

ANNUAL REPORT

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Bringing Ideas to Life

Bringing Ideas to Life

Annual Report 2009

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VCU TECH TRANSFER

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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.

Letter from the Director

Dear Colleagues and Friends,

This past year marked the 15th anniversary of VCU Tech Transfer. Born of modest beginnings and few resources in 1994, this office has evolved considerably over the years, helping undergird VCU's reputation as among the finest research universities in the nation. Over the years, we have become a valued partner and critical springboard to help bring the best innovations from the drawing board to the marketplace.

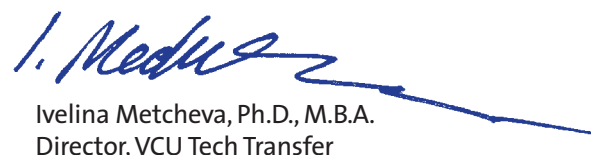
The numbers tell part of the story: \$14 million in licensing revenue, more than 1,000 invention disclosures, over 200 licensing deals, and 32 startup companies since our creation. This past year, despite a challenging economic environment, our work continued apace. While the number of invention disclosures (93) was down modestly, licenses jumped significantly (from 10 to 18) as did new patent applications (from 81 to 110). Licensing revenues are near \$1 million.

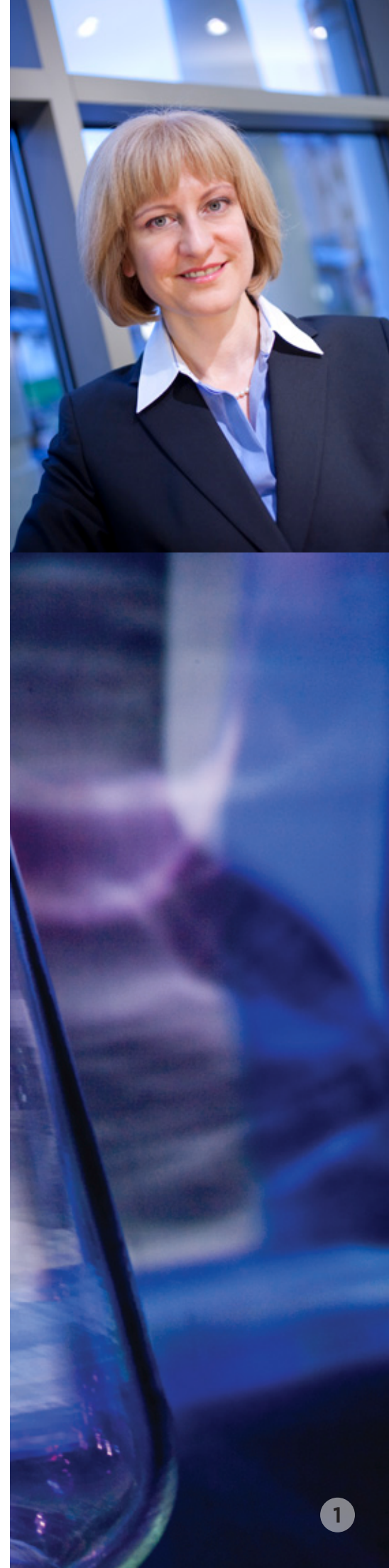
Those statistics reflect the extent of our activity, but our work is in many ways less about numbers and more about the talented and dedicated people that make it possible. To celebrate their achievements, we have christened a VCU Inventors Hall of Fame and again this year held our annual "Invented at VCU" reception, where new VCU president Dr. Michael Rao presented the annual Billy R. Martin Innovation Award. The 2009 award went to the team that created WEAVEonline, the software program now used by more than 140 colleges and universities.

The spirit of collaboration that was at the genesis of WEAVEonline is alive throughout the university, both among and across various departments and disciplines. More and more, we are witnessing collaborative explorations that know no boundaries. Researchers in the Medical, Nursing and Pharmacy Schools are working closely with those in the School of Engineering. Cross-disciplinary teams are tackling problems together in ways that create opportunities for innovative solutions. Such is certainly the case with VCURES (VCU Reanimation Engineering Shock Center), which teams together physicians and engineers, clinicians and basic scientists in research that improves survival among trauma patients.

