

ANNUAL REPORT

# Bringing Ideas to Life

13



**VCU**

Innovation Gateway

VIRGINIA COMMONWEALTH UNIVERSITY



*Bringing Ideas to Life*

# 13

## *Annual Report*

**COVER PHOTO:**

*ESCALab 250 located in the VCU nanomaterials characterization facility*

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## Mission

*Our mission is to facilitate commercialization of university inventions; support university research through collaborative agreements; foster a culture of innovation and entrepreneurship at the university; and promote regional economic development and new venture creation.*

LINKEDIN: VCU INNOVATION GATEWAY 

FACEBOOK: VCU INNOVATION GATEWAY 

TWITTER: @VCUINNOVATION 



## ***Dear Colleagues and Friends,***

This has been a year of transformation for us.

We unveiled our brand new name -- VCU Innovation Gateway -- at this year's annual Invented at VCU reception. The change in our name represents an evolution that has been in the making for the past few years. We have broadened our mission as part of a strategic vision that is directly tied to Quest for Distinction, the university's strategic plan.

The new Innovation Gateway comes with more than just a fancy name change. Previously, our functions were focused on technologies commercialization and research support agreements. Now, our expanded priorities include building strategic industry collaborations and regional partnerships, supporting entrepreneurship and new venture creation, promoting economic development, and building a regional innovation ecosystem.

We work with our regional partners to ensure that there's an easy-to-use "front door" into VCU. This front door allows our partners to access important information on our capabilities and expertise. Under the Innovation Gateway's broader mission, VCU is expanding collaborations with local and prospective companies not only to build external support for our researchers and students but to also promote regional economic growth.

VCU Innovation Gateway is committed to fostering greater Richmond's innovative and entrepreneurial ecosystem. The VCU Squared strategy is key to doing just that. The programs that Innovation Gateway has rolled out in support of that strategy are focused not only on enhancing the culture of entrepreneurship but also on harnessing the talent of VCU's students, research community and alumni population.

Through a recent survey, we found that more than 50 percent of VCU students are interested in starting their own business. With exciting initiatives such as the VCU Squared strategy, we'll be able to support new and evolving innovation and entrepreneurship around the university. We are growing an entrepreneurial population that will help us commercialize our technologies through new venture creation, thus supporting the economic growth of our region.

We invite you to explore some of the highlights of 2013 and learn about exciting translational research, commercialization activities, and start-up companies that connect VCU faculty, staff, and students to the community and the world.

We are looking forward to more successes in the years to come.

With sincere gratitude,

Francis L. Macrina, Ph.D.  
Edward Myers Professor of Dentistry and  
Vice President for Research

Ivelina Metcheva, Ph.D., MBA  
Executive Director, VCU Innovation Gateway

# ***Message from Dr. Michael Rao President of VCU and VCU Health System***

For decades, research universities have been our nation's greatest innovation engines. And within those universities, technology transfer offices have made sure that innovations moved quickly and efficiently from the laboratories to the marketplace. Traditionally, these offices have focused mainly on intellectual property protection and commercialization, bringing benefit back to the university and the inventors.

At Virginia Commonwealth University, we see innovation a bit differently.

While our technology transfer office, now under a new name - VCU Innovation Gateway - similarly supports our university inventors, we understand that the real value in any innovation is not simply the benefit it can bring to the university. It is the benefits it has on our region - and beyond that - on our society.

VCU Innovation Gateway now serves as the door that connects the discoveries of our faculty, staff, and students with industry partners, entrepreneurs, and venture capital. It serves to enhance the university entrepreneurial culture and reinforce VCU as the catalyst of our region's economic, cultural, and innovation ecosystem.

## Why does this matter?

Well, people at VCU have good ideas. Ideas that save lives. One example is Shunlin Ren, an associate professor in the Department of Internal Medicine, who is developing novel therapeutics for the treatment of high cholesterol and atherosclerosis.

But Dr. Ren's discovery cannot help people if it remains in the university. That is where VCU Innovation Gateway comes in. It helps connect life-saving discoveries, like Dr. Ren's, with companies and entrepreneurs who could develop them and bring them to the marketplace quickly and efficiently.

