



# New Jersey Commission on Science & Technology



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2005-2006 ANNUAL REPORT

## **Our Mission:**

*To encourage economic development and job growth in New Jersey by:*

- promoting strong ties between industry and universities in order to accelerate commercialization of technology
- supporting entrepreneurial technology businesses in areas of strategic importance to the state and
- strengthening research collaborations among universities to create new potential for increased federal funding and private investment.

## **New Jersey Commission on Science and Technology**

**E**stablished in 1985, the New Jersey Commission on Science and Technology is responsible for the development and oversight of policies and programs promoting science and technology research and entrepreneurship in New Jersey. Commission members include business leaders, university leaders, scientists, the Secretary of Commerce and Economic Growth Commission, the Commissioner of Education, a representative of the Governor and four legislators.

## **New Jersey Commission on Science and Technology**

### **Highlights 2005**

#### **Technology Fellowships**

a new program putting young scientists to work at early-stage tech firms in New Jersey

#### **Stem Cell Research Grants**

leading the nation with public funding for embryonic stem cell research in New Jersey

#### **Technology Incubators**

increased funding to create new high-tech companies and jobs for New Jersey

#### **High Tech Recovery Plan**

providing a clear and compelling science and technology strategy for New Jersey

#### **More than \$1.4 million**

awarded directly to 24 early-stage technology companies

## Commission Members

DECEMBER 2005

### **Donald Drakeman, J.D., Ph.D.,** *chairman*

Dr. Drakeman is president and chief executive officer of Medarex Inc., one of New Jersey's largest and fastest-growing biotechnology companies. Medarex is developing targeted therapies for cancers and other life-threatening diseases. Medarex's patented monoclonal antibody technology is being employed by numerous companies in the development of new treatments for disease, including Pfizer, Novartis, Johnson & Johnson and Amgen. Under Dr. Drakeman's leadership, Medarex has raised more than \$1 billion in capital.

Dr. Drakeman is a founding member and former chairman of the Biotechnology Council of New Jersey. In 1995, Dr. Drakeman served as a member of the bicameral, bipartisan Joint Legislative Technology Task Force which produced a package of bills, including the popular, first-of-its-kind Technology Tax Certificate Transfer Program, which enables emerging technology businesses to raise capital by selling net operating losses.

**David P. Beck, Ph.D.,** president of BioScience Consulting. Dr. Beck is past president of the Coriell Institute for Medical Research and was adjunct professor in the Department of Molecular Genetics and Microbiology at UMDNJ-Robert Wood Johnson Medical School. He served as Associate Director of the Public Health Research Institute and in various capacities at the National Institute of General Medical Sciences of the NIH, rising to Deputy Director of the Genetics Program. Dr. Beck's scientific interests are in stem cell biology, human genetics, and the development of biomaterials banks for research. He has long experience at the intersection of science and public policy.

**Mario M. Casabona,** founder of Electro-Radiation Inc., a developer of electro-magnetic interference mitigation solutions serving the defense industry. Honeywell International recently acquired ERI, adding the Fairfield-based company to its Defense & Space Electronic Systems Missiles and Munitions business and naming Mr. Casabona its director of electrical protection products. Mr. Casabona currently serves as Chairman Emeritus of the Research and Development Council of New Jersey. Mr. Casabona holds several patents in the area of adaptive Electronic Interference Mitigation Technology.

**James Coleman Jr.,** chairman of International Matex Tank Terminals and acting chair of NJCST from June 2003 to October 2004. International-Matex Tank Terminals is a world-class provider of bulk liquid handling services for the petroleum and chemical industries; it is a privately owned company. The company has major facilities on the East Coast, West Coast, Gulf Coast, in the Midwest and Quebec and Newfoundland with 40 million barrels of storage capacity.

**Peter Eisenberger, Ph.D.,** professor, Earth and Environmental Sciences Department, Columbia University and former head of the Princeton Materials Institute, Princeton University. Dr. Eisenberger is co-chair of the National Advisory Board for a new science center in Tucson, Arizona. A fellow of the AAAS and the APS, he is leading an effort to devise a new way for professional societies to advise Congress.

**Richard Goldberg,** Vice President of Public Affairs for DRS Technologies, Inc., one of the nations leading defense contractors, headquartered in Parsippany, New Jersey. He was formerly the president of the Commerce and Industry Association of New Jersey and the former Executive Director of the American Electronics Association (AeA), and vice president of the Association of Food Industries, Inc. Mr. Goldberg's areas of expertise include media and government relations, business development, and marketing communications.

**S. Yee Lee, Ph.D.,** Chairman and CEO of Yee Enterprise Solutions, Inc. (YES-LENOVOcw). Dr. Lee is a former AT&T Vice President of Software Systems, named an AT&T Fellow in 2001 for his long standing exemplary contributions. Dr. Lee holds a Master's and PhD in Electrical Engineering and Computer Science from the University of Pennsylvania. He has completed Advanced Management and Executive MBA programs at the Harvard University School of Business. Dr. Lee recently formed a partnership with Lenovo promoting US-China relations regarding technology development.

**Gregory Olsen, Ph.D.,** President, GHO Ventures and co-founder of Sensors Unlimited Inc., a developer and manufacturer of optoelectronic devices for fiber optic communications systems and near infrared imaging devices. Under Dr. Olsen's direction, the company grew into a world-class fiber optic component design, fabrication and supply operation. Dr. Olsen was a research scientist at RCA Sarnoff Labs before starting EPITAXX, a fiber optic detector company in 1984. In 2005, he spent 10 days in space aboard the International Space Station. He holds a BSEE and MS Physics from Fairleigh Dickinson University and a Ph.D. in Materials Science from the University of Virginia.

