt service. Each institution was required to provide matching funds equal to its allocation from the Technology Infrastructure Fund, thereby leveraging the state's investment to infuse a total of $100 million for enhanced technology infrastructure in New Jersey.

Direct Institutional Expenditures

Of the $45 million allocated directly to institutions, more than half was used to expand campus networks; upgrade wiring to provide enhanced network access for students, faculty, and staff; and install new servers to meet increased demand. The colleges and universities used nearly $6 million for academic purposes, such as upgrading distance learning capabilities, installing "smart" classrooms, and providing new computer equipment for computer laboratories. Another $3 million dollars was used to acquire new computers for members of the campus communities.

A summary of direct institutional expenditures in primary categories is provided on the following page.

Higher Education Technology Infrastructure Fund

$45 million allocated to colleges and universities to expand campus networks and enhance academic technology

$5 million for interconnectivity among NJ institutions:

- **$4.4 million for institutions to link with NJEDge.Net**
- **$100,000 for network management and hardware**
- **$500,000 for Virtual Academic Library Environment**

$50 million in institutional matching funds

Higher Education Technology Infrastructure Fund – Summary of Expenditures

Computer Acquisitions	$ 3,152,554
Classrooms, Computer Laboratories, and Library Systems Upgrades	$ 4,353,437
Distance Learning Upgrades	$ 1,766,279
Network Servers	$ 3,385,732
Network Hardware	$ 1,035,707
Internet Enhancements	$ 776,000
Network Upgrades	$19,471,363
Software Purchases	$ 1,612,102
Telecommunications and Communications Upgrades	$ 3,171,083
Wiring Upgrades	$ 6,275,743
Total of Direct Institutional Allocations	**$45,000,000**

A complete list of institutional expenditures can be found in Appendix B.

Interinstitutional Connectivity

A key aspect of the state's strategic investment in higher education technology infrastructure was the decision to set aside $5 million for interconnectivity among the state's colleges and universities. These funds enabled the institutions and the Commission on Higher Education to work collaboratively to establish the Virtual Academic Library Environment of New Jersey (VALE) and NJEDge.Net -- an advanced higher education telecommunications infrastructure.

A total of $500,000 was allocated to support the Virtual Academic Library Environment. VALE allows academic libraries across New Jersey to collaborate on database acquisitions and leverage their collective buying power with other consortia to provide access to information resources beyond that which any single institution could provide individually. These funds, combined with a $500,000 institutional match and support from the State Library, provided statewide access to electronic databases and the necessary infrastructure improvements at each institution to support a seamless network of shared electronic academic information resources throughout the State of New Jersey.

The Commission on Higher Education earmarked $4.4 million of the interconnectivity funds to assist institutions with start-up costs to join the new higher education data and video network. These costs included equipment and wiring upgrades, as well as network services charges. The remaining $100,000 for interconnectivity was used to purchase computer and other equipment for network management and for the system hardware and software to support application services for institutions. The state's commitment to the network extends beyond the Technology Infrastructure Fund to include an annual appropriation since fiscal 2001 of $350,000 to help support network management and administration.

The systemwide higher education network is specifically designed to support new forms of interinstitutional collaboration, yielding significant advancements in technological capabilities as well as major efficiency gains for colleges and universities in New Jersey. This private, statewide infrastructure effectively "raises the bar" for high-performance data and video capabilities across

the state and extends the reach of higher education institutions to new populations of off-campus learners and preschool-12 (P-12) students, as well as corporate and community constituents.

At the core of this new network are sophisticated video conferencing and distance learning capabilities with the capacity to handle several hundred simultaneous videoconferences anywhere in the state with multiple participating sites. It provides a new generation of online collaboration tools designed to create optimal environments for teaching and learning. These capabilities provide powerful new tools to effectively deliver academic course offerings, as well as community-based workforce development initiatives, throughout the state. Distributed network-based learning technologies are eliminating many of the usual barriers to information access and providing a convenient and efficient manner to deliver statewide educational programs.

New classes of network membership now allow corporate participation for organizations desiring access to customized distance education courses as well as opportunities for research and development partnerships. A number of institutions have vigorously pursued information technology resources to strengthen partnerships with business and industry and to participate more fully in developing scientific and technological advances needed to stimulate the economy and provide New Jersey industries with a competitive advantage**.**

The new statewide network has provided considerable momentum in the expansion of interinstitutional research collaboration particularly evident in joint initiatives currently underway between Rutgers, UMDNJ, and NJIT. The very high costs associated with specialized state-of-the-art equipment underscore the importance of sharing facilities, whenever possible. The new statewide network gives institutions the ability to remotely control and share scientific instrumentation in real time. These new network-based research collaborations will serve as a platform for further research and development success in areas such as biomedicine, biomedical informatics, pharmaceutical chemistry, and neuroscience.

The creation of NJEDge.Net has provided the opportunity to achieve significant economies of scale through leveraging the collective buying power of New Jersey's higher education institutions. For example, the cost of commodity Internet was cut in half through pooling the collective bandwidth of all member institutions into a single contract. Other economies of scale have been achieved in statewide site licensing of software, sharing of scientific instrumentation, satellite uplinks, and video streaming servers. Additional economies of scale are anticipated for statewide course management systems, student service portals, digital libraries, disaster recovery, and long distance telephony.

The recent connection of NJEDge.Net into Internet2, the next generation Internet, was equally strategic in opening up opportunities for international videoconferencing and collaboration around the world. Collaboration with Internet2 member communities brings to New Jersey colleges and universities the opportunity to tap into remote expertise and experiences, increase opportunities for grant funding, and bring the world into the classroom.

The new network was also specifically designed to provide a mechanism to help increase systemic collaboration between the higher education community and New Jersey's P-12 schools.

The videoconferencing resources of NJEDge.Net are interconnected with the Department of Education's video portal, known as Access New Jersey, and provide for interoperability between these videoconferencing systems. Discussions are underway exploring the use of video-conferencing to increase opportunities for collaboration by:

- providing college credit courses to high school seniors;
- providing a directory of faculty experts willing to videoconference into a P-12 class; and
- delivering P-12 teacher certification training over the network.

The state's investment in the higher education network has increased the overall efficiency and effectiveness of the higher education system. The resources and capabilities of the network are facilitating:

- acceleration of long-range campus technology plans;
- development of new joint degree programs between institutions;
- shared faculty expertise/team teaching across institutions, using videoconferencing;
- more accessible and convenient higher education opportunities through distance learning;
- enhancements in the presentation of course materials in traditional classes;
- customized workforce development programs;
- expansion of access to scholarly materials;
- network-based research collaboration;
- significant economies of scale and efficiencies; and
- New Jersey's overall economic competitiveness.

The positive impact of technology on the process of education is undeniable. New Jersey has been, and will continue to be, at the forefront of enabling the deployment of technology to improve the quality of higher education in the state. Taking a retrospective look at the history of and the impact of technology deployment in higher education will help us to design and implement better technology solutions and, therefore, even better student outcomes.

William M. Freeman, Vice Chairman
NJ Commission on Higher Education

HIGHER EDUCATION EQUIPMENT LEASING FUND

New Jersey took the first step in investing in equipment and technology for education more than a decade ago when the Legislature enacted the Higher Education Equipment Leasing Fund in 1993. The original fund provided $100 million to support the purchase of scientific, engineering, technical, computer, communications, and instructional equipment at New Jersey's public and private colleges and universities.

The fiscal 2001 budget authorized the issuance of a second $100 million in bonds for the equipment leasing fund. The Educational Facilities Authority (EFA) issues bonds to generate funds for the program. The state finances 75% of the annual debt service on the bonds; the participating institutions pay the remaining 25%. The Commission on Higher Education specifically allocated $2 million to purchase equipment for Advanced Technology Centers, which were established in 1984 through the New Jersey Commission on Science and Technology.

One-third of the new equipment purchased with the 2001 bond funds supported programs in the natural sciences (biology, chemistry, physics, and mathematics), engineering, and scientific research. In addition to general scientific laboratory equipment, the colleges and universities used funds for such things as imaging systems, spectrophotometers, and cancer research equipment.

The colleges and universities used approximately $12.5 million to enhance their computer networks through wiring, installing more powerful servers to handle increased demand, upgrading telecommunications systems, and in some cases extending the campus network to the residence halls. Additionally, funds were spent to upgrade the physical infrastructure of the campuses by installing smart classrooms. These classrooms permit instructors to use the latest audiovisual, web, and computer applications in the presentation of class material. Additional funds were spent to equip computer labs and to provide students and faculty with personal computers.

Funds were also used to upgrade libraries by porting catalogues to the web, allowing for access outside the library building. In addition, pianos were purchased for practice rooms, student theaters received new lighting, and broadcast studios were upgraded with the latest equipment.

Issuing an additional $100 million in bonds for the equipment leasing fund has enabled New Jersey's colleges and universities to purchase critical scientific and technological equipment that impacts directly on student learning and research. Each institution has set its own priorities for investing in computer technology, scientific equipment, and other equipment to enhance academic learning.

Higher Education Equipment Leasing Fund

$100 million bond fund established in 1993

Additional $100 million bonded in 2001 to renew the fund and invest in equipment and technology

Higher Education Equipment Leasing Fund – Summary of Expenditures

Creative Arts	$ 3,847,964
General Academic	$ 7,918,327
Business Programs	$ 1,392,615
Computer Science and Information Technology	$ 4,182,585
Classroom Upgrades	$ 6,522,614
Engineering	$ 4,290,366
General Campus	$ 8,394,257
Physical Education	$ 446,369
Health Sciences	$ 2,548,631
Network Infrastructure	$ 12,559,150
Computer/Research Labs	$ 5,354,685
Language Programs	$ 1,139,294
Library Technology	$ 2,970,273
Media and Communications	$ 5,710,788
Natural Sciences	$ 18,796,899
Research	$ 9,828,519
Social Sciences	$ 2,096,664
Advanced Technology Centers	$ 2,000,000
Total Equipment Leasing Fund Projects (2001 allocation)	***$100,000,000***

A complete list of institutional expenditures can be found in Appendix B.

Technology impacts virtually every program and service offered by colleges and universities. The state's investment in technology assures that our future workforce is prepared to meet the challenges of the 21st century.

Edward J. Yaw, President
County College of Morris

HIGH-TECH WORKFORCE EXCELLENCE GRANT PROGRAM

The High-Tech Workforce Excellence Grant Program was designed to enhance the state's economic competitiveness by creating a pipeline of highly qualified individuals to meet future workforce needs and by helping to establish, attract, and retain high-technology companies and jobs in the state. The initiative also provided an opportunity to move the state's higher education system into the upper echelon nationally by enhancing already strong programs, attracting students and faculty to New Jersey institutions, and raising the prominence of New Jersey's colleges and universities among the business and government communities.

The state budget for fiscal 2001 established this critical link between higher education and New Jersey's high-tech workforce with a new grant program to help the state's colleges and universities develop nationally recognized programs in four key academic areas:

- Computer Science and Information Technology
- Physical, Life and Health Sciences
- Engineering and Engineering Technology
- Science and Mathematics Teacher Education

The state provided nearly $30 million in High-Tech Workforce Excellence Grants over two years to help colleges and universities develop 18 technology-related programs that helped address key areas of workforce demand. Many of the grants focused on developing a pipeline of future employees for expanding industries such as pharmaceuticals, biotechnology, health care, and information technology. Others addressed the burgeoning need for well-qualified teachers to equip future students with advanced math and science skills to meet future demands in these areas.

The grants have enabled 12 colleges and universities to advance key areas of strength to become regionally or nationally renowned. The grant funding provided by the state has enabled them to create new courses and degree programs to meet workforce needs, attract top faculty and students, invest in essential facilities and equipment, attract research funding, and provide state-of-the-art professional development opportunities to help K-12 teachers enhance students' math and science skills.

The High-Tech Workforce Excellence Grant Program grew out of a recommendation in *New Jersey's Plan for Higher Education: 1999 Update,* which calls on colleges and universities to identify their strongest programs and make them competitive with the best in the region, the nation, or the world. It also calls for supplemental state funding to assist institutions where there is strong evidence of institutional planning and leadership in areas that coincide with state goals.

High-Tech Workforce Excellence Grant Program

$15 million for nine grants in fiscal 2001

$15 million for nine grants in fiscal 2002

A complete list of High-Tech Workforce Excellence Grants awarded in fiscal 2001 and 2002 follows.

HIGH-TECH WORKFORCE EXCELLENCE GRANTS
Fiscal 2001

Bergen Community College - *High Technology Surgical Workforce Project* $573,300

- Created a simulated high-tech operating room (three-room suite) to provide surgical technology students with training on actual equipment and instrumentation. Grant funds used for equipment and materials/supplies total almost $307,000.
- Students: 1st cohort – 31 students graduated
  2nd cohort – 39 students graduated
  3rd cohort – 40 students currently enrolled in the training program

The College of New Jersey - *Expanding a K-12 Science, Mathematics, Engineering, and Technology (SMET) Teacher-Preparation Program* $2,498,074

- More than 300 teachers attended training courses and workshops; 40 of these now form a cadre of trainers.
- Nearly 8,500 students benefited; in the first school year after the project, the number now exceeds 14,000.
- Student engagement in design, engineering, technology, and SMET activities has grown, resulting in increased course enrollments.
- Six schools will continue as demonstration sites, and another six school districts will serve as outreach/training sites.
- Six new schools, including schools in Abbott Districts, are adopting the program; a growing number of schools have expressed interest.

NJIT - *NJ Information-Technology Opportunities for the Workforce, Education, and Research (NJI-TOWER)* $2,500,000

- 12 laboratories were created or updated.
- As a result of the state grant, an additional $4.18 million in sponsored research was obtained and/or conducted by NJI-TOWER faculty. Pending proposals account for another $4.6 million.
- Project supported 53 research experiences for undergraduates.
- A total of 85 doctoral and master's level students were recruited and supported by the grant (23 PhD and 62 MS).
- 82 students working in six different areas of information technology participated in cooperative learning as part of the project activities.
- Project sponsored an international conference on information technology, 150 registrations from 31 countries.
- Project sponsored a series of three-day seminars over a two-year period where 1,449 faculty were trained in different computer-assisted teaching methodologies to improve their presentation, assessment, and distance education skills.
- 45 new courses for both undergraduate and graduate curricula were developed, including 28 honors and 10 distance learning courses.

Rutgers University - *Tissue Engineering: A New Frontier in Material, Biology, and Medicine* $2,500,000

- Two fully equipped laboratories established:
  - Cell and Tissue Engineering and Manipulation Lab
  - Cell and Tissue Analysis and Characterization Lab
- Three new faculty members hired.
- Four new courses developed.
- Three major competitive awards resulted in part from the state grant:

- A $5 million Whitaker Foundation award will help fund new faculty hires and state-of-the-art facilities for the Department of Biomedical Engineering.
- A three-year U.S. DOE graduate student training grant will provide six full (stipend + tuition) fellowships for students working in molecular and tissue engineering.
- A $3.6 million, five-year NSF grant will support graduate fellowships in a new training program "Integratively Engineered Biointerfaces."

Rutgers University - *University-Industry Partnership* $1,335,250

- Purchased equipment to establish a core facility that provides laboratory classroom experience for students in the life sciences field, focusing on automated high throughput screening using the latest robotic equipment. Equipment totaled $1.04 million.
- Corporate donor contributed another $500,000 worth of equipment for exclusive use in training students. The core facility impacts the education of more than 100 students per year on a continuing basis.
- Obtained two NIH grants as a result of the new facility and received funding through U.S. DOE Graduate Assistance in Areas of National Need (GAANN) award in microbial biotechnology.
- Created three new courses around the high throughput concept.

Salem Community College - *Process Technology Grant Meeting the Needs of a High-Tech Workforce* $204,163

- Existing Process Technology certificate program expanded to establish a two-year AAS degree.
- Scholarships provided for 23 students.
- Simulation laboratory created – $101,896 (using $47,678 grant and $54,218 institutional funds).
- Process Technology website established: www.salemcc.edu/programs/aas/process-tech.htm.

Stevens Institute of Technology - *K-12 Partnership Enhancement* $1,078,560

- Provided 78 hours of hands-on training on Internet-supported science mathematics resources for K-12 teachers and students. Teachers participated in a total of 13 workshops. 120 teachers from 11 Abbott districts participated in the program. The number of students impacted was 9,900.
- All teachers participating in the program received a laptop computer, scanner, digital camera, printer, and a software package, and each school team received a projector. Total equipment expenditures were almost $443,000.
- Website developed for this project. www.k12science.org/workforce/

Stevens Institute of Technology - *Implementation of Technogenesis in Undergraduate Engineering Curriculum* $1,341,800

- Nine undergraduate courses redesigned to expose students to the full spectrum of product creation, from basic science and technology to prototype development.
- Creation of Product Innovation and Realization Center (PIRC), $282,000, and Virtual Engineering Center (VEC), $135,000. PIRC enables students to develop prototypes for new-product concepts; the center emulates the best industrial practices to allow for processing, manufacturing, and testing through the prototypes. VEC prepares students for working at the interface of the virtual and real worlds.
- Creation and maintenance of technogenesis website: www.soe.stevens-tech.edu/technogenesis
- Established the Technogenesis Summer Scholars Program
  - Year 1 – 18 students participated
  - Year 2 – 29 teams of students, 12 from the School of Engineering

UMDNJ - *Graduate Program in Bioinformatics* $2,263,000

- Three faculty members were hired, one each in:
  - Department of Oral Biology, New Jersey Dental School
    - → Pharmacogenomics - discover how an individual's unique genes may dictate how he or she reacts to drug therapy.
  - Department of Pharmacology, Robert Wood Johnson Medical School
    - → Rational Drug Design - use computers to accelerate drug discovery.
  - Department of Biochemistry and Molecular Biology, New Jersey Medical School
    - → Computational Genomics/Systems Biology - computer deciphers how and when genes function.
- The University's informatics infrastructure was enhanced.
  - Dedicated bioinformatics laboratories established on two campuses.
  - Bioinformatics software library enhanced.
  - 10 high-performance Silicon Graphics workstations were purchased:
    - → Provide platforms for visualization in drug discovery.
  - 26 high-performance Linux workstations were purchased:
    - → Create a clustered network for students to gain competencies in distributed computing, network system management, and team projects.
- The GSBS Concentration in Bioinformatics was initiated.
  - A curriculum and requirements for the Concentration in Bioinformatics within MS and PhD degree programs were developed.
  - The program is described and course materials delivered through its website at http://informatics.umdnj.edu/bioinformatics.
  - Support was provided to students in the program:
    - → Year 1 – 16 PhD students; 5 students were awarded fellowships.
    - → Year 2 – 48 PhD and MS students; 19 students were awarded fellowships.
    - → Year 3 – 44 PhD and MS students; 14 students were awarded fellowships.