This annual report showcases some of the fruits of that kind of collaboration as well as a diversity of other inventions that have been spawned by the dual necessities of inspiration and perspiration. They represent breakthroughs that help education or improve the lives of countless people. They are as well the source of great pride to the entire VCU community. To these innovators and to the university's leadership that makes this work possible, we remain both grateful and inspired.

With gratitude,


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



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FISCAL YEAR AT A GLANCE

Licensing Revenues	\$964,033
Invention Disclosures	93
License Agreements	18
Other Research Support Agreements	7
Patents Filed	110
Patents Issued	7
Copyrights Filed	1
Material Transfer Agreements	153
Non-Disclosure Agreements	81
Start-up Companies	1

DEPARTMENTS WITH 10 OR MORE INVENTION DISCLOSURES

Computer Engineering
Emergency Medicine
Mechanical Engineering

DEPARTMENTS WITH 5-9 INVENTION DISCLOSURES

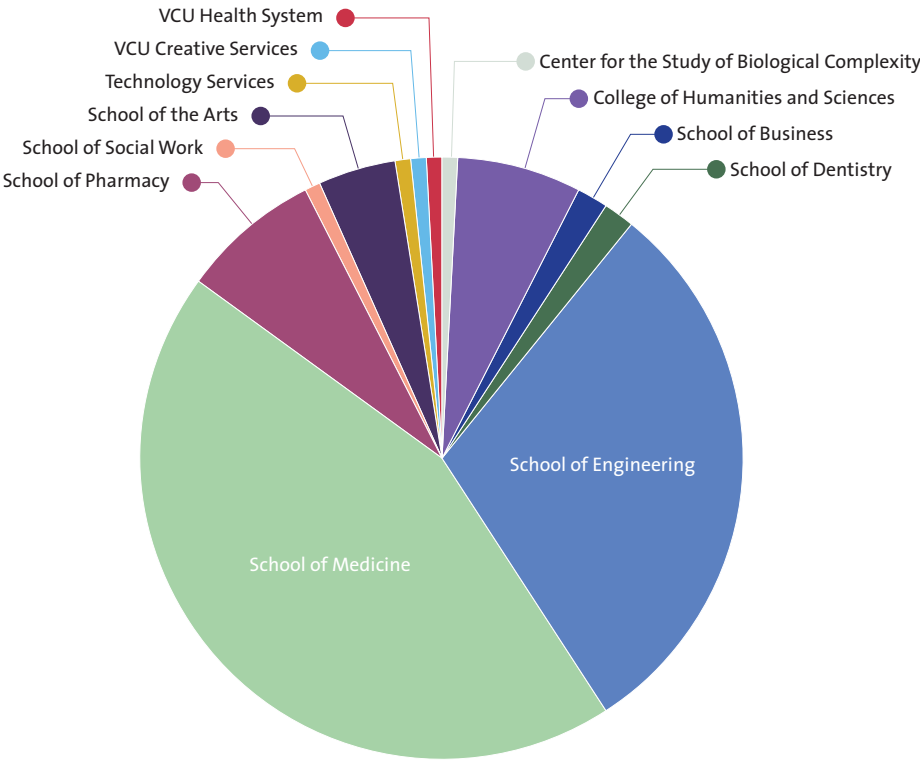
Chemical and Life Science Engineering
Internal Medicine
Biomedical Engineering
Medicinal Chemistry
Anatomy and Neurobiology
Microbiology and Immunology



- School of Medicine
- School of Engineering
- School of Pharmacy
- College of Humanities and Sciences
- School of the Arts
- School of Business
- School of Dentistry
- School of Social Work
- Technology Services
- VCU Creative Services
- VCU Health System
- Center for the Study of Biological Complexity