**Sen. Robert W. Singer** represents District 30, including parts of Burlington, Mercer, Monmouth and Ocean counties.

**Assemblyman Upendra J. Chivukula** represents District 17, including parts of Middlesex and Somerset counties.

**Virginia Bauer,** Secretary and Chief Executive Officer of the New Jersey Commerce and Economic Growth Commission

**Lucille Davy,** Commissioner of the New Jersey Department of Education

**Patrick Brannigan,** Governor's Office

**Robert Altenkirch Ph.D.,** president, New Jersey Institute of Technology. Under Dr. Altenkirch's leadership, NJIT has developed a focused strategic plan emphasizing national prominence for a number of NJIT's academic and research strengths, recruiting high-achieving students from diverse backgrounds, increasing research funding and improving campus quality of life.

**Harold Shapiro Ph.D.,** president emeritus, Princeton University; University of Michigan. Dr. Shapiro served as Princeton University's 18th president and as chair of the President's Council on Bioethics for President Clinton. He is chair of the New Jersey Stem Cell Ethics Advisory Panel.

## Chairman's Letter

New Jersey has earned a reputation as one of the world's most attractive places to build high technology businesses. But achieving and sustaining technology leadership has proved challenging.

The Commission on Science and Technology this year launched several innovative programs that are helping New Jersey meet that challenge. We have provided \$1.4 million to 24 early-stage New Jersey tech firms through the New Jersey Technology Fellowship and SBIR Bridge Grant programs.

We increased the budget for Business Assistance by 50 percent, to \$5.5 million in FY 06, and expanded our network of Technology Incubators where early-stage companies find the support they need to succeed.

The Commission also made international headlines as New Jersey became the first state to award grants for the full range of stem cell research, approving a total of \$5 million for 17 research teams at university, nonprofit institution and corporate labs in New Jersey.

Commission members now are working with Governor Corzine's office to implement a High Tech Recovery Plan based on a report prepared at the Commission's request by Rutgers University Professors James Hughes and Joseph Seneca of the Edward J. Bloustein School.

The Rutgers report documented erosion of New Jersey's key technology assets and called for action to salvage the state's high-tech community. The Commission responded by reaching out to New Jersey's high-tech community to develop a strategic plan for promoting an entrepreneurial business climate in New Jersey.

We are pleased that Governor Corzine's vision for an Edison Innovation Fund encompasses many of the elements needed to support our technology economy. We will continue to work with the Governor and the technology community to implement his broad-reaching policy.

As this report shows, the Commission continues to work hard. Together with New Jersey's technology community, we are making progress, building partnerships and planning for New Jersey's prosperity. We welcome any ideas that might help us achieve our goals.

Sincerely yours,  
Donald L. Drakeman, J.D., Ph.D.  
Chairman



# Supporting High Tech Business

## Technology Fellowships



**Mariela Reyes-Reyes, Ph.D. (UMDNJ)** working at **Advaxis, Inc.**, a company poised to conduct clinical trials of a vaccine for late-stage cervical cancer patients. *“To work on a project that can be life-changing for everyone affected by this disease is a priceless opportunity.”*

**James Nehlsen, Ph.D. (Princeton University)** working at **Exelus Inc.** on environmentally friendly processes for ultra-clean fuels and other consumer products. *“The Fellowship accelerates my career by enabling me to jump immediately into an important project and contribute in a very significant way to the development of a new technology.”*

## Putting Research to Work

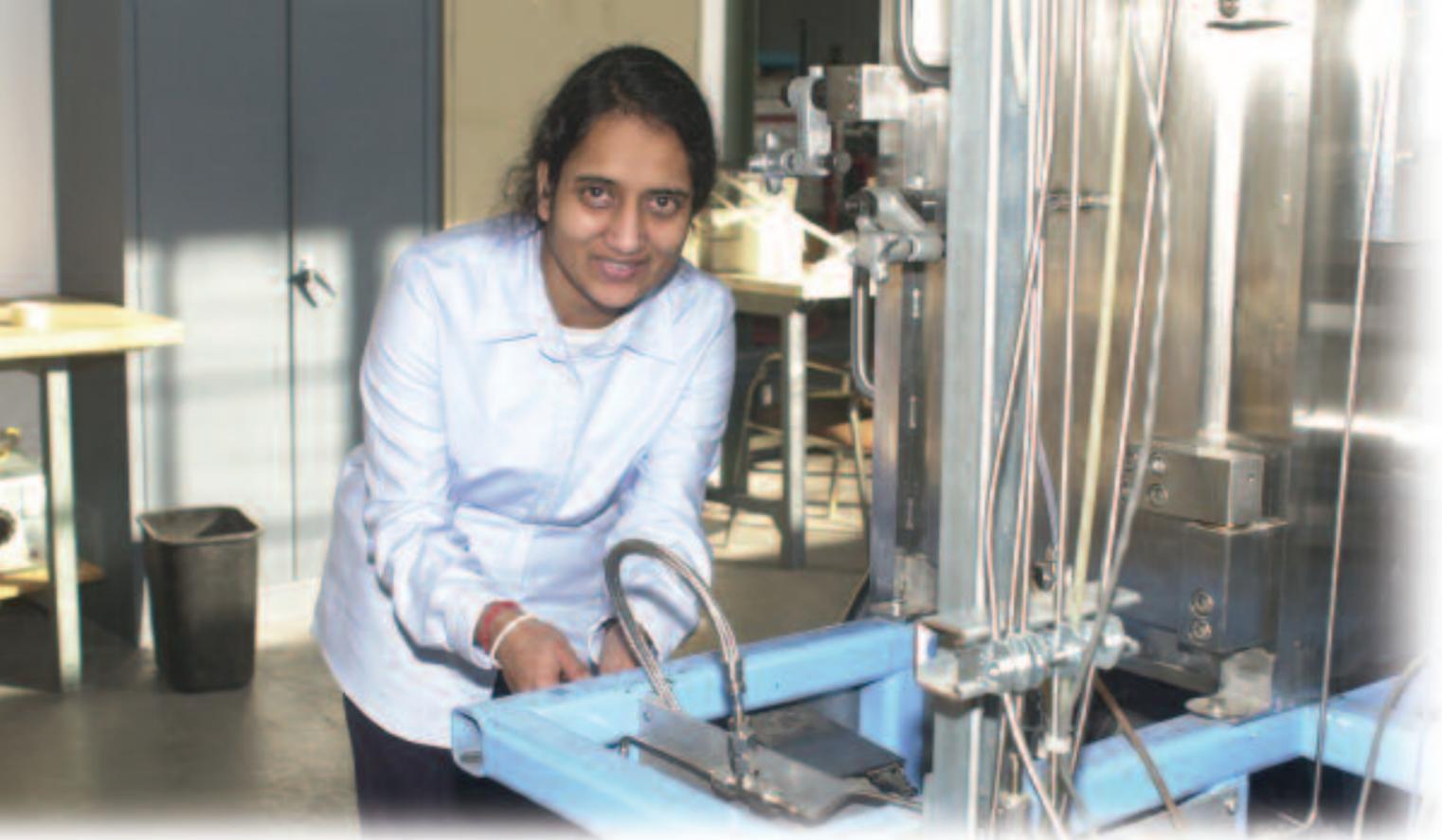
**T**he New Jersey Technology Fellowship is a unique program giving early-stage firms what they need most – talented, dedicated employees.