HIGH-TECH WORKFORCE EXCELLENCE GRANTS
Fiscal 2002

Bergen Community College - *High Technology Veterinary Technician Project* $1,305,441

- Created or upgraded high technology facilities at the three partnering institutions.
  - Newly constructed High Technology Veterinary Surgical and Nursing Center at Bergen Community College, Spring 2004 – a premiere teaching facility with state-of-the-art equipment for a highly specialized field.
  - Newly constructed Vertebrate Anatomy and Physiology Laboratory at Sussex County Community College, summer 2004 – the fully equipped laboratory provides the most up-to-date teaching facilities available.
  - Upgraded Animal and Clinical Research Laboratory at County College of Morris – the upgrade houses a Nikon Microinjection Teaching System, which allows the Consortium to offer unique training for veterinary technician students in a rapidly expanding field.
- Expenditures for the first two years totaled $522,000 for equipment and $98,000 for materials and supplies.
- The grant combined with institutional funds has enabled development of a program unmatched anywhere in the U.S. Equipment purchases include upgraded interactive television capabilities, which allow teaching all students at any of the three campuses.
- Creation of website: www.bergen.edu/vet

Camden County College - *Fiber Optics Technology Workforce Excellence Project* $775,556

- Upgraded Photonics Laboratory to include new equipment that will enable students to work with fiber optics on the level of today's telecommunications industry.
- Created new certificate program, Fiber Optic Technical Specialist. New program also certified by the Fiber Optic Association.
- Project received donation from several companies of modern diagnostic and testing instruments worth more than $529,000.
- Creation of a website: www.camdencc.edu/department/photonics

Essex County College - *Enhancing Network Certification Program* $482,200

- Created three laboratories serving up to 525 students each semester. Two of the labs specialize in Cisco training, and the other specializes in Microsoft. Approximately $370,000 used to outfit the labs.

Montclair State University - *MGM-STEP*
(Middle Grade Mathematics Science Teacher Education Project) $2,499,886

- Grant funds provided laptop computers to teachers enrolled in the program, approximately 50 each year. Cost for equipment for the first two years was $188,000.
  - The grant provided a problem-solving Blackboard site, with which program faculty are experimenting.
  - Teachers report increased comfort with and use of technology in their teaching, as well as improved student confidence in using technology.
- Grant also provided scholarships and stipends to undergraduate and graduate students (teachers) in the program. Cost for student support for the first two years was $671,000.

New Jersey Institute of Technology -
Pre-Engineering Instructional and Outreach Program $2,499,700

- The Education and Training Institute of this project has provided instruction to 147 educators representing 80 school districts through intensive summer institutes and workshops.
- NJIT, through this project, became the 6th state affiliate for the Project Lead the Way (PLTW). Project provides leadership, training, and support for the adoption and implementation of the middle and high school PLTW curricula.
- Project hosted Engineering Career Days:
  - Year 1 – 710 students and 68 teachers from 48 high schools attended
  - Year 2 – offered in the fall and spring, over 800 attended
- The Engineering Outreach Program:
  - Presented awareness activities and experiences to 30 high schools and 15 middle schools in Year 2.
  - Participated in National Engineers' Week 2003 by providing activities for over 800 students, teachers, and parents.
- Two statewide "Building an Engineer" LIVE Teleconferences were aired, designed to reach teachers, administrators, and guidance counselors across the state.

Rider University - *SELECT-VLC: High-Tech Support for a Continuum of Professional Development for Teachers of Science and Mathematics* $1,804,502

- Grant funds equipped laboratory and seminar rooms in the new Bristol-Myers Squibb Center for Science Teaching and Learning with state-of-the-art videoconferencing equipment, wireless Internet, and portable laptop computers. Allows live audio/video interaction with area schools and institutions via NJEDge. Approximately $425,000.
- Creation of web-based collaborative community platform for teachers of math and science that provides continuous mentoring during the critical years of a teacher's professional development. Rider SELECT-VLC allows participants to interact and share resources across districts via chat, discussions and e-mail.
- Creation of a web-based video portal showcasing exemplary math and science teaching by teachers in area schools.

Rowan University - *Expanding the Educational Opportunities for Undergraduates in the Study of Advanced Materials for Commercial Applications* $1,462,248

- External sources of funding
  - Year 1 – $2.3 million from NASA and NSF
  - Year 2 - $500,000 from NSF and Research Corporation.
- New equipment purchased to improve learning experience for several undergraduate courses, including Advanced Laboratory, Physics Research, Chemistry Research, and Junior and Senior Engineering Clinics.
  - Year 1 - $479,000
  - Year 2 - $407,000
- Summer Institute:
  - Year 1 – 20 high school students and 7 teachers participated.
  - Year 2 – 24 high school students participated.
- College Class of 2003: all students in the materials science program either had a full-time job offer or knew prior to graduation that they were attending graduate school.

Rutgers University - *Nanomaterials Science and Engineering:*
An Enabling Paradigm Shift for Photonics, Energy, Electronics, and Biology $2,500,000

- Renovated and equipped three undergraduate teaching laboratories; estimated grant funds, $991,000.
- Four new lecture and three new laboratory classes in nanomaterials and nanotechnology, 183 students enrolled in total.
- Three new faculty hired; total of 35 participating faculty.
- Created website to publicize curriculum and grant: www.ceramicmaterials.rutgers.edu/NMSE
- Increased enrollment for the program, 135%: Class of 2005, 17 students; Class of 2006, 40 students.
- Outreach activities
  - Semi-annual NanoDay: 26 HS teachers and 55 HS students
  - High school Nano-Research internships during the summer 2003 (7 weeks), 15 students
  - College Nano-Research internships during summer 2003 (10-weeks), 7 undergraduates
  - Nanotechnology Issue of "RutgerScience," circulation 450,000

Rutgers University - *New Directions for the High-Tech Computer Science Workforce* $1,640,000

- Design and development of two software systems:
  - Handin – designed as a web-based homework management tool.
  - eLearning Lecture Tools – designed to provide easy-to-use, cost-effective environment that captures lectures and plays them back over standard web interfaces asynchronously, incorporating questions and answers to them into the lecture content.

As learning takes place, technology is now supporting a variety of interaction modalities, facilitating improved access to information or knowledge, addressing various learning styles, and enabling greater learning control. Realizing the potential of learning technologies, however, is in their proper selection, use, and mix with appropriate pedagogical practices.

Fadi Deek, Professor of Information Systems and Mathematical Sciences
New Jersey Institute of Technology

RESEARCH CAPACITY BUILDING GRANTS

Recognizing that academic research is instrumental in building businesses, creating jobs, boosting productivity, and saving lives, New Jersey invested a total of $11.5 million in fiscal years 2001 and 2002 to help the state's six public and independent research universities expand their capacity for biomedical and other high-tech research. This investment in research capacity has enabled these universities to launch cutting-edge research with the potential to enhance New Jersey's economy and improve the health of people throughout the world.

New Jersey Institute of Technology, Princeton University, Rutgers University, Seton Hall University, Stevens Institute of Technology, and the University of Medicine and Dentistry of New Jersey used this funding to recruit renowned faculty, purchase state-of-the-art equipment, and launch innovative new research in biomedical and other high-tech areas with important commercial and health care applications. The disciplines advanced through the capacity building grants include medicine, genomics, proteomics, and nanotechnology. Building their research capacity in these areas also enabled the universities to leverage other sources of funding for research.

The capacity building funds were targeted to these six universities because they are the state's top recipients of external grant dollars. They are the only New Jersey institutions designated as research, doctoral, or specialized (medical) institutions in the nationally recognized system of institutional classification developed by the Carnegie Foundation for the Advancement of Teaching. The Commission allocated 80% of the available funds to the public research universities and 20% to the independent research universities. Institutional grants ranging from approximately $181,000 to $2.6 million were based upon each institution's then-current level of external research funding and its graduate enrollment.

The grants for university research grew out of a key recommendation in *New Jersey's Plan for Higher Education*, which called for supplementary funding to help the state's research universities become more competitive in securing external research grants and contracts. Although they have made significant gains over recent years, New Jersey's research universities lag behind the nation and competitor states in federally funded research grants and contracts.

Research Capacity Building Grants

$11.5 million invested over fiscal 2001 and 2002 to build university capacity for high-tech research

FISCAL 2001 CAPACITY BUILDING GRANTS

New Jersey Institute of Technology $710,816

- Received external funding from NSF, US Army, Pfeiffer Foundation, and Whitaker Foundation totaling $750,000.
- As part of the NJ Center for Biomaterials, contributed to major NIH award to Rutgers; a portion of the funded research is subcontracted to NJIT.
- As a result of its increased capacity for biomedical engineering research, NJIT is increasingly competitive with major national universities:
  - Placed second among a field that included Northwestern, MIT, Penn, and Stanford in competition for a $5 million center on rehabilitation robotics.
  - Earned peer review scores equal to Harvard and the Mayo Clinic in another competition.
- $4.5 million proposal to the Rehabilitation Engineering Research Center is pending.

Princeton University $713,733

- Funds used to develop genomics and proteomics capabilities via new or upgraded high-tech equipment:
  - BiFlex III Madi-TOF Mass Spectrometer for the DNA Synthesis and Protein Sequencing Facility – $349,810.
  - Becton Dickinson diva upgrade to the fluorescence activated cell sorter (FACS) for the Flow Cytometry Facility – $51,612.
  - Technical support personnel costs – $124,396.
- Grant funds also supported three graduate students ($123,915), modification of public space to provide safe transport of potentially biohazardous material ($50,000), and specimen tube and specimen holder for the Electron Microscope Facility ($14,000).
- New externally funded grants to users of the new mass spectrometer total $5,440,688.
- New externally funded grants to users of the upgraded cell sorter total $7,933,980.

Rutgers, the State University $2,581,549

- Funds from grant contributed to externally funded research totaling $24 million and could increase by an additional $30 million if pending proposals are funded.
- Supported seven projects in the following departments: Pharmacy, Computer Science, Life Sciences, Animal Science, Chemistry, Biology (at Newark campus), and Liberal Arts (at Camden campus).
- Pharmacy – newly hired scientist brought two NIH grants totaling $2,431,700; new grants (three) total $2,693,595. Pending – NJCST, $4,960,000, and NIH, $2,413,325.
- Computer Science
  - Newly hired scientist brought almost $3 million in grant funds and has secured an additional $3.5 million; another $1.3 million is pending.
  - Formed CBIM (Center for Biomedicine Imaging and Modeling).
- Life Sciences (Centers for Biomaterials and Collaborative Neuroscience, and Dept. of Genetics)
  - Four projects funded by the NJ Commission on Spinal Cord Research (each between $100,000 and $200,000) are pending. Additionally, the University has received special requests from two federal grants ($2 million and $3.5 million consecutively) and several promising inquiries from the pharmaceutical industry.
  - Equipment purchased:
    - → Multiprobe II Ex
    - → Meta Scan Head (w/ upgrades)
    - → Pyrosequencer
    - → Wave Mutation Detection System
- Animal Science

  - Grant funds used only for equipment purchases (instruments to examine protein/enzyme properties):
    - → Chip Biology System II
    - → Circular Dichroism Spectrometer
    - → Spectrometer and Accessories
  - NJCST grant - $150,000
- Chemistry - small project $150,000
  - Equipment purchased:
    - → Computers, data minilibrary, server
    - → Diode pumped solid state laser
    - → NSF grant funding $1.074 million
- Biology at the Newark campus
  - Equipment purchased:
    - → Fluorescence spectrometer and isothermal titration calorimeter
    - → Real Time PCR Quantitative System
    - → Olympus BX51WI fixed-stage upright microscope
  - New grants awarded total $5,823,433; new grants still pending total $11,991,272.
  - Industry partnerships with ISP Corporation, Unilever, and Proteome Inc.
- Camden - small project ($100,000 for computer equipment to develop theoretical models)

Seton Hall University $353,087

- Equipment purchases by the Department of Chemistry and Biochemistry include:
  - Differential scanning and isothermal titration calorimeters for biopolymers
  - Differential calorimeter for solid and liquid samples and a thermogravimetric analyzer
  - Dynamic light scattering instrument
  - Reaction calorimeter
  - Discrete polarization modulation automatic ellipsometer
- This instrumentation has enabled previously impossible cutting-edge studies.
- NSF- and NIH-funded research using the new equipment totals more than $1 million. Pending proposals total $1.625 million.

Stevens Institute of Technology $233,179

- Grant funds helped build research strength and infrastructure for the processing and characterization of polymer-based biomedical devices.
- Instrumentation purchases:
  - High-pressure liquid chromatography system for organic solvents/synthetic polymers
  - Liquid chromatography system for proteins and water-soluble polymers
  - Millipore reverse osmosis deionizer for Type I water
  - Flourescence Optical Microscope for protein and cell analysis
  - Micro robot for automated polymer thin-film self-assembly
  - Six computers for a networked Linux cluster
- Six externally funded proposals totaling $1.747 million.

UMDNJ $1,880,863

- All funds to be used for equipment including a state-of-the-art Magnetic Resonance Imaging (MRI) scanner. Scanner to be a key tool in the study of neurodegenerative diseases such as Alzheimer's, ALS, Parkinson's, and stroke.

FISCAL 2002 CAPACITY BUILDING GRANTS

New Jersey Institute of Technology $587,537

- Grant funds were pooled with NSF and institutional moneys to install a $2 million state-of-the-art electron microscopy facility.
- The facility's two electron microscopes (TEM and SEM) are equipped with energy dispersive X-ray spectroscopy (EDS) for analytical capability. Electron energy loss spectroscopy (EELS) enables one scope (TEM) to distinguish elements at nano-resolution, and a variable pressure mode enables the other (SEM) to analyze samples containing moisture. A samples preparation laboratory handles a variety of materials, including particulate, biological, metallic, and electronic materials.
- Nearly 20 research groups within NJIT spanning a range of disciplines are using the facility for externally funded projects that would not be possible without the high-resolution characterization capabilities of these instruments.
- This unique facility allows for characterization of advanced materials, such as engineered particulates and biomaterials, and for the development of new advances in nanotechnology, including microelectronic and opto-electronic devices.
- It has already greatly facilitated and enhanced the research of NJIT faculty, graduate and undergraduate students, as well as nearby users from academia and industry.

Princeton University $576,439

- Funds used to hired a skilled technician and for the purchase of a nano-high pressure liquid chromatography system and an electron microscope.

Rutgers, the State University $2,327,623

- Funds distributed as follows:
- Life Sciences – created new interdisciplinary program for research and education that interfaces Biology, Mathematics, and Physical Sciences (BioMaPS). Two new research labs were established, one for study of single molecules and a second for the study of anticancer vaccines. Equipment and materials totaled $720,000, and two new professors with expertise in systems biology were recruited.
- Engineering – equipment purchases totaled ~$164,000. Additional external funding:
  - NJ Commission on Science and Technology, $2.8 million
  - NSF, ~ $500,000
  - Industrial support, ~ $180,000
- Pharmacy – equipment purchased totaled $184,000. New faculty member hired who brought a 4½ year NIH grant totaling $1.3 million. Additional grant received from NIH for $155,000.
- Agricultural Biotechnology – equipment purchased totaled $150,000. Equipment will be used in leveraging future NSF grants.
- Food Sciences – equipment purchased totaled $150,000.
- Arts and Sciences (Camden Campus) – equipment purchased totaled $41,000. A $253,000 grant from the NSF was successfully funded. Additionally, this project enabled increased collaboration between Rutgers and UMDNJ.
- Molecular and Behavioral Neuroscience (Newark Campus) – equipment purchased totaled $200,000. During the grant period the department successfully applied for almost $12 million in awards from seven different federal agencies and private foundations including NSF, NIMH, NINDS, NIAID, GM, NJ Commission for Spinal Cord Research, and American Health Assistance Foundation.

