



Bringing Ideas to Life

ANNUAL REPORT 2008

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Mission

VCU Tech Transfer's mission is to foster a culture of innovation at the university and to protect and commercialize inventions created by the VCU research enterprise for the benefit of the university, its members, and the public.

Vision

VCU Tech Transfer's vision is to bring world-class recognition and value to VCU and its members through commercialization of intellectual property developed at the university.



ON THE COVER

Life-sustaining oxygen bubbles produced from oxygen generating technology used in wound and tissue therapy (page 10).

Letter from the Director

Dear Friends:

Two thousand and eight was a year of commemoration for Virginia Commonwealth University. The university marked the 40th anniversary of its founding. This has been an occasion for reflecting on the significant growth and accomplishments over the past four decades. Among those achievements has been the remarkable progress the university has made in the area of research and innovation. In less than a half century, VCU has grown to claim a spot among the nation's most respected research universities.

This annual report provides a snapshot of how we are continuing to earn and broaden that reputation for excellence and innovation. VCU researchers are involved in a wide range of scientific discovery, and we in Tech Transfer have been pleased to work with many of them to move their inventions and breakthroughs out of the laboratory and into the marketplace.

Of particular note during 2008 was the precipitous spike in disclosures made by VCU inventors. We received a total of 98 disclosures – a 30 percent increase over last year. These numbers not only point to the depth, breadth and quality of inventions, but to the growing recognition that the road to commercialization requires a productive partnership. We work hand in glove with the VCU innovators to assess the commercial potential and to spearhead the protection, marketing, and licensing of their inventions.

Our strong partnerships with the Virginia Bio-Technology Research Park and the Virginia Biosciences Development Center have helped create an environment that nurtures and sustains the essential elements of innovation.

Our new Technology Validation Fund, providing some well-needed runway so that promising ideas could prove their viability, counts on the wisdom and expertise of an esteemed board of private-sector executives. We also benefit from the inspired leadership within the university itself, particularly from VCU President Dr. Eugene P. Trani and Dr. Francis L. Macrina, vice president for research.

In the pages to follow, you will find some of the fruits of our collective success – inventions that are already in the marketplace and those on their way. We are proud of the ideas that have been spawned within our midst as well as of our role in helping bring these ideas to life. These inventions are contributing in making the world safer, happier and healthier, in profound ways.

We are grateful for the immeasurable support from throughout the university and beyond, and we look forward to help growing VCU's reputation as one of our nation's premier research universities.