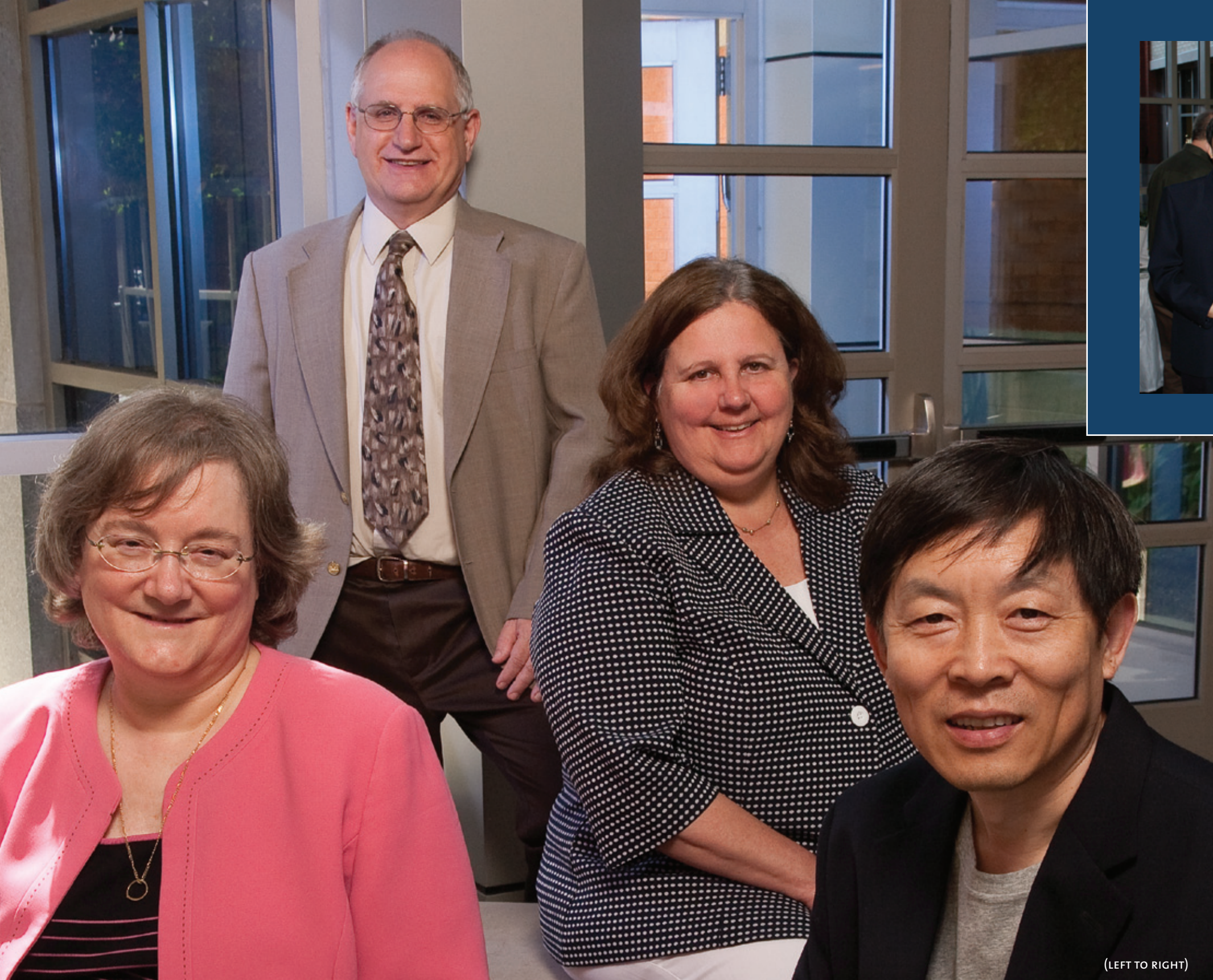
- 53
- 36
- 9
- 8
- 5
- 2
- 2
- 1
- 1
- 1
- 1
- 1