Seton Hall University $242,316

- Audiology and Pathology Department equipment purchases totaled $75,000.
- Biology Department expanded the types of research projects, was more competitive in pursuit of external funding, developed doctoral program for Molecular Bioscience, and hired two new faculty members.
- Biology Department equipment purchases totaled $100,000 and included:
  - ABI Prism 7000 Sequence Detection System
  - Cytofluor 4000 Florescence Multi-Well Plate Reader with Temperature Control
  - Molecular Dynamic STORM 860 Imager of Phosphor and Fluorescence (partial cost)
- Physics Department equipment purchases totaled $67,000 and included:
  - Tunable infrared laser and bulk optics.
- During the grant period, the institution submitted five independent scientist and career development award applications to the NIH, Deafness Research Foundation, and the American Hearing Research Foundation. In addition, several National Science Foundation applications/grant awards resulted from the state-funded technology initiative.

Stevens Institute of Technology $181,245

- The Departments of Electrical and Computer Engineering and Computer Science purchased various computer and network systems.
- Equipment has facilitated research in the following areas, much of it related to Homeland Security:
  - Network system security
  - Wireless communications and wireless network security
  - Wireless sensor array technology
  - Steganography detection (finding messages hidden as images or video)
  - Computer vision, including biometrics
- A number of these projects form part of the work of a new Center for Wireless Network Security (WiNSeC): http://wireless.ece.stevens-tech.edu/.

UMDNJ $1,084,840

- New Jersey Medical School acquired various equipment, such as the following instruments:
- A two-photon laser system (totaling $518,698) that enables the Digital Imaging Microscopy Facility to make rapid manipulations of cell constituents in living cells/tissues while preserving their viability.
  - System used successfully for one newly funded NIH grant and three pending NIH proposals.
- A light cycler system, array scanner, and Gene Tac Hybridization Station (totaling $179,480), which enabled the Center for Human and Molecular Genetics to establish a genomics program; diseases being studied include Sudden Infant Death Syndrome (SIDS) and cancer.
  - Two proposals (national level) pending; one grant from the New Jersey SIDS Foundation received.
  - A network analyzer and digital oscilloscope, which permit developing new MRI coils for high resolution studies of specific structures or pathologies.
  - $1.5 million NIH grant awarded for research involving blood flow in animal models; $700,000 NIH grant to study the effect of anesthesia in animal models pending.

STATE MATCHING FUNDS FOR BIOMEDICAL AND OTHER TECHNOLOGY RESEARCH

The State Matching Funds for Biomedical and Other Technology Research program was established in fiscal 2001 to give New Jersey universities a competitive advantage in attracting federal funding for research in biomedicine and other high-technology areas. Recognizing that many federal grants and contracts require applicants to provide both institutional and other support, the program initially earmarked $3.5 million for state matching funds to support federally funded research at New Jersey's six public and independent research universities. The matching funds were targeted to key programmatic areas in which the universities had the potential to attract more federal research support, including:

- computer science and information technology
- physical, life, and health sciences
- engineering and engineering technology.

Eligibility for the matching funds was initially limited to New Jersey's three public research universities (Rutgers, The State University of New Jersey, University of Medicine and Dentistry of New Jersey, and New Jersey Institute of Technology) and three independent research universities (Princeton University, Seton Hall University, and Stevens Institute of Technology). The program was subsequently expanded to include New Jersey's nine public colleges and universities.

During the three years the fund operated, $2.1 million in matching funds were awarded to seven institutions. A total of 15 matching grants attracted $28 million in federal research support. On average, each dollar awarded through the matching funds program brought in $14 in federal research support. The amount of the state match for each proposal could not exceed one-half of the requested grant amount and could not exceed the amount of the institutional match for that proposal.

During the first year of the program, Stevens Institute of Technology was the only research university to successfully compete for a federal grant ($800,757) and be awarded matching funds from the state ($161,222). In fiscal 2002, the second year of the program, five awards totaling $560,568 were made to two institutions. The University of Medicine and Dentistry of New Jersey received four awards and New Jersey Institute of Technology received one award, attracting a total of $3.9 million in federal grants that year. In the third and final year, the program was revised to include all of the senior public colleges and universities. UMDNJ, William Paterson University, Rowan University, Rutgers University, and Princeton University received nine awards totaling $1.4 million. These nine matching grants supported $23.4 million in federal grants. A summary of each of the grants received with state matching funds follows.

Matching Funds For Biomedical and Other Technology Research

$2.1 million in matching funds awarded to seven institutions

A total of 15 grants attracted $28 million in federal grants

STATE MATCHING FUNDS FOR BIOMEDICAL AND OTHER TECHNOLOGY RESEARCH

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
Stevens Institute	**$ 161,622**	**$800,757**	**US Army**

Funds were used to develop the science and technology base of the crystallization of various energetic solids, including RDS and HMX to allow the tailoring of the size and shape distributions of the particles and robust control of the crystallization process using state-of-the-art model-based predictive control. The control system relies on mathematical models of the crystallization process developed earlier at Stevens, which solve the coupled equations of mass and energy conservation and the population balances.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
UMDNJ	**$ 130,000**	**$260,000**	**US Army**

This research provides a broad-based approach to identify unique "signatures" of infectious agents using host DNA micro-arrays. The agents under initial investigation were *Bacillus anthracis, Burkholderia mallei, Francisella tularensi,* multi-drug resistant *Mycobacterium tuberculosis* and *Yersinia pestis. In vitro* infection models for these respiratory pathogens were developed using blood samples from unvaccinated and vaccinated individuals. Recognition of specific genes that are expressed or repressed during these early infection models provide signature markers that can be used in related and alternate approaches for rapid diagnosis. The long-term goal of this project is to develop DNA chips and assays for associated disease markers that focus on genes and their products that provide the best discrimination among bioterrorism agents.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
UMDNJ	**$ 150,000**	**$3,000,000**	**NIH**

Construction grant received for new Molecular Research Laboratories that contain both clinical and research activities to enhance the exchange of ideas between clinicians and biomedical investigators, strengthen interdisciplinary research studies at the medical school, and establish state-of-the-art instrumentation.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
UMDNJ	**$ 25,000**	**$75,000**	**NINDS**

Research determined the molecular basis for classical late infantile type and characterized the CLN2 protein. This research provides aid in the prevention of LINCL through genetic counseling and revealed strategies and test systems for therapeutic intervention. In addition, the research is providing fundamental information regarding a previously unknown lysosomal protein that may have a role in more common human neurodegenerative disorders.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
NJIT	**$ 195,568**	**$337,475**	**NSF**

Funds received to acquire Field Emission Scanning Electron Microscope that enhances the ability of the New Jersey Center for Engineered Particulates to characterize particles at the nano and sub-micron scales. This enables the Center to obtain the data needed for models to develop a predictive capability, which is necessary not only to properly engineer the particulate materials, but also to scale-up and optimize the processes.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
UMDNJ	**$ 60,000**	**$195,826**	**NSF**

Funds received for (1) the acquisition of a circular dichroism (CD) spectrophotometer system, with a modern computer operating system and superior optics, and (2) the support of personnel, maintenance contract, and nitrogen for 3 years. The instrumentation and personnel support are being used to maintain and upgrade a multi-user CD facility with a proven outstanding track record in both research and teaching.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
Rowan University	**$ 32,313**	**$132,383**	**NSF**

Research analyzed characters of the skull, postcranial skeleton, and dentition in a wide array of extant and extinct perissodactyl taxa from the early Tertiary, particularly those of Eurasia. The result of this study is a hypothesis of relationships among perissodactyl taxa that addresses a number of specific questions regarding perissodactyl phylogeny. This result is providing a phylogenetic framework for understanding the origin and evolution of perissodactyls, as well as detailed documentation of primitive perissodactyl osteology that is important for interordinal studies.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
William Paterson University	**$ 19,000**	**$216,222**	**NSF**

Funds were used to construct a model of the function of 5-HT2 receptors on the initiation and generation of locomotion in the pectoral fin system of a teleost. This model provides a better understanding of mechanism underlying the orchestration of activity across neuronal populations in a simple vertebrate brain. The long-term objectives are development of the cellular and molecular mechanism of the generation and initiation of locomotion in a simple vertebrate organism.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
Rowan University	**$ 50,000**	**$153,335**	**NSF**

Grant funds were used to acquire an Atomic Force Microscope for Materials Research and Education. Several courses are benefiting from the broad array of scanning measurement capabilities, which include mapping of surface topography, hardness, elastic moduli, contact friction, magnetic domains, and tunneling current. For research purposes the instrument allows faculty to further projects that impact the telecommunications, micromachining, industrial processing, polymer science, and nanotechnology industries.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
Rutgers University	**$ 73,099**	**$240,004**	**NSF**

The theoretical research is studying and documenting solutocapillary driven convection in spherical shells, a problem of great interest to accurate manufacturing of laser targets in inertial confinement fusion and future inertial fusion energy targets.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
Rutgers University	**$ 46,765**	**$264,996**	**NSF**

The research is being conducted in partnership with BOC Edwards on interfacial reliability of nanomaterials used in semiconductors. The study affects the structural reliability determination of semiconductors as well as predictions of their operational lives. In the course of this investigation, material anisotrophy and scale effects are studied to model and predict interfacial reliability. The impact and scientific principles developed during this investigation will describe the realistic cases of inhomogeneous interfaces relaxing the current approximating assumptions of isotrophic homogeneous interfaces, and improving existing design methodologies to avoid damage initiation and evolution.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
Rutgers University	**$ 23,175**	**$100,000**	**USEPA**

This grant provided support to the Advanced Material via Polymer Blends (AMIPB) Center, which is developing new technologies for non-hazardous treated wood and transferring the treatment methods to fabricators and construction industries. The Center is establishing partnerships with key industrial organizations to assist in the transfer of the technology, accelerate the replacement of non-hazardous treated wood, and promote the acceptance of the broadly available polymer replacement materials.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
Princeton University	**$ 500,000**	**$17,400,000**	**NSF**

NSF is providing support for a Material Research Science and Engineering Center with four interdisciplinary research groups: Interplay of Magnetism and Transport in Correlated Electronic Materials; Guided Self Assembly; Adhesion, Deformation and Transport at Contacts in Small Structures; and Patterned Assembly of Functional Cell-based Biomaterials. The Princeton Center for Complex Materials assembles a group of interdisciplinary researchers with the goal of creating and understanding materials having complex structures at the micro, meso, and nanoscale levels. Both natural and engineered, these materials promise unique properties valuable for fundamental science and potential applications such as communications, chemicals, and consumer products.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
Princeton University	**$ 440,000**	**$4,400,000**	**NSF**

This funding supports the integrated research program of the Center for Environmental Bioinorganic Chemistry that focuses on the direct and indirect role of metals in the global carbon and nitrogen cycles. The results of CEBIC's research will lead to a more precise and predictive understanding of the local and global effects of metals in the environment and establish the basic knowledge necessary to develop better technologies for pollution control, mitigation, and remediation.

INSTITUTION	STATE MATCHING FUNDS	TOTAL GRANT	FUNDING AGENCY
UMDNJ	**$ 220,000**	**$443,223**	**NIH**

Funds received to purchase a laser scanning confocal microscope system to support multi-disciplinary funded research at the RWJ Medical School. The system is being used for tracking living cells, analyzing the movement and sub-cellular distribution of signaling molecules or proteins labeled with fluorescent probes, and obtaining high-sensitivity, dynamic-range images.

Technology provides the university with a backbone that reinforces our ability to prepare students for productive lives, supports the research and scholarly activities of our faculty, and supports the efficient and effective operations of the university.

Arnold Speert, President
William Paterson University

NEW JERSEY VIRTUAL UNIVERSITY

Distance learning through New Jersey's colleges and universities provides flexibility and increased opportunity to meet individual and workforce needs. The courses and programs offered by New Jersey higher education institutions respond to the needs of a diverse population of learners requiring flexible timeframes and convenient ways to access education.

In fiscal 2000, the state appropriated $500,000 to develop the New Jersey Virtual University (NJVU) and a three-pronged faculty development initiative designed to enhance the quality of online teaching and learning and to increase the number of courses available.

The NJVU website (www.njvu.org) an easy-to-use index to over 2,000 credit and noncredit distance learning courses offered by 42 of the state's public and independent higher education institutions. The index also includes more than 70 complete degree and certificate programs at the undergraduate and graduate level.

The $500,000 state appropriation was used over several years to provide:

- regional workshops for faculty and college and university administrators;
- online and campus-based training opportunities for faculty to expand their online capabilities and to use the Internet as an effective teaching and learning tool;
- an online faculty resource center equipped with course development tools, threaded discussion groups, and best practices;
- support for an educational technologist in the NJEDge.Net central office to coordinate online faculty development training and related activities; and
- general support to promote high-quality online teaching and learning.

NJVU significantly increased access to high-quality online instruction, ranging from individual courses to full degree programs. It demonstrates how the state's colleges and universities are fully integrating technology to meet New Jersey's workforce training and education requirements, as well as the needs of a steadily growing number of high school graduates and adults seeking lifelong learning opportunities. The institutions are building on the state's wealth of academic and high-tech corporate resources to move New Jersey to the forefront of technology-mediated education.

New Jersey Virtual University
www.njvu.org

- **$500,000 to enhance online teaching and learning**
- **Online index of distance learning offerings and faculty resource center**

NJ COMMISSION ON SCIENCE AND TECHNOLOGY – RESEARCH AND DEVELOPMENT EXCELLENCE PROGRAM

The Commission on Science and Technology has made investments in new and emerging fields of technology, in the people behind those technologies, and in areas of great potential benefit to the State of New Jersey. These investments helped to build the infrastructure and capacity of New Jersey's research universities, not only in developing new technologies, jobs, products, and spinout businesses, but also in training the technologists, scientists, and engineers for those new technologies. In the private sector, this commitment helped to build and support emerging technology businesses through incubation, financing, and assistance. The collective annual return on the Commission's programs and investments is significant.

The Commission on Science and Technology surveyed New Jersey's leading academic and industrial scientists and engineers over several years for ideas and research projects that could lead to new technologies, products, services, and industries in our state. The Commission conducted thorough reviews and assessments of these potential projects and selected those that were the most promising. The top projects were then provided critical seed support of up to $2–$4 million over five years to nurture and develop the full commercial potential for each idea. This program provided important benefits to universities, the industrial base, and the economy. On average, at least three dollars in nonstate funds were leveraged for every dollar invested by the Commission.

The collaborative academic/industry research and development programs were designed to: build strong ties between our academic and industrial research centers; provide the seed for new clusters of innovation in our state; provide the training ground for 21st century workers in future technology areas; generate significant additional funds from federal and industrial sources; generate significant intellectual property for license and/or to spin off new technology companies; build the expertise and capacity of select academic faculty, departments, and programs to become world-class centers; and contribute significantly to the economy of the state.

The ideas and projects funded by the Commission on Science and Technology had to:

- Represent an outstanding, state-of-the-art scientific and technical opportunity with valuable commercial potential
- Involve substantial corporate collaboration, partnering, and support
- Have the potential to leverage and/or attract significant federal and other industrial funding for the project
- Build the capacity and reputation of New Jersey's academic research programs so that they might, in turn, support and contribute to technology-based industries in the state.

NJ Commission on Science and Technology – Research and Development Excellence Program

Approximately $77 million in grants provided since fiscal 1998

39 collaborative academic/industrial projects supported

The total annual investment in the Commission on Science and Technology's R&D programs through fiscal 2003 averaged about $12 million. In fiscal 2004, the Commission will invest about $5 million in these programs. Since fiscal 1998, the Commission's R&D Excellence Program has invested in 39 collaborative academic/industrial projects with commercial and economic potential that can build a strong research infrastructure in the state and provide a critical resource to industries and the economy. These seed and infrastructure investments have realized the following:

- Thirty-seven new, widely recognized and respected academic/industrial collaborative research teams and programs are now in place at research universities in the state.

- Approximately $3 of industrial and/or federal dollars has been leveraged for every state dollar invested in these programs during the seed stage. Considerable amounts of additional funds and investments have been made and in some cases have demonstrated an 8:1 and 10:1 return for mature programs.

- Over 519 New Jersey companies are collaborative industrial partners in these R&D programs, taking advantage of the technical expertise and opportunities now available on the university campuses. Many more companies participate and have received various and additional forms of assistance.

- For 29 R&D programs that have been in existence for at least three years, there have been 267 invention disclosures, 244 patent applications, and 92 patents issued.

- The intellectual property from 76 of the patents attributed to this program has been licensed and is generating royalties to the sponsoring academic institutions.

A summary of the 39 funded projects begins on the following page.

The states that are going to play leadership roles in the next generation are the ones that make strategic investments in this generation – in capacity, in quality, and in the most promising areas of scientific discovery. The challenge is to make investments that are not only sufficient to make a real difference, but smart; that move New Jersey closer to the frontiers of science and technology and leverage both private and federal funds; that result in meaningful job creation and sustainable economic growth.

Shirley M. Tilghman, President
Princeton University

COMMISSION ON SCIENCE AND TECHNOLOGY
RESEARCH AND DEVELOPMENT EXCELLENCE PROGRAM

Summary of Funded Projects

Biotechnology/Human Health

1. A one-year award was provided for the support of the New Jersey Vision Center. Professors at NJIT and UMDNJ collaborated to develop a number of ophthalmic medical devices for ocular diagnosis, management, and drug delivery.

2. An R&D Excellence award created An Initiative in Structural Bioinformatics to determine the 3-D structure of important molecules and develop high throughput software techniques to aid in macromolecular structure determination. Institutional sponsors: the Center for Advanced Biotechnology and Medicine of Rutgers and UMDNJ.