Ivelina Metcheva, Ph.D., M.B.A.
Director, VCU Tech Transfer



Bringing Ideas to Life
Annual Report 2008



2008 Fiscal Year at a Glance

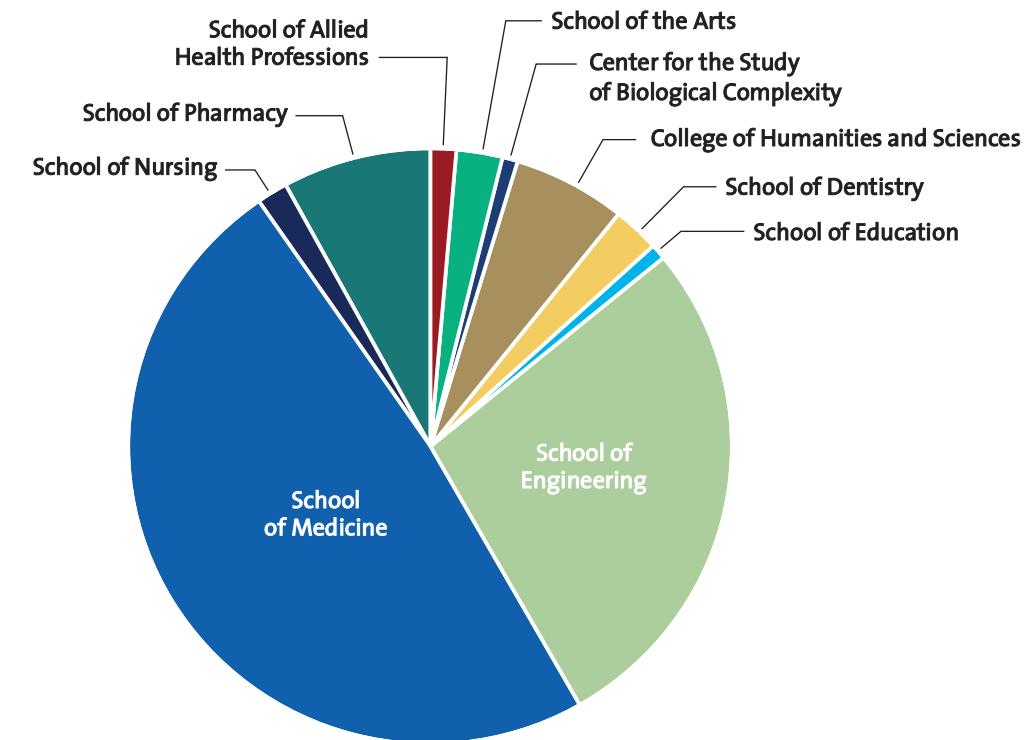
GROSS REVENUES	1.88 MILLION
SPONSORED RESEARCH BY LICENSEES	\$226,158
INVENTION DISCLOSURES	98
LICENSE AGREEMENTS	10
OTHER RESEARCH SUPPORT AGREEMENTS	13
PATENTS FILED	81
PATENTS ISSUED	7
MATERIAL TRANSFER AGREEMENTS	172
NON-DISCLOSURE AGREEMENTS	110
START-UP COMPANIES	3

Departments with Ten or more Invention Disclosures

DEPARTMENT

Anesthesiology	11
Biochemistry and Molecular Biology	10
Biomedical Engineering	17
Internal Medicine	14
Mechanical Engineering	10
Microbiology and Immunology	10

Distribution of Invention Disclosures



Revenues

ROYALTIES AND LICENSE FEES	\$1,276,770
PATENT REIMBURSEMENTS	\$83,650
NONCASH ROYALTIES	\$366,265
OTHER REVENUES	\$110,133
INVESTMENT INCOME	\$47,275
GROSS REVENUES	\$1,884,093

Distributions

ROYALTY DISTRIBUTION TO VCU INVENTORS	\$564,106
ROYALTY DISTRIBUTION TO VCU SCHOOLS AND DEPARTMENTS	\$113,220

2008 VCU Patents Issued

ISSUE DATE	PATENT NO.	VCU INVENTORS	TITLE
08/28/07	US 7262030	Xiangning Chen, Ph.D.	Multiple Sequencible and Ligatable Structures and Using Them for Genomic Analysis
10/09/07	US 7279555	Darrell L. Peterson, Ph.D.	Advanced Antigen Presentation Platform
10/09/07	US 7279500	Billy R. Martin, Ph.D.	Sulfonamide Cannabinoid Agonists and Antagonists
10/09/07	CA 2252084	Richard C. Franson, Ph.D. Raphael M. Ottenbrite, Ph.D.	Cytoprotective Compounds
10/23/07	US 7285687	Billy R. Martin, Ph.D.	Cannabinoids
12/18/07	US 7310427	Sheldon M. Retchin, M.D., MSPH Martin L. Lenhardt, Au.D., Ph.D.	Recreational Bone Conduction Audio Device, System
5/20/08	US 7374774	Gary L. Bowlin, Ph.D. David G. Simpson, Ph.D.	Electroprocessed Material Made by Simultaneously Electroporessing a Natural Protein Polymer and Two Synthetic Polymers



"Billy Martin was an outstanding innovator and an enthusiastic teacher and investigator. It is a privilege and an honor to be chosen as the first recipient of The Billy R. Martin Innovation Award."