DISTRIBUTION OF INVENTION DISLCOSURES



2009 VCU PATENTS ISSUED

ISSUE DATE	PATENT No.	VCU INVENTORS	TITLE
7/8/08	US 7,396,590	Kenneth J. Wynne, Ph.D.	Soft Block with Repeat Units that Favor Migration to a Surface and Repeat Units with an Activity of Interest, and Polymeric Articles or Coatings Using Same
07/22/08	US 7,402,594	Umesh R. Desai, Ph.D. Gunnar T. Gunnarsson, Ph.D.	Sulfated Bis-Cyclic Agents
10/1/08	MX 260,974	Aron H. Lichtman, Ph.D. Billy R. Martin, Ph.D. Joanne Peart, Ph.D. Peter R. Byron, Ph.D.	Tetrahydrocannabinol THC Solution MDIs and Method of Use
10/28/08	US 7,442,754	Gary C. Tepper, Ph.D. Dmitry Pestov, Ph.D. Natalia Levit, Ph.D. Gary E. Wnek, Ph.D.	Molecular Imprinting of Small Particles, and Production of Small Particles from Solid State Reactants
10/30/08	AU 2003257031	Sheldon M. Retchin, M.D., MSPH Martin L. Lenhardt, Au.D., Ph.D.	Recreational Bone Conduction Audio Device, System
12/23/08	US 7,468,067	Kevin R. Ward, M.D. Marcus E. Carr, Jr., M.D., Ph.D.	One Hand Tourniquet with Locking Mechanism
5/1/09	IN 227,207	Martin K. Safo, Ph.D. Richmond Danso-Danquah, Ph.D. Samuel Nokuri Faik N. Musayev, Ph.D. Gajanan S. Joshi, Ph.D. James C. Burnett Donald J. Abraham, Ph.D.	Anti-Sickling Agents



The Billy R. Martin Innovation Award

The year was 2001, and VCU administrators were facing the once-in-a-decade task of assembling vast amounts of data needed for reaffirmation of the university's accreditation.

Fast-forward to 2009. The Billy R. Martin Innovation Award is bestowed on Yerian, Yucha, Jovanovich, Hounghu and Downing, the team that created WEAVEonline. This assessment and planning system that streamlines the burdensome task of preparing for accreditation was used by VCU in its re-accreditation by the Southern Association of Colleges and Schools. At present, WEAVEonline has been adopted by some 140 colleges and universities across the U.S. and in the Caribbean. Centrieva Corporation was spun off in 2006 to exclusively market, license and further develop WEAVEonline. With more than ten employees, the company is now a thriving business in Glen Allen, Virginia, returning profit to the inventors and the university.

"I'm certain that WEAVEonline never would have left the university without the encouragement and support of VCU Tech Transfer. I'm sure there are many more 'born of necessity' efforts at the university now that could possibly become solutions for people outside VCU."

— JEAN YERIAN

(LEFT TO RIGHT)

JEAN M. YERIAN
FORMER VCU DIRECTOR OF ASSESSMENT
V.P. ASSESSMENT & DEVELOPMENT CENTRIEVA CORPORATION

JAMES B. YUCHA
DEPUTY DIRECTOR , APPLICATION SERVICES
VCU TECHNOLOGY SERVICES

DONNA JOVANOVIH
FORMER SENIOR ASSOCIATE
OFFICE OF INSTITUTIONAL RESEARCH AND EVALUATION

DONGHAI HOUNGHU
APPLICATIONS ANALYST, APPLICATIONS SERVICES
VCU TECHNOLOGY SERVICES

Dolly Pakurar and John Bigbee demonstrate how easy it is to review microscopic structures on the computer and follow along in the accompanying text.