3. New drugs, diagnostics, vaccines, and more efficient treatments for a variety of diseases are goals for the Center for Applied Genomics. This collaborative effort between the Newark-based Public Health Research Institute, UMDNJ and NJIT, was funded to conduct research applications in gene chip development and manufacturing and to develop an applied bioinformatics component that will generate custom software for users to analyze gene-chip data.

4. Crescent Genomics Inc., a Newark-based company "spun off" from UMDNJ, is leveraging an R&D Excellence award on The Role of the HMGI-C gene in Obesity, Cancer, and Other Diseases as a first step toward gene-based diagnostic and therapeutic products. Institutional sponsors: UMDNJ and Rutgers.

5. Better understanding of the mechanisms of tissue interaction with bone and other materials may lead to new strategies for replacing tissue lost to aging, trauma, and disease. An R&D Excellence award supported a Program for Engineered Tissue Response in partnership with three New Jersey biotechnology firms: Integra Life Sciences, Therics, and Orthogen. Institutional sponsors: UMDNJ, Rutgers, and Stevens.

6. A new generation of advanced materials promises medical devices and surgical implants that are more versatile and more compatible with the body's immune system. The New Jersey Center for Biomaterials and Medical Devices received an R&D Excellence award to investigate the design and application of the next generation of advanced materials in partnership with technology companies from the region and beyond. Institutional sponsors: UMDNJ, Rutgers, Princeton, and NJIT.

7. An R&D Excellence award created the Center for Particle Processing Research to advance the underlying science of a manufacturing process that is critical to New Jersey firms like Merck and Bristol-Myers-Squibb—both of which are co-sponsors. Institutional sponsors: Rutgers and NJIT.

8. Advanced processing techniques for the manufacture of a broad range of applications can be used in environmentally friendly ways to make entirely new classes of powdered materials with desired bulk or surface properties. An R&D Excellence award to the New Jersey Program for Engineered Particulates was provided to enable interdisciplinary collaboration with the U.S. Army and companies such as Lucent, Du Pont, Union Carbide, Dellsys Pharmaceutical, and Hosokowa Micron. Institutional sponsors: NJIT, Rutgers, and Princeton.

9. An R&D Excellence award for Biomolecular Applications of Nanoscale Systems helped cross-fertilize expertise from biotechnology and advanced materials. Funds were provided to develop low cost methods for manufacturing products with ultrafine, nanoscale, detailed features, and use these methods and products to manipulate biological molecules in precise ways. Institutional sponsors: Princeton, UMDNJ, and Rutgers.

10. Victory over cancer comes ever closer, as pharmacologists learn to manipulate the critical functions of cancerous cells through better understanding of "promoter" and "suppressor" genes. An R&D Excellence award on Development of p53-MDM-2 Drug Interactions was provided to advance this important agenda. Institutional sponsor: Princeton.

11. Alzheimer's Disease and other dementias may ultimately be conquered by gene therapies. An R&D Excellence award was provided to study the Genomic and Synaptic Basis of Dementia and identify candidate gene targets through combined study of single-cell synaptic physiology, genomics, proteomics, and animal models. The project was undertaken in collaboration with AHP-Wyeth Ayerst. Institutional sponsor: UMDNJ/Cancer Institute of New Jersey.

12. New Jersey's university labs have pioneered the development of lasers that pulse for as short a time as 10 femtoseconds—that is, 10^{-14} seconds. An R&D Excellence award created a Center for Ultrafast Laser Applications where researchers can learn to apply these new devices to medical imaging of healthy and cancerous tissues and the monitoring of chemical processes in the pharmaceutical sector. Institutional sponsors: Princeton, Rutgers, NJIT, and UMDNJ.

13. An R&D Excellence award for the Center for Molecular and Biomolecular Imaging focuses on magnetic resonance imaging, optical imaging, and developing advanced light sources that are critical to support and expand research and clinical applications vital to the growing pharmaceutical and biotech industrial base in New Jersey. The principal investigator, from Princeton University, collaborated with researchers at Rutgers and the University of Pennsylvania Medical School.

Environmental/Energy Technology

14. Funding was provided for the New Jersey Center for MicroChemical Systems to develop and demonstrate portable fuel cells and to replace current battery technology in mobile applications, including cell phones, laptop computers, military communications equipment, and miniature biomedical devices. The principal investigator, from Stevens Institute of Technology, partnered with academic researchers from the NJIT and William Paterson University, and with industrial collaborators including H-Power, FMC Corporation, PSE&G, and the U.S. Army/CECOM.

15. Phytoremediation of Dredge Spoils Using Living Plants and Associated Microorganisms was an R&D Excellence project to develop a safe, low-cost strategy based on plant/microbial systems to decontaminate spoils from the dredging of New Jersey's harbors. Institutional sponsors: Center for Agricultural Molecular Biology at Rutgers and the Hazardous Substance Management Research Center at NJIT.

16. Landfills would be cheaper and longer-lasting if industrial and consumer products were designed to be cheaply and easily "remanufactured" at the end of their useful lives. The Multi-Lifecycle Engineering Research Center received an R&D Excellence award to develop this strategy with industrial partners, and to investigate materials that can be engineered from waste streams. Several post-recycling products have been developed. Institutional sponsors: NJIT, Rutgers, Princeton and Stevens.

Food Technology

17. Principal investigators from Rutgers University were funded to direct five years of research into Foods Fortified with Stable Omega-3 Fatty Acids: Health Benefits in Ulcerative Colitis. The Cancer Institute of New Jersey at UMDNJ collaborated on this project to establish guiding principles for shelf-stable baked foods with Omega-3 fatty acids, and to transfer that technology to New Jersey companies for commercialization of value-added healthy products.

18. Conch, a major shellfish product and important part of the coastal and southern New Jersey economy, shows great potential for aquaculture, or managed breeding and harvesting. An R&D Excellence award sponsored applied research in Shellfish Aquaculture, in partnership with the Aquaculture Development Corporation and the Cape May Seafood Association. Institutional sponsors: The Haskin Shellfish Research Lab at Rutgers and Cumberland County College.

19. New Jersey's food processing and marketing companies will soon be "designing" foods for beneficial health effects. An R&D Excellence award supported a program in Pioneering Nutraceutical Research to put this process on a sound genomic basis in partnership with the firms that sponsor the Center for Advanced Food Technology. Institutional sponsor: Center for Advanced Food Technology at Rutgers.

20. South Jersey's devastated oyster business can probably be saved only by aquaculture based on advanced genetic techniques. An R&D Excellence award titled Cytogenetics Program for Shellfish Breeding Biotechnology aims to move "triploid-tetraploid" technology from the laboratory to the marketplace within five years, with additional applications for hard-shell clams. Commercial partners include local firms Biosphere, Atlantic Capes Fisheries, and 4Cs Breeding Technologies. Institutional sponsor: The Haskin Shellfish Laboratory of Rutgers.

21. The R&D Excellence award for Modulation of Gene Expression of Inflammatory Mediators by Processed Foods was focused on developing optimal processing conditions to enhance the presence of anti-inflammatory and antioxidant properties in foods. The efficacy of these processed foods will be evaluated in animal models of inflammatory diseases, setting the stage for clinical evaluations in humans. The principal investigator in this collaborative effort with Temple University and the Cancer Institute of New Jersey is from Rutgers University.

Information Technology—Hardware

22. Princeton received an award for the New Jersey Center for Organic Optoelectronics, in collaboration with researchers from Rutgers, NJIT, the University of Southern California, and a range of large and small New Jersey firms. The program was funded to work over five years to develop and apply a fundamental understanding of optical and electronic processes in organic semiconductors toward realizing new technologies.

23. A five-year award was made for Nanotechnology for Photonic Materials and Devices to a Rutgers researcher who collaborated with other researchers at Rutgers, NJIT, and Princeton, and a range of New Jersey materials companies. The program was designed to utilize a range of technologies to synthesize nanopowders, modify material properties, enhance performance, and develop components for photonic applications.

24. Rutgers University's Center for Multimodal Wireless Integrated Sensor-on-Silicon Technology received an award focusing on the development and transfer of wireless sensors for use in a variety of applications. Collaborating institutions included Princeton and UMDNJ, and committed New Jersey industrial partners include Agere Systems, Lucent, Sarnoff, Johnson & Johnson, Thomson Multimedia, and Semandex Networks.

25. The New Jersey Center for Optoelectronics has spawned new optical-based devices and technologies, including the new field of organic optoelectronics. An R&D Excellence award established the Center to investigate and develop new applications that can be commercialized in partnership with New Jersey firms. Institutional sponsors: Princeton and NJIT.

26. Princeton received an R&D Excellence award for the Consortium for Industrialization of Large-Area Electronics to develop state-of-the-art technologies related to "large-area" electronics. The principal investigator collaborated with researchers from NJIT and with industrial partners including Universal Display Corporation and Lucent Technologies.

27. There is growing need for new digital radio systems to support reliable wireless transmission of voice, video, and data within a fixed radio spectrum. An R&D Excellence award supports the New Jersey Center for Wireless Telecommunication and Digital Radio, which will help assure New Jersey's continued commercial leadership in this vital technology. Institutional sponsors: NJIT, Princeton, Rutgers, and Stevens.

Information Technology—Internet & Software

28. The Center for Wireless Networking and Internet Security received an R&D Excellence award to develop new tools for integrated wireless and wired network management to provide optimal efficiency and security in a multimedia environment. The principal investigator, from NJIT, collaborated with researchers at Princeton and leading communication, computer and networking industries, including Mitre Inc., Panasonic, Lucent, Perceptive Systems Inc., and IBM.

29. An R&D Excellence award to The New Jersey Center for Multimedia Research supports advanced educational software applications, in collaboration with 17 industrial partners such as IBM, Microsoft, AT&T, and Lucent. Institutional sponsors: NJIT and Princeton.

30. An R&D Excellence award in Transportation Information and Decision Systems was designed to develop "intelligent software agents" that gather real-time information from sources like the EZ-Pass toll collection system and feed them back in ways that help motorists choose the best route and avoid delay. Institutional sponsors: NJIT, Princeton, and Stevens.

31. An R&D Excellence award in Software Engineering for Distributed Computing and Networking was targeted to help researchers work with Lucent Technologies to develop software that implements many of the functions that used to be imbedded in hardware. Institutional sponsors: Stevens, Rutgers, and NJIT.

32. An R&D Excellence Award was granted to develop Collaborative Telemedicine Environments by adapting Internet technologies to the specific needs of healthcare professionals. Such environments would allow doctors to consult with, or medical and dental students to learn from, the best specialists from around the world. Institutional sponsors: Rutgers, UMDNJ, and NJIT.

33. Pervasive information systems will allow people to work with information anywhere, at any time. An R&D Excellence Award established the New Jersey Center for Pervasive Computing to explore a new generation of home and office "information appliances" in partnership with firms like NEC, IBM, and Lucent. Institutional sponsors: Princeton, NJIT, and Rutgers.

Manufacturing

34. The New Jersey MEMS Initiative received an R&D Excellence award to explore the fabrication of and industrial applications for MEMS — micro-electro-mechanical systems. Institutional sponsors: NJIT and Rutgers.

35. The R&D Excellence program in Functional and Structural Materials from Immiscible Polymer Blends focused on research to achieve near-nano-scale microstructures with exceptional structural and functional performance, develop novel polymer formulations that contain unique nanostructural morphology, and examine these unique materials for functional nanoparticle self assembly, optical performance, gas permeability control, conductivity, and electronic and magnetic response. The principal investigators, from Rutgers, collaborated with researchers at Rutgers, Princeton, and Washington & Lee University.

36. The New Jersey Center for Micro-Flow Control received an R&D Excellence award to develop innovative technology to control industrial or biological processes involving fluids. Applications included microscale sensors, drug delivery systems, and others. Industry partners included Honeywell, U.S. Dermatalogics, Vision Research, and Kleissler Co. The Center collaborates with the City University of New York. Institutional sponsors: NJIT and Princeton.

37. Mathematicians predict that shaping materials into different geometric patterns can yield dramatic improvements in strength and crush-resistance. An R&D Excellence award is helping industrial engineers understand how to actually produce the newly described "doubly periodic folded" shapes, in a project titled Applications of a New Mathematical Theory in Sheet Forming Processes. Institutional sponsor: Rutgers.

38. Entire computer systems and devices with multiple components will soon be built on single semiconductor chips using functional blocks called cores. An R&D Excellence award created a new Center for Embedded System-On-a-Chip Design to help make New Jersey a focus of this important industry at the intersection of computer engineering and materials science. Institutional sponsors: Princeton, NJIT, and Rutgers.

39. Hall thrusters may be the propulsion method of choice for maneuvering low-earth-orbit communication satellites. An R&D Excellence Award entitled Variable Thrust Segmented Electrode Hall Thruster was designed to help develop the technology at Princeton Plasma Physics Laboratory to the point it can be transferred to a satellite provider. Institutional sponsor: Princeton.

New Jersey's economic future will be ever more knowledge dependent and information driven. Strong research universities support the development and growth of high value added businesses and also provide the ideas that ultimately lead to new products and services.

Joseph J. Seneca, Professor
Edward J. Boustein School of Planning and Public Policy
Rutgers University

NEW JERSEY ECONOMIC DEVELOPMENT AUTHORITY

RECENT STATE INVESTMENTS

Through its various divisions, the Economic Development Authority (EDA) has worked with institutions of higher education by arranging financing, overseeing construction/development projects, and serving as an intermediary to bring the resources of the universities together with the business community and create new economic growth. The EDA and institutions of higher education have worked together over the past several years to enhance economic opportunities. A brief summary of the primary EDA investments directly related to higher education over the past seven years follows.

University Heights Science Park, Newark

A state investment of $18 million was made toward the $73 million International Center of Public Health, the first phase of the University Heights Science Park. The center, which was developed for the University of Medicine and Dentistry of New Jersey (UMDNJ) and the Public Health Research Institute, opened in 2002 and is the hub of the science park. The center brings together world-class doctors and scientists dedicated to researching infectious diseases.

The EDA supported this project by taking the lead in site assemblage. Through a land exchange, the EDA conveyed about 25,000 square feet of land to the New Jersey Institute of Technology (NJIT) that enabled the university to break ground for a technology incubator facility and support further revitalization of the area.

Technology Centre of New Jersey, North Brunswick

The EDA's Technology Centre of New Jersey in North Brunswick offers affordable and modern laboratory and production facilities that can be customized to fit specific research and development needs. One of the tenants is the Rutgers University IR-4 Agricultural Research Project, which helps to get regulatory clearance for crop pest control agents and coordinates the activities of 37 research centers across the country. Its research benefits farmers and plant nursery operators throughout New Jersey and nationwide.

Support for Nanotechnology

The EDA recently provided a $2 million grant to the New Jersey Nanotechnology Consortium to support the state's leadership role in promoting nanotechnology research and encouraging closer collaboration between the public and private sectors in scientific discovery and technical innovation. The grant will enable the state's three public research institutions – NJIT, Rutgers University, and UMDNJ – to

New Jersey
Economic Development Authority

Over $20 million to enhance targeted economic opportunities

Innovation Zones proposed for:

- **Newark**
- **New Brunswick**
- **Camden**

participate in the consortium. It will also help foster technology transfer, enabling each of the three universities to receive a share of the grant for fee-based project services through the Nanotech Consortium over a four-year period. The collaboration will also help both the consortium and the institutions better compete for federal funding for research and development projects.

The nucleus of the consortium is the Bell Labs nanofabrication laboratory in Murray Hill, along with a team of highly skilled Bell Labs nanoscientists and researchers who are affiliated with the consortium. By combining the leading-edge capabilities of this lab with New Jersey's academic research institutions, the consortium will help to stimulate regional economic growth by quickly bringing nanotech ideas from concept to commercialization.

LOOKING TO THE FUTURE

Governor James E. McGreevey recently unveiled plans for the creation of Innovation Zones. The Innovation Zone concept is the state's latest initiative that builds upon EDA's past successes in strengthening university, business, and government collaborations.

This proposal is designed to spur collaboration between the state's universities and business community. It will target financial and other state resources to provide funding and technical support that encourages universities and private businesses to collaborate on projects, encourages businesses to locate in the defined zones, and attracts more federal and other research dollars to businesses and universities located in the zones. It will seek to attract scientists, students, and entrepreneurs with the goal of creating a technology environment where people live, work, and learn.

Examples of initial Innovation Zone plans follow.

Newark: Assist in the development of a speculative, high-tech dry labs commercialization center as an expansion of University Heights Science Park. This project would leverage tens of millions of dollars in total investments and result in 300 new jobs. The foundation for a cluster exists with Public Health Research Institute and UMDNJ, which also has plans to build a bioterrorism research facility funded by federal grants.

New Brunswick: Expand the EDA's Commercialization Center in North Brunswick in partnership with Rutgers and in close proximity to UMDNJ's New Brunswick campus in the heart of the state's pharmaceutical center. Monies would be used to develop specialized web lab facilities for biotech/life science tenants employing up to 60 people. EDA has already invested several million dollars in the building shell, and Rutgers plans to spend another several million in facility costs as part of this expansion.

Camden: Develop the Camden Technology Center in partnership with Rutgers, resulting in 300 new jobs. EDA would provide several million dollars of financing, including some federal grant moneys, and would leverage the investment with private and other public funds.

The Innovation Zone proposal is an outgrowth of the important work done on university restructuring last year, and it will advance the vision that underlies *A Blueprint for Excellence,* New Jersey's long-range plan for higher education.