The Commission offers early-stage tech companies up to \$55,000 to hire selected post-doctoral graduates from New Jersey research universities. In 2005, the Commission awarded 14 Technology Fellowships to talented young scientists working in a variety of tech fields, including alternative energy and life sciences.

The Technology Fellowship program is dedicated to the memory of Dr. William Oliver Baker, a founding member of the Commission on Science and Technology. Dr. Baker was president of Bell Telephone Laboratories from 1973-1979 when Bell Labs scientists twice received the Nobel Prize in Physics.

**Kathleen Gilbert, Ph.D. (NJIT)** working at **Pestka Biomedical Laboratories** to develop novel treatments for infectious diseases and cancer. *“This fellowship has given me the opportunity to begin my research career at a cutting-edge biotech firm.”*





**Anamika Patel, Ph.D. (NJIT)** working at **Energy Photovoltaics** to make solar energy more economical.  
*"Establishing the tie between industry and university is a very good idea."*

**"Of all the types of assistance the state could provide to a young start-up such as Signum, Tech Fellowship is the best we have seen."**

– SIGNUM BIOSCIENCES



**Jason Steffener, Ph.D. (NJIT)** working at **Medsonics, Inc.** on developing ultrasound medical monitoring and imaging diagnostic devices.

## Technology Fellowships

### Retaining Talent

**"This program helps create energy and awareness around New Jersey technology companies, while building long-lasting relationships between those companies and NJ universities."**

– LORI ARNOLD, CEO RELEVANTNOISE

**"We are proud to launch the careers of these young scientists and to help New Jersey entrepreneurs create more quality high-tech jobs in New Jersey."**

– DONALD L. DRAKEMAN, COMMISSION CHAIRMAN



**David Fela, Ph.D. (Rutgers University)** working at **Signum Biosciences** to develop pharmaceutical and botanical extracts to treat neurological diseases. *"The Fellowship allows young researchers and small companies to perform advanced research that will lead to significant results for the biomedical community."*

**Gregory Kornhaber Ph.D. (UMDNJ)** working at **ExSar Corp.** on treatments for genetic diseases with no current therapies. *"Biotech ventures are springing up all over the country. This Fellowship increases the likelihood of retaining talent in New Jersey."*



# Supporting High Tech Business

## SBIR Bridge Grants Sustain Tech Companies

### Boosting Federal SBIR Funding for New Jersey

**F**ederal Small Business Innovation Research (SBIR) funding finances the critical start-up and development stages for new tech firms and enables entrepreneurs to create quality jobs in our state.

The Commission on Science and Technology is boosting federal funding by helping entrepreneurs win competitive grants through the federal (SBIR) program.

#### The Commission offers:

- Bridge Grants (\$50,000) to sustain New Jersey early-stage firms through the funding gap between phases of federal R&D grant awards
- Training sessions where entrepreneurs learn how to develop winning applications for federal grant programs

### Finding a Better Way

**M**enssana Research Inc. is putting “the world’s most sensitive breathalyzer” to work helping physicians diagnose and treat TB and other devastating diseases faster and cheaper.

Menssana’s technology is “a billion times more sensitive than the breathalyzers used by the police to measure alcohol,” says Michael Phillips, CEO and president of **Menssana Research, Inc.** This simple test could improve early detection – and treatment – of diseases such as lung cancer, breast cancer and heart transplant rejection.

To help **Menssana** advance its innovative technology, the Commission awarded a \$50,000 SBIR Bridge Grant to the Fort Lee company. The grant provided needed revenue while Menssana pursued a second National Institutes of Health grant.

Today, **Menssana** is developing a miniaturized and rapid breath test suitable for screening in a doctor’s office. The company has won FDA approval for clinical use of the test for heart transplant rejection and the company is now seeking approval to market the breath test for lung cancer in Europe and the U.S.