ALICE “DOLLY” PAKURAR, PH.D.
ASSOCIATE PROFESSOR
DEPARTMENT OF ANATOMY
AND NEUROBIOLOGY

JOHN BIGBEE, PH.D.
PROFESSOR
DEPARTMENT OF ANATOMY
AND NEUROBIOLOGY

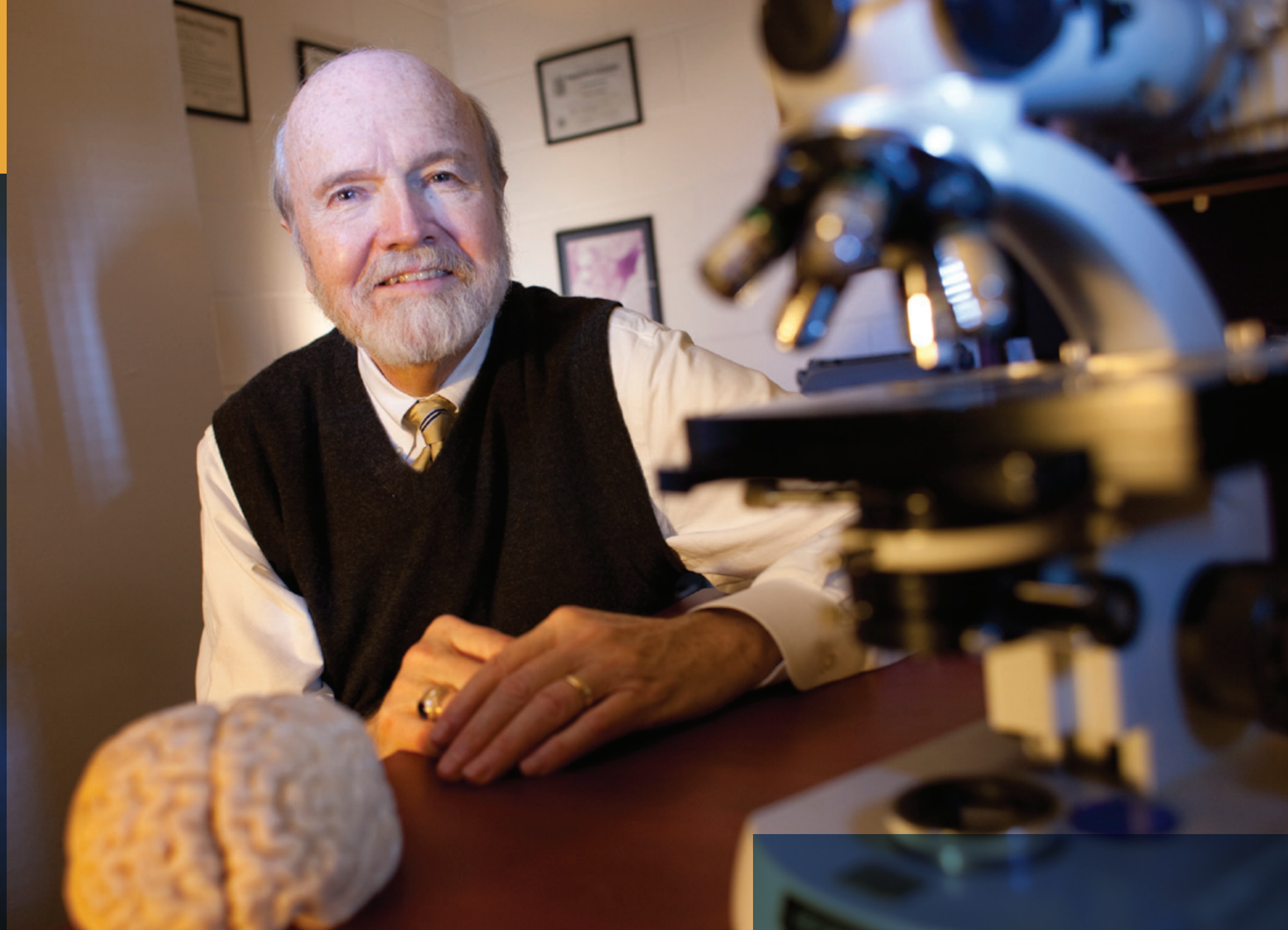
“Educators often have little knowledge of the publication world. Tech Transfer’s negotiation and implementation of the contract with John Wiley and Sons, Inc. was essential to the publication of Digital Histology.”