Working independently of each other, New Jersey's business community, research scientists, and institutions of higher learning can assuredly make progress in the advancement of technology-based economic development initiatives. However, when state government takes steps to create a synergy between these three prongs of the technology triangle by providing incentives for cooperative action, I feel confident in saying that economic development endeavors in our state will be more focused, and ultimately more successful in bringing new technologies to market.

Alfred C. Koeppe, Chairman
NJ Economic Development Authority

OTHER TECHNOLOGY & RESEARCH INVESTMENTS FISCAL 1998 – 2004

Over the past several years the state budget has included support for various special technology initiatives at several institutions. The table below lists these initiatives.

TECHNOLOGY INITIATIVE	INSTITUTION	APPROPRIATION
Discrete Mathematics & Computer Science Center	**Institute for Advanced Study**	**$ 780,000**

Currently in its fifth year, the program runs two weekly seminars. The residents of the program are engaged in intensive research, often in cooperation with short-time visitors and local people from Princeton and Rutgers Universities, as well as from DIMACS, NEC and AT&T research centers.

High Technology Center	**Georgian Court University**	**$ 100,000**

The funding created a special math and computer science training lab where each of the 20 computers is itself a server. This topology enables students majoring in math or computer science to receive much more intensive training than otherwise possible.

Acceleration in Computer Sciences for Minorities	**Monmouth University**	**$ 15,000**

The program annually provides computer, math, heritage, and special subject classes to minority pupils from the Monmouth and Ocean Area. To date the program has been in operation for 16 years and has served over 1150 children from grades 2 through 12.

Park City Mathematics Institute	**Institute for Advanced Studies**	**$ 580,000**

The IAS/Park City Mathematics Institute is designed for mathematics educators at the secondary and post-secondary level, as well as mathematics researchers and students at the post-secondary level. These groups find at PCMI an intensive mathematical experience geared to their individual needs.

Educational Technology Center	**Centenary College**	**$ 1,000,000**

The Robert E. and Virginia N. Littell Educational Technology Center supports the College's technology master plan, while offering education and training to members of the Northwestern New Jersey community.

Statewide Systemic Initiative to Improve Mathematics and Science Education	**Rutgers University**	**$ 6,000,000**

Since 1993, NJ SSI's work has impacted over 40,000 teachers and administrators and 75% of schools in New Jersey have been reached. As a result of NJ SSI activities, new or revised standards-based curricula have been implemented in at least 1,690 schools representing 68% of the total students in the state. Furthermore, districts demonstrating a commitment to aligning curricula with new standards serve over 80% of New Jersey''s students.

High Performance Computing Initiative	**Rutgers University**	**$ 1,500,000**

The Rutgers University High Performance Computing Project provides scientific consulting, and hardware and software support to academic research requiring large scale high performance computing resources.

Online Syllabi Project	**Rutgers University**	**$ 10,000**

Rutgers students sought state support to make class syllabi available online. Money was used to link the online course syllabus system with the online schedule of classes.

Distance Learning Initiative	**Fairleigh Dickinson University**	**$**	**3,900,000**

The university is the first in the nation (and perhaps the world) to require all undergraduates to take four distance learning courses during the course of their studies.

Smart Gun Technology Development	**New Jersey Institute of Technology**	**$**	**2,000,000**

NJIT has been in the forefront of developing a personalized weapons technology. The technology calls upon sensors that read the owner's handprint and grip and fires only for the owner.

TOTAL APPROPRIATIONS FOR TECHNOLOGY/RESEARCH INITIATIVES	**$**	**15,885,000**

APPENDICES

Appendix A
HIGHER EDUCATION TECHNOLOGY INFRASTRUCTURE FUND
Direct Institutional Allocations
Detail of Expenditures

INSTITUTION	APPROVED PROJECT	COST	CATEGORY TOTAL
	Computer Acquisitions		
Montclair State University	Implement program to maintain currency with industry standard computing systems for the faculty	$ 35,000	
William Paterson University	Computer upgrades	$ 220,000	
Centenary College	Provide faculty and students with computer systems, enhance and expand computer laboratories for commuter students, establish internet service for campus community, and upgrade security system	$ 252,243	
College of Saint Elizabeth	Upgrade academic instructional network computer	$ 92,875	
Fairleigh Dickinson University	Attain and maintan currency in the availability of computer and information technology	$ 240,958	
Georgian Court University	Acquire new computers and database management system, provide enhanced access to networking, and upgrade library computer and operating system to allow off campus access	$ 281,937	
Saint Peter's College	Increase computer facilities for faculty	$ 147,502	
Hudson County Community College	Upgrade desktop hardware	$ 251,000	
Hudson County Community College	Install automated library system	$ 150,000	
Raritan Valley Community College	Replace faculty and staff computers	$ 91,008	
Salem Community College	Acquire computers and peripherals	$ 125,563	
Union County College	Replace personal computers	$ 88,088	
Warren County Community College	Upgrade existing computers to permit full access to learning resource and academic resource centers	$ 121,680	
New Jersey Institute of Technology	Upgrade faculty, student, and classroom computers	$ 1,054,700	
	Total Computer Acquisitions		**$ 3,152,554**
	Classrooms, Computer Laboratories, and Library Systems Upgrades		
Kean University	Upgrade academic computer laboratories	$ 736,201	
Kean University	Upgrade online library catalog to provide web access	$ 38,120	
Montclair State University	Upgrade classroom technology	$ 410,000	
Princeton University	Create five distributed language learning laboratories	$ 438,357	
Rider University	Create electronic classroom in Moore Library	$ 21,635	
Stevens Institute of Technology	Equip eight classrooms for interactive use with laptop computers	$ 108,000	
Camden County College	Install projections systems in 20 classrooms linked to a network	$ 223,000	
Gloucester County College	Create new smart classrooms and acquire new networked computers	$ 379,034	

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INSTITUTION	APPROVED PROJECT	COST	CATEGORY TOTAL
County College of Morris	Install multimedia and interactive computers in various laboratories and classrooms	$ 173,494	
Passaic County Community College	Establish multimedia language laboratory	$ 180,018	
University of Medicine and Dentistry of New Jersey	UMDNJ-NJMS Educational Videoconferencing Network	$ 230,818	
Montclair State University	Create emerging technology laboratory to support research and curriculum development	$ 248,000	
College of Saint Elizabeth	Library network computing	$ 5,665	
Rider University	Modernize Rider Learning Center computer lab	$ 9,000	
Rider University	Modernize three general access computer labs	$ 52,500	
Rider University	Modernize Communications Multimedia Center and TV Studio	$ 33,690	
Rider University	Expand and modernize Faculty Instructional Technology Training Center	$ 15,601	
Rider University	Create student athlete learning center	$ 4,850	
Rider University	Modernize Computer Information Systems electronic classroom/lab	$ 44,135	
Rider University	Modernize science hall lab	$ 20,791	
Stevens Institute of Technology	Install 24 ports and a new commuter lounge	$ 2,877	
Raritan Valley Community College	Upgrade computer laboratories and technology classrooms	$ 327,651	
University of Medicine and Dentistry of New Jersey	University Libraries Electronic Systems and Services	$ 650,000	
	Total Classrooms, Computer Laboratories, and Library Systems Upgrades		**$ 4,353,437**
	Distance Learning Upgrades		
Thomas Edison State College	Upgrade distance learning programs	$ 185,000	
University of Medicine and Dentistry of New Jersey	University-wide management approach to distance learning and interactive videoconferencing	$ 1,581,279	
	Total Distance Learning Upgrades		**$ 1,766,279**
	Network Servers		
Kean University	Expand server capacity to meet additional requirements	$ 250,178	
Rowan University	Upgrade on campus servers	$ 599,000	
William Paterson University	Install new servers and network management software	$ 608,000	
College of Saint Elizabeth	Purchase equipment to enable the campus-wide use of cable television to expand potential of interactive television classrooms and television studio	$ 56,350	

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INSTITUTION	APPROVED PROJECT	COST	CATEGORY TOTAL
Fairleigh Dickinson University	Utilize available information and communication technology for effective and efficient delivery of instruction and service to current and new student audiences	$ 240,959	
Monmouth University	Install new network servers	$ 38,470	
Monmouth University	Purchase equipment to develop and deliver electronic courses	$ 53,775	
Rider University	Purchase faculty workstations and printers	$ 110,550	
Rider University	Purchase various equipment	$ 12,665	
Atlantic Cape Community College	Install new switches and routers	$ 111,237	
Cumberland County College	Upgrade servers, purchase additional computers for faculty and students, install touch-tone registration system, and provide multi-media technology cart for teaching	$ 445,879	
Union County College	Wiring desktops and workstations for voice and data	$ 163,630	
Union County College	Disk storage system	$ 133,000	
Union County College	Upgrade various web servers	$ 252,855	
New Jersey Institute of Technology	Replace communications servers	$ 145,504	
New Jersey Institute of Technology	Upgrade campus web server	$ 163,680	
	Total Network Servers		**$ 3,385,732**
	Network Hardware		
Gloucester County College	Acquire hardware to implement website and digital telephone system	$ 182,227	
Hudson County Community College	Purchase hardware and software for interactive student information system	$ 50,000	
Salem Community College	Purchase hardware and software to operate network	$ 107,105	
University of Medicine and Dentistry of New Jersey	Expanding the mission through advance Technologies	$ 107,105	
University of Medicine and Dentistry of New Jersey	Distributed Graduate Education	$ 194,360	
University of Medicine and Dentistry of New Jersey	Revitalizing ACS's Technical Services Infrastructure	$ 153,044	
	Total Network Hardware	**$ 348,971**	**$ 1,035,707**
	Internet Enhancements		
Montclair State University	Upgrade Internet connections to provide high speed and broadband capacities	$ 150,000	
Richard Stockton College of New Jersey	Provide high speed data services throughout the campus	$ 220,000	

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INSTITUTION	APPROVED PROJECT	COST	CATEGORY TOTAL
Rowan University	Improve campus access to Internet	$ 13,000	
Rowan University	High speed data access to residence halls	$ 107,000	
Rowan University	Improve incoming remote access services	$ 30,000	
Rowan University	Technology infrastructure for new student services building	$ 256,000	
	Total Internet Enhancements		**$ 776,000**
	Network Upgrades		
Kean University	Integrate all information technology for delivery of KCN services to students in academic computer laboratories, classrooms, faculty offices, and off-campus	$ 112,501	
New Jersey City University	Complete migration from a shared, 10 Mbps Ethernet network to a 655 Mbps ATM core, with 155 Mbps ATM within each building and 100 Mbps switched Ethernet to the workstation.	$ 576,912	
Montclair State University	Complete network backbone for existing campus facilities and new construction	$ 158,000	
Montclair State University	Install remote access system to support all constituencies	$ 50,000	
Ramapo College of New Jersey	Bild an integrated voice, video, and data network	$ 935,000	
Rowan University	Upgrade campus backbone to enhance access to resources	$ 230,000	
Rowan University	Extend campus backbone to certain unconnected office and classrooms	$ 65,000	
Rowan University	Extend video network to unserved buildings	$ 55,000	
Rowan University	Enhance networked in-classroom technology	$ 20,000	
William Paterson University	Upgrade campus backbone to create a wide area network shared with school districts in Passaic County	$ 651,400	
William Paterson University	Purchase switching and related equipment to provide voice, video, and data services to campus community	$ 230,600	
The College of New Jersey	Expand network capacity for access by entire campus community	$ 1,555,000	
Bloomfield College	Upgrade and extend campus network to make higher speed connections, install new servers, software and firewall, and purchase library reference computers	$ 287,382	
Monmouth University	Upgrade switching equipment to expand capacity	$ 96,260	
Seton Hall University	Deliver connectivity and content to support mobile computing	$ 446,772	
Atlantic Cape Community College	Upgrade LAN	$ 287,500	
Atlantic Cape Community College	Expand bandwith capacity	$ 210,000	
Bergen Community College	Upgrade network infrastructure	$ 967,796	
Brookdale Community College	Extend campus-wide network backbone	$ 898,728	
Camden County College	Complete college-wide network	$ 558,688	
Camden County College	Enhance technology for remote advertising	$ 110,700	
Essex County College	Strengthen network backbone and provide for remote access	$ 868,774	
Gloucester County College	Upgrade technology infrastructure backbone	$ 9,250	

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INSTITUTION	APPROVED PROJECT	COST	CATEGORY TOTAL
Hudson County Community College	Upgrade network	$ 113,024	
County College of Morris	Replace network hubs and switches to increase capacity of network backbone	$ 224,070	
County College of Morris	Integrate college-wide and community applications and collaborative initiatives into the campus infrastructure	$ 353,205	
Passaic County Community College	Expand existing network and desktop computing capabilities	$ 76,046	
Passaic County Community College	Install campus-wide video distribution system	$ 237,133	
Sussex County Community College	Install WAN linking campus facilities	$ 175,000	
Sussex County Community College	Upgrade LAN in one building and install in four others	$ 49,195	
Sussex County Community College	Enhance campus data network connections	$ 167,227	
Warren County Community College	Expand audiovisual connections between library and classrooms	$ 139,600	
Rutgers, The State University of New Jersey	Establish fiber optic backbone on three campus for RUNet 2000	$ 7,722,000	
New Jersey Institute of Technology	Complete shared services initiative	$ 461,579	
University of Medicine and Dentistry of New Jersey	Intra-campus High Speed Network	$ 300,000	
University of Medicine and Dentistry of New Jersey	University-wide Approach to Enterprise LAN and Desktop Management	$ 72,021	
	Total Network Upgrades		**$ 19,471,363**
	Software Purchases		
Montclair State University	Install dedicated servers	$ 170,000	
Montclair State University	Install network software to permit access to campus database systems	$ 385,000	
Stevens Institute of Technology	Acquire hardware and software for student information database management system	$ 138,250	
Mecer County Community College	Convert administrative software to relational database to increase network use	$ 750,188	
Union County College	Install web based student information system	$ 48,000	
Warren County Community College	Develop interactive management system	$ 120,220	
Warren County Community College	Purchase training and software	$ 444	
	Total Software Purchases		**$ 1,612,102**
	Telecommunications and Communications Upgrades		
New Jersey City University	Additions to the ATM network, expansion of Voice and Data services to the University's West Campus, various upgrades to PBX and upgrade of all desktop sytems to Internet/Intranet	$ 668,088	
Richard Stockton College of New Jersey	Procure voice communication system to support all functions of campus	$ 666,500	
Thomas Edison State College	Upgrade voice communications system	$ 340,000	
Caldwell College	Upgrade voice communications and establish full data interconnectivity across the campus	$ 281,937	

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INSTITUTION	APPROVED PROJECT	COST	CATEGORY TOTAL
College of Saint Elizabeth	Upgrade communications infrastructure	$ 83,674	
College of Saint Elizabeth	Voice Network Upgrade	$ 13,679	
Monmouth University	Upgrade telephone to allow for migration to fiber optic cable	$ 50,622	
Burlington County College	Optimize technology at telecommunications and science center	$ 617,998	
Sussex County Community College	Replace existing telephone system	$ 67,745	
Union County College	Acquire PBX telephone system	$ 143,000	
University of Medicine and Dentistry of New Jersey	RWJMS Voice Communications Technology Upgrade	$ 237,840	
	Total Telecommunications and Communications Upgrades		**$ 3,171,083**
	Wiring Upgrades		
Kean University	Complete the campus wiring to interconnect all buildings and offices to the KCN	$ 623,000	
Montclair State University	Install integrated wired and wireless communications facilities in a total of 20 class, seminar, and meeting rooms	$ 414,000	
Richard Stockton College of New Jersey	Install new fiber and copper wire and replace coaxial and copper wiring	$ 358,500	
Rowan University	Add 275 networked workstations for student and facutly access to network resources	$ 230,000	
Drew University	Complete final phase of installing underground conduit, fiber optic cabling, and station wiring and purchasing necessary electronic equipment	$ 323,022	
Felician College	Provide new infrastructure for voice, data, and video for Rutherford Campus and connect it to Lodi campus	$ 270,057	
Monmouth University	Replace and upgrade cable in Wilson Hall	$ 172,500	
Rider University	Install a fiber optic voice, data and video network in Westminster library and create a new arts and sciences electronic classroom and link everything to main campus	$ 115,415	
Saint Peter's College	Expand fiber optic network and upgrade network bandwith to allow more access	$ 23,854	
Saint Peter's College	Add cable to three dormitories and upgrade computers available to students and network operating system	$ 198,691	
Stevens Institute of Technology	Extend infrastructure wiring to new women's center and dormitory	$ 162,500	
Middlesex County College	Complete connections to campus network and Internet	$ 867,654	
Ocean County College	Install fiber optic ring to connect all campus buildings, install internal wiring for each building, and purchase network interface devices	$ 694,436	
Raritan Valley Community College	Complete internal building wiring and provide network enterprise servers, switches, hubs and firewalls	$ 133,730	
Salem Community College	Install network cabling to connect all campus facilities	$ 154,180	

Appendix A
HIGHER EDUCATION TECHNOLOGY INFRASTRUCTURE FUND
Direct Institutional Allocations
Detail of Expenditures

INSTITUTION	APPROVED PROJECT	COST	CATEGORY TOTAL
New Jersey Institute of Technology	Complete campus rewiring and upgrade network bandwith	$ 996,037	
University of Medicine and Dentistry of New Jersey	Completion of Martland Building Ninth Floor Technology Component	$ 308,224	
University of Medicine and Dentistry of New Jersey	Instruction, Research and Service: Integrated Technological Approach	$ 229,943	
	Total Wiring Upgrades		**$ 6,275,743**
	Total Higher Education Technology Infrastructure Fund Direct Institutional Allocations		**$45,000,000**