**LAWRENCE SCHWARTZ,
M.D., PH.D.**



HONORING BILLY R. MARTIN, PH.D.

The VCU community lost one of its true giants in 2008. Dr. Billy R. Martin, the genial, prodigious and ever-curious recipient of the inaugural Inventor of the Year Award in 2007, passed away this year. To celebrate his countless contributions to the university, we have renamed this award The Billy R. Martin Innovation Award. We miss you, Billy.

The Billy R. Martin Innovation Award

For more than a quarter century, Dr. Lawrence Schwartz has focused his research on human mast cells, the cells that grow in number during allergic reactions. While scientists have long known that mast cells release histamine during periods of inflammation, no one realized that the enzyme tryptase also was present – no one, that is, until Dr. Schwartz. Through his breakthrough discovery, the medical community can now assess the severity and risks associated with allergic reactions.

The test that Dr. Schwartz and his colleagues subsequently developed for evaluating the total body burden of mast cells has since become one of the World Health Organization's criteria

for diagnosing systemic mastocytosis. The Swedish biomedical company Phadia has licensed the testing protocols under the name ImmunoCAP Trypsin, and the product is available today through 3,000 laboratories in 60 countries around the world. It has become a convenient and reliable means for testing whether a patient's symptoms are due to an allergic reaction or whether a patient has too many mast cells.

For his pioneering achievements in this area, The Billy R. Martin Innovation Award for 2008 was presented to Dr. Lawrence Schwartz.

"The research and development work we did while at VCU laid a strong foundation for our future growth. The support of VCU Tech Transfer and the Virginia Biotech Park incubator was instrumental in my effort to transform a small pilot project into a national business."

SUSAN GELLER, PRESIDENT, WINGSPAN

IN THE MARKET *Wingspan*

Fifteen years ago, the Virginia Institute for Developmental Disabilities received a government grant that changed Susan Geller's life.

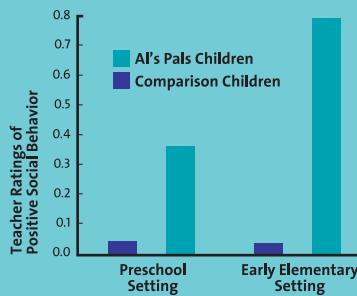
Since then, it has changed the lives of countless young children.