The impact is much broader than for VCU alone. When these innovations flourish, jobs are created, lives are saved and the society benefits. That is the real value of

innovation, and that is why VCU Innovation Gateway is an essential part of our nationally recognized premier research university.

The university commitment to innovation is also seen in our students. Increasingly, young scholars are drawn to VCU because they will have the chance to learn from and work alongside professors who are renowned experts in their fields. More students than ever are engaged in real research and innovation as part of their educational experience. Fifty percent of our students want to start a business at some point in their life.

Take Tumi Oredein, a product innovation major at VCU. Tumi's passion for innovation made him the national winner of Walmart's "Get on the Shelf" competition, and his SKRIBS wristbands are now being sold by the nation leading retailer. VCU Innovation Gateway took a hands-on approach, helping Tumi refine his business model and providing him with the funds and guidance needed to start his first business.

Nowhere is VCU's commitment to innovation more apparent than with our distinguished faculty who brought almost \$250 million in research grants last year and whose productivity has helped VCU become one of the world's Top 200 research universities. VCU's research is increasingly interdisciplinary, inter-professional, and innovative.

With its innovative faculty and students, VCU is moving steadfast to bring more innovations to the bedside and society. The best way to measure this is in lives changed, lives improved, and lives saved.

This is how VCU defines innovation.

And this is what VCU Innovation Gateway helps us achieve every day.



**Michael Rao, Ph.D.**

## **David G. Simpson, Ph.D. and Gary Bowlin, Ph.D.**



GARY BOWLIN AND DAVID G. SIMPSON RECEIVED THE 2013 BILLY R. MARTIN INNOVATION AWARD DURING THE EIGHTH ANNUAL “INVENTED AT VCU” RECEPTION. FROM LEFT TO RIGHT: FRANCIS L. MACRINA, GARY BOWLIN, DAVID G. SIMPSON AND BEVERLY WARREN



## The Billy R. Martin Innovation Award

What if a bandage could almost instantly stop bleeding on contact? And not from a small cut, but from a traumatic wound, such as one to a major artery? This type of technology may one day save the lives of severely wounded soldiers on the frontlines of combat, civilians injured here at home as well as patients during surgical procedures.

Two VCU scientists teamed up to invent such a product that has been licensed to a start-up company, St. Teresa Medical, Inc.

David G. Simpson, Ph.D., associate professor in the Department of Anatomy and Neurobiology in the VCU School of Medicine, and Gary L. Bowlin, Ph.D., formerly a professor in the VCU Department of Biomedical Engineering and now a faculty member with the University of Memphis, were awarded with the 2013 Billy R. Martin Award for Innovation.

Their invention uses a technology called electrospinning to create a bandage that uniformly disperses clot-forming proteins to an injury site. Upon contact with blood, the bandage immediately dissolves and releases the proteins at the site, stopping the bleeding almost instantaneously.

"I am fortunate to work in a department that recognizes the critical role of translational research in the practice of medicine. VCU has provided its faculty with an environment and the freedom that makes it possible to explore the development of a broad spectrum of next generation clinical interventions," Simpson said. "Our efforts to develop the *Fastclot* hemostatic technology platform would not have been possible without the support and efforts of our colleagues at the VCU Innovation Gateway. I am greatly honored to be recognized with the Billy R. Martin Innovation Award."

## Student Innovation Award

Tumi Oredein was honored with the inaugural Student Innovation Award. Oredein, a VCU product innovation major, developed SKRIBS, customizable wristbands on which wearers can write and rewrite their own messages. As the winner of Walmart's "Get on the Shelf" competition, his invention will be sold on Walmart.com and receive additional online marketing support. The bands will also be introduced to the Walmart's Stores' Merchandising team for store shelf consideration.



