

**University of Virginia School of Medicine 2020 Faculty Research Retreat**  
**Saturday, February 8, 2020**  
**Boar's Head Inn**

**Descriptions/Learning Objectives:** See attached session descriptions and learning objectives.

**Accreditation:** The University of Virginia School of Medicine is accredited by the ACCME to provide continuing medical education for physicians. The University of Virginia School of Medicine designates this live activity for a maximum of **6.0 AMA PRA Category 1 Credits™**. Physicians should claim only the credit commensurate with the extent of their participation in the activity. The University of Virginia School of Medicine and/or The University of Virginia School of Nursing Continuing Education, as accredited provider(s), awards **6.0 Hours of Participation** (consistent with the designated number of AMA PRA Category 1 Credit(s)™ or ANCC contact hours) to a participant who successfully completes this educational activity. The University of Virginia School of Medicine and/or The University of Virginia School of Nursing Continuing Education maintains a record of participation for six (6) years. CME transcripts may be obtained at [www.cmevillage.com](http://www.cmevillage.com) (click on Learning Portal, select CE Transcript and follow the instructions).

**Faculty Disclosure/Conflict of Interest:** The University of Virginia School of Medicine, as an ACCME accredited provider, endorses and strives to comply with the Accreditation Council for Continuing Medical Education (ACCME) Standards of Commercial Support, Commonwealth of Virginia statutes, University of Virginia policies and procedures, and associated federal and private regulations and guidelines on the need for disclosure and monitoring of proprietary and financial interests that may affect the scientific integrity and balance of content delivered in continuing medical education activities under our auspices.

The University of Virginia School of Medicine requires that all CME activities accredited through this institution