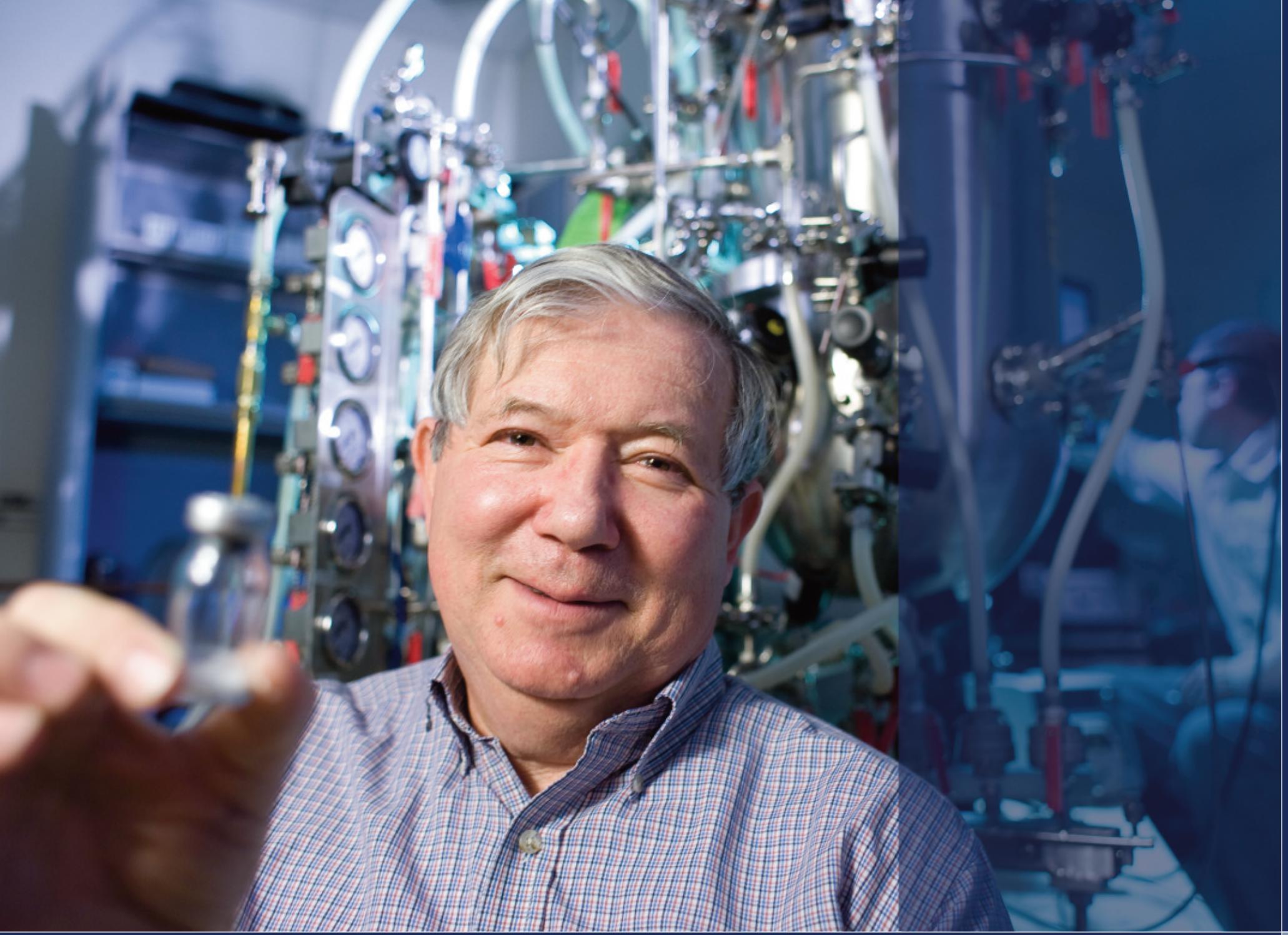
In 1993 Geller was hired by the institute – an affiliate of VCU's School of Education – to develop a prevention program that would help young children acquire life skills for success in school and in life. When Geller's team could find no suitable curriculum, they decided to create one of their own. Over the next four years, working with preschool teachers and child care professionals, the staff developed – and tested and tweaked and tested again – a puppet-based program that has achieved profound results, so much so that it soon became apparent that there was a commercial market for it.

Geller subsequently left her job at VCU, licensed the technology from VCU Tech Transfer and launched a new company – Wingspan. The company's curriculum, known as *Al's Pals: Kids Making Healthy Choices*, has reached more than 200,000 kids in 28 states, and along the way earned prestigious recognition from the U.S. Department of Education and the U.S. Department of Health and Human Services.



POSITIVE SOCIAL BEHAVIORS
Example - sharing, helping, taking turns





IN THE MARKET

Diagnostic Test Offers Hope to Rein in Equine Disease

Equine infectious anemia, an AIDS-like disease that afflicts only horses, has no cure or vaccine to prevent it. The most effective means for controlling the disease is to keep it from spreading.

Darrell L. Peterson, Ph.D., a professor of biochemistry & molecular biology, has developed a pioneering diagnostic test for determining if a horse has EIA. The antibody test, conducted using a sample of the horse's blood, provides a rapid and reliable method for detecting whether any of the viral antibodies are present.