TUMI OREDEIN RECEIVED THE 2013 STUDENT INNOVATION AWARD DURING THE RECEPTION. FROM LEFT TO RIGHT: BEVERLY WARREN, TUMI OREDEIN AND FRANCIS L. MACRINA

*"We're truly fortunate to be in a sphere that really does feel like an innovation ecosystem. Our goal is to make sure we are providing the space where you can do good work and where our work benefits humankind, not only in this region, but across the world."*

**Beverly Warren, Ed.D., Ph.D.**

*Provost and Senior Vice President for Academic Affairs*

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## FISCAL YEAR AT A GLANCE

Licensing Revenues	\$1,344,410
Invention Disclosures	103
Licenses/Options	11
Other Research Support Agreements	16
Start-ups	3
Patents Filed	150
Patents Issued	6
Copyrights	7
Material Transfer Agreements	272
Non-Disclosure Agreements	103

### DEPARTMENTS WITH TEN OR MORE INVENTION DISCLOSURES

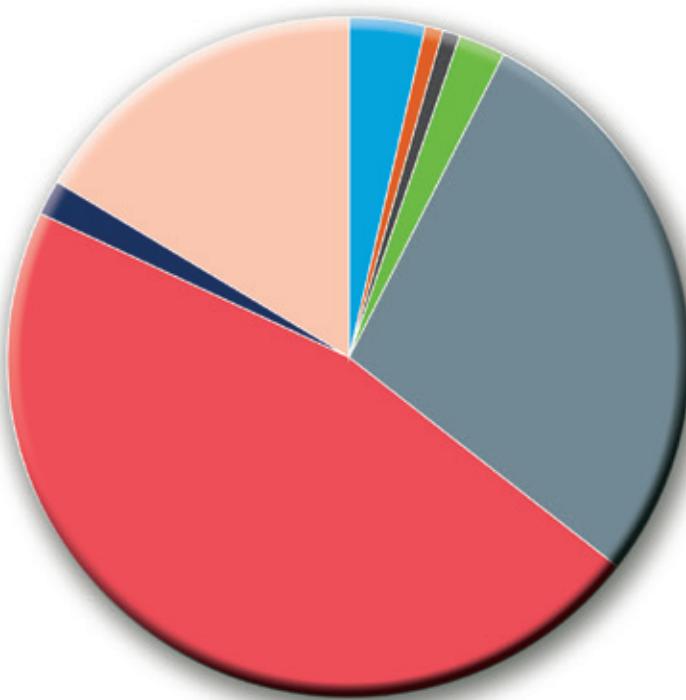
Biomedical Engineering 11

### DEPARTMENTS WITH FIVE TO NINE INVENTION DISCLOSURES

Internal Medicine	9
Pharmaceutics	9
Medicinal Chemistry	9
Computer Science	8
Chemical and Life Science Engineering	8
Neurosurgery	6
Human Genetics	6
Mechanical and Nuclear Engineering	6
Pharmacology and Toxicology	5
Emergency Medicine	5

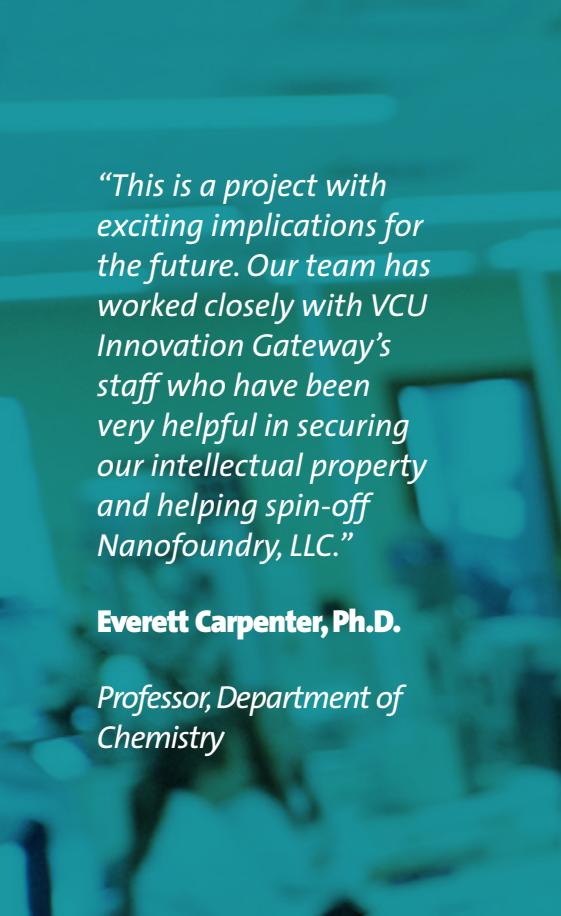
College of Humanities and Sciences	5
School of Education	1
School of the Arts	1
School of Dentistry	3
School of Engineering	36
School of Medicine	60
School of Nursing	2
School of Pharmacy	21