Appendix B
EQUIPMENT LEASING FUND
Direct Institutional Allocations
Detail of Expenditures

INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
	Creative Arts			
Atlantic Cape Community College	Culinary Arts Program various equipment	$	2,102	
Bloomfield College	Creative Arts & Technology Animation Video Labs	$	82,780	
Bloomfield College	Creative Arts & Technology Music Studio	$	21,917	
Bloomfield College	Creative Arts & Technology Fine Arts Studios	$	1,032	
Bloomfield College	Creative Arts & Technology Output/Outreach	$	9,350	
Bloomfield College	Creative Arts & Technology Projection System	$	7,400	
Brookdale Community College	Art Department various equipment	$	350	
Brookdale Community College	Music Department various equipment	$	2,320	
Brookdale Community College	Photography equipment	$	10,275	
Caldwell College	Art Department various equipment	$	8,136	
Caldwell College	Music Department various equipment	$	30,080	
Camden County College	Visual and Performing Arts various equipment	$	23,172	
College of St. Elizabeth	Art Department	$	8,776	
County College of Morris	Music	$	31,240	
County College of Morris	Photography Technology	$	194,510	
County College of Morris	Graphic Design	$	270	
Cumberland County College	Arts & Humanities Graphics Lab	$	49,146	
Cumberland County College	Fine & Performing Arts Center	$	4,500	
Cumberland County College	Electronic Music Lab	$	7,106	
Georgian Court University	Music	$	19,230	
Gloucester County College	Communications, Theater and Performing Arts	$	150,943	
Hudson County Community College	Culinary Arts Program	$	211,852	
Kean University	Graphic Communications Program Printing Equipment	$	118,074	
Kean University	Art Education Program Equipment	$	9,921	
Kean University	Fine Arts Ceramics Equipment Replacement and Upgrade	$	16,544	
Kean University	Fine Arts Jewelry and Sculpture Equipment	$	27,136	
Kean University	Fine Arts New and Replacement Photography Equipment	$	30,772	
Kean University	Fine Arts Video Equipment Upgrade	$	22,395	
Kean University	Fine Arts Student Documentation Equipment	$	3,857	
Kean University	Fine Arts Printing Presses	$	29,990	
Kean University	Fine Arts 3-D Sculpture Video Equipment	$	2,779	
Kean University	New and Replacement Instruments for Music Department	$	90,123	
Kean University	Performing Arts Program Equipment Upgrade	$	22,298	
Kean University	Theater Department New and Upgraded Equipment	$	154,738	
Kean University	Music Technology Lab Enhancement	$	16,154	
Kean University	Theater Projection Laboratory Enhancements	$	30,288	
Kean University	Academic Support Music Lab Upgrade	$	6,000	
Kean University	Fine Arts Graphics Tablet System	$	7,090	
Mercer County Community College	Visual Arts Programs	$	125,665	
New Jersey Institute of Technology	University Theatre Projection & Lighting	$	50,000	

Appendix B
EQUIPMENT LEASING FUND
Direct Institutional Allocations
Detail of Expenditures

INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Ocean County College	Fine Arts	$	42,768	
Ramapo College of New Jersey	Performing Arts	$	8,000	
Richard Stockton College of New Jersey	Visual Arts Computer Lab	$	114,779	
Rowan University	College of Fine and Performing Arts	$	330,905	
Rutgers, The State University of New Jersey	Theater Stage Lighting Controls System	$	200,000	
Rutgers, The State University of New Jersey	Theater Sound/Communications System	$	51,400	
Rutgers, The State University of New Jersey	Art Department Equipment	$	218,836	
Rutgers, The State University of New Jersey	Visual and Performing Arts - Upgrade Lighting System	$	200,000	
Rutgers, The State University of New Jersey	Visual and Performing Arts - Advanced Multimedia Library	$	200,003	
Rutgers, The State University of New Jersey	Theater Arts Department	$	60,111	
Rutgers, The State University of New Jersey	Visual Arts/Printmaking	$	15,111	
Rutgers, The State University of New Jersey	Visual Arts/Time-based Media	$	27,459	
Rutgers, The State University of New Jersey	Department Dance	$	27,704	
Rutgers, The State University of New Jersey	Music Department	$	115,222	
Rutgers, The State University of New Jersey	Visual Arts/Photo	$	17,493	
William Paterson University of New Jersey	College of Arts & Communications	$	457,862	
	Total Creative Arts			**$ 3,847,964**
	General Academic			
Atlantic Cape Community College	Academic Instruction	$	537,168	
Atlantic Cape Community College	Academic Computing	$	25,000	
Atlantic Cape Community College	Center for Corporate & Workforce Training	$	61,784	
Atlantic Cape Community College	Academic Computing & Distance Education	$	12,977	
Brookdale Community College	ITV - Distance Learning	$	180,438	
Brookdale Community College	Instructional Training	$	56,985	
Caldwell College	Faculty Resources	$	78,850	
Camden County College	Instructional Support Department	$	11,800	
College of St. Elizabeth	Academic Computer Center	$	150,967	
College of St. Elizabeth	The Learning Center	$	3,900	
County College of Morris	LRC Instructional Services	$	15,000	
County College of Morris	Professional Programs/Distance Education	$	43,836	
Cumberland County College	Writing Center	$	8,000	
Cumberland County College	Success	$	12,249	
Drew University	Academic Technology	$	215,115	

Appendix B
EQUIPMENT LEASING FUND
Direct Institutional Allocations
Detail of Expenditures

INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Fairleigh Dickinson University	Distance Learning	$	1,526,846	
Hudson County Community College	Special Needs Program	$	39,064	
Kean University	E-learning for Pre-professional Field Experience	$	69,061	
Kean University	Learning Disabilities Support Program	$	1,000	
Kean University	Instructional Equipment for General Education Program	$	6,500	
Middlesex County College	Academic Services	$	281,836	
New Jersey Institute of Technology	Learning Center Assistance Improvements	$	12,325	
Passaic County Community College	ITV Upgrades/Distance Learning	$	76,134	
Ramapo College of New Jersey	Campus-wide Academic Computing	$	1,541,766	
Rutgers, The State University of New Jersey	Instructional & Outreach Presentations	$	50,000	
Rutgers, The State University of New Jersey	Videoconferencing Solutions	$	65,400	
Rutgers, The State University of New Jersey	FAS Departmental Leveraging/Grant Matches	$	625,500	
Rutgers, The State University of New Jersey	"If Plants Could Talk"/Rutgers Cooperative Extension	$	55,061	
Salem Community College	Academic Computing & Instruction	$	192,687	
Salem Community College	Learning Resource Center	$	18,837	
Seton Hall University	Assistive Technologies	$	43,958	
Sussex County Community College	Counseling Center	$	29,000	
Thomas Edison State College	Online course Delivery Improvements	$	456,000	
Thomas Edison State College	Expanding College Course Offerings	$	194,900	
Union County College	Collegewide Academic Programs/Technology Infrastructure	$	950,000	
Union County College	Collegewide Academic Programs/Instructional Media Support	$	268,383	
	Total General Academic			**$ 7,918,327**
	Business Programs			
Camden County College	Business, Computer and Technical Studies Division	$	6,900	
Cumberland County College	Business Administration, Computer Science, Corporate & Professional Studies	$	229,943	
Georgian Court University	Business & Psychology (Smart Classrooms)	$	24,750	
Hudson County Community College	Business & Social Science	$	69,768	
Kean University	College of Business & Public Administration Computer Lab Upgrade	$	48,000	
Mercer County Community College	Business Career Programs	$	35,123	
Middlesex County College	Division of Business Computer Science & Engineering Technology	$	240,092	
Rutgers, The State University of New Jersey	Camden Business Instructional Equipment	$	237,000	

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Direct Institutional Allocations
Detail of Expenditures

INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Rutgers, The State University of New Jersey	School of Management and Labor relations	$	50,000	
Rutgers, The State University of New Jersey	Financial Analysis Center & Trading Room	$	63,124	
Rutgers, The State University of New Jersey	Upgrade Faculty of Management Teaching Facilities	$	247,785	
Rutgers, The State University of New Jersey	Upgrade Faculty of Management Teaching Facilities in Levin Building	$	89,430	
Saint Peter's College	Accountancy	$	17,700	
Saint Peter's College	Maketing/Management	$	4,400	
William Paterson University of New Jersey	College of Business various equipment	$	28,600	
	Total Business Programs			**$ 1,392,615**
	Computer Science and Information Technology			
Atlantic Cape Community College	Information Technology	$	81,671	
Atlantic Cape Community College	Information Technology	$	28,836	
Atlantic Cape Community College	Information Technology	$	5,376	
Atlantic Cape Community College	Information Technology	$	5,507	
Camden County College	Computer Systems Technology (CST)	$	25,500	
Camden County College	Computer Information Systems	$	12,000	
Camden County College	Computer Studies/Office Systems Technology	$	25,420	
County College of Morris	Information Technologies	$	52,156	
Cumberland County College	Information Technology	$	46,500	
Georgian Court University	Information Technology	$	298,935	
Kean University	Math/Computer Science Student Study Room Computers	$	3,627	
Mercer County Community College	Information Technology Programs	$	221,936	
Middlesex County College	Information Technology & Corporate Community Education	$	726,550	
Montclair State University	Computer Science	$	97,772	
New Jersey City University	Information Technology Services	$	319,100	
Rowan University	Information Resources	$	500,001	
Rowan University	Instructional Technology	$	149,748	
Rutgers, The State University of New Jersey	Division of Computer and Information Sciences Integrated Unix, Linux, Windows and Networking	$	327,000	
Rutgers, The State University of New Jersey	Information Technology of the Manufacturing Movement	$	33,715	
Salem Community College	Information Technology Degree & Certification Program	$	138,165	
Salem Community College	Computer Graphics Arts Degree & Certification Program	$	64,620	
Stevens Institute of Technology	Computer Science - High Performance Computing Facility	$	130,800	
Stevens Institute of Technology	Computer Science Program Equipment	$	10,200	
Warren County Community College	Computer Curriculum/Upgrade Digital Media & Webmaster Lab	$	8,750	

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INSTITUTION	APPROVED PROJECT	COST	CATEGORY TOTAL
William Paterson University of New Jersey	Information Networking Equipment	$ 868,700	
	Total Computer Science and Information Technology		**$ 4,182,585**
	Classroom Upgrades		
Atlantic Cape Community College	Mobile Moduation Distance Education Classroom System	$ 76,000	
Atlantic Cape Community College	Data Projection for Classroom Instruction	$ 100,000	
Bergen Community College	TEC, ITV Classroom	$ 192,448	
Bergen Community College	TEC, Classroom Teaching Station	$ 230,971	
Bloomfield College	Electronic Classrooms (4)	$ 65,200	
Bloomfield College	Wireless Classrooms	$ 35,600	
Brookdale Community College	Smart Classrooms	$ 433,546	
Brookdale Community College	ITV Classroom	$ 14,603	
Caldwell College	Classroom Instruction	$ 279,523	
Camden County College	Blackwood Campus Classrooms Enhancement	$ 65,096	
Centenary College	Classroom Technology Upgrade	$ 163,927	
College of St. Elizabeth	Permanent LCD Projectors/Data Monitors for Classrooms/Labs	$ 160,640	
Cumberland County College	Classrooms and Academic Lab Support	$ 89,400	
Kean University	Multimedia Smart Classroom	$ 227,260	
Kean University	School of Education Interactive Classroom Equipment	$ 25,811	
Kean University	Upgrade Smart Classrooms/Smart Carts	$ 46,762	
Kean University	SUN Classroom Equipment Upgrade	$ 49,825	
Mercer County Community College	Classroom Equipment	$ 321,110	
New Jersey City University	Academic Affairs Matching Funds for Grants and Smart Classrooms	$ 437,246	
Passaic County Community College	Pateson/Wanaque Lecture Hall AV Completion	$ 197,843	
Passaic County Community College	Paterson Auditorium AV Upgrades	$ 117,843	
Passaic County Community College	Classroom Media Additions	$ 197,920	
Raritan Valley Community College	Classroom Instruction - Computers and Audio Visual Equipment	$ 736,987	
Richard Stockton College of New Jersey	Electronic Classrooms	$ 37,791	
Rider University	2 Mobile Classrooms	$ 98,290	
Rider University	Equip more classrooms of electronic presentation equipment including 5 stationary and 5 portable units	$ 97,650	
Rutgers, The State University of New Jersey	Classroom Technology Upgrades	$ 317,000	
Rutgers, The State University of New Jersey	Smart Classroom Technology for Law	$ 128,280	

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Direct Institutional Allocations
Detail of Expenditures

INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Rutgers, The State University of New Jersey	Newark Smart Classroom Facility	$	234,230	
Rutgers, The State University of New Jersey	Global Media Classroom	$	34,794	
Rutgers, The State University of New Jersey	CoRE Lecture Hall smart classroom	$	45,000	
Rutgers, The State University of New Jersey	Smart Classroom Expansion and Upgrade Initiative	$	577,755	
Rutgers, The State University of New Jersey	Art History: Smart Classroom and Digitization	$	23,092	
Saint Peter's College	Interactive Classrooms	$	131,271	
Saint Peter's College	Upgrade Current Classroom Technology	$	92,600	
University of Medicine and Dentistry of New Jersey	Smart Classrooms in Dental School	$	230,000	
University of Medicine and Dentistry of New Jersey	Smart Classrooms	$	56,000	
Warren County Community College	Classroom Upgrades - Horizontal Shading Whiteboards	$	5,600	
Warren County Community College	Classroom Technology Equipment	$	147,700	
	Total Classroom Upgrades			**$ 6,522,614**
	Engineering			
Bergen Community College	Pre-engineer CAD Labs	$	217,706	
Camden County College	Computer Integrated Manufacturing Engineering Technology (CIMET)	$	35,275	
Camden County College	Engineering Technology	$	8,500	
Camden County College	Electrical/Electronic Engineering	$	15,000	
County College of Morris	Electronic Engineering Technology	$	78,671	
County College of Morris	Mechanical Engineering Technology	$	93,270	
County College of Morris	Engineering Science	$	20,941	
Cumberland County College	Engineering Technology	$	71,787	
Essex County College	Engineering Technology Equipment	$	460,200	
Essex County College	Biotechnology Laboratory	$	163,830	
New Jersey Institute of Technology	Computer Control & Theory/Practice in Chemical Engineering	$	369,744	
New Jersey Institute of Technology	Electrical and Computer Engineering Tech A	$	48,774	
New Jersey Institute of Technology	Internet Engineering Lab	$	317,600	
New Jersey Institute of Technology	Mechatronics	$	348,111	
New Jersey Institute of Technology	IME Automation and Ergonomics	$	100,000	
Rowan University	College of Engineering	$	500,000	
Rutgers, The State University of New Jersey	Civil and Environmental Engineering Education	$	79,846	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Rutgers, The State University of New Jersey	Ceramic and Materials Engineering	$	78,041	
Rutgers, The State University of New Jersey	Multiphoton Microscopy in Bioengineering	$	270,782	
Rutgers, The State University of New Jersey	Engineering Information Techonology : Level 1	$	70,633	
Rutgers, The State University of New Jersey	Engineering Information Techonology: Display wall for Reseaching and Teaching	$	147,600	
Rutgers, The State University of New Jersey	Engineering Information Techonology: Mechanical and Aerospace Engineering Robotics Lab	$	32,000	
Rutgers, The State University of New Jersey	Engineering Information Techonology: Civil and Environmental Engineering	$	29,650	
Rutgers, The State University of New Jersey	Ceramic and Materials Engineering/Chemical Imaging System for TEM	$	71,750	
Rutgers, The State University of New Jersey	Ceramic and Materials Engineering: Advanced Battery & Fuel Cell Materials	$	75,000	
Rutgers, The State University of New Jersey	Ceramic and Materials Engineering: Central X-ray Diffraction Lab	$	111,350	
Rutgers, The State University of New Jersey	Replacement and Upgrade of the Manufacturing Process Lab	$	83,421	
Stevens Institute of Technology	Chemical Engineering	$	52,884	
The College of New Jersey	Department of Engineering	$	338,000	
	Total Engineering			**$ 4,290,366**
	General Campus			
Atlantic Cape Community College	Computers for Classrooms/Faculty Offices	$	95,217	
Bloomfield College	Data Projectors and Electronic Screens	$	18,251	
Bloomfield College	Laptop Project	$	23,023	
Camden County College	Rohrer Center	$	50,000	
Camden County College	Camden City	$	59,969	
Camden County College	Camden Campus Computer/Audiovisual	$	162,115	
Camden County College	Wolverton Learning Resource Center	$	461,814	
Centenary College	Instructional Equipment	$	87,400	
Drew University	Supplemental Equipment	$	8,817	
Essex County College	Computer Equipment (Training, Inc.)	$	165,045	
Gloucester County College	Computing Equipment	$	757,790	
Kean University	Computer Science Classroom Network Equipment	$	10,803	
Kean University	Computer Science Classroom Projection Equipment	$	21,944	
Kean University	Mobile Smart Carts	$	81,696	
Kean University	Integrated Classroom Video Projection Systems	$	75,650	
Kean University	Digi Cam for Instructional Materials	$	6,294	
Kean University	Design Studio Equipment Upgrades	$	17,203	
New Jersey Institute of Technology	Classroom and Lecture Hall Projection Devices	$	234,624	
New Jersey Institute of Technology	Freshmen Computer Distribution	$	1,010,625	