— DOLLY PAKURAR

ON THE MARKET
**Digital Histology
CD Aids Anatomy
Students**

Histology, a very visual discipline, requires extensive interaction between teacher and student. To provide students with accurate, individual instruction, associate professor Alice “Dolly” Pakurar compiled digital images from microscopic slides, organizing them into laboratory units for several histology courses. When histology laboratories were eliminated in the medical school, Pakurar teamed with professor John Bigbee to expand the software to meet this void.

With Carole Christman, John Priestly, Chris Stephens and Jeanne Schlesinger, Pakurar and Bigbee organized 1200 images, illustrations, quizzes and study tools into a comprehensive package that became an integral part of the VCU medical, dental, graduate, pharmacy and dental hygiene curricula. *Digital Histology* offers students a realistic alternative to time spent in the lab, while allowing VCU to save money on microscopes and slides. VCU Tech Transfer licensed the software and the textbook to publisher John Wiley and Sons, Inc. in 2004, with a second edition published in 2009.



George Leichnetz
is the “brain” behind
the CD and education
manual known as
Digital Neuroanatomy.

GEORGE LEICHNETZ, PH.D.
PROFESSOR
DEPARTMENT OF ANATOMY
AND NEUROBIOLOGY

“A few years ago, VCU had the prescient vision to start highlighting the work of innovative faculty that not only includes publications like Digital Neuroanatomy, but also potential cutting-edge therapeutics and novel medical devices. Our collective work demonstrates how VCU is leading the way in many areas of medical education, research, and innovation.”

— GEORGE LEICHNETZ

George Leichnetz, a professor in the VCU Department of Anatomy & Neurobiology, began by taking photomicrographs of brain tissue to develop a six-part slide presentation known as *Essential Neuroanatomy*. The work covered light and electron microscope neurohistology, skull, spinal cord, and brain imaging to guide medical and graduate students’ learning of neuroanatomy. With help from Canh Doan, a computer science student, Leichnetz then used this presentation as the basis for the development of an interactive computer program supported by a VCU Teaching Excellence Award.

The material proved to be such a successful supplemental teaching aid that Leichnetz was approached by John Wiley and Sons, Inc. with the request to expand the program into a CD with an accompanying manual. The former *Essential Neuroanatomy* thus became *Digital Neuroanatomy* and was licensed to John Wiley and Sons, Inc. by VCU Tech Transfer in 2006.

ON THE MARKET
**Digital
Neuroanatomy**

*Martin Safo and
Richmond Danso-Danquah
are enthusiastic about 5HMF
that could help patients
with sickle cell disease.*

MARTIN K. SAFO, PH.D.
ASSISTANT PROFESSOR
DEPARTMENT OF MEDICINAL CHEMISTRY

RICHMOND DANSO-DANQUAH, PH.D.
ASSISTANT PROFESSOR
DEPARTMENT OF MEDICINAL CHEMISTRY

*“Due to the efforts and
dedication of VCU Tech
Transfer we are a step closer to
developing this compound into a
therapeutic agent.”*

— MARTIN SAFO



HEADING TO MARKET

Anti-Sickling Compounds Offer Hope for SCD Patients

Sickle cell disease (SCD) is a hereditary blood disorder, affecting over 75,000 people in the United States and millions of people in India, Africa and the Middle East. In an SCD patient, the red blood cells form rigid “sickle” shapes that block capillaries and other small blood vessels, leading to anemia, stroke and cumulative damage to tissues and organs.

In the U.S., people with SCD have an average life expectancy of forty years, poor quality of life and high medical costs. The only drug approved for SCD is hydroxyurea. However, not all patients respond to hydroxyurea, which could also cause life-threatening side effects. Investigators led by professor Donald Abraham (now professor emeritus) and assistant professor Martin Safo have discovered a new, safer and more effective anti-sickling agent, 5HMF. This compound has a potent anti-sickling effect when it binds with intracellular sickle hemoglobin. Preliminary studies in mice show that orally administered 5HMF inhibits the formation of sickled cells in the blood, while carrying a minimal risk. With the patent already issued and the potential for a quick FDA approval, look for this VCU discovery to make medical headlines in the near future.