### DISTRIBUTION OF INVENTION DISCLOSURES



## VCU PATENTS ISSUED

Issue Date	Patent No.	VCU Inventors	Title
3/19/13	US 8,399,441	William M. Pandak, M.D. Shulin Ren, M.D., Ph.D.	Nuclear Sulfated Oxysterol, Potent Regulator of Lipid Homeostasis, for Therapy of Hypercholesterolemia, Hypertriglycerides, Fatty Liver Diseases, and Atherosclerosis
1/1/13	US 8,343,731	Don Farthing, Ph.D. Lei Xi, Ph.D. Thomas Karnes, Ph.D. Domenic Sica, Ph.D. Todd Gehr, Ph.D. Lynne Gehr, Ph.D. Martin Unverdorben, Ph.D.	Method for Diagnosing Acute Cardiac Ischemia
12/4/12	US 8,324,197	Nicholas Farrell	Transplatinum Complexes with N2o2 Donor Sets as Cytotoxic and Antitumor Agents
9/11/12	US 8,262,881	Umesh Desai, Ph.D. Timothy King	A Method for Fingerprinting Heparin and Low Molecular Weight Heparins
8/21/12	US 8,247,226	John Tew, Ph.D.	Methods of Evaluating an Immune Response to an Antigen
3/12/13	Canada 2,464,092	David G. Simpson, Ph.D. Gary Bowlin, Ph.D. Gary Wnek, Ph.D	Electroprocessing in Drug Delivery and Cell Encapsulation