“The SBIR Bridge Grant award did exactly what its title says — it was a bridge between two NIH awards, and it was very helpful and welcome,” Phillips says.

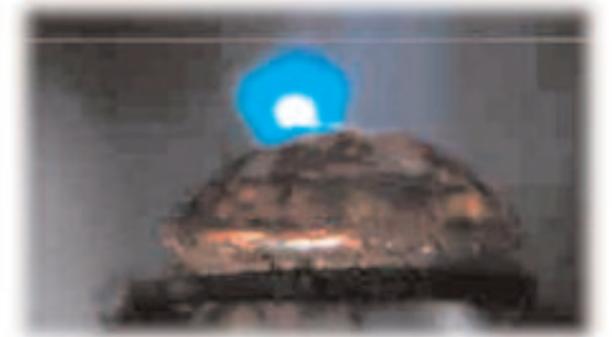
### High-Tech Detectives

**E**nvimetrics is using plasma technology to help keep our air clean and our soldiers safe. The Bedminster start-up uses patented plasma technology to monitor mercury emissions from incinerators and utility plants and to help the US Army detect chemical, biological, explosive and nuclear agents from a safe distance. **Envimetrics** also is applying its innovative technology to homeland security uses to detect explosive, chemical and biological agents.

A Bridge Grant from the Commission helped keep **Envimetrics** in business between federal grant awards, enabling the firm to complete development of its product early and to pursue new applications, says Philip Efthimion, director of research and development.

**Envimetrics** now is working on a portable device for use in the field, as well as non-military uses such as chemical analysis for the gem industry.

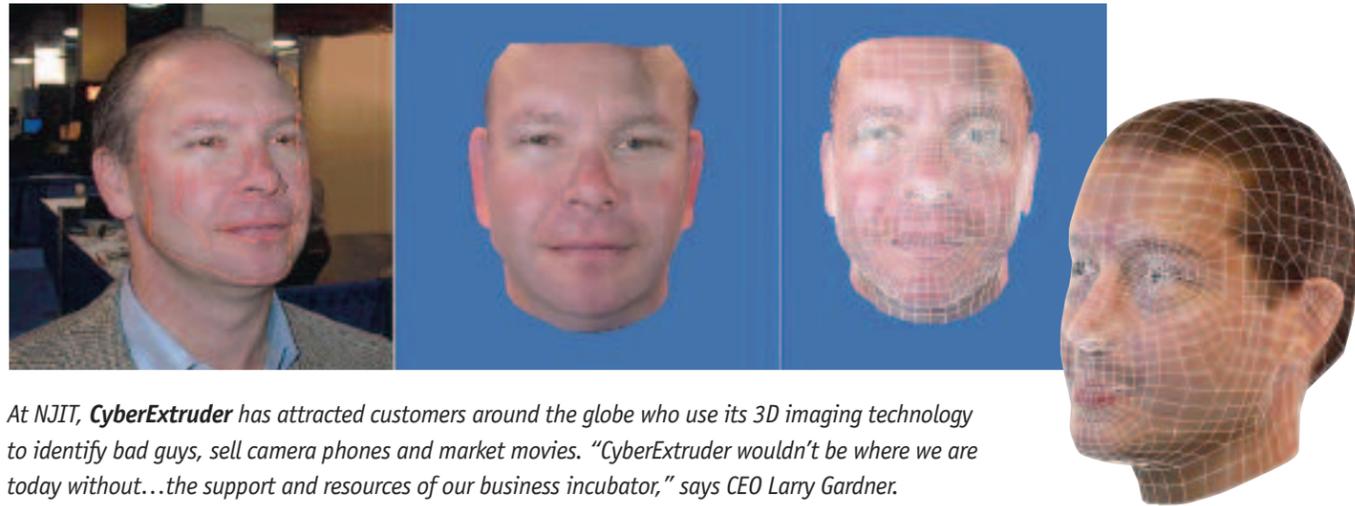
“Envimetrics is very appreciative to have received an SBIR Bridge Grant,” Efthimion says. “The Grant has allowed us to pursue non-military applications of the technology...Furthermore, the Grant has allowed us to provide briefings on our technology to other DOD agencies — and it will probably result in additional funding and military applications.”



Gem analysis by **Envimetrics**

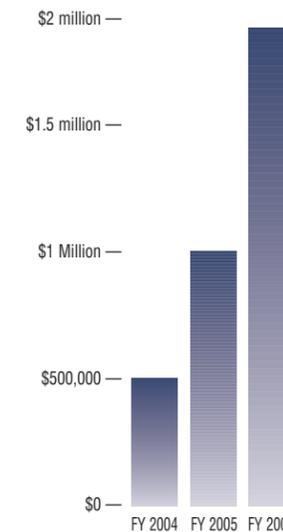
# Supporting High Tech Business

## Technology Incubators Breed Success



At NJIT, **CyberExtruder** has attracted customers around the globe who use its 3D imaging technology to identify bad guys, sell camera phones and market movies. "CyberExtruder wouldn't be where we are today without...the support and resources of our business incubator," says CEO Lary Gardner.

Commission Support for Incubator Services



"If we hadn't been in the Incubator, we wouldn't have been able to survive long enough to attract \$3.2 mil in VC funding."

- CERIONX

## Mentoring People, Nurturing Business

In FY 05, the Commission Technology Incubator network supported **160 companies** providing more than **900 jobs**.

In FY 06, with the addition of three incubators, the Commission Technology Incubator network now supports **240 residential companies** providing **950 jobs**, plus 124 virtual client companies.