Tim Davey is proud of the way SINC has created a successful match between School of Social Work students and social service agencies in Richmond and across Virginia.

TIM DAVEY, PH.D., MSW
ASSOCIATE DEAN FOR FIELD STUDIES
SCHOOL OF SOCIAL WORK

VCU CREATIVE SERVICES DEVELOPERS:
ROB DOWNS
KIMBERLY WITT
PAMELA ARNOLD
MORGAN HUFF
JESSICA FOSTER

"The SINC system not only helps us to effectively manage the internships of our 600 plus students each year, but it also increases our capacity to more efficiently communicate with the 500 agency sites throughout the state, at a fraction of the cost."

— TIM DAVEY



HEADING TO MARKET *Online System Matches Students with Internships*

Each year, the VCU School of Social Work places several hundred student interns in Richmond social service agencies. While the internship learning experience is highly valued, the manual process of matching student applications with agency firms was both costly and labor-intensive.

No wonder Student Intern Connect (SINC) has won high praise for its developers. Tim Davey, Rob Downs, Kimberly Witt, Pamela Arnold, Morgan Huff and Jessica Foster from the VCU School of Social Work worked together to develop an efficient software program that automates the information gathering and matching of student to agencies and completely eliminates the need for copying and mailing. The program is easily accessed from any Internet-connected computer and meshes seamlessly with VCU web page templates and systems. In addition, SINC provides the university with the comprehensive internship data required for annual reporting to the Council on Social Work Education. In fact, SINC has been so well-received at the university that VCU Tech Transfer is currently working with other schools to adopt the software to their internship needs.



Inventors of the Non-Invasive CVP Monitor are proud their new device will lead to improved patient outcomes and fewer complications. Here they gather in VCURES, the VCU Reanimation Engineering Shock Center, where their idea came to fruition.

(LEFT TO RIGHT)

R. WAYNE BARBEE, PH.D.
EMERGENCY MEDICINE

KEVIN R. WARD, M.D.
EMERGENCY MEDICINE

BRUCE D. SPIESS, M.D.
ANESTHESIOLOGY

JAMES ARROWOOD, M.D.
INTERNAL MEDICINE

RAO R. IVATURY, M.D., F.A.C.S.
SURGERY

MOHAMMAD H. TIBA, M.D.
EMERGENCY MEDICINE

“The interaction with VCU Tech Transfer has made a large difference in our ability to collaborate with other researchers throughout VCU as well as inspired us to come back and deliver yet more new technologies for medicine.”

— BRUCE SPIESS

Seven VCU researchers have developed a central venous pressure (CVP) measurement device that eliminates the need for a catheter. The implications are far-reaching: more rapid treatment decisions for health care workers and fewer potential complications for patients.

The standard technique for measuring blood pressure inside the heart requires inserting a catheter into a subclavian or internal jugular vein. This method can result in punctured lungs, infection, bleeding and arrhythmias. The new device measures blood volume changes in the brachial vein in the arm and sends that information to a computer, which then determines the CVP. VCU Tech Transfer has licensed the invention to a Pennsylvania start-up company called NeuMeDx, Inc. Now, inventors Kevin Ward, Wayne Barbee, Mohammad Tiba, James Arrowood, Bruce Spiess, Rao Ivatury and Russell Hummel are eagerly awaiting its market release in late 2010.

HEADING TO MARKET **Non-Invasive Central Venous Pressure Device Gives Rapid and Safe Measurement**

Intellectual property:

Property (as an idea, invention, or process) that derives from the work of the mind or intellect.

Types of Intellectual Property

- Patent
- Copyright
- Trade Secret
- Trademark
- Tangible research material
- Know-how

What is patentable?