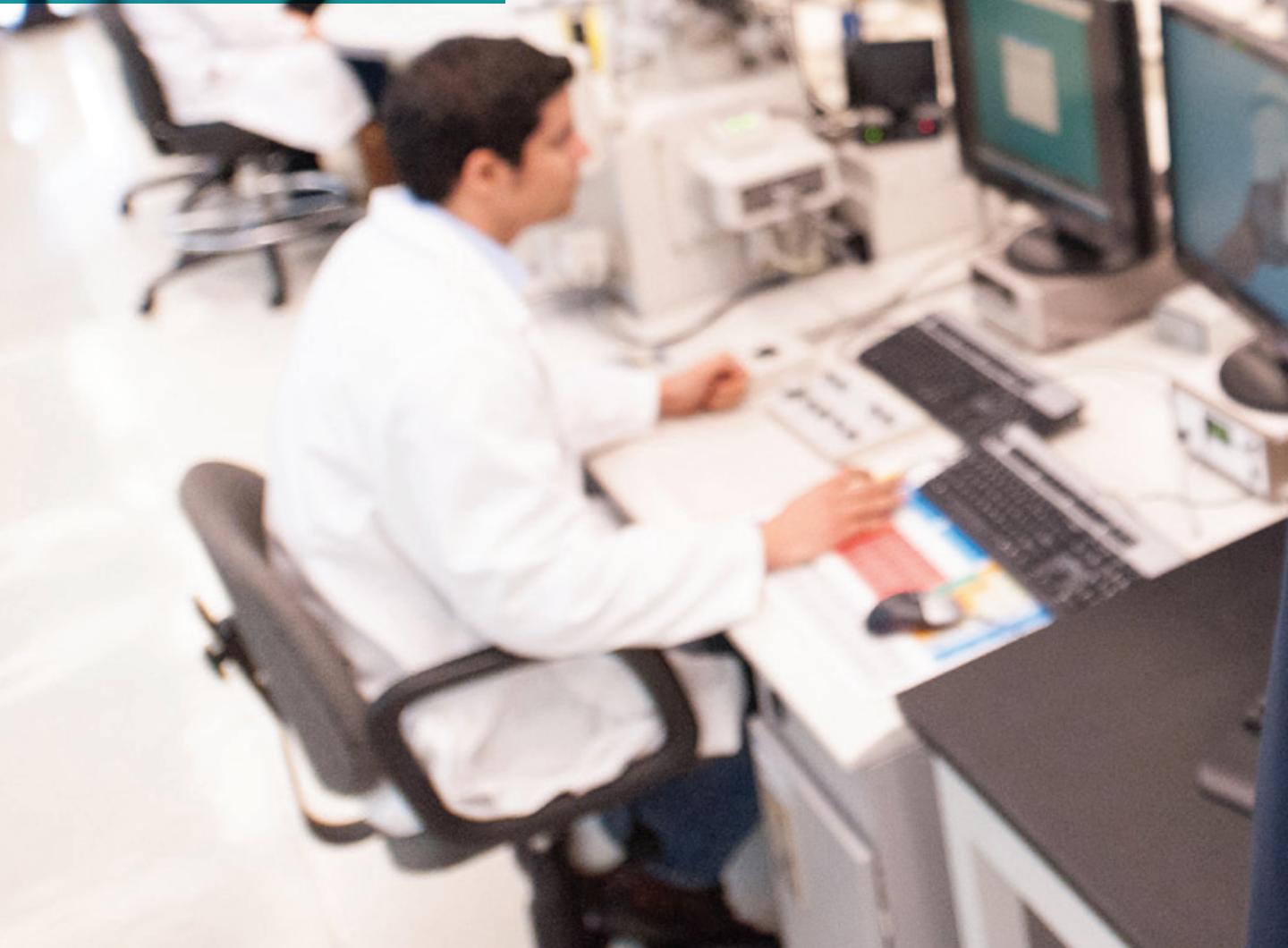


*"This is a project with exciting implications for the future. Our team has worked closely with VCU Innovation Gateway's staff who have been very helpful in securing our intellectual property and helping spin-off Nanofoundry, LLC."*

**Everett Carpenter, Ph.D.**

*Professor, Department of Chemistry*

## **The Nanomagnets of the Future**





With a push for more energy-efficient and green-powered technologies, materials scientists are working to create permanent magnets that perform as well as the best commercial magnets, but are less expensive and don't rely on rare earth metals.

VCU received a contract totaling more than \$2 million from the U.S. Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) to design and develop a new class of permanent magnets to be used in energy-efficient electric car motors or generators. The VCU project used a magnetic carbide-based composite, which looks like a fine black powder, to develop a magnet for use in a prototype electric motor.

The transition metal carbide nanomagnets, which require no rare earth elements, were developed by Everett Carpenter, Ph.D., director of VCU's Nanoscience and Nanotechnology program, professor of inorganic and materials chemistry and affiliate professor of chemical and life science engineering.

Carpenter was selected to be a part of the I-Corps program, a National Science Foundation initiative to assess the readiness of emerging technology concepts for transitioning into valuable new products through a public-private partnership.

"Recent market trends have made the production and procurement of rare earth permanent magnets more challenging and less cost efficient. Creating a secure supply of these materials here in the United States is critical," Carpenter said. In addition, the cost to produce this new magnetic material could be significantly reduced due to a simplified synthesis technique.

The project led to the creation of a start-up, NanoFoundry, LLC, based in Glen Allen, Virginia. The company has secured a SBIR grant for proof-of-concept development. Carpenter is the company chief technical officer.

Millions of people around the world suffer from metabolic syndromes, including hyperlipidemia, atherosclerosis and fatty liver diseases. Most of these diseases currently have no specific proven treatment. Only 35 percent of patients with hypercholesterolemia are responsive to the currently available therapy.

Shunlin Ren, M.D., Ph.D., a dual-appointed associate professor of internal medicine at VCU and the Hunter Holmes McGuire VA Medical Center, discovered novel cholesterol metabolites and identified cholesterol metabolism in the mitochondria as a regulatory pathway. These novel cholesterol metabolites could potentially be used to treat metabolic syndrome.

"The novel cholesterol metabolites are able to decrease lipid biosynthesis, decrease lipid accumulation, suppress lipid-induced inflammatory responses and induce hepatocyte regeneration at transcriptional levels," Ren said. "The metabolites have the potential to turn patients' liver tissue back to a normal condition and may allow the patients to lead a healthy life."

With assistance from VCU Innovation Gateway, Ren has started an industry collaboration. His therapy has been licensed to, and his research has been supported by Durect Corporation, located in Cupertino, California. During the past several years, Ren has filed nine patent applications, with two being issued.