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Direct Institutional Allocations
Detail of Expenditures

INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Richard Stockton College of New Jersey	Various Collegewide Computing Needs	$	1,072,200	
Rutgers, The State University of New Jersey	Public Computer Workstations	$	385,600	
Rutgers, The State University of New Jersey	Law School computer equipment	$	179,840	
Rutgers, The State University of New Jersey	Camden Faculty Computing Upgrades	$	41,500	
Rutgers, The State University of New Jersey	FAS Start-up equipment	$	675,000	
Salem Community College	Faculty Information Technology Multimedia Instructional Station	$	19,250	
Seton Hall University	Laptop Computers for Faculty and Students	$	345,153	
Saint Peter's College	Institutional Resources Center - AV Equipment Replacement	$	10,000	
Saint Peter's College	Institutional Resources Center - Non Linear Editing Systems	$	36,895	
Saint Peter's College	Institutional Resources Center - AV Equipment for Pope Hall	$	101,060	
Sussex County Community College	Continuous Computer Upgrades	$	444,016	
Sussex County Community College	Customized Training Center	$	76,153	
Warren County Community College	Computer Overhead Projectors	$	14,850	
Warren County Community College	Student Laptops	$	10,207	
Warren County Community College	Faculty Computers	$	85,203	
William Paterson University of New Jersey	Instructional Support Services & Computer Hardware	$	645,000	
William Paterson University of New Jersey	Campus-wide Multimedia Distribution Equipment	$	189,300	
William Paterson University of New Jersey	Campus-wide Video Distribution Equipment	$	88,750	
William Paterson University of New Jersey	Classroom and Public Access Computer Lab Equipment	$	626,000	
	Total General Campus			**$ 8,394,257**
	Physical Education			
Brookdale Community College	Fitness Center instructional equipment	$	797	
Brookdale Community College	Fitness Center instructional equipment	$	226,991	
County College of Morris	Exercise Science equipment	$	87,190	
Kean University	Physical Education Lab/Classroom Upgrade	$	101,391	
Rutgers, The State University of New Jersey	FAS Department of Exercise Science	$	30,000	
	Total Physical Education			**$ 446,369**

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Direct Institutional Allocations
Detail of Expenditures

INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
	Health Sciences			
Bergen Community College	Radiography Lab	$	35,000	
Bloomfield College	Nursing Testing Equipment	$	7,130	
County College of Morris	Nursing equipment	$	173,967	
County College of Morris	Respiratory Therapy	$	3,006	
County College of Morris	Radiography Lab equipment	$	11,725	
Cumberland County College	Nursing equipment	$	6,925	
Kean University	Community Nursing Health Promotion Clinic	$	33,057	
Kean University	Occupational Therapy Adult Therapeutic Equipment Lab	$	4,228	
Kean University	Nursing Department Patient Information Production Center	$	5,670	
Mercer County Community College	Health Career Programs	$	15,141	
New Jersey City University	Student Affairs - Medical Services Department and Peers Educating Peers Program	$	10,420	
Rutgers, The State University of New Jersey	Biomedical Engineering Initiative	$	221,873	
Rutgers, The State University of New Jersey	Biomedical Engineering	$	152,100	
Rutgers, The State University of New Jersey	College of Nursing Server	$	21,958	
Rutgers, The State University of New Jersey	Nursing Live Webcast System	$	40,450	
Rutgers, The State University of New Jersey	Upgrade College of Nursing Instructional Facilities	$	46,207	
Saint Peter's College	Nursing equipment	$	19,100	
The College of New Jersey	Nursing equipment	$	91,729	
University of Medicine and Dentistry of New Jersey	Technology Support for Clinical Education	$	1,175,000	
University of Medicine and Dentistry of New Jersey	Core Research Facilities	$	393,600	
University of Medicine and Dentistry of New Jersey	Observation Center	$	75,000	
Warren County Community College	Allied Health & Nursing Education	$	5,345	
	Total Health Sciences			**$ 2,548,631**
	Network Infrastructure			
Atlantic Cape Community College	Emergency Power System	$	9,200	
Atlantic Cape Community College	Digital Satellite Receiver Installation	$	1,100	
Bergen Community College	TEC, Satellite Facility	$	19,100	
Bloomfield College	Information Technology Server, Backup & Blade	$	44,500	
Burlington County College	Office of Institutional Technology	$	249,800	
Camden County College	Camden Campus Network	$	252,286	
Centenary College	Electronics for Technical Center	$	223,000	
County College of Morris	Telecommunications	$	40,165	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Cumberland County College	Satellite Internet Access Equipment & New Power Generator	$	32,515	
Cumberland County College	Enhanced Communications System	$	170,979	
Felician College	Technical Support	$	477,582	
Kean University	Computer Science Windows NT Server	$	4,787	
Kean University	Upgraded Server for Information Systems Program	$	3,833	
Mercer County Community College	College-wide Internet Service/ Network	$	133,910	
Mercer County Community College	Instructional Video Distribution	$	171,962	
Montclair State University	Upgrade of Core Computer Network Structure	$	1,578,268	
Montclair State University	Develop and Install Wireless Network	$	892,250	
New Jersey Institute of Technology	Replacement of CS Unix Server	$	100,968	
New Jersey Institute of Technology	Public Access Oracle AFS Server	$	100,968	
New Jersey Institute of Technology	Residence Hall Network Electronics Replacement	$	183,481	
New Jersey Institute of Technology	Campus AFS and GITC 2305 Unix Workstations	$	351,498	
New Jersey Institute of Technology	Research Computation Servers Upgrades	$	219,835	
New Jersey Institute of Technology	Upgrade Network Electronics to 100 Mb in GITC	$	23,570	
Ocean County College	Computers and Peripherals Acquistion	$	740,333	
Ocean County College	Computing Support	$	155,596	
Ocean County College	Adaptive Equipment (ADA Compliance)	$	16,300	
Passaic County Community College	Networking Infrastructure and Upgrade for NJEDge Video and Data	$	248,627	
Raritan Valley Community College	Network Infrastructure Improvements in Support of Instruction	$	280,000	
Rider University	Voice, Data, & Video Network at Westminster	$	302,740	
Rider University	Upgrade & expand Technology Infrastructure	$	250,000	
Rider University	Upgrade lab workstations, faculty workstations, and LANS	$	258,340	
Rider University	Install wireless zones on Lawrenceville campus	$	37,165	
Rutgers, The State University of New Jersey	FAS Dean's Office Networking and Computing	$	390,575	
Rutgers, The State University of New Jersey	Enhancements of Information and Communications Infrastructure	$	397,499	
Rutgers, The State University of New Jersey	RCI Upgrades	$	466,572	
Rutgers, The State University of New Jersey	Systems Operations and Services in New Brunswick	$	100,000	
Rutgers, The State University of New Jersey	Network Enhancements School of Law	$	48,290	
Rutgers, The State University of New Jersey	Wireless Installations	$	59,921	
Rutgers, The State University of New Jersey	Streaming Video	$	168,937	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Rutgers, The State University of New Jersey	Services Upgrades in New Brunswick	$	285,099	
Rutgers, The State University of New Jersey	Estimated Finance Charges	$	785,487	
Seton Hall University	Network Backbone Upgrade	$	830,318	
Seton Hall University	Wireless LAN Projects	$	382,629	
Thomas Edison State College	Expanding Student Access	$	244,100	
Thomas Edison State College	Video conference Room Expansion	$	155,000	
University of Medicine and Dentistry of New Jersey	Server for Informatics Program	$	655,000	
Warren County Community College	Academic Servers	$	15,065	
	Total Network Infrastructure			**$12,559,150**
	Computer/Research Labs			
Rutgers, The State University of New Jersey	Labs/Eden upgrades in New Brunswick	$	121,088	
Bergen Community College	Manufacturing Technology Lab	$	408,650	
Bloomfield College	Computer Information Systems Lab	$	49,500	
Bloomfield College	Internet Technology CISCO Lab	$	36,555	
Brookdale Community College	Student Labs	$	645,337	
Camden County College	Learning Resource Center Labs	$	75,315	
Essex County College	Academic Computer Labs	$	187,400	
Hudson County Community College	Instructional Resource Labs	$	108,909	
Kean University	School of Education Instructional Lab Upgrade	$	34,499	
Kean University	School of Education Instructional Lab	$	32,977	
Kean University	Telecommunications Computer Lab	$	138,782	
Kean University	Interim Design Computer Lab	$	13,459	
Kean University	Equipment Upgrade for Speech Science Lab	$	40,088	
Kean University	Department of Design CAD Lab	$	58,419	
Monmouth University	Teaching Labs	$	43,956	
New Jersey Institute of Technology	Upgrade of Graduate Computer Science Research Labs	$	104,424	
New Jersey Institute of Technology	Computer Science Ph.D. Student Lab	$	35,000	
New Jersey Institute of Technology	Infrastructure Labs I	$	130,148	
New Jersey Institute of Technology	Upper Level Undergraduate and Graduate IS and HCI Labs	$	360,000	
New Jersey Institute of Technology	CAMS Computing Lab Upgrade	$	23,205	
New Jersey Institute of Technology	Mobile Computer Lab/Faculty Development	$	87,400	
New Jersey Institute of Technology	SSSP Computer Lab	$	9,19	
New Jersey Institute of Technology	Honors College Computer Lab	$	4,529	
New Jersey Institute of Technology	HSS Teaching and Learning Labs I	$	5,000	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
New Jersey Institute of Technology	CAD Graphics and Animation Lab I	$	52,000	
New Jersey Institute of Technology	E-Learning Laboratory	$	48,094	
Richard Stockton College of New Jersey	Electronic Teaching Labs	$	349,563	
Richard Stockton College of New Jersey	Upgrade & Expand Geographic Information Systems Lab	$	178,900	
Richard Stockton College of New Jersey	Multimedia Development Lab	$	7,000	
Rutgers, The State University of New Jersey	Communications Systems Lab	$	34,132	
Rutgers, The State University of New Jersey	Virtual Reality Teaching Lab	$	35,988	
Rutgers, The State University of New Jersey	Instructional Technology Lab	$	42,000	
Rutgers, The State University of New Jersey	EENR - Teaching Lab Microscopes	$	30,780	
Rutgers, The State University of New Jersey	Teaching Lab Equipment Department of Biochemistry & Microbiology	$	259,940	
Rutgers, The State University of New Jersey	CAD VLSI Lab	$	42,913	
Rutgers, The State University of New Jersey	High Speed Optical Lab	$	34,448	
Rutgers, The State University of New Jersey	Virtual Reality Teaching Lab	$	27,021	
Rutgers, The State University of New Jersey	Semiconductor Design Simulation Lab	$	10,800	
Rutgers, The State University of New Jersey	Didactic Program in Dietetics Teaching Lab	$	36,000	
Rutgers, The State University of New Jersey	Heat Transfer Lab	$	12,243	
Rutgers, The State University of New Jersey	RF Signal Analysis Lab	$	101,200	
Rutgers, The State University of New Jersey	Training Labs in New Brunswick	$	67,251	
Rutgers, The State University of New Jersey	Test Lab Equipment in Newark	$	31,000	
Salem Community College	Process Technology Computer Lab	$	35,400	
Salem Community College	Adult Basic Skills Computer Lab	$	24,908	
Salem Community College	Scientific Glass Technology/Glass Lead Lab	$	64,040	
Sussex County Community College	Multifunctional Election Lab	$	139,620	
Warren County Community College	Computer Curriculum/PC Lab Replacement Lab 2	$	63,200	
Bergen Community College	TEC, Computer for Instructional Labs	$	577,500	
Warren County Community College	Computer Lab Replacements/Upgrades	$	178,285	
Warren County Community College	Computer Curriculum/PC Lab Replacement Lab 1	$	76,700	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
	Total Computer /Research Labs			**$ 5,354,685**
	Language Programs			
Camden County College	Language and Culture Department	$	1,600	
Camden County College	Interpreter Education and Sign Language	$	6,122	
Camden County College	English as a Second Language	$	10,050	
Hudson County Community College	English & Humanities	$	329,585	
College of St. Elizabeth	Foreign Language Lab	$	5,700	
Kean University	Foreign Languages Lab Enhancement	$	13,000	
Kean University	New Instructional Labs for Department of English	$	63,778	
Kean University	ESL Laboratory Upgrade	$	31,889	
Mercer County Community College	English as a Second Language	$	42,082	
Richard Stockton College of New Jersey	Romance & Classical Language Labs	$	207,280	
Rutgers, The State University of New Jersey	FAS Language Institute/Foreign Languages	$	312,173	
Saint Peter's College	Center for Advancement of Language and Learning	$	18,400	
Saint Peter's College	Modern Languages	$	3,400	
Saint Peter's College	Institutional Resources Center - Language Lab	$	94,235	
	Total Language Programs			**$ 1,139,294**
	Library Technology			
Bergen Community College	Technical Education Center, Library	$	153,015	
Caldwell College	Learning Center/Library	$	10,369	
Cumberland County College	Library	$	5,00	
Essex County College	Library Server and Infrastructure Upgrade	$	12,999	
Georgian Court University	Library Services	$	10,384	
Hudson County Community College	Library/Learning Resource Room	$	110,287	
Kean University	Library Microform Equipment Upgrade	$	109,824	
Kean University	Student Workstations for Library Research	$	28,000	
Mercer County Community College	Library/Testing Center Services	$	81,690	
New Jersey City University	Library, Computer Lab and Faculty Computer Improvements	$	944,678	
Rider University	Replace public access computers in Moore Library 2/ 20 internet appliances	$	4,412	
Rowan University	Campbell Library	$	156,000	
Rutgers, The State University of New Jersey	New Jersey Digital Legal Library	$	43,974	
Rutgers, The State University of New Jersey	Digital Library Research Cluster	$	47,446	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Rutgers, The State University of New Jersey	Dana Library Instructional Support	$	36,130	
Rutgers, The State University of New Jersey	Dana Library Audio Research Program	$	11,230	
Rutgers, The State University of New Jersey	PCs and Other Equipment for Library Instruction	$	277,683	
Rutgers, The State University of New Jersey	Preservation of Library Materials	$	72,194	
Seton Hall University	Library Online Reserve	$	77,254	
Sussex County Community College	Library SIRSI System Upgrade	$	8,905	
Union County College	Collegewide Academic Programs/Computer Labs & Library	$	325,000	
Warren County Community College	Computer Curriculum/Library Availability of High-end PCs & MACs	$	12,000	
Warren County Community College	Library/Media Equipment Upgrades	$	12,158	
Warren County Community College	Library- Upgrade & Expansion of Catalog & Circulation System	$	17,700	
William Paterson University of New Jersey	Library Services	$	101,841	
	Total Library Technology			**$ 2,970,273**
	Media and Communications			
Brookdale Community College	Radio Station	$	15,025	
Brookdale Community College	Television Production	$	21,400	
Burlington County College	Video Production Studio	$	462,451	
Burlington County College	Radio Station Broadcasting Equipment	$	150,933	
Caldwell College	Communications, Arts & Sciences Department	$	16,000	
Caldwell College	Media Center --Theater	$	79,015	
Caldwell College	Media Center - AV Equipment	$	13,500	
County College of Morris	Media	$	179,146	
Cumberland County College	TV Studio	$	3,978	
Essex County College	Studio Equipment	$	82,363	
College of St. Elizabeth	Digital Video Instruction	$	28,888	
College of St. Elizabeth	Streaming Video Station	$	133,877	
Georgian Court University	Video Production & Photography	$	27,960	
Kean University	Department of Communications Training Center	$	30,497	
Kean University	Broadcast and Public Communications Lab Upgrade	$	47,435	
Kean University	Integrated Television Studio and Lighting System Upgrade	$	668,526	
Mercer County Community College	Radio/TV Programs	$	217,800	
Monmouth University	TV Studio/Master Control	$	648,750	
Monmouth University	AV Edit Suites	$	96,000	
Monmouth University	On Air Studio	$	122,650	
Monmouth University	Newsroom/Interactive Studio	$	49,950	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Monmouth University	Production Studio	$	97,650	
New Jersey City University	Media Arts Program	$	317,625	
New Jersey Institute of Technology	Communications Lab	$	209,481	
New Jersey Institute of Technology	Distance Learning TV Studio Upgrades	$	41,100	
New Jersey Institute of Technology	BME Studios - Introductory and Advanced	$	288,282	
Ocean County College	Media Equipment	$	119,837	
Passaic County Community College	Digital Editing Workstation	$	17,769	
Passaic County Community College	Video Duplication	$	15,912	
Passaic County Community College	Videoconferencing	$	67,000	
Passaic County Community College	Automated Cable Playback System	$	9,100	
Ramapo College of New Jersey	Communications Arts Equipment	$	92,056	
Ramapo College of New Jersey	Visual Arts	$	66,003	
Richard Stockton College of New Jersey	Media & Media Related Upgrades	$	439,600	
Rowan University	College of Communications	$	400,000	
Rutgers, The State University of New Jersey	RU-TV Network/RUNet2000	$	230,000	
Saint Peter's College	Communications - Radio Station	$	5,650	
Saint Peter's College	Communications - Classroom/Lab	$	45,400	
Stevens Institute of Technology	Multimedia Research and Development Facility	$	70,179	
University of Medicine and Dentistry of New Jersey	Video Editing Facilities	$	82,000	
	Total Media and Communications			**$ 5,710,788**
	Natural Sciences			
Bloomfield College	Biology Centrifuge & Safety Cabinet	$	16,114	
Bloomfield College	Biology Physiology Equipment	$	12,180	
Bloomfield College	Chemistry Analytical Balances and Calibration Weights	$	13,400	
Bloomfield College	Chemistry Organic/Inorganic Chemistry Equipment	$	22,010	
Bloomfield College	Chemistry Lab Works Equipment and Computer	$	11,667	
Brookdale Community College	Biology Department various equipment	$	36,844	
Brookdale Community College	Chemistry Department various equipment	$	4,00	
Brookdale Community College	Marine & Environmental Services Department various equipment	$	29,913	
Brookdale Community College	Mathematics Department various equipment	$	3,900	
Brookdale Community College	Physics Department various equipment	$	12,434	
Burlington County College	Laboratory Equipment	$	262,000	
Caldwell College	Science Department laboratory equipment	$	97,375	
Camden County College	Physics Department various equipment	$	26,090	
Camden County College	Phontonics (Laser/Fiber Optics)	$	20,899	
Camden County College	Math, Science and Health Careers Division	$	6,900	
Camden County College	Basic Skills Math equipment	$	850	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Camden County College	Chemistry Department various equipment	$	43,319	
Camden County College	Biology Department various equipment	$	40,875	
Camden County College	Mathematics Department various equipment	$	7,890	
Camden County College	Academic Skills Mathematics	$	346	
Camden County College	Chemistry Department various equipment	$	3,034	
Camden County College	Organic Chemistry Department various equipment	$	4,855	
Camden County College	Animal Science Department various equipment	$	25,000	
Camden County College	Fire Science Department various equipment	$	6,000	
College of St. Elizabeth	Biology Department various equipment	$	4,100	
College of St. Elizabeth	Biology Lab	$	20,285	
College of St. Elizabeth	Department of Chemistry and Biochemistry equipment	$	61,715	
County College of Morris	Biology/Chemistry equipment	$	108,785	
County College of Morris	Aviation Flight Technology equipment	$	14,440	
County College of Morris	Environmental Science equipment	$	15,733	
County College of Morris	Process Technology eqiupment	$	147,174	
County College of Morris	CASE	$	3,395	
Cumberland County College	General Science & Chemistry equipment	$	43,755	
Cumberland County College	Math & Social Sciences equipment	$	8,000	
Cumberland County College	Aquaculture Technology equipment	$	29,249	
Drew University	Physics and Astronomy equipment	$	106,235	
Drew University	Biology and Chemistry equipment	$	218,624	
Drew University	Mathematics and Computer Science equipment	$	30,689	
Drew University	Biology Department various equipment	$	74,937	
Felician College	Scientific Equipment	$	43,760	
Georgian Court University	Natural Sciences equipment	$	244,804	
Gloucester County College	Scientific Laboratory Equipment	$	164,935	
Hudson County Community College	Math, Science & Technology equipment	$	216,208	
Kean University	Instrument Support for Chemistry Labs	$	202,802	
Kean University	Math/Statistics Computer Labs & Classroom	$	39,299	
Kean University	Math/Calculus Computer Labs & Classroom	$	39,299	
Kean University	Biotechnology Across the Curriculum Equipment	$	137,166	
Kean University	Biology Department Multimedia Lecture Hall	$	41,341	
Kean University	Biology Lab Preparation Equipment	$	24,672	
Kean University	Anatomy & Physiology Equipment Upgrade	$	18,475	
Kean University	Molecular Modeling/Bioinformatics Center	$	39,523	
Kean University	Presentation Tools for Biology Classrooms	$	8,880	
Kean University	Marine Biology Labs	$	6,919	
Kean University	Geology/Meteorology Lab Equipment Upgrade	$	70,116	
Kean University	Geology/Meteorology X-Ray Diffraction System Upgrade	$	30,360	
Kean University	Physics Lab Equipment Upgrade	$	24,745	
Kean University	Geology/Meteorology GPS System	$	3,989	
Kean University	Update Instrumentation in Chemistry Labs	$	67,238	
Kean University	Industrial Design Program Equipment	$	6,988	
Mercer County Community College	Natural Sciences equipment	$	109,645	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Middlesex County College	Division of Science Mathematic & Health Technologies equipment	$	377,060	
Montclair State University	Department of Biology various equipment	$	446,000	
Montclair State University	Molecular Biology and Genetics	$	38,000	
Montclair State University	General Biology equipment	$	38,000	
Montclair State University	Analytical Chemistry equipment	$	500,014	
Montclair State University	Earth and Environmental Studies Department various equipment	$	260,673	
Montclair State University	Mathematical Sciences equipment	$	171,497	
Montclair State University	School of Conservation	$	20,026	
New Jersey City University	Lab Equipment for Science Departments	$	459,431	
New Jersey Institute of Technology	MATH Capstone Course	$	24,895	
New Jersey Institute of Technology	Physics Lab Upgrade	$	20,000	
New Jersey Institute of Technology	Teaching Organic Chemistry in New Millenium	$	180,000	
New Jersey Institute of Technology	Center for Math, Science and Teaching Excellence	$	1,000,000	
Ocean County College	Lab Equipment	$	214,013	
Ramapo College of New Jersey	Scientific Equipment	$	161,175	
Richard Stockton College of New Jersey	Inorganic Chemistry equipment	$	7,800	
Richard Stockton College of New Jersey	Biology,Chemistry, Biochemistry & Molecular Biology	$	47,040	
Rowan University	Science Lab Equipment	$	1,027,550	
Rutgers, The State University of New Jersey	Core Science Facility	$	273,595	
Rutgers, The State University of New Jersey	Chemistry/Computer Science/Math/Physics/Research equipment	$	157,764	
Rutgers, The State University of New Jersey	Biology Instructional Equipment	$	122,360	
Rutgers, The State University of New Jersey	Cell Biology & Microscopy	$	380,250	
Rutgers, The State University of New Jersey	Chemistry Instructional Equipment	$	141,800	
Rutgers, The State University of New Jersey	Center for Molecular and Behavioral Neuroscience various equipment	$	75,000	
Rutgers, The State University of New Jersey	Chemistry Undergraduate Instructional Labs	$	171,477	
Rutgers, The State University of New Jersey	Mathematics Instructional & Research PC Labs	$	30,000	
Rutgers, The State University of New Jersey	Math & Science Learning Center	$	63,480	
Rutgers, The State University of New Jersey	Physics and Anatomy - Graduate Student Computers	$	37,980	
Rutgers, The State University of New Jersey	Behavioral Neuroscience/Psychology & Genetics	$	44,340	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Rutgers, The State University of New Jersey	Environmental Sciences/Analytical Environmental Chemistry Lab	$	97,800	
Rutgers, The State University of New Jersey	Environmental Sciences/Microbiology Lab	$	111,867	
Rutgers, The State University of New Jersey	Biotechnology Support Facility	$	180,000	
Rutgers, The State University of New Jersey	Plant Biology/Instruction	$	91,613	
Rutgers, The State University of New Jersey	Plant Pathology	$	38,897	
Rutgers, The State University of New Jersey	Plant Physiology course in Plant Biology curriculum	$	38,535	
Rutgers, The State University of New Jersey	Equipment for Measurement of Particle Size Distribution	$	65,350	
Rutgers, The State University of New Jersey	Parallel and Distributed Computing equipment	$	60,812	
Rutgers, The State University of New Jersey	Particle Image Velocimetry	$	28,705	
Rutgers, The State University of New Jersey	Environmental Initiative	$	250,000	
Rutgers, The State University of New Jersey	Advanced Materials: X-ray Flourescence System	$	123,159	
Rutgers, The State University of New Jersey	Advanced Materials: Dry Etching System	$	165,404	
Rutgers, The State University of New Jersey	Inquiry based Science Teacher Education	$	9,214	
Rutgers, The State University of New Jersey	Gene Discovery Center	$	300,000	
Rutgers, The State University of New Jersey	Supporting Soil & Plant Testing Capabilities for New Jersey Agriculture, Horticulture & NJAES Research	$	12,219	
Rutgers, The State University of New Jersey	Pharmaceutical Chemistry	$	37,767	
Rutgers, The State University of New Jersey	Pharmacy Practice	$	46,407	
Rutgers, The State University of New Jersey	Pharmaceutics and Drug Delivery/Mass Spectrometer	$	200,000	
Rutgers, The State University of New Jersey	Upgrade of DIMACS PC Lab	$	36,800	
Rutgers, The State University of New Jersey	Remus Vehicle	$	125,000	
Rutgers, The State University of New Jersey	Connectivity for the Center of Behavioral Health	$	40,000	
Rutgers, The State University of New Jersey	SCILS Information Technology & Informatics	$	92,086	
Rutgers, The State University of New Jersey	Digital Access to Microform Resources	$	254,348	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Salem Community College	Scientific Labs (Biology & Chemistry)	$	74,784	
Salem Community College	Mathematics Computer Lab	$	44,357	
Saint Peter's College	Biology	$	83,684	
Saint Peter's College	Physics	$	3,016	
Stevens Institute of Technology	Physics - Photonic Science Technology Lab	$	125,386	
Stevens Institute of Technology	Chemistry & BioChemistry - Molecular & Environmental Biology Lab	$	113,364	
Stevens Institute of Technology	Laboratory Simulation System	$	26,400	
Stevens Institute of Technology	Robotics & Control Program	$	78,660	
Stevens Institute of Technology	Wireless Systems Lab	$	84,225	
Stevens Institute of Technology	Institute Machine Shop	$	35,086	
Stevens Institute of Technology	Secure Network Systems Design Lab	$	10,046	
Stevens Institute of Technology	Center for Technology Management Research	$	10,738	
Sussex County Community College	Science Laboratories	$	192,100	
The College of New Jersey	Chemistry	$	960,513	
The College of New Jersey	Biology	$	597,058	
The College of New Jersey	Physics	$	494,463	
The College of New Jersey	School of Science	$	626,237	
University of Medicine and Dentistry of New Jersey	Proteomic Center Equipment	$	1,660,000	
University of Medicine and Dentistry of New Jersey	Microbiology & Human Genetics Equipment	$	1,250,000	
Warren County Community College	Mathematics - Enhancing Teaching and Learning through Sampling Calculators	$	13,500	
Warren County Community College	Enhancing Teaching and Learning in Biology & Chemistry	$	22,480	
William Paterson University of New Jersey	College of Science & Health	$	257,024	
	Total Natural Sciences			**$18,796,899**
	Research			
Kean University	Updated Spectrophometric Instrumentation	$	11,204	
New Jersey Institute of Technology	SOM Research Workstations	$	9,200	
Rowan University	Agilent Technologies Liquid Chromatograph/Mass Spectrometer System	$	148,796	
Rutgers, The State University of New Jersey	Lab for Cancer Research/Equipment	$	165,976	
Rutgers, The State University of New Jersey	Division of Life Sciences Core Facilities for Research, Instruction and Service	$	697,250	
Rutgers, The State University of New Jersey	Division of Life Sciences Core Facilities for Research, Instruction and Service	$	1,077,750	
Rutgers, The State University of New Jersey	Collaborative Video Conferencing with Off-campus Reaserch and Extension Centers	$	169,749	
Rutgers, The State University of New Jersey	Nuclear Magnetic Resonance Instrument	$	500,000	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Rutgers, The State University of New Jersey	X-Ray Crystallography	$	242,500	
Rutgers, The State University of New Jersey	Materials Science Research	$	173,000	
Rutgers, The State University of New Jersey	Research Program in Visual Perception & Cognition	$	114,560	
Rutgers, The State University of New Jersey	Cognitive Studies Eye Tracking Facility	$	35,000	
Rutgers, The State University of New Jersey	800 Mhz NMR-Life Sciences & Chemistry	$	800,000	
Rutgers, The State University of New Jersey	Lab for Surface Modifaction Nanoscale Surface Characterization Facility	$	177,000	
Rutgers, The State University of New Jersey	High Hydrostatic Pressure Unit for Research, Teaching and Extension for Food Science/Marine Science/Engineering	$	200,000	
Rutgers, The State University of New Jersey	Computer Controlled Lab Batch Reactor	$	37,746	
Rutgers, The State University of New Jersey	Semiconductor Parameter Analyzer	$	44,935	
Rutgers, The State University of New Jersey	Large data-set social science research community	$	63,000	
Rutgers, The State University of New Jersey	Research & Training Equipment	$	67,400	
Rutgers, The State University of New Jersey	Obesity Research Program	$	150,000	
Rutgers, The State University of New Jersey	Subsonic Wind Tunnel	$	60,753	
Rutgers, The State University of New Jersey	Luna Imaging System	$	12,000	
Rutgers, The State University of New Jersey	RUTCOR - Operations Research	$	16,000	
Rutgers, The State University of New Jersey	Luna Imaging System	$	12,000	
Stevens Institute of Technology	Secure Network Design Lab	$	83,300	
University of Medicine and Dentistry of New Jersey	Start up equipment for Chair of Cell Biology	$	493,000	
University of Medicine and Dentistry of New Jersey	Equipment for New Chairs and Faculty - RWJ Medical School	$	756,400	
University of Medicine and Dentistry of New Jersey	Genomics Center Equipment	$	1,510,000	
University of Medicine and Dentistry of New Jersey	Positron Emission Tomography/CAT Scanner	$	2,000,000	
	Total Research			**$ 9,828,519**
	Social Sciences			
Bloomfield College	Humanities Communictions Lab	$	6,664	
Bloomfield College	Humanities Video Lab	$	31,790	