### New Technology Incubator Services

- Seed Funds providing much-needed, pre-"angel" financial support to early-stage firms within Incubators
- Partnership with MBA students and business school faculty to help entrepreneurs with market research, sales, pricing and competitive analysis
- Entrepreneur-in-Residence providing one-on-one mentoring and support
- Counseling on financing, legal issues, sales, marketing, human resources, and real estate
- Mentoring senior-year college students planning to launch tech-based businesses
- Seminars and private advisory sessions with financial expert in tech-based investments and deal structuring
- Collaborative technical programs including access to prototyping and design assistance

## 2005 Tech Incubator Metrics

- New Jersey incubators graduated 19 firms from January 2004 to June 2005
- New Jersey incubator companies raised about \$56 million from third-party investors
- New Jersey incubator companies have revenues of \$110 million
- New Jersey incubator companies provide more than 900 jobs

### Technology Incubator Network

**NJIT Enterprise Development Centers I, II, III**  
Newark, 973 643-4063

**The Technology Centre of New Jersey**  
North Brunswick, 732 729-0022

**Picatinny Technology Innovation Center**  
Dover, 973 442-6400

**Trenton Business & Technology Center**  
Trenton, 609 396-8801

**Rutgers-Camden High Tech Incubator**  
Camden, 856 225-6400

**Business Development Incubator at New Jersey City University**  
Jersey City, 201 200-2313

**The High Technology Small Business Incubator**  
Burlington County College, 609 894-9311

**Rutgers EcoComplex\***  
Bordentown, 609 499-3600

**Food Innovation & Research and Extension Center\***  
Bridgeton, 856 495-1125

**ACIN-High Tech Incubator\***  
Camden, 856 614-5414

\*Added in January 2006



Companies at Technology Incubators such as the Enterprise Development Center at NJIT have created more than 900 tech jobs in New Jersey.

# Leading the Nation in Stem Cell Research

## Commission programs encourage discovery, innovation

The New York Times

Published: December 17, 2006

### New Jersey Awards \$5 Million in Grants for Stem Cell Research

By DAVID W. CHEN

TRENTON, Dec. 16 - New Jersey officials on Friday announced \$5 million in grants for stem cell research, including studies involving human embryonic stem cells. The awards are said to be the first instance of a state using public funds for such research.

The grants may appear to be modest compared with those for other scientific endeavors, but they represent an important step in New Jersey's effort to establish a stem cell research industry. With strong competition already under way from California and Florida, supporters say, New Jersey cannot afford to fall behind.

"The grants we have awarded today are based on science, not politics, and have been conceived by some of the brightest minds and best institutions in our state," Acting Gov. Richard J. Codey said in a statement. "This funding will hopefully set the stage for a new era in medical research that will ease the suffering of millions of people and save lives."

State officials said the grants will fund research using embryonic stem cells in human and mice.

New Jersey is the first state in the nation to award public grants for research using human embryonic stem cells.

The Commission in December 2005 awarded \$5 million in grants to 17 research teams at university, nonprofit institution and corporate labs in New Jersey for ground-breaking research into potential therapies for devastating and debilitating disorders.

The New Jersey Stem Cell Research Grant program advances New Jersey's leadership in the life sciences industry by creating new opportunities and new research capacity in New Jersey.

New Jersey Stem Cell Research Grants encourage both development of cell-based therapies for today's incurable diseases and a surge in technological innovations contributing to economic development and high-tech job growth in New Jersey.

### Fighting Cancer

At Princeton University, **Kateri Moore** is using a New Jersey Stem Cell Research Grant to understand how stem cells interact to maintain healthy body tissues.

Understanding such a normal process, she says, will lead to understanding what goes wrong in times of disease, specifically metastatic cancer – and help develop targeted therapies to halt abnormal signals.

"The people of New Jersey have the highest interest in the best possible health care," Dr. Moore says. "That can only be obtained through the support of basic research programs that translate into therapies."

### Solving the Mystery

**Michael Shen** is leading a UMDNJ-Robert Wood Johnson Medical School research team investigating embryonic stem cell differentiation – how they keep their options open for developing into any cell needed and how they decide to become specific cell types.

The New Jersey Stem Cell Research Grant enables Dr. Shen to work with human embryonic stem cell lines. Understanding these basic biological processes is the first step to developing ways for directing stem cells to become the types of cells patients need.

"I am extremely enthusiastic about the NJCST Stem Cell Research Grant program," Dr. Shen says. "The funding of these initial awards speaks far louder than the rhetoric that dominates public discussion of this topic."



### Building New Bones and Cartilage

**Treana Arinze** believes she has found a better way to treat patients with cartilage defects and injuries. The New Jersey Stem Cell Research grant enables her to prove it.

Dr. Arinze is working with an orthopedic surgeon at the New Jersey Sports Medicine Center and a researcher from the Naval Undersea Warfare Center to develop nanofiber "scaffolds" that encourage stem cells to grow strong, healthy tissue that can replace damaged cartilage.

In earlier research, Dr. Arinze showed that stem cells, when mixed with scaffolds, can help regenerate bone growth and that stem cells taken from one person can be successfully implanted into another.



### 2005 New Jersey Stem Cell Initiative

- First state to fund hESC research
- \$5 million in stem cell research grants
- The Stem Cell Institute of New Jersey
- Annual statewide symposiums encouraging research collaborations
- New Jersey Stem Cell Resource Bank for donated cord and placental blood providing researchers with a reliable source of stem cells

## Funding Scientific Discovery

**Monica Roth** is using the New Jersey Stem Cell Research Grant to apply her expertise in gene therapy to stem cell biology in hopes of finding more effective treatments for blood disorders and cancer.