*"The assistance of VCU Innovation Gateway in securing a licensing deal will make the transition of this therapy from bench to bedside much faster. The goal is to eventually cure fatty liver and cardiovascular diseases."*

**Shunlin Ren, M.D., Ph.D.**  
*Associate Professor, Internal Medicine*



# *Fighting Cholesterol*

**Shunlin Ren, M.D., Ph.D.**



# *Spanning the Globe* The VCUQ Project



FROM LEFT TO RIGHT:  
PETER CHOMOWICZ, ASSOCIATE DEAN FOR RESEARCH AND DEVELOPMENT, VCUQ  
ROMAN TURCZYN, DIRECTOR OF THE CENTER FOR RESEARCH, DESIGN AND ENTREPRENEURSHIP, VCUQ  
JOHAN TERBLANS, GENERAL MANAGER, CORE PROJECTS & SUPPLY, WLL

The year 2022 may seem far away, but if you're living in Qatar, it's just around the corner. Qatar is hosting the 2022 FIFA World Cup and the exponential growth in construction has increased the need for construction workers.

This has posed a great challenge for Qatar and neighboring Middle East countries that have also experienced a similar expansion in construction, as they struggle to find safe and acceptable housing for the large influx of migrant workers into the region.

Enter a team from VCUQ campus, led by Roman Turczyn, director of the Center for Research, Design and Entrepreneurship, that developed an innovative concept of prefabricated portable housing modules that can easily be flat-packed for shipping and then assembled on site for use.

VCUQ's project examined and identified sustainable, economic options for use in urban, rural and remote construction site locations to serve the growing market for worker housing. The concept is based on a business model that demonstrates cost effectiveness through reduced operating costs and is intended to meet and surpass international standards for workers' living conditions.

The project will improve housing standards of migrant workers by providing a holistic and sustainable model for communal living that is reinforced by innovative design and planning concepts using portable modules. These modules have a "connecting architecture" that threads through the community, providing the residents with a rich nurturing environment.

The combination of these modules and connecting architecture is economical and can be easily configured to respond to specific site conditions and modified as the site expands and contracts.

"We have been able to confirm that our concept is a very lucrative and sustainable financial model," said Turczyn.

Core Projects and Supply, WLL, a construction company in Qatar, will be responsible for marketing and selling the housing units.

The workers housing project has already received national recognition last year when it was announced that the standards for the housing design have been adopted into Qatar Foundation Mandatory Standards of Migrant Workers' Welfare for Contractors and Sub-Contractors.



Five VCU research projects received funding through a statewide network designed to accelerate innovation and economic growth. The Virginia Innovation Partnership, created as part of the U.S. Department of Commerce's i6 Challenge, awarded \$258,000 to VCU research projects representing the highest dollar awards total for all Virginia universities in 2013.

The Virginia Innovation Partnership provides proof-of-concept funding to advance early-stage research and connects academic researchers with mentors, corporations, and investors to accelerate commercialization of the new discoveries.

"VCU Innovation Gateway was instrumental in preparing the commercialization plans for the winning proposals, reviewing the presentations and rehearsing the 'pitches' of our researchers," said Ivelina Metcheva, Ph.D., MBA, executive director of VCU Innovation Gateway. "Our team and members of our advisory panel are involved with the mentoring teams created for each of the awardees to ensure that our projects gain significant traction."



**THE VCU AWARDEES INCLUDE:**

- “Development of a novel chimeric vaccine for tick-transmitted disease,” submitted by Jason Carlyon, Ph.D., assistant professor of microbiology and immunology in the Department of Molecular Biology and Genetics, and Richard Marconi, Ph.D., professor of microbiology and immunology in the Department of Molecular Biology and Genetics.
- “Transporter-directed prodrugs for drug delivery to the brain: In vivo proof of concept,” submitted by Phillip Gerk, Ph.D., associate professor in the Department of Pharmaceutics.
- “Point-of-care biomarker of ischemia,” submitted by Lynne Gehr, M.D., assistant professor in the Department of Anesthesiology, and Todd Gehr, M.D., professor in the Department of Internal Medicine.
- “Airway stent delivery system,” submitted by Aamer Syed, M.D., assistant professor in the Department of Internal Medicine, and Hans Lee, M.D., assistant professor in the Department of Internal Medicine.
- “Sustained drug release formulation for glaucoma,” submitted by Hu Yang, Ph.D., associate professor in the Department of Biomedical Engineering.