Dr. Peterson's diagnostic test has been licensed by Centaur, Inc., a Kansas-based company that specializes in adapting human diagnostic procedures to the animal healthcare market. The company sells the EIA test to thousands of veterinarians and USDA-approved laboratories throughout the country.

"This project began when the head of Centaur, Inc. (then a Virginia based company) came to my laboratory to discuss the possibility of making a new test for EIA. The science was pretty straight forward, because my laboratory has had a lot of experience with devising ways to detect viruses in blood. However, it took the involvement and cooperation of VCU Tech Transfer and Centaur to bring it to the marketplace, an area in which I had no experience."

DARRELL PETERSON, PH.D.

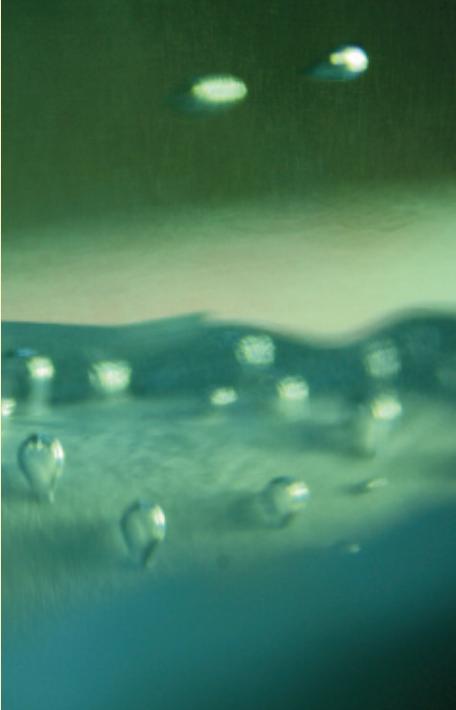
Medical science has long understood the healing power of oxygen. From simple skin wounds to more serious brain injuries, the delivery of oxygen to the afflicted area is critical to helping the body mend itself. More confounding has been finding a way to deliver O₂ effectively to the damaged area.

Until now.

An interdisciplinary team of researchers from VCURES – VCU's Reanimation Engineering Shock Center – has devised a patented oxygen-generating technology to transport oxygen to precise parts of the body. The scientists behind this discovery include Kevin R. Ward M.D. (Emergency Medicine), Gary Huvard, Ph.D. (formerly of VCU Chemical Engineering and now president of Huvard Research Consulting), Bruce D. Spiess, M.D. (Anesthesiology), Robert F. Diegelmann, Ph.D. (Biochemistry & Molecular Biology), Gurbhagat Sandhu, Ph.D. (Chemical Engineering), Mark McHugh, Ph.D. (Chemical Engineering) and Everett Carpenter, Ph.D. (Chemistry).

VCU Tech Transfer licensed the discovery to Oxygen Biotherapeutics, Inc., which recently has moved its major research efforts to the Virginia Biotech Park adjacent to VCU. The company will employ this breakthrough application in combination with Oxycyte®, the company's perfluorocarbon therapeutic oxygen carrier, to create an over-the-counter bandage product designed to treat the more than 36 million topical wounds and burns that occur in the country each year.

Oxycyte® also is being investigated at VCU for the treatment of traumatic brain injury, which is the most prevalent injury in the battlefield and the number one cause of death among young adults. The team also is investigating the use of Oxycyte® to treat and prevent decompression sickness and make escape from a disabled submarine possible. Future applications of Oxycyte® with enhanced oxygen delivery could be used in heart attacks and strokes as well as for common dermatologic afflictions.



"The unique relationship between VCU and Oxygen Biotherapeutics has led to potential breakthroughs in many areas of medicine where prior therapies have been lacking."

BRUCE D. SPIESS, M.D.

GARY HUVARD, PH.D.
KEVIN R. WARD, M.D.
ROBERT F. DIEGELMANN, PH.D.
BRUCE D. SPIESS, M.D.