Grants awarded by the Commission are stimulating new research and enabling scientists from diverse specialties to develop and apply their expertise to new areas of investigation.

“The New Jersey Stem Cell Research Grant program sends an extremely healthy signal to scientists — as well as citizens of New Jersey — about the future of scientific discovery in the state,” Dr. Roth says.



## Building BioTech Partnership

The New Jersey Stem Cell Research Grant program prompted **Celgene Corp.** - the world's fifth largest biotech company - to team up with **Randall McKinnon**, at the University of Medicine and Dentistry of New Jersey, to develop a stem cell-based approach for treating spinal cord injuries, multiple sclerosis and similar debilitating conditions.

“This unique funding program represents an exciting

opportunity” Dr. McKinnon says. “Hopefully, this work will help progress our understanding of these diseases.”

Mo Heidar, senior director discovery therapeutics at Celgene Cellular Therapeutics, says these grants tell life sciences companies that New Jersey is “extremely committed to advancing collaborations that will accelerate innovation...and product development.”



## Curing Paralysis

At the W.M. Keck Center for Collaborative Neuroscience, **Ron Hart** and his research team are discovering how to “program” stem cells to treat brain trauma, stroke, spinal cord injury, Parkinson’s and Alzheimer’s disease.

“The first Stem Cell Research Grant program comes at a crucial time for researchers,” Dr. Hart says.

The New Jersey Stem Cell Research Grant enables Dr. Hart to pursue promising results from earlier research.

“Our goal is to cure paralysis,” Dr. Hart says. “We believe that some combination of stem cells and genetic programming will be an effective therapy...”



# Leading the Nation in Stem Cell Research

## Stem Cell Research Symposium

The Commission hosted its Second Annual Scientific Conference on Nov. 21 2005 at the Hyatt Regency Hotel in New Brunswick. The statewide symposium attracted 300 scientists, providing an opportunity to network with other researchers, industry representatives, venture capitalists and funders such as the Juvenile Diabetes Research Foundation and the National Institutes of Health.

The conference showcased New Jersey’s life science assets, including a thriving pharmaceutical and biotech presence, a world-class Stem Cell Institute, a dedicated funding source for research, a supportive political environment and a rich supply of cord and placental blood for research.



## Conference speakers

- Keynote Speaker: Harold Shapiro Ph.D., chair New Jersey Stem Cell Ethics Advisory Panel and President Emeritus of Princeton University
- Leonard Zon M.D., past president of the International Society for Stem Cell Research
- Sol Barer Ph.D., president of Celgene



# Creating a Foundation for High Tech Growth

## Moving University Research to Market

The Commission in April 2005 created a \$1 million Commercializing University Intellectual Property program to help New Jersey research universities develop new products, create new businesses and generate new quality jobs in New Jersey.

### FY 2005 programs

■ **New Jersey Institute of Technology**– NJIT has created multi-disciplinary teams of students, including MBA candidates and graduate students, to assess university-generated intellectual property. Students work side-by-side with entrepreneurs. Teams plan to present final reports during a special seminar on technology commercialization in June 2006.

■ **University of Medicine and Dentistry of New Jersey**– UMDNJ has collaborated with Rutgers University School of Business to enable Rutgers students to intern at the UMDNJ Office of Patents and Licensing. Rutgers students analyze license agreements for compliance and work with UMDNJ faculty inventors to develop business plans.

■ **Princeton University** – Princeton established a “Gap Fund” awarding grants to faculty for proof-of-concept, animal studies, data collection and prototyping to demonstrate the commercial potential of their research. Some of the winning projects include a miniaturized atomic clock valuable to GPS receivers, video security technology, and a coating to prevent corrosion that already is being eyed by a company moving to New Jersey from New York. The Fund has proved so profitable, the University has contributed \$250,000 to the effort.

### Increased Funding

The Commission in FY 06 boosted its investment to \$1.85 million for the University IP program to help attract more entrepreneurs to commercialize university research. These grants will enable University teams to obtain proof-of-concept research and prototyping, draw industry partners and create new, spin-off companies.

## Grants Help Attract Investors

Princeton University is using its University IP grant to help spin-off companies attract investments by demonstrating the commercial appeal of faculty research.

Through a new Gap Fund, Princeton recently awarded \$81,000 to *Orthobond*, a biotech firm using technology based on Professor Jeffrey Schwartz’s pioneering research to develop a bio/inorganic interface that encourages longer-lasting bone adhesion to orthopedic implants.

The Gap Fund award helped *Orthobond* finance proof-of-concept studies. Favorable results prompted discussions with potential partners for production, and *Orthobond* is beginning the process of obtaining regulatory approval for clinical trials. Plus, the extra income helped *Orthobond* hire a vice president of R&D.

“The grant made a huge difference for us,” says Hans Hull, VP and General Manager of *Orthobond*.

# Creating a Foundation for High Tech Growth

## Investing in Nanotechnology

**N**anomaterials – microscopic particles and products – are revolutionizing tech industries in New Jersey. The Commission is promoting nanotechnology innovations through the Greater Garden State Nanotechnology Alliance, an organization of researchers at university and industry labs, and the Mid-Atlantic Nanotechnology Alliance (MANA).

The Commission represents New Jersey as one of MANA's three state partners. Together with Pennsylvania and Delaware, we have created the nation's first multi-state coalition promoting nanotechnology.

A regional study commissioned by MANA in late 2005 began the important task of assessing the region's assets and potential for nanotech development. Preliminary findings showed the best commercialization model for nanotechnology will be entrepreneurial companies with university partners.