FROM LEFT TO RIGHT:  
HU YANG, PHILLIP GERK, AAMER SYED, IVELINA METCHEVA,  
JASON CARLYON, RICHARD MARCONI, LYNNE GEHR, ALLEN MORRIS



*The Virginia  
Innovation Partnership*



## **VCU Innovation Gateway Team**

*Pictured from Left to Right:*

### **SEATED**

**NICOLE COLOMB**

**WENDY REID**

**TRISHA MASSENZO**

**KELLY MORGAN**

### **STANDING**

**JUSTIN KAUSZLER**

**LIVIA HORTON**

**LINDSAY CLAYTON**

**IVELINA METCHEVA**

**ALLEN MORRIS**

**SUSAN PATOW**

**CLARA SINE**

**MAGDALENA MORGAN**

**RAMZY ISMAIL**

## **Board of Directors**

**Michael Grisham, MBA**  
**President and CEO**  
**Virginia Biosciences Health Research Corporation**

**Spencer Williamson, MBA**  
**CEO, Kaléo, Inc.**

**Michael D. Fraizer**  
**VCU Board of Visitors**  
**Operating Advisor, Blue Heron Capital**  
**Senior Advisor, Frontier Project**

**L. Franklin Bost, MBA, IDSA**  
**Executive Associate Dean, School of Engineering**  
**Virginia Commonwealth University**

**Jerome F. Strauss III, M.D., Ph.D.**  
**Dean, School of Medicine**  
**Virginia Commonwealth University**

### **EX-OFFICIO MEMBERS**

**Francis L. Macrina, Ph.D.**  
**Vice President for Research**  
**Virginia Commonwealth University**

**Ivelina S. Metcheva, Ph.D., MBA**  
**Executive Director, VCU Innovation Gateway**  
**President, VCU Intellectual Property Foundation**  
**Virginia Commonwealth University**

# *VCU Commercialization Advisory Panel*

**David R. Beauregard**  
Managing Director, Monument  
Square Advisors, LLC

**Geoffrey D. Beecher**  
Senior Sales Specialists  
Carticept Medical

**L. Franklin Bost**  
Executive Associate Dean  
VCU School of Engineering

**Reinhold Brand**  
President  
Evonik Goldschmidt  
Corporation  
Consumer Specialties

**Rebecca Caffrey**  
Senior Director of Intellectual  
Property Strategy, Health  
Diagnostic Laboratory, Inc.

**Brian Carney**  
Principal  
Harbert Venture Partners

**John Clore**  
Program Director  
VCU Center for Clinical and  
Translational Research

**William H. Daughtrey**  
Entrepreneur-in-Residence  
Dominion Resources  
Innovation Center

**Alex Euler**  
Investment Director  
CIT Gap Fund

**Paul France**  
MeadWestvaco

**James Fort**  
Associate Director  
Pain Management  
Product Development  
Pfizer Consumer Health

**Jeffrey M. Gallagher**  
CEO, Virginia Bio

**Mike Grisham**  
President and CEO  
Virginia Biosciences Health  
Research Corporation

**Graham Henshaw**  
New Richmond Ventures

**Neil Hughes**  
Chief Commercial Officer  
Kaléo, Inc.

**Michael Innes**  
Managing Director  
Cary Street Partners

**Todd Nuckols**  
VP of Business Development  
EnterBridge Technologies  
Managing Director  
Lighthouse Labs

**Mike McGinley**  
Managing Partner  
New Dominion Angels

**Neil Patel**  
Senior Vice President  
Content Strategy & Development  
The Martin Agency

**Carrie Roth**  
Interim President and CEO  
Virginia BioTechnology  
Research Park

**Dennis Schafer**  
Life Science Management

**Andrew W. White**  
Attorney, LeClairRyan

**Mike Whitham**  
Patent Attorney, Whitham,  
Curtis, Christofferson & Cook





800 East Leigh Street, Suite 3000  
P.O. Box 980568  
Richmond, VA 23298-0568  
[www.research.vcu.edu/ott](http://www.research.vcu.edu/ott)  
(804) 828-5188

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