



COLUMBIA UNIVERSITY SCIENCE AND TECHNOLOGY VENTURES ANNUAL REPORT 2005

FROM THE DIRECTOR

I am delighted to present the 2005 Annual Report for Science and Technology Ventures (STV), Columbia University's technology transfer arm. We enjoyed another successful year with licensing activities generating approximately \$160MM.

While licensing the world-class technologies provided by Columbia's faculty is crucial in terms of improving the University's research capabilities as well as providing societal benefits, we are especially proud of STV's accomplishments in generating industry- and foundation-sponsored research income—something becoming increasingly important in these times of tightening federal funding budgets. During FY'05, Columbia researchers spent more than \$19MM of STV-generated research income. At the same time, STV achieved a record by putting \$39.5MM under contract for research in FY'06 and beyond. This not only enables Columbia faculty to continue generating valuable intellectual property for future licensing, but it also contributes significantly to lowering Columbia's overhead costs.

At STV, we are proud of the contributions we've made to our institution and the outside world in FY'05. Looking ahead, we will continue to work diligently to maintain this momentum in both our licensing and research funding activities.

Mike Cleare





highlights

JAPAN STEEL WORKS, a Tokyo-based systems integrator of leading-edge manufacturing equipment, has entered into an exclusive relationship with Columbia University to license sequential lateral solidification (SLS) technology in Japan, Korea, and Taiwan. SLS, which was developed by Professor James Im of the Materials Science Program, uses laser irradiation to alter a material's structure. To date, SLS has been embraced by almost half the world's market for the next generation of liquid crystal displays (LCDs). The flexibility of the SLS process further makes it suitable for many applications, including solar cells, smart cards, image sensors, and three-dimensional integrated circuits.

DR. JONATHAN BARASCH, associate professor of medicine and of anatomy and cell biology, and his colleagues have identified Ngal, a protein that transports iron as it induces the formation of kidney tubules. The discovery has promising implications for understanding kidney development as well as diagnosing and preventing kidney disease—a significant risk for patients undergoing cardiopulmonary bypass surgery, radiological testing, or antibiotic therapy, or in patients suffering from severe infections.

In partnership with Columbia professors Drs. Salvatore Stolfo and Angelos Keromytis, **REVIVE SYSTEMS** has developed a breakthrough approach to ensure computer network security and system reliability. Building upon research conducted in the Intrusion Detection and Network Security Labs at Columbia University's Computer Science Department, Revive Systems' technology makes network applications self-healing. The system effectively closes the “window of vulnerability,” the waiting time between newly discovered attacks and the eventual distribution of vendor patches.

Today, this window of vulnerability can extend from several days to several months. Revive Systems' technology can automatically create, test, and implement fixes for previously unknown vulnerabilities, reducing the window of vulnerability from months to minutes.

DR. JUDAH WEINBERGER, associate professor of medicine at Columbia, has developed a new stent-type device that provides a novel treatment for aortic aneurysms. An estimated 1.7 million Americans have abdominal aortic aneurysms (AAA), and the worldwide market for AAA stent grafts is expected to expand to \$1 billion by 2010. Dr. Weinberger's innovation bests the existing treatments because it is less invasive than current surgical procedures, prevents the leaking and migration issues of current devices, promises a faster recovery time, and is capable of treating small-diameter aneurysms as well as thoracic aortic aneurysms (TAA). The device can also be a useful drug delivery vehicle.

PROLEXYS PHARMACEUTICALS, a biopharmaceutical company dedicated to the development of novel cancer therapies, entered into an exclusive agreement with Massachusetts Institute of Technology, the Whitehead Institute for Biomedical Research, and Columbia University. The agreement provides Prolexys with exclusive, worldwide rights to a patent estate covering selective antitumor compounds discovered by Dr. Brent Stockwell, a former Whitehead Fellow, now an assistant professor of biological sciences and chemistry at Columbia University.

A CONSORTIUM consisting of Drs. Michael Rosen and Richard Robinson, professors of pharmacology at Columbia, Drs. Ira Cohen and Peter Brink, professors of physiology and biophysics at Stony Brook University, and Dr. Glenn Gaudette, assistant professor of biomedical engineering and medical physics at University of Massachusetts, have developed a stem-cell-based therapy to enhance repair and regeneration of heart muscle for patients who suffer from myocardial infarction and/or congestive heart failure. Animal studies demonstrate that cardiogenic cells regenerate 70 percent of the regional mechanical function in treated ventricles—a very promising finding for the more than 64 million Americans suffering from heart disease.

Columbia's **DR. RICHARD AMBRON**, professor of anatomy and cell biology, and his colleague, **DR. YING-JU SUNG**, have identified a novel molecular signaling pathway that leads to abnormally active neurons after a nerve injury or inflammation—a discovery that could be key to understanding and treating chronic pain. Unlike acute or short-lived pain, chronic pain involves long-term changes in gene expression and has proven largely refractory to treatment. Their research, validated in two animal models, has identified several promising targets for drug development.

World-class researcher **DR. HENNING SCHULZRINNE**, head of Columbia's Computer Science Department and Internet Real-Time (IRT) Lab, has made many significant contributions in the area of Voice over Internet Protocol (VoIP). He is the pioneer of one of the most noteworthy technologies, Session Initiation Protocol (SIP), which establishes real-time interactive communication sessions over Internet Protocol (IP) networks and is being used for an array of applications, including audio, video, chat, and instant messaging. It has been accepted as a standard by the Internet Engineering Task Force and is gaining rapid acceptance from major equipment and service providers, enterprises, and software companies.

Laparoscopic surgery is based on counterintuitive, mirror-image movements, difficult to learn and even more challenging to master. **DR. DENNIS FOWLER**, professor of clinical surgery, **DR. PETER ALLEN**, professor of computer science, and **DR. ANDREW MILLER** have developed a novel surgical device that may one day replace conventional laparoscopic technology. The device consists of a fully insertable, robotically assisted camera and surgical tools platform that can be used to perform minimally invasive surgeries with intuitive motion. It has the potential to achieve the true promises of minimally invasive surgery: easier for more surgeons to practice and master; safer for patients, reduced hospital operating room time, and lower costs for patients.

DR. MARC BESSLER, a bariatric surgeon at Columbia University Medical Center, offers a new way to fight obesity—an epidemic affecting millions of people worldwide. Dr. Bessler is the inventor of a patent-pending device that aims to achieve the effects of gastric bypass surgery, considered the gold standard therapy for long-term weight loss, with fewer complications and side effects. By reducing the risks, the novel device may make surgical therapy more accessible to the many patients who cannot or choose not to undergo gastric bypass due to safety concerns. The device, which may be used as both an adjunctive and definitive therapeutic tool, is designed for minimally invasive endoscopic insertion that can be performed in an ambulatory setting without general anesthesia.

FOR FURTHER INFORMATION

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STV DISCOVERY AND COMMERCIALIZATION 2005

Research Expenditure: Federal, State, Industry, and University	\$600MM
New Inventions by Faculty or Graduate Students	272 inventions reported
STV U.S. Patent Filing	160 new U.S. patents filed
Licensing to Existing Companies	72 licenses executed
Licensing to Start-ups	10 start-up/small companies formed

MARKET

Licensing revenue: \$159.72MM

FY'05 research spending on STV research contracts: \$19.4MM

Research put under contract for FY'06 and beyond: \$39.5MM

7 start-ups VC funded (including one already acquired)

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