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INSTITUTION	APPROVED PROJECT		COST	CATEGORY TOTAL
Bloomfield College	Social & Behavioral Science Lab	$	52,785	
Brookdale Community College	Psychology	$	17,414	
Camden County College	Arts, Humanities and Social Sciences Division	$	6,900	
Camden County College	History	$	8,000	
Camden County College	Continuing Education - Occupational Skills	$	39,000	
Camden County College	Continuing Education	$	48,000	
Camden County College	Continuing Education - Customized Training	$	19,200	
Camden County College	Continuing Education - General Interest Programming	$	17,280	
Camden County College	Dietetics	$	4,914	
County College of Morris	Psychology	$	15,660	
County College of Morris	English and Philosophy	$	809	
County College of Morris	Agricultural Technology	$	34,650	
Essex County College	Police Academy Target Retrieval/Lighting/Air Handling System	$	249,429	
Essex County College	Police Academy Driving Simulator	$	130,000	
Georgian Court University	School of Education	$	33,800	
Kean University	Psychology Department Video Observation System	$	6,000	
Middlesex County College	Division of Social Sciences & Humanities	$	88,650	
New Jersey Institute of Technology	Architecture Design and Visualization Studio Upgrades	$	500,000	
Richard Stockton College of New Jersey	Psychology Lab	$	26,547	
Rutgers, The State University of New Jersey	Center for Africana Studies	$	7,589	
Rutgers, The State University of New Jersey	Center for Evolutionary Studies	$	40,000	
Rutgers, The State University of New Jersey	Psychology Department Equipment	$	102,300	
Rutgers, The State University of New Jersey	Southern African Large Telescope Prime Focus Imaging Spectrograph	$	200,000	
Rutgers, The State University of New Jersey	New Technology Workforce Demands in Applied Psychology	$	40,000	
Rutgers, The State University of New Jersey	Startup for new faculty in the School of Education	$	40,786	
Rutgers, The State University of New Jersey	School of Criminal Justice Technology Initiative	$	39,018	
Rutgers, The State University of New Jersey	Department of Landscape Architecture	$	27,539	
Saint Peter's College	Afro-American Studies	$	3,400	
Saint Peter's College	Urban Studies	$	6,500	
Saint Peter's College	Theology	$	2,250	
Saint Peter's College	Psychology	$	81,417	
Saint Peter's College	Criminal Justice	$	3,800	
Saint Peter's College	Writing Program	$	9,900	
William Paterson University of New Jersey	College of Humanities & Social Sciences	$	71,752	

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INSTITUTION	APPROVED PROJECT	COST	CATEGORY TOTAL
William Paterson University of New Jersey	College of Education	$ 82,921	
	Total Social Sciences		**$ 2,096,664**
	Advanced Technology Centers		
Advanced Technology Centers	Rutgers/University of Medicine and Dentistry of New Jersey: PCR Sequencer Detector, Phosphorimager, 500 MHz NMR Cryoprobe	$ 405,000	
Advanced Technology Centers	Rutgers: Expansion of existing E10000 HPC Facility	$ 330,000	
Advanced Technology Centers	Rutgers: RF/Millimeter Wave Network Analyzer, Particle Characterization Equipment	$ 250,000	
Advanced Technology Centers	Rutgers: Upgrades to MCVD System	$ 225,000	
Advanced Technology Centers	Rutgers: Q-TPOF Mass Spectrometer	$ 150,000	
Advanced Technology Centers	Rutgers: Agilent Gas Chromatograph Mass Spectrometer	$ 80,000	
Advanced Technology Centers	NJIT: CNC Vertical Machining Center	$ 140,000	
Advanced Technology Centers	NJIT: Agilent Liquid Chromatograph Mass Spectrometer	$ 170,000	
Advanced Technology Centers	Princeton: Sputtering System, Vacuum Annealing Chamber	$ 250,000	
	Total Advanced Technology Centers		**$ 2,000,000**
	TOTAL EQUIPMENT LEASING FUND PROJECTS		**$100,000,000**