### Existing industry expects to profit from nanotech

- Pharmaceutical companies – predict major impact in 2010-2014 with 23% sales revenues incorporating nano by 2014
- Medical Equipment – nanocoatings, nanosensors, totaling 30% of sales revenue by 2014
- Industrial Electronics – see key opportunities in 2010-2014, with 75% of sales involving nanotech by 2014
- Batteries and Fuel Cells – nanostructured materials with 33% of sales incorporating nanotech by 2014

Source: Battelle Research 2005

## New Jersey Assets

### University research:

- A National Nanotechnology Institute-federally funded center: The Bio-Inspection, Design & Processing of Multifunctional Nanocomposites, at Princeton University
- A National Science Foundation designated Materials Research Science & Engineering Center — the Princeton Center for Complex Materials at Princeton University
- More than 100 Rutgers University faculty active in nanotechnology research
- New Jersey Institute of Technology faculty working with carbon nanotubes, polymers and synthetic proteins

### Industry:

- About 45 firms engaged in nanotech research and product development
- Picatinny Arsenal's radiofrequency plasma nanoparticle reactor – the largest and first in North America

Source: Battelle Research 2005

## Commission Support Bolsters Nanotech

**A** spin-off from Princeton University, **Nanonex Inc.** has developed a unique manufacturing technology that enables cost-effective mass production of nanotech devices, based on the pioneering research of Professor Stephen Y. Chou.

In 2005, **Nanonex** received an SBIR Bridge Grant from the Commission to help sustain the small firm between phases of its federal Small Business Innovation Research contract to work with the Department of Defense on creation of nanoscale masks.

The Monmouth Junction company continues to succeed. For the third year in a row, **Nanonex** has been named one of the Top 60 start-ups by EE Times.

"The Bridge Grant is very important," says COO Larry Koecher. "It allows an uninterrupted effort in the drive to place these technologies in the market."

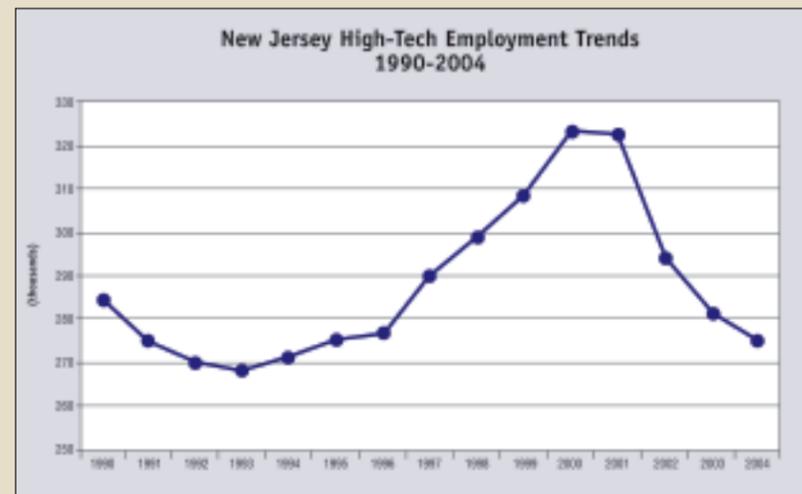
**New Jersey nanotechnology assets include university-based research and an energetic entrepreneurial community**

# Building a High Tech Economy

## New Economy Needs New Strategy

At the request of the Commission on Science and Technology, Rutgers University economists James Hughes and Joseph Seneca of the Edward J. Bloustein School of Planning and Public Policy prepared a comprehensive analysis of New Jersey's technology economy.

Their report, **An Economy at Risk: The Imperatives for a Science and Technology Policy for New Jersey**, showed that New Jersey has lost tech jobs and gained lower-level jobs. But tech jobs are key to our economy. Tech jobs represent 7 percent of New Jersey jobs, but provide at least 30 percent of state income taxes.



### Policy Principles

- Significant resources should be committed to building research excellence
- The magnitude of this commitment should be sustained over time
- Resources should be invested in a strategic and focused manner
- State investments should be based on a peer-review process

### Three Key Policy Goals

- Support Economic Growth Driven by University Research
- Enhance the Entrepreneurial Environment
- Assist Existing Technology Businesses

Source: *An Economy At Risk*

## Recommendations

The **Economy at Risk** report identifies four development phases for New Jersey Science and Technology Policy, including:

### Phase I

Establish new centers of excellence and facilitate cooperation within the academic research community.

- The Commission should develop appropriate plans for centers of excellence, including funding requirements and implementation schedules.
- The state should establish an Eminent Scholar Endowment program to recruit world-class researchers to New Jersey universities in the priority science and technology areas.

### Phase II

Enhance the entrepreneurial environment.

- The Commission should work to improve the effectiveness of existing technology incubators and to establish new, specialized incubators in conjunction with development of centers of excellence.
- As a single, immediate policy with the most rapid payoff, the state should increase the supply of funding for investments in venture capital funds.

### Phase III

Improve the state's overall business climate and technology resources

- Work with representatives of industry to enhance graduate-level curricula in order to produce a highly skilled scientific workforce for the state's high-tech industries.
- A review of the state's overall business climate should once again be undertaken.

### Phase IV

Program Evaluation

- The Commission should develop and track measures of the effectiveness of programs.

Additional details are available at the Commission website, <http://www.state.nj.us/scitech/wn051206a.html>

**"New Jersey has been losing high-paying technology-dependent jobs and has been mainly gaining low-paying lower-level jobs."**

– JAMES HUGHES/JOSEPH SENECA  
*AN ECONOMY AT RISK*

# Advancing A High Tech Recovery Plan

**T**he Commission on Science and Technology responded to the *Economy at Risk* report by developing a **High Tech Recovery Plan** with input from New Jersey's high-tech community.

**The Goal:** Thriving and growing high technology businesses in New Jersey, leading to increased numbers of high-paying jobs

**The Policy:** Invest State resources in a series of near-term, mid-term and long-term programs designed to promote high technology job growth and company success. These investments will be focused on the critical elements of high technology success, or the "Creativity Cascade":

- Creation of intellectual property (IP)
- Efficient acquisition and development of IP into commercial product opportunities
- Promotion of an entrepreneurial business climate in which IP can be converted into economic growth.

Additional details are available at the Commission website, <http://www.state.nj.us/scitech/wn051206a.html>

**"Many graduates from my lab are doing extremely well — but in other parts of the country. There need to be more opportunities in New Jersey."**

— ERIC GARFUNKEL, RUTGERS CHEMISTRY PROFESSOR



*Tech jobs at Burlington County Community College incubator.*

# Success Story

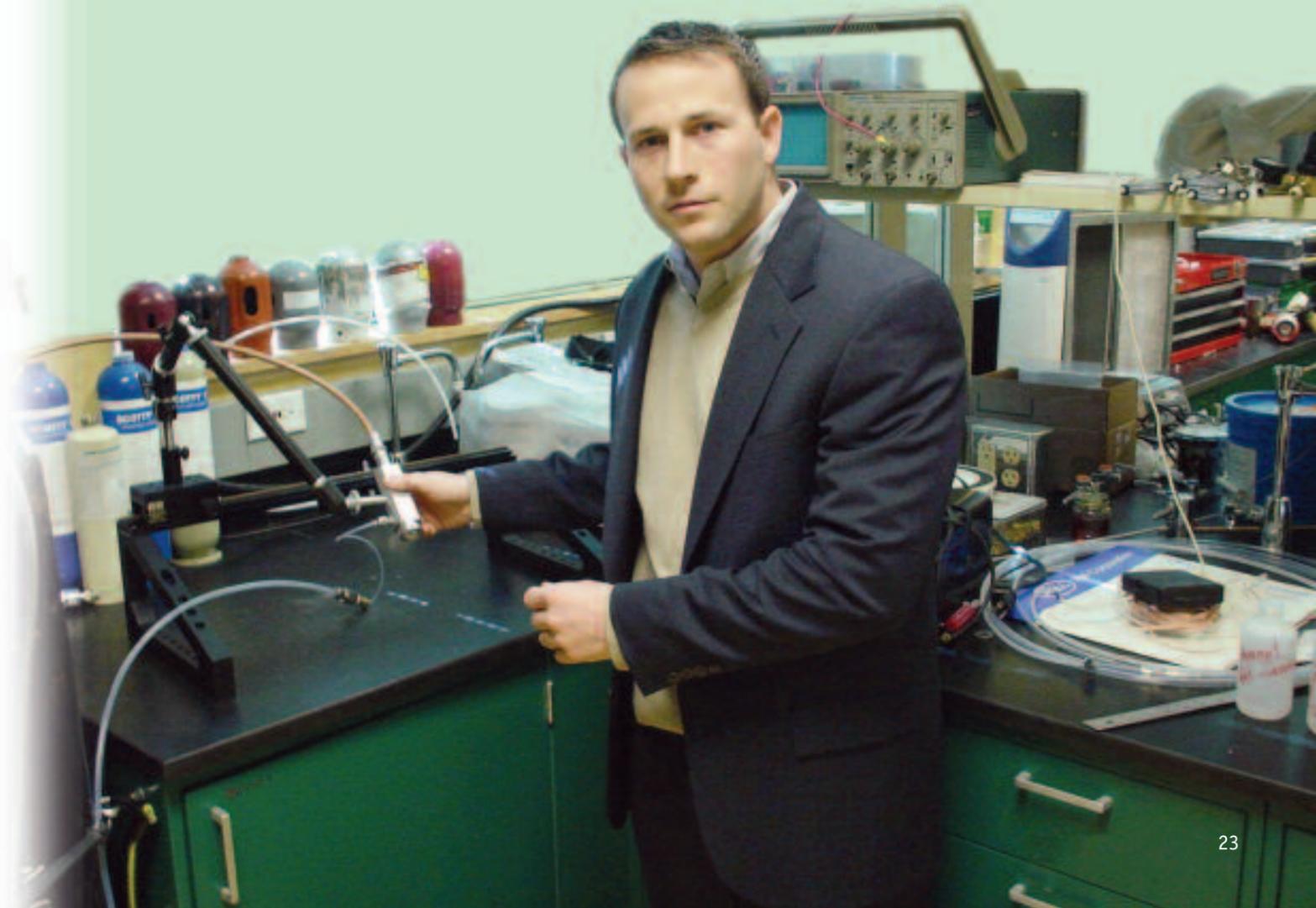
**A** \$250,000 grant from the Commission helped **PlasmaSol** grow into a valuable tech firm that recently sold for more than \$17 million.

Seth Tropper started **PlasmaSol** as a spin-off company based on Stevens Institute of Technology plasma research. The Commission grant enabled **PlasmaSol** to develop a prototype that attracted federal contracts, as well as private investors.

That grant came at a crucial time for **PlasmaSol**, Tropper says. Now he counsels other entrepreneurs to take advantage of state tech support programs.

Since the sale to Stryker, a large medical device manufacturer, Tropper is considering several tech ventures. But there's one thing he knows for sure: "I am absolutely planning to come visit the Commission."

**"I always advise (entrepreneurs) that the state has significant opportunities and programs to assist them."**



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