- New chemical compounds, formulations or mixtures
- New uses for existing compounds
- New or improved device or machine
- Method of doing business (by software, algorithm, etc)
- Methods for synthesizing a compound or treating a disease

What is copyrightable?

- Software
- Images
- Books or chapters
- Literary and artistic works

What are tangible research materials?

- Antibodies
- Transgenic mice
- Cells
- Plasmids
- Compounds
- Devices

When should you submit an invention disclosure?

- You can fully describe your discovery and how it works; or
- You plan to give a talk or publish a manuscript or abstract; or
- You are leaving VCU; or
- You have been contacted by a company

If you are in doubt, we urge you to contact Tech Transfer to discuss your discovery

What is intellectual property and what should I do with it?

What is intellectual property?

The term “intellectual property” or “IP” may mean different things to different people. However, for VCU Tech Transfer, the meaning is clear: it is the innovations developed by VCU employees and students that may be valuable to industry or to other academic institutions. This includes inventions, such as new drugs, devices or processes. Intellectual property may also be in the form of computer programs, microscopic images and written materials that are protected by copyrights.

In addition to patentable inventions and copyright-protected IP, there are other types of intellectual property that you should consider disclosing to VCU Tech Transfer:

1. Tangible research materials, which may include antibodies, cell lines, plasmids, transgenic animals, devices and equipment, may also be transferred to industry and other institutions through the technology transfer process.
2. Know-how may also be of great value to industry or to others. A patent may not be worth much more than the value of the paper it is printed on without the knowledge and expertise of the researchers behind it.

The definition of intellectual property is listed in the VCU Intellectual Property Policy (http://www.research.vcu.edu/p_and_g/ippolicy.htm). The Policy also details when IP is owned by VCU and when it is owned by the inventors.

What to do if you think you may have an invention?

Once you determine that you may have created intellectual property, we encourage you to share it with us by completing an invention disclosure form, which is posted on our web site (www.research.vcu.edu/ott).

When is the best time to submit an invention disclosure?

Most intellectual property is not conceived in a stereotypical flash

of a light bulb. Instead, IP is usually developed after many months or years of optimization of the invention or software code. An optimal time to submit an invention disclosure is when you can fully describe your discovery and how it works.

Many researchers submit invention disclosures at the same time they are getting ready to submit a manuscript for publication that describes the discovery. Much of the effort required to complete the invention disclosure is synergistic with preparing a manuscript; both use much of the same information on the methodologies and data related to the discovery. It is a good idea to submit an invention disclosure to our office or contact us before any publication, which includes manuscripts, abstract submissions for meetings, or presentations.

Another event that may trigger submission of an invention disclosure is a pending industry research agreement. An invention disclosure should be submitted ahead of signing a related industry research agreement. This will allow us to inform the company that VCU already has existing IP related to the proposed work.

Invention disclosures may need to be submitted ahead of your departure from VCU. If you further develop your discovery at another institution, we will continue to work together to ensure that commercialization occurs.

Sometimes, we receive invention disclosures after a publication has occurred. While publication without patent protection may hamper our ability to commercialize a patentable invention, it certainly does not prevent us from commercializing copyrights and tangible research materials. In fact, a number of VCU researchers have been contacted by potential industry partners who have seen their publications. We encourage you to submit an invention disclosure on your copyright or tangible research material.

We will be glad to talk with you and advise you on the preparation of invention disclosures, on the different types of intellectual property protection and commercialization.



VCU Tech Transfer Team

[FROM LEFT TO RIGHT]

MAUREEN C. KELLY, PH.D.
LICENSING ASSOCIATE

CLARA A. SINE
OFFICE MANAGER

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

T. ALLEN MORRIS, PH.D., M.B.A.
ASSISTANT DIRECTOR

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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 more than 32,000 students. Located on two campuses in historic downtown Richmond, Virginia, this vibrant, urban university offers 211 undergraduate, graduate and professional programs in 13 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 \$225 Million in fiscal year 2009. Twenty-seven 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 more than \$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.



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800 EAST LEIGH STREET, SUITE 113
P.O. Box 980568
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