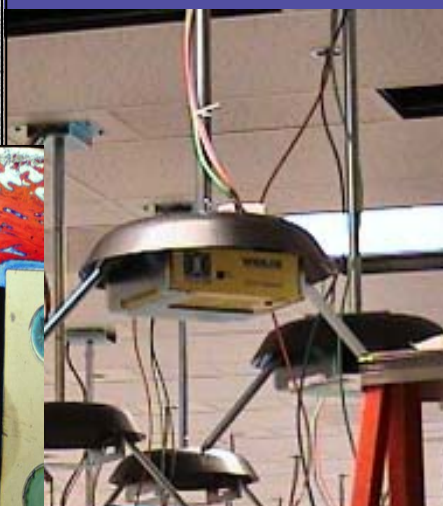
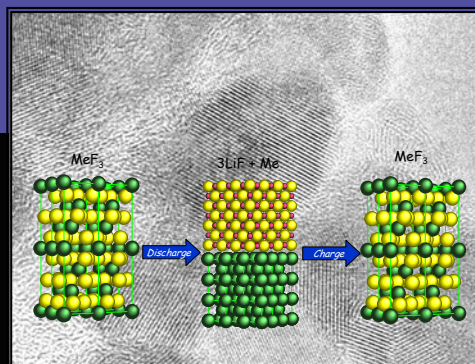
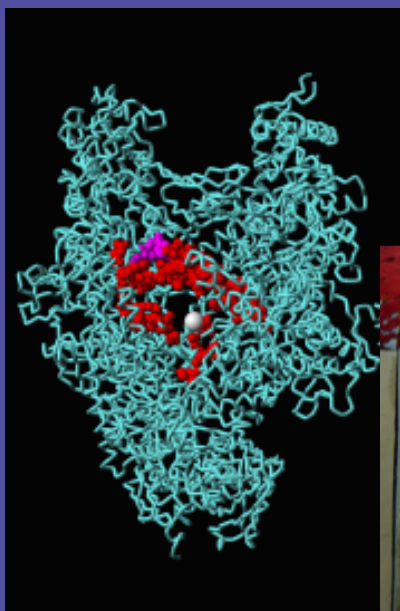


Annual Report FY 2005

Office of Corporate Liaison and Technology Transfer

Powering the connection between worldclass technology and the marketplace



“Successful university technology transfer programs ensure that not only will we have access to advanced medicines, computers, medical devices, plants and so on - but also that these new and better products will be available to help people, society and the environment worldwide.”

***Ann Hammersla
2004 - 2005 AUTM President***

Cover photo descriptions:



Clockwise from top left: 1) Work done in the labs of Drs. Ebright and Severinov which show the mechanism of action of the antibiotic microcin J25 (MccJ25), setting the stage for development of a new generation of antibiotics. MccJ25 inhibits the key bacterial enzyme RNA polymerase. The figure shows RNA polymerase in light blue. Sites of substitutions in RNA polymerase that confer resistance to MccJ25 are shown in red and pink. The RNA polymerase active center is shown in white. 2) The Energy Research Storage Group's (ESRG) ultra high energy storage technology, new mechanism and class of electrode materials enabled by nanocomposite metal fluorides; 3) From WINLAB, a portion of the ceiling-mounted ORBIT radio grid set up at the new Rutgers

Technology Center II facility; 4) The Technology Center II, Route 1, North Brunswick, NJ; 5) A distinct peach variety of Peach Tree called "Flat Wonderful; and ***Center:*** 6) From the Kohn Laboratory, an experimental device designed to test the ability of bone to interact with different biomaterials. Bone is colored in red and is seen penetrating to different degrees in between irregularly shaped coupons of various biomaterials.

The Year in Review

Technology transfer has evolved since the early 1980's to become an essential activity of most major research universities in the United States. The Office of Corporate Liaison and Technology Transfer at Rutgers has participated in this growth and is a prime example of how such an office can interact constructively with its own faculty inventors and the business community that seeks commercial access to the rich trove of intellectual property developed on our campus. In addition, the OCLTT has reached out in partnership statewide to the organizations supporting high technology business growth, such as the New Jersey Technology Council, the Research and Development Council of New Jersey and the Biotechnology Council of New Jersey. Importantly, the OCLTT has also nurtured a growing partnership with the two major state agencies whose mission it is to promote high technology growth in New Jersey: the Economic Development Authority of New Jersey and the New Jersey Commission on Science and Technology.

During this past fiscal year (which ended June 30, 2005), Rutgers received \$295.5 million in research, education, and public service grants and \$5.7 million in revenue from license agreements and sales of equity.

We are very pleased to report excellent progress in securing sponsored research agreements and licenses this past year, particularly during our continually challenging economy. Overall, the OCLTT processed more than 850 agreements, including the full execution of patent licenses, option agreements, confidential disclosure agreements, sponsored research, and material transfers. Rutgers was issued 21 patents, filed 55 provisional and 39 regular patent applications and received 131 invention disclosures.

These accomplishments pay tribute to the dedicated efforts of Rutgers University's world class faculty and staff. We are extremely optimistic about the future of Rutgers research and the OCLTT's ability to commercialize it. New programs have been introduced within the department and several new faces and positions have been added to better serve faculty and corporate partners.

We're proud of the OCLTT's accomplishments and enthusiastic about building continued relationships between our researchers and the corporate sector. We are confident that the best is yet to come.

Sincerely,



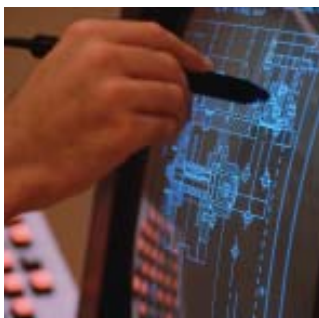
Michael E. Breton, Ph.D.
Associate Vice President
Research & Sponsored Programs



William T. Adams, J.D., L.L.M.
Director, Office of Corporate Liaison
and Technology Transfer

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Fast Facts

- Rutgers is the only public university in New Jersey that is a member of the Association of American Universities, a group comprising the 62 leading research universities in North America.
- As an institution, Rutgers is accredited by the Middle States Commission on Higher Education. That accreditation was reaffirmed in 1998 and 2003, and will again be reviewed in 2008.
- In 2005, OCLTT's Corporate Contracts group processed more than 735 contractual transactions, equating to \$20.3 million in industry sponsored projects.
- Rutgers technology transfer commercialization success stories have been published in the Annual AUTM Survey in six of the last seven years.
- James. L. Flanagan, former vice president for Research and director of the Center for Advanced Information Processing, received the 2005 Institute of Electrical and Electronics Engineers (IEEE) Medal of Honor. The award celebrates Flanagan's sustained leadership and outstanding contributions in speech technology. The IEEE is the world's largest technical professional society.

Did you know ...

Rutgers has two inventions listed in "University Inventions that Changed the World" according to the Patent Foundation, University of Virginia. Those inventions include:

- Streptomycin, invented by Selman Waksman and Albert Schatz in 1943. This was the first antibiotic effective against Tuberculosis
- Kentucky Bluegrass Hybrid patented (US PP4,223) by C. Reed Funk in 1977. This represents the first man-made Kentucky Bluegrass hybrid. Kentucky Bluegrass is perennial ground cover that withstands regular mowing and traffic. It is the turf of choice in cool-weather locations throughout the United States.

About Rutgers, The State University of New Jersey

Rutgers is one of the nation's major state universities with over 50,000 students on three regional campuses in Camden, Newark, and New Brunswick/Piscataway. Located in the center of the Washington/Boston Corridor between Philadelphia and New York, Rutgers is the eighth oldest college in the nation. The University was chartered in 1766 as Queen's College. Rutgers has a unique history as a colonial college, a land-grant institution, and a state university. The University was designated "The State University of New Jersey" by legislative acts in 1945 and 1956.



OCLTT Staff Members

The well-educated, professional staff at the Office of Corporate Liaison and Technology Transfer (OCLTT) offers extensive industry and university experience. Members of the team are specialists in business, law, licensing, and marketing and are dedicated to serving the distinct needs of the University faculty and our corporate partners. In 2005, new opportunities, growth, and ever-changing priorities led to a change in personnel, with staff members assuming new responsibilities and new personnel being hired.

Office of the Associate Vice President for Research

Michael E. Breton, Ph.D., Associate Vice President for Research and Sponsored Programs
Noelle Connelly, Administrative Assistant

Office of Corporate Liaison and Technology Transfer

Director: *William T. Adams*
Varinia Roberson, Administrative Assistant

Finance/ Compliance

Victor M. Sanchez, Associate Director
Wael Hanna, Accountant
Pamela Krebs, Administrative Assistant

Industrial Agreements/Corporate Contracts

Charles Wyckoff, Associate Director
Thomas Zambito, Contract Negotiator
Marian Monahan, Contract Grant Assistant

Intellectual Property/Patents

*Joseph DiDonato, Associate Director,
Intellectual Property*
Dorian Grumet, Intellectual Property Manager
Erica Graser, Patent Administrator

Ventures and Operations

Yair Harel, Associate Director
Leslye Lowen, Administrative Assistant

Technology Licensing

Agriculture (Cook-NJAES)

*Christopher Izzo, Manager, Licensing and
Technology*
Pat Bzdek, Administrative Assistant

Biomedical

*Barry Levinson, Consultant, Licensing and
Technology*
Lori Dars, Marketing Specialist

Engineering/IT

*Andrew Staroscik, Manager, Licensing and
Technology*

OCLETT Purpose and Goals

Rutgers University provides access to its science and technology through patenting and licensing of intellectual property, contracting for applied research projects, and actively organizing new company start-ups. The University has maintained an active technology transfer program since 1989, when the Office of Corporate Liaison and Technology Transfer was established. The primary purpose of the department is to transfer technology from the academic environment to the commercial sector. In doing this, it acts as a link between two unique cultures - the academic/research world which generates technology and the business/commercial world which puts this technology into the marketplace.



Our Goals:

- Support faculty, staff and students in matters relating to the protection and marketing of their intellectual property and the pursuit of research excellence.
- Develop a greater outside awareness of the University's research and educational programs, and the opportunities Rutgers offers industry for research collaborations.
- Facilitate industrial support of faculty research and the transfer of Rutgers technology to industry.
- Protect Rutgers intellectual property through patents, copyrights, trademarks, and agreements.
- License protected intellectual property to realize its commercial value.
- Negotiate fair and reasonable agreements in support of our missions and goals, which protect the University's fundamental interests and promote its fundamental policies.
- Promote corporate support and technology transfer in novel areas and promote economic development in the State of New Jersey.
- Advocate the value to both the university and the public of a Rutgers faculty interested not only in research, but in the applications of research as well.

Benefits of a successful technology transfer program:

- Research from academia is put to practical use in society, often improving the quality of life.
- Commercialization creates financial benefits to the University and its departments creating additional research funding.
- New businesses are created adding to employment growth and other economic benefits for the community and state.

Department Highlights

Route 1 Technology Center Opening

State and university dignitaries were on hand for the opening dedication of the 26,000 square-foot Rutgers Technology Center II. The new center was constructed by Rutgers University with \$3.7 million in financing from the New Jersey Economic Development Authority, at an existing structure on the New Jersey Technology Centre Campus on Route 1 in North Brunswick. The new Center houses WINLAB's wireless test bed; the Energy Storage Research Group that develops new chemistries to store energy; and Provid Pharmaceuticals, a drug discovery company.



The Technology Center II, Route 1, North Brunswick, NJ.

Rutgers IMAX Film and Directors Honored for Contribution to Scientific Literacy

The New Jersey Association for Biomedical Research (NJABR) honored "Volcanos of the Deep Sea," the IMAX movie based on research from Rutgers citing the film for its contribution to scientific literacy.

Released in 2003, the film describes the exploration of deep-sea hydrothermal vents in the Mid-Atlantic Ridge. The film has been viewed by 20 to 30 million people worldwide with a local showing at the Liberty Science Center in Jersey City, NJ.

Richard A. Lutz, professor at Rutgers' Institute of Marine and Coastal Sciences (IMCS), the film's science director, accepted the award at the NJABR's annual gala in Somerset, NJ. Lutz's IMCS colleague, Peter Rona, a marine geologist and professor, was the film's associate science director.



From left: Drs. Michael Breton, Associate Vice President for Research and Sponsored Programs; Phillip Furmanski, Executive Vice President for Academic Affairs; and Caren Franzini, CEO of the NJEDA cut the ribbon for the Technology Center II Opening.

Technology Transfer benefits both the University and the people of New Jersey

Drug Discovery Forum

OCLTT hosted this exciting event where New Jersey's premier research universities showcased cutting-edge research in the drug discovery and drug development



areas to potential investors and strategic partners. Sponsored by Johnson and Johnson, the forum included presenters from Rutgers, UMDNJ, NJIT and Princeton.

Rutgers presenters included Dr. Edmond LaVoie, Department of Pharmaceutical Chemistry; Dr. Bonnie Firestein, Department of

Cell Biology and Neuroscience; Dr. Richard Ebright, Department of Microbiology and Molecular Genetics; and Dr. David Devore, Department of Chemistry and Biological Chemistry.

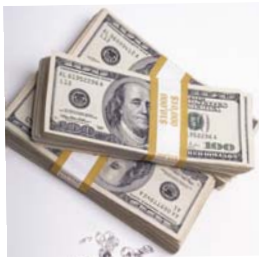
Department Highlights

Rutgers Technology Commercialization Fund (TCF)

TCF was created to provide Rutgers with an effective tool to enhance its technology commercialization efforts. This tool, which is managed by OCLTT, will advance promising Rutgers technologies and start-up companies to the point where outside entities (e.g. prospective licensees, strategic partners, angel investors, VCs) will be interested in investing their own resources to bring the technologies and related products and services to the market. To be eligible for consideration, the proposed technology has to be disclosed to OCLTT.

The TCF's sources of funds

An initial grant to TCF of \$325,000 has come from the New Jersey Commission on Science and Technology (NJCST). About half of this amount will be dedicated to Rutgers-generated technologies, and the balance will be used to fund Rutgers research and testing services provided to New Jersey companies. In addition, TCF has received a three-year commitment from Merck for a total of \$105,000. The TCF intends to start a proactive campaign to secure additional funding from corporations, partnerships and individuals.



The TCF grants

So far the TCF has reviewed 12 proposals and provided the following grants - totaling \$80,000:

- Dr. Suzie Chen - Melanoma cell line derived tumor bearing transgenic mice - \$15,000
- Dr. Daniel Murnick- High electric field, high pressure UV light source - \$15,000
- Dr. Yicheng Lu - Multifunctional nanosensors for biosensing and environmental monitoring - \$15,000
- Dr. Elsayad A. Elsayed- Automated sheet folding technology - \$15,000
- Dr. Gaetano Montelione - A process for designing influenza A virus inhibitors - \$15,000
- Dr. Sobin Kim - Microbead tip device for efficient genotyping by MALDI-TOF mass-spectrometry - \$5,000



David Ribnicky (second from left) and Ilya Raskin (second from right) share the spotlight with "Edison" and "Einstein."

Thomas A. Edison Patent Award

Drs. Ilya Raskin and David Ribnicky (members of Rutgers Biotechnology Center for Agriculture and the Environment) were awarded the 2005 Thomas Alva Edison Patent Award from the Research and Development Council of New Jersey. Their patent, titled "Method for Treating Type 2 Diabetes with an Extract of Artemisia," won on behalf of Rutgers in the Consumer/OTC category.

The invention describes anti-diabetic properties of a standardized extract of artemisia. The extract is currently being tested in clinical studies since it influences insulin resistance, the underlying cause of type 2 diabetes.

The Research and Development Council of New Jersey supports the advancement of technology and innovation within New Jersey by building working partnerships among academia, industry, and the state.

For the past 17 years, the R&D Council has presented the award to New Jersey inventors in several disciplines with a goal of recognizing outstanding patents with the potential to have an impact on New Jersey.

Improved Patents and Licensing Database

OCLTT is now using an upgraded Information Management System, the Inteum C/S® database. Inteum allows the department to more effectively manage disclosures and the Intellectual Property and Licensing Operations.

Inteum C/S® provides a universal view of technologies, patents, and agreements, and allows for quick, direct access to all relevant information, electronic documents and activities. The user-friendly system has increased printing and reporting capabilities as well as the ability to export data to spreadsheets and other programs.

Technology Highlights

Agriculture/Cook College

Peach Tree - Flat Wonderful



A new and distinct peach variety of Peach Tree "*Prunus persica*" was created by Dr. Joseph Goffreda, associate professor, Department of Plant Biology & Pathology. This variety, called "Flat Wonderful," is distinguished from other peach varieties by its unique combination of large showy pink flowers, red coloring of young foliage, flat fruit shape, and high quality nonmelting fruit. The fruit ripens in early midseason (late July) and is super sweet. In addition to bearing sweet, juicy fruit, the trees have beautiful springtime blossoms and attractive leaves, making them valuable and beautiful landscaping trees

Dr. Goffreda, director of the New Jersey Agricultural Experiment Station - Fruit Research and Extension Center, Cream Ridge, NJ also researches and develops new specimens of apples and apricot trees. In January 2005, Dr. Goffreda; Jerry Frecon, Agricultural Agent and Department Head, Rutgers Cooperative Extension of Gloucester County; and Peter Shearer, Specialist in Tree Fruit Entomology presented "Seven Promising Peach Cultivars from the New Jersey Agricultural Experiment Station at Rutgers University" at the Sixth International Peach Symposium in Santiago, Chile.

Life Sciences

Transgenic Mouse Model System

Incidence of malignant melanoma, a very aggressive type of skin cancer, is rising rapidly, and on its present course, the lifetime risk will reach 1 in 75 among Caucasians in the U.S. in the next five to ten years. If detected and removed at an early stage, the overall 5-year survival rate is relatively high. However, if the lesions are not detected and removed at an early stage, metastasis may occur and spread to other parts of the body, which is associated with high mortality rate. Currently, malignant melanoma is largely unresponsive to conventional therapies.

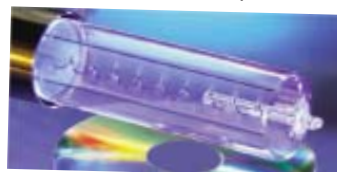


The research work of Professor Suzie Chen, Department of Chemical Biology, Ernest Mario School of Pharmacy, has shown that the aberrant expression of a G-protein-coupled-receptor, metabotropic glutamate receptor 1 (*Grm1*), in melanocytes to be responsible for the onset of melanoma in our system. Melanoma cell lines as well as a transgenic mouse line that displays melanoma phenotype spontaneously have been developed in Dr. Chen's lab. These research tools will be highly valuable for the discovery of novel therapeutic agents to treat melanoma by inhibiting the *Grm1* pathway. A potential marketing partner has been identified and hopes are that a drug therapy will be developed in the years ahead.

Physical Sciences

New and more efficient way to produce Ultra-Violet Light

UV Solutions, Inc. (UVS) was incorporated in November 2004 to design, develop and manufacture innovative ultraviolet light sources spanning a wide range of applications from materials processing, water treatment and



172 nm excimer lamp used to enhance wettability of surface in CD manufacture

ozone generation to the curing of paints, inks and adhesives. Incorporating proprietary technology licensed from Rutgers, the Company's products are far more efficient, powerful and cost effective than any

other existing system. The major competitive advantage of UVS technology is its ability to produce powerful UV radiators with very high (up to 70%) electricity-to-light

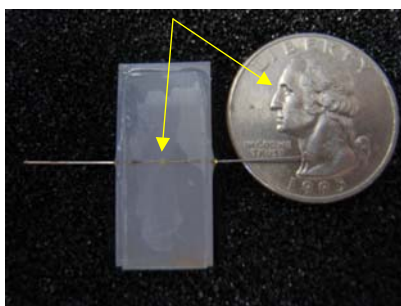
Technology Highlights

Ultra-Violet Light (continued)

conversion efficiency. Conventional systems reach around half this efficiency at best. In addition, UVS lamps are simple in design and use low-cost, DC power supplies. Environmentally friendly, they produce little heat and completely eliminate the use of mercury. The primary inventors for the UV technology are Drs. Daniel Murnick, a physics professor who holds the Donald H. Jacobs Chair of Applied Physics, and Manfred Salvermoser, research associate, department of physics.

Energy Research Storage Group (ESRG)

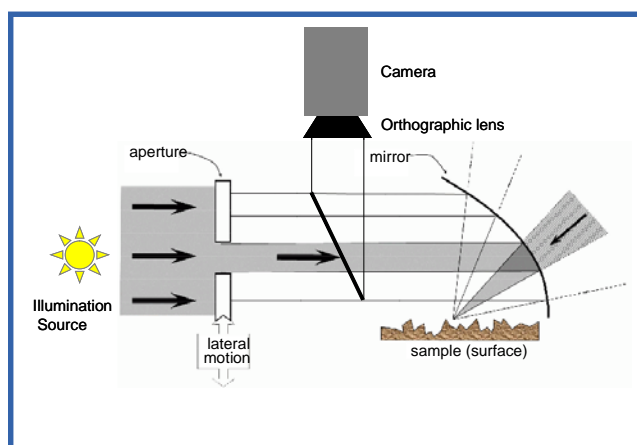
Professor Glenn Amatucci is the director of the Energy Storage Research Group (ESRG), a technically diverse applied research group whose charter is the research, development and advancement of new energy storage device chemistries enabled by advancements in materials science. The group focuses on a wide range of nonaqueous and solid state chemistries, the majority of



ESRG's self assembled microbattery is the size of Washington's eye

which incorporate ESRG developed nanocomposites which enable significant new abilities to deliver and store large amounts of power and energy per weight of device. The group focuses not only on the development of new materials but especially on the in depth understanding of bulk and interfacial operational and failure mechanisms which occur on the nanoscale during the operation of these ionically active materials. The ESRG maintains over 3000 square feet of off campus laboratories dedicated to this mission. Capabilities range from fabrication and broad characterization of macro and nanoelectrode materials to the development of rechargeable energy storage devices of flat laminar design incorporating these materials to evaluate electrochemical performance.

TextureCam - a novel, economical and compact surface characterization device



A concave parabolic mirror allows simultaneous measurement of reflected rays from a large range of angles. The same mirror also directs the incident rays to the sample.

The Rutgers TextureCam is a patented new device that enables variations of both viewing and illumination directions without the need for complex mechanical equipment. The TextureCam uses a concave parabolic mirror to focus light to a single point on the sample surface for illumination. The same mirror collects the reflected rays and images the sample on the camera. The sample surface is scanned using planar translations of the mirror, and the appearance from any view or illumination direction is reconstructed. A newly developed design has eliminated the scanning procedure. The primary inventor for the TextureCam is Dr. Kristin Dana, Assistant Professor, Electrical and Computer Engineering.

Potential commercial uses for the TextureCam include:

- characterization of optical surfaces: metals, textured surfaces, optical coatings, holographic surfaces.
- surface texture measurements in medicine e.g., skin disorders.
- surface analysis for machining and monitoring of wear, spark erosion, etch, powder blasting and laser texture
- secure optical watermarking of documents and cards.

WellGen, Inc. (www.wellgen.com) Natural Products Biopharma Looks To Cap Series B At \$3M

WellGen Inc., a biopharmaceutical company developing plant-based products for cancer and inflammatory



diseases, closed \$1 million of a planned \$3 million Series B round in late 2005. The company is backed by about \$7 million to date. WellGen's previous capital infusion closed Aug. 30,

2005 and was provided by existing Shareholder Amphion Capital Partners, the sole investor.

WellGen uses nutrigenomics to develop wellness products from plants that alter the expression of genes responsible for human disease. The company's core intellectual property was licensed from Rutgers. Key Rutgers inventors include Dr.s Geetha Ghai, Chi-Tang Ho, Mohamad Rafi and Robert Rosen, of the Food Science/Food Technology departments.

The company recently completed a pilot study testing a natural compound derived from tea on 18 patients with osteoarthritis. According to Chief Executive David Evans, WellGen plans to do a larger clinical trial before launching the product. WellGen is also looking at genes in obesity. "We have identified some natural compounds that turn off the genes involved," Evans said. Encouraged by animal studies that were completed in late 2005, WellGen anticipates beginning human clinical studies during 2006.

WellGen also has a cancer prevention program - targeting colon, breast and skin cancer - based upon a compound derived from orange peel. Evans eyed 2007 as an ideal launch date for this program. Founded in 1998, the New Brunswick, N.J.-based company has six employees.

Xstream Systems (www.xstreamsystems.net) Next Generation equipment for material identification



XSTREAM SYSTEMS produces next-generation equipment for material identification. The Vero Beach, Florida start-up's patented systems are based on energy-dispersive X-ray diffraction, a highly sensitive and accurate technology previously

available only in expensive, high-end systems used by major laboratories. Dr. William E. Mayo, Ph.D., cofounder of XStream Systems, Inc., has served as tenured professor in the Ceramics and Materials Science Department at Rutgers University for over twenty five years.

XStream Systems Inc. specializes in X-ray based detection equipment. Its unique technology analyzes the molecular structure of an object. The unique molecular fingerprint is then compared against a database of known threats, resulting in extraordinarily accurate threat identification information. "We are able to instantly identify whether a white powder is talcum powder, cocaine or just powdered milk," said chief marketing officer, Vincent DeTurriss.

Traditional X-ray machines rely solely on images from a machine that displays only the shape and density of the scanned object – not the molecular composition of the item.

The company is currently finishing up on a government contract for \$500,000 that tests the actual levels of performance on the products (X-ray systems) currently in the market. DeTurriss said the company's main goal is to eventually manufacture and sell molecular threat-detection systems for airports and various law enforcement type agencies locally and nationwide.

Phytomedics, Inc., (www.phytomedics.com)

A life sciences company merging healthcare and plant biotechnology

Launched in December of 1996, Phytomedics of Dayton, NJ is a successful and rapidly growing



biopharmaceutical company that specializes in discovering, developing and manufacturing novel botanical therapeutics.

Phytomedics defines botanical therapeutics as health and wellness products derived from plants and delivered in the form of pharmaceuticals, dietary supplements, functional foods, or cosmetic ingredients. Through state-of-the-art, proprietary approaches, Phytomedics' botanical therapeutics program reconnects plants and human health at a new level of technological sophistication. This platform overcomes major technological and economic obstacles to developing a new generation of efficacious, safe and standardized botanical therapeutics for humans.

Founded by Dr. Ilya Raskin, Rutgers professor at the Biotech Center for Agriculture & the Environment, Phytomedics signed a broad research and licensing agreement with Rutgers University. This allows the Company to exclusively license its core technologies and products. Phytomedics has a product candidate in Phase II clinical trials that shows significant potential in treating autoimmune disorders (specifically rheumatoid arthritis). A nutraceutical product for the prevention of Type II diabetes is expected to be introduced in 2005 by a marketing partner. Product candidates for cardiovascular health, beauty and wellness are also being developed.

TyRx Pharma Inc., (www.tyrxpharma.com)

FDA Approves First Medical Device Using Rutgers Biomaterial



Rutgers scientists and TyRx Pharma, Inc., have announced the Food and Drug Administration's clearance of a new medical device for hernia repair that incorporates a biodegradable technology developed at the University. This device signals a paradigm shift in the application of

biomaterials from permanent prosthetic replacements toward regenerative medicine, in which materials help the body to repair itself and are then reabsorbed.

The device consists of a surgical mesh coated with a polymer developed using a Rutgers bioresorbable technology. This may help maximize patient comfort during the post operative period. Also, the polymer gives the surgical mesh improved handling characteristics that facilitate precise placement during the surgical repair and leave less implant material following the resorption of the coating.

TyRx[®]

TyRx is dedicated to the innovation, development and commercialization of high-value combination medical devices and pharmaceutical products, utilizing robust tyrosine-based resorbable polymer systems developed by Dr. Joachim Kohn, director, NJ Biomaterials and Devices Center. Currently TyRx is partnering with Boston Scientific to develop new biodegradable coatings for the TAXUS drug eluting coronary stent line.

Connotate (www.connotate.com) **Creating Useful Intelligence from the Dynamic Web**

Connotate goes Beyond Search to create useful intelligence and to collect unique and valuable data from the Web. As a leading provider of web-monitoring and web-mining solutions, Connotate uses automation tools and machine-learning information agents that can be trained to do anything a human can to monitor, extract, repurpose and integrate web content. Connotate bridges the information gap by accessing actionable intelligence and indispensable data from any site on the "Surface Web" or "Deep Web." The Deep Web refers to content in data-



bases that rarely shows up in Web searches. Connotate software can search an estimated 500 billion Web pages and deliver the information in any format and through any delivery mechanism. This new approach complements search engines by automatically monitoring, mining, processing and delivering unique and timely data in addition to high-value and perishable information.

Located in New Brunswick, NJ, Connotate is privately-held with venture funding from Trautman-Wasserman, Inc. of New York City. The company is rapidly expanding both its client base and employee staff. Clients include large hedge funds, financial firms, global publishers, healthcare and pharmaceutical companies, energy and Internet businesses, and federal and state government agencies. The company was named as one of "100 Firms that Matter in Knowledge Management" by KM World in March, 2005. The company has also received accolades from both USA Today and TheDeal.com.

Connotate was formed in 1999 by three Rutgers University professors whose web-mining technology research was funded by the Defense Advanced Research Projects Agency and the University. Founders include Dr. Tomasz Imielinski, Professor and Chairman of the Department of Computer Science; Dr. Donald Smith, Director of the Laboratory for Computer Science Research, and an Associate Professor at Rutgers University; and Vincent Sgro, previously Research Programmer for the Computer Science Department at Rutgers.

Chlorogen (www.chlorogen.com) **Chlorogen receives \$6 million in Venture Funding**

Chlorogen, Inc., a biopharmaceutical company focused on the development and manufacture of plant-made proteins for use in the treatment and prevention of human diseases, has secured \$6 million in additional venture funding. The company, which secured an initial \$5.8 million in venture funding in 2003, will use the Series B investment to finance development of its lead product candidates, which include protein-based therapies for gynecological cancers.

Chlorogen, based in St. Louis, MO, produces therapeutic proteins in tobacco using chloroplast transformation technology (CTT™) and has acquired an exclusive license to chloroplast transformation patents held by Rutgers. The



technology was developed by Dr. Pal Maliga of the Waksman Institute for

Microbiology.

CTT is unique in the arena of plant biotechnology in that new genetic material is introduced into the cell chloroplasts rather than the cell nucleus, providing productivity and environmental advantages. Transforming the chloroplasts of plant cells greatly increases the protein output of plants and could yield a more cost-effective supply of proteins for therapeutic uses compared with other transformation systems. Another advantage of CTT is the fact that chloroplast DNA is not inherited through pollen, which can significantly limit the potential for foreign genes to be transferred to non-transgenic crops or other sexually compatible plants.

Since 2003, Chlorogen has used tobacco chloroplast technology to develop several candidates for preclinical evaluation. Chlorogen is actively pursuing a commercial TGF-beta candidate as a cancer therapy. In addition, Chlorogen has secured exclusive rights to competing technology and developed its own intellectual property around the chloroplast-tobacco platform to create a patent estate that provides the company with an impenetrable position with respect to plastid transformation of all plant forms. The company has licensed its patented technology to several leading companies for commercial use in food and agriculture.

Disclosure Activity

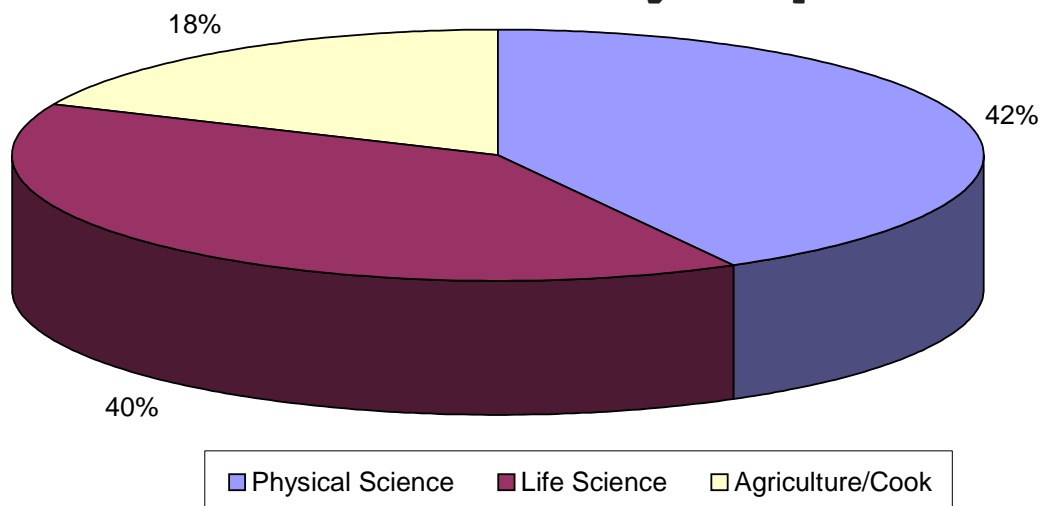
In FY 2005, 131 new disclosures were received by the department from Rutgers researchers. The largest share of disclosures (42%) were received in Physical Sciences, closely followed by Life Sciences (40%), with the balance (18%) related to Agriculture.

In addition to the disclosure activity, the department was actively revising its Triage process in FY 2005. The process was refined to ensure enhanced communication with faculty, better tracking of technologies received and related patent activity, and improved record keeping

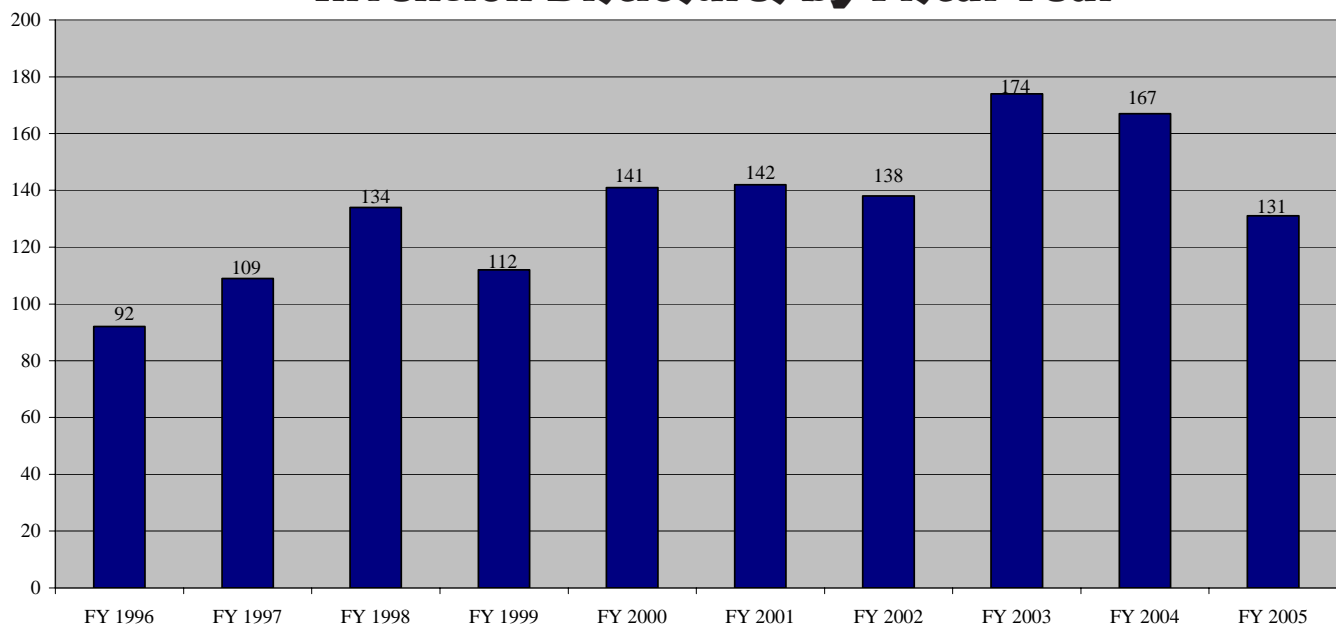
through the use of Inteum C/S, our new database. The department has also fine tuned its procedure for invention reporting.

Submitting a disclosure is often the first point of contact between the inventor and OCLTT and is typically the first step in getting a new idea, process, drug or devise into the marketplace. See pages 18 and 19 for a list of disclosures received in FY 2005.

Invention Disclosures by Discipline



Invention Disclosures by Fiscal Year



Patent Activity

O CLTT manages and commercializes the intellectual property (IP) developed at Rutgers. The University holds more than 400 US patents, 297 of which have issued since 1995. The continued high levels of patent activity shows the dedication and impressive accomplishments of Rutgers researchers.

providing there was no public disclosure prior to filing in the United States. Prior to the end of one year, the permanent patent application must be filed referencing the provisional patent application. If the filing does not occur within one year, the PPA is automatically abandoned.

Patent Definitions

A patent for an invention is the grant of a property right to the inventor, issued by the Patent and Trademark Office. The right conferred by the patent grant is, “the right to exclude others from making, using, offering for sale, or selling” the invention in the United States or “importing” the invention into the United States for a term of 20 years from the filing.

A Provisional Application for Patent (PPA) is a preliminary patent application which lasts for up to one year. It is the same legal format with the same kind of drawings as a permanent patent application, but without the claims. Once filed, PPAs are kept at the PTO for one year, establishing a legal filing date. PPAs are not examined by the PTO. During that year, the inventor has patent pending status.

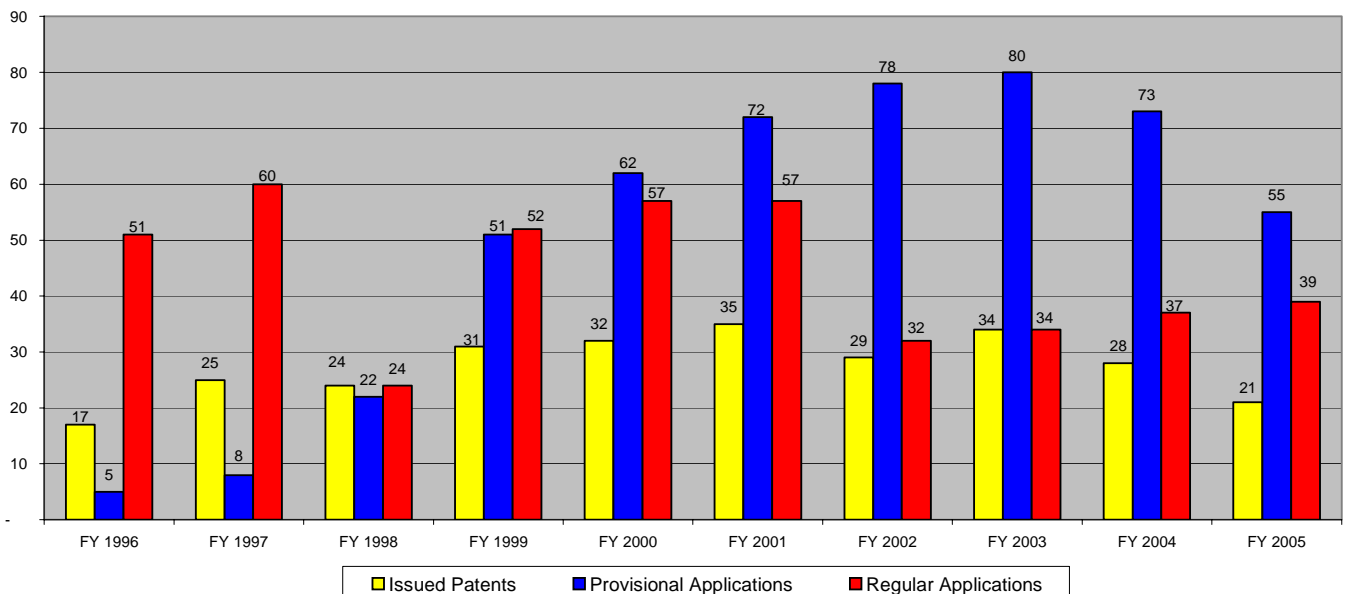
Provisional patent applications effectively preserve the inventor’s right to file patent applications internationally

Patent highlights

In FY 2005:

- 55 Provisional Applications for Patents were filed
- 39 Regular Applications were filed
- 21 U.S. Patents were issued to Rutgers.

U.S. Patents Issued and Applications Filed by FY



Corporate Contracts

Corporate Contracts is responsible for negotiating and processing industry sponsored projects. Their objective is to foster and maintain mutually beneficial relationships with industrial sponsors and to provide high quality and timely service to our faculty and staff while maintaining a balance between Rutgers and industry interests.

Since its inception in 1989, Corporate Contracts has experienced an overall upward growth trend. The record setting results for FY 2005, include 735 contractual transactions processed through this office equating to \$20.3 million in industry sponsored projects, an increase of 31% from FY 2004.

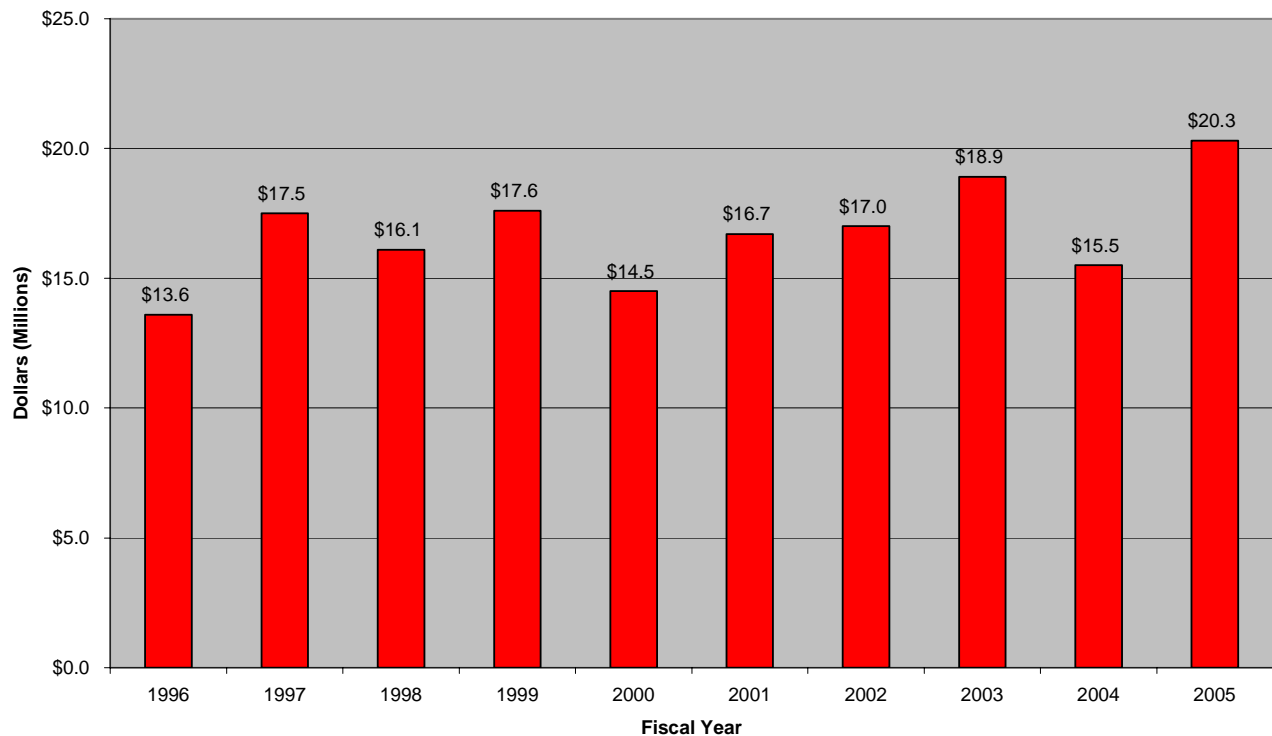
Corporate Contracts typically operates in a pre-license scenario when research is in the early stages of development. With few exceptions, OCLTT has the responsibility for all industry-related contracts that pertain to the outsourcing of faculty and staff members' scientific and

business know-how. Types of contractual arrangements include:

- Funded and collaborative research
- Small business ventures
- Laboratory/field services for a fee
- Material transfer (biological and other scientific material)
- Confidentiality/nondisclosure (exchange of proprietary information)
- Student Sponsorships (fellowships and company programs)
- Visiting scientists and sabbaticals
- Other unique agreements.

Corporate Contracts is the focal point for the hundreds of Confidential Disclosure and Material Transfer Agreements flowing through the University.

Corporate Contracts by Fiscal Year



Technology Licensing and Related Activity

OCLTT is involved with identifying potential licensees and negotiating licenses with appropriate companies. Depending on the technology and its market potential, either an exclusive or a non-exclusive license may be offered.

A license agreement grants the right to use a University invention. This is in exchange for the licensee's commitment to provide the resources required for further development and commercialization of the invention. Rutgers currently has over 100 active licenses (??).

According to the most recent published AUTM survey (2003), Rutgers ranked 13th in terms of Licenses and Options Executed (Exclusive and Non-Exclusive) compared to other universities without medical schools.

In FY 2005, OCLTT had a record-breaking year in terms of licensing revenue, which totaled \$5.7 million. We're optimistic that the growth trend will continue.

Technology licensing is one of the more visible methods of technology transfer. In addition to generating royalty income, bringing together University researchers with business and industry can translate into additional research and development dollars.

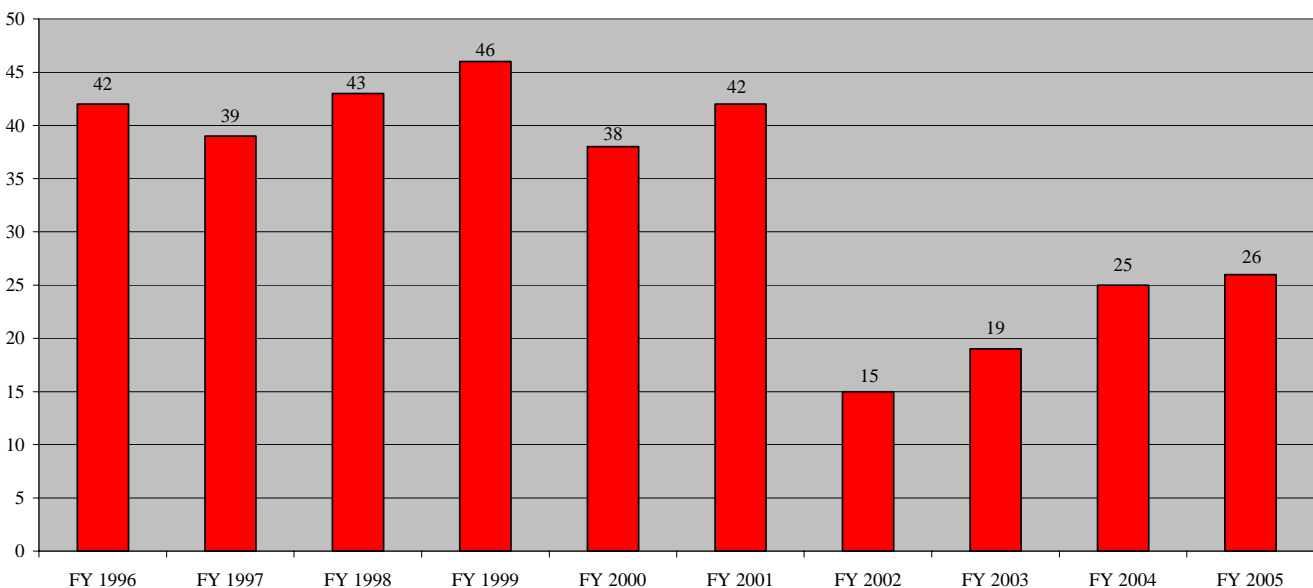
Licensing Highlights

- 26 license agreements (including options for licenses) were completed.
- 62 Confidentiality Agreements were executed
- Total licensing revenue was \$5.7 million, a record for the office, and an increase of over 30% from 2004
- Total licensing revenue since 1994 is \$48.6 million

Following is a sampling of successful licenses executed in FY 2005.

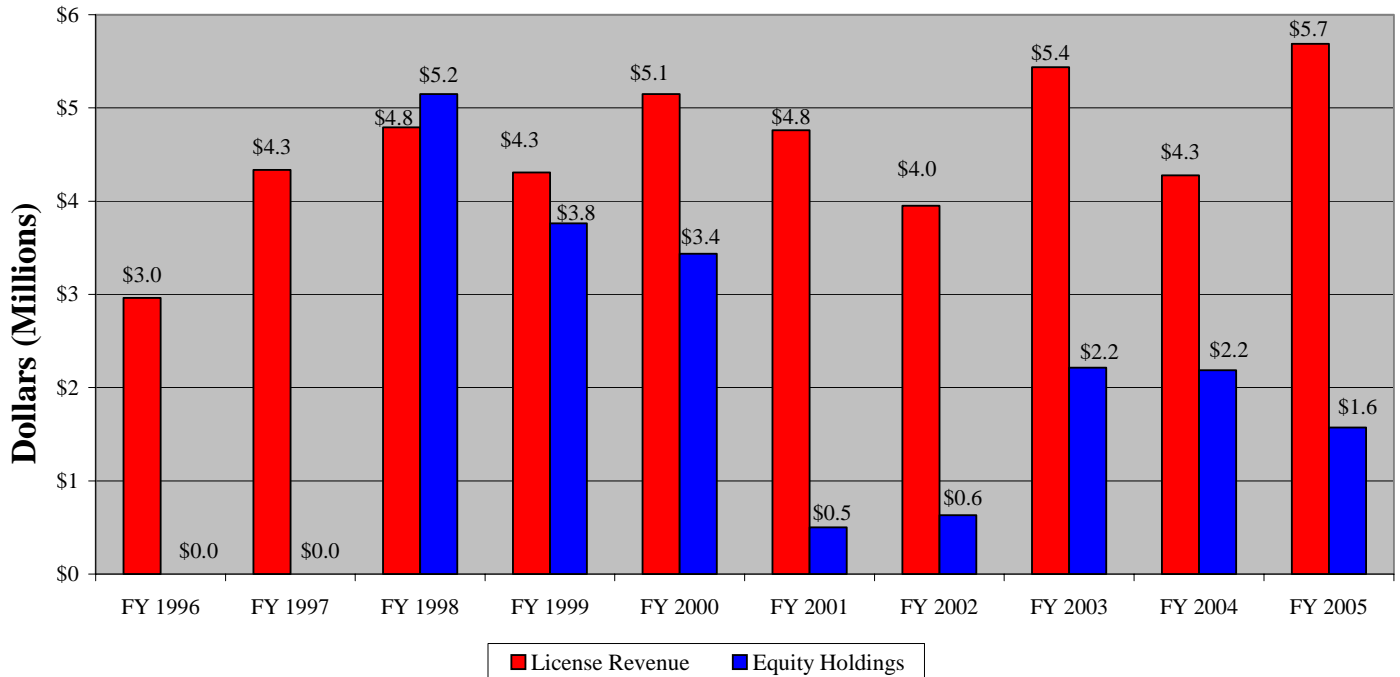
- Osteotech, Inc.
- Reva, Inc.
- Edwards Life Sciences
- Grove Hydrogen Cells
- Surmodics
- Dogwood Tree Licenses

Licenses and Options Executed by Fiscal Year

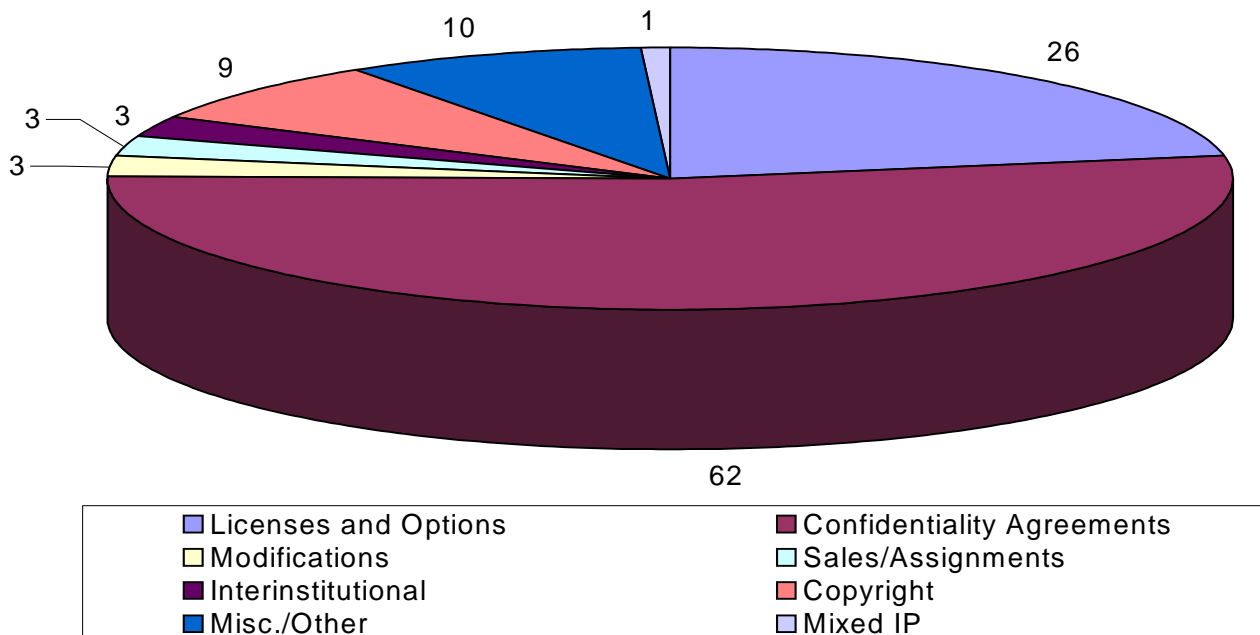


Technology Licensing and Related Activity

Annual License Revenue and Equity Holdings



Licensing Activity by Agreement Type



2005 Disclosures

Chimeric Virus Vaccine

Heterocyclic Cytotoxic Agents

Use of Ionomers as High Dielectric Constant Materials for Capacitors and Electrostrictive (including Maxwell effect) Materials

Rapid Plasma Condensation

A validated algorithm for designing oligonucleotide probes for micro RNA microarrays

Alginate Poly-L-Lysine Encapsulation as a Technology for Controlled Differentiation of Embryonic Stem Cells

ZnO/Si Light Emitting Diode

Angiogenesis Promoter

A Novel Formulation for Stable Omega-3 Fatty Acids in Sandwich Cookies

Topical Anti-Cancer Compositions and Methods of Use Thereof

Method for Preparation of High-Performance Carbon-Coated LiFePO₄ and Other Lithium Transition Metal Phosphates

Primer Prim'er

Corona Discharge lamp improvements

Improvement to low energy electron beam pumped excimer lamps

Automated Large-Scale Statistical Organization Search Engine

Trimethylsilylmethyl-substituted methylimidazolium-cation ionic liquids: design of flexible molecular ions for producing a class of low-viscosity, non-volatile organic solvents.

Mapping surfaces using regionally specific hyperfine polarization

Chameleon Optics for Tunable Absorption

Hand-held Salad Product with Edible Wrap

802.11 Based self-organizing 3-Tier Hierarchical Ad-Hoc Wireless Network

Distributed Lind Scheduling Multiple Access in Wireless ad hoc Networks

Er Doped ZnO Nanostructures for Multicolor Light Emitter and Integrated Wavelength Converter

Event Synchronization Using a Synthesized Clock

The analytical solutions of ka and Fa using a absorption-disposition kinetic model

Radio-Opaque Polymer Medical Devices

Genomic sequence of *Bacillus anthracis* bacteriophage Fah

Genomic sequence of *Thermus thermophilus* phage YS40

Sensor networks/buddy protocol

Methods for Treating Disorders Using Plant Extracts

Recruitment of Multi-Lineage Stem Cells into Tumors: A Possible Source of Adult Stem Cells

ZnO Nanostructure-based Light Emitting Devices

Bismuth/Metal fluorides as positive electrode materials for Li batteries

Immiscible Polymer Blend Structural Material Comprised of Polymethylmethacrylate and High-Density Polyethylene

Metastable Nanostructured Materials and Method for Production of Same

Using Plants to Produce Methylated Small RNAs

HEN 1 as a Small RNA Methyltransferase

Tyrosinase Inhibitor and Method for Preparation

Linear Predictive Coding with Alopex

Non-MccJ25-Related Lariat Peptide Inhibitors of Bacterial RNA Polymerase

Topical Anti-Cancer Compositions and Methods of Use Thereof

PSD-95 acts as a stop signal for proximal dendrite branching in hippocampal neurons

Hydrolysable Organic Phosphates in Hydrothermal Synthesis of Hydroxyapatite with Controllable Size and Morphology

Novel Plastid-Encoded Glyphosate Herbicide Resistance

High Strain to Failure Materials for Engineering Applications from Immiscible Polymer Blends

Method of Recycling Latex Paints as a Component of Immiscible Polymer Blends

Peach Tree Named 'NJ-H28-52-96270'

Apricot Tree Named 'NJ-J8-91-94121'

A Method for Selecting transformed Plant Cells using Ethionine and Cystathionine Gamma Synthase as the Selection Agent and Marker Gene

A Low-power Low-stress Collector for Viable Biological Aerosols

Bipartite Inhibitors of Bacterial RNA Polymerase

Inhibitory effect of adenosine receptor inhibitor on UVB-induced apoptosis

Phospholipid Transfer Protein (PLTP) and Cholesterol Metabolism

An Isolated Species of Steinernematid Nematode and Methods of White Grub Control Therewith

Tunneling Bridge Appliance

A Simulation Technology for Evacuation and Surge Capacity of Healthcare Systems

Derivatives of peptide antibiotic Microcin J25 with increased antibacterial action

Data Reduction for Change Detection and Statistical Disclosure Control

Shear Application System and Methods Relating Thereto

Branched Pegs based on a central multiple attachment peptidic core

Room temperature Cure Geopolymer compositions for coatings and composites

Processing technology to increase toughness of immiscible polymer blends

Radiant Plasma Processing of Nanostructured Materials

An assay to search for novel inhibitors on bacterial RNA polymerase that act by interfering with an essential interaction between the subunit flap domain and subunit region 4

Pharmacological Regulation of Cholesterol Metabolism

Self Assembled Microbatteries

Development of Bioactives for Chronic Inflammation

Au-Cu Alloy Electrical Contacts for Monolithically Integrated Systems in III-V Materials

Method for Enhancing Anaerobic Degradation of Methyl tert-butyl ether (MTBE) and Structurally Related Fuel Oxygenates

Compositions based on catechins in combination with vanilloid and/or naturally-occurring inhibitors of multidrug resistance associated proteins to improve the bioavailability of catechins

Raspberry Plant Named 'Jaclyn'

Fluidic Dielectric Capacitors: A New Pathway to Miniaturization

Increased Expression in Dorsolateral Prefrontal Cortex of CAPON in Schizophrenia and Bipolar Disorder

Hydrothermal Ceramic Passivation Coatings

Arm rehabilitation and telerehabilitation system

Purification of Horseradish Peroxidase

Novel structure and properties of alumina - spinel

Peer to peer transportation systems

Fluorometric signature of Caloric Restriction

Development of a non-tumorigenic ointment/cream safe for topical application

Switch Region--Target and Method for Inhibition of Bacterial RNA Polymerase

Metastable Materials & nanostructures Derived Therefrom

Remote Console for Telerehabilitation (ReCon)

Low-Power Electrostatic Bioagent Collector with Very High Concentration Rate

Digital informants - reward driven mechanisms towards self aware society

Interaction of Sorangicin with bacterial RNA polymerase: structural and genetic analysis

Robotic Mobility Simulator

Compositions and Methods for Manipulation of Lysine Biosynthesis and Uses Thereof

A Novel Role for Snapin in Dendrite Patterning: Interaction with Cypin

A Novel Polymeric System with Multivalent Components for Cancer Therapy

Bioavailability Enhancement of Nutraceuticals by Nano-emulsification

Use of Uric Acid in Treating SCI

Compositions and Methods for Be1-2 Phosphorylation and Reduction of iNOS and Cox-2 Expression

Compositions from Morus alba and Methods for the Isolation and Uses Thereof

Immiscible Polymer Blend Materials Comprised of Polymethylmethacrylate and Poly (trimethylene terephthalate)

Copper Fluoride Based Nanocomposites as Electrode Materials

Reductive Plasma Processing of Nanostructured Metal Powders

Nanocomposite Ceramic Armor and Method for production of Same

High Temperature Reactor for the Production of Nanophase WC/Co Powder

Instant Low Temperature Conversion Method for Oxalate Salts

EPR Assembly of Microgel for Cancer Detection and Treatment

Efficacy of B-GBP against multidrug resistance in cancer

Chalcogenide-Bound Erbium Complexes: Paradigm Molecules for Infrared Fluorescence Emission

Preparation of PEG Hydrogels using sorous silica templates

Nanomachine Drug Delivery System

Enhancement of the Transition in Atomic Clocks

Composition and Methods to Reduce Exercise Induced Fatigue

Superplasticity Enhanced Densification of Multiphase Ceramic Nanocomposites

The New Jersey Integrated Competency-Based Nursing Practice Model

A promoter element required for efficient transcription in thermophilic bacteria of the Thermus genus

Invention Fluorescence and Optical Gain Characteristics of Chalcogenide-bound Erbium-Cluster-Fluoropolymer Nanocomposites

Various Isothiocyanate Compounds are strong Phase II enzyme inducers with potential anti-cancer effects

Technology to create photoluminescent sign lettering that will glow through the night

Recovering 3D Tumor Locations from a Series of 2D Bioluminescence Images

Involvement of peptide/histidine transporters in histamine biogenesis and their utilization for antihistamine drug development.

Tethered Cyclic Dinucleotides

Inhibition of Ricin Mediated Cell Death by Bax Inhibitor-1

Identification of High Artemisinin Accumulating Plants from Artemisia annua, Source of Anti-Malarial Bioactive Compounds

Planar Optical Waveguides by Direct Write Technology

Extracts of Blueberries with Anti-oxidant and Anti-cancer Properties

Method(s) for Improving Gene Delivery to Mammalian Cells

Materials forming nano-scale square bar array

Micropatterning Surfaces using Hydrophilic/Hydrophobic Segregated Areas Produced by Selective Plasma Treatment

Innovative Materials for Releasing Active Compounds in a Controlled Manner to Enhance the Quality and Safety of Food and Other Sensitive Products

Polyanhydrides, Polyesters, Polyamides and Polycarbonates Derived from Antioxidants

Dual Catalyst System for Alkane Metathesis

Microporous Metal Organic Framework Promising for Gas Separation and Storage

VITP: Vehicular Information Transfer Protocol

Device for Separating Gas Mixtures

Automated Detection of Prostate Cancer from High Resolution MRI

Tunable Triblock Copolymer Nanospheres for Delivery of Hydrophobic Drugs

Novel controlled released drug delivery system and enhanced passive targeting and retention to the lung

Transgenic Plants Producing a PAP II Protein

System for High-Resolution Measurements of a Magnetic Field Gradient and its Application to a Magnetometer or Gradiometer

Thin Film Bulk Acoustic Wave Sensor Suite

OCLTT - Making a Difference



Since FY 1995, the OCLTT Technology Transfer Program has:

- Received and evaluated 1,458 invention disclosures
- Generated in excess of \$180 million in industry sponsored projects
- Filed 506 Provisional Patent applications
- Filed 443 regular U.S. Patent applications
- Received 297 Issued U.S. Patents
- Licensed/optioned 346 inventions
- Generated close to \$50 million in license revenue
- Licensed technology to 46 new start-up companies
- Entered into over 900 research agreements

OCLTT

The Office of Corporate Liaison and Technology Transfer (OCLTT) is the University department responsible for transferring Rutgers University technology to the marketplace. To carry out this mission, the OCLTT staff works closely and supportively with Rutgers faculty and industry to secure corporate funding for faculty research. At the same time, the staff identifies, protects and licenses marketable University inventions and intellectual property making additional income available to further University research.



The OCLTT office is located in ASB III, off Ryders Lane and Route 1 on the Cook Campus in New Brunswick.

**"The most beautiful thing
we can experience
is the mysterious.
It is the source of
all true art and science."**

- Albert Einstein -

Notes





**The important thing in science
is not so much to obtain new
facts as to discover new ways
of thinking about them.**

William Bragg

**Research is the art of seeing
what everyone else has seen,
and doing what no-one else
has done.**

Anonymous



**Art and science have their
meeting point in method.**

Edward Bulwer-Lytton

**Science is organized
knowledge.**

Herbert Spencer

If you would like to learn more about OCLTT
or would like a presentation about our technologies and opportunities,
please contact Lori Dars at dars@oclitt.rutgers.edu

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