HEADING TO MARKET

Oxygen-Delivery Product Breathes Life into a Publicly Traded Company



"Not only was the whole grant-funding process an educational one for us, but it provided critical funding in moving a technology from the bench to the bedside."

**BABETTE FUSS, PH.D.
(PICTURED)**

"The VCU Technology Validation Fund provides an essential source of early-stage funding critical to developing licensable IP for either established healthcare firms or faculty start-up opportunities."

**DAVID R. LOHR
EXECUTIVE DIRECTOR
VIRGINIA BIOSCIENCES DEVELOPMENT CENTER**

Our sincere gratitude to the external Investment Committee:

RONALD D. GUNN
VP, Drug Development, Intelliject, LLC

Dean M. Johnson
President and CEO, Avir Sensors

DAVID R. LOHR
Executive Director
Virginia Biosciences Development Center

Sandy Williamson
CEO, CapTech Ventures, Inc.
Spencer Williamson
President and CEO, Intelliject, LLC



BRIDGING THE GAP

The VCU Technology Validation Fund

VCU is an incubator of ideas, so much so that the most prevalent sound on campus could be the “blink” of another light bulb going off over a researcher’s head. But ideas are one thing; inventions with demonstrated practical, commercial applications can be something else altogether.

The Technology Validation Fund was inaugurated in 2008 to help bridge the gap that can separate basic research from the marketplace. The fund provides grants to help nurture innovative ideas and give them enough runway to prove their commercial viability. This past year, funds

were awarded to a range of innovations – an inhalation device for pulmonary drug delivery, a novel peptide for the treatment of multiple sclerosis, a new device for monitoring intracranial pressure in a noninvasive way and an optimized prototype for an intravenous line organizer.

Every invention that is disclosed to VCU Tech Transfer is eligible for consideration. The fund’s Investment Committee reviews the proposals to select those with the most significant promise for licensing and commercialization.

Inside VCU Tech Transfer

Step by Step

1

Discovery

A new discovery is generated by a university member.

2

Invention Disclosure

Inventors disclose their inventions to VCU Tech Transfer. Tech Transfer's staff reviews the disclosures for completeness and makes a preliminary decision on ownership.

The invention disclosure form is online at
www.research.vcu.edu/forms/InventionsDisclosure.doc.

3

Technology Assessment

Invention disclosures are assigned to a technology manager who reviews them for patentability and commercial potential.

4

Protection and Marketing

Inventions selected for commercialization are protected through patent, copyright or trademark applications.

5

Marketing

Technology managers market the inventions to potential licensing partners from the VCU Tech Transfer's commercial network, or in the case of a new company spin-off, to venture capitalists, angels and entrepreneurs.

6

Licensing

Licensing decisions are made based on the likelihood of the license to lead to rapid commercialization and whether it serves the public interest. Typically, intellectual property is transferred through royalty-bearing licenses, which VCU Tech Transfer monitors for compliance.

7

Revenues

- 40% to inventors
- 40% to VCU Tech Transfer
- 10% to inventors' departments
- 10% to inventors' schools

Marketing VCU Inventions

As part of its mission to commercialize VCU developed inventions, VCU Tech Transfer markets these innovations to a range of companies, investors, and entrepreneurs.

VCU Tech Transfer seeks to find the most appropriate commercial partner to bring the invention to the marketplace through targeted marketing to its existing network of companies, attending conference partnering forums, web

postings and direct marketing to suitable potential licensees. VCU Tech Transfer solicits input from the inventors to find the best match for each technology.

Once it finds a company interested in licensing a VCU technology, Tech Transfer conducts a due diligence, reviewing its track record, key management and commercialization plan. To ensure that the technology reaches the marketplace in a timely and appropriate way, licensees are obligated to reach certain development milestones.

Material Transfer Agreements

A Material Transfer Agreement (MTA) is a contract that lays out the terms and conditions for the transfer of tangible research materials, including unique plasmids and vectors, cell lines, viruses, genetically modified animals and pharmaceutical compounds, between VCU and an outside organization, such as a company or another university. MTAs are important to help researchers protect their intellectual property. They can prevent potential misuse of the IP and protect inventors and VCU against liability claims.

Nondisclosure Agreements

A Nondisclosure Agreement (NDA) is a contract that states the terms and conditions for the sharing of confidential information, for a limited period of time (usually one year), between VCU and an outside organization. NDAs allow VCU to share confidential information with another organization when the parties are considering a license or research agreement, or discussing a possible

collaboration or funding opportunity. Confidential information, which must be marked as such to be protected, may include unpublished details of inventions, business methods and plans, research protocols and proposals, research results and software code. VCU faculty and staff have an obligation to protect an outside party's confidential information for an extended period of time (usually 3 to 10 years after disclosure) and should only disclose such information to other VCU faculty and staff on a "need-to-know" basis.

As a service to VCU researchers, VCU Tech Transfer drafts, reviews, negotiates and executes MTAs (170 in 2008) and NDAs (110 in 2008). VCU Tech Transfer works with the outside organizations to ensure that these agreements conform to VCU policies and protect the interests of our researchers.

FOR MORE INFORMATION CONTACT VCU TECH TRANSFER AT:

EMAIL: OTT@VCU.EDU

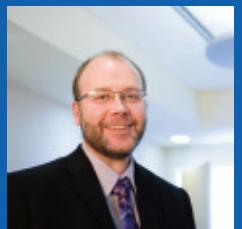
PHONE: 804-828-5188

WEB: WWW.RESEARCH.VCU.EDU/OTT

VCU TECH TRANSFER TEAM



IVELINA METCHEVA, PH.D., M.B.A.
Director



T. ALLEN MORRIS, PH.D., M.B.A.
Licensing Manager



MAUREEN C. KELLY, PH.D.
Licensing Associate



CLARA A. SINE
Office Manager

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*Executive Director
Virginia Biosciences
Commercialization Center*

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Virginia Commonwealth
University*

Mr. Michael Sugerman
Founder, Seven Consulting

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*Vice President for Research
Virginia Commonwealth
University*

Ivelina S. Metcheva, Ph.D., M.B.A.
*Director, VCU Tech Transfer
President, VCU Intellectual
Property Foundation*

About VCU

Virginia Commonwealth University is the state's largest university with 32,000 students. Located on two campuses in historic downtown Richmond, Virginia, this vibrant, urban university offers more than 200 undergraduate, graduate and professional programs in 15 schools and one college. VCU also is home to one of the nation's leading academic medical centers and has received recognition from the Carnegie Foundation for its research activity and community engagement.

VCU ranks among the top 100 universities in the country in sponsored research, with awards of \$223 Million in fiscal year 2008. Twenty three of the university's graduate and professional programs are ranked among the best in the nation in U.S. News & World Report's "America's Best Graduate Schools."

Many of VCU's 2,000 full-time instructional faculty are recognized nationally and internationally for excellence in the humanities, arts, sciences, engineering, education, social work, business and the health care professions. Dr. John B. Fenn was one of three international scientists to be awarded the 2002 Nobel Prize in chemistry.

The VCU Medical Center is the only academic medical center in Central Virginia and offers state-of-the-art care in more than 200 specialty areas, including organ transplantation, head and spinal cord trauma, burn healing and cancer treatment at the VCU Massey Cancer Center, Virginia's first NCI-designated cancer center.

Together, VCU and VCU Medical Center are the largest single employer in the Richmond area with 17,000 employees and combined budgets of approximately \$2 billion. As an economic engine and urban leader, VCU has forged ties with business, industry and government in such innovative projects as the VCU School of Engineering and the Virginia BioTechnology Research Park, which encompasses more than 1.2 million square feet of space, housing 2,000 scientists, researchers, engineers and technicians in fields like drug development, medical diagnostics, biomedical engineering, forensics and environmental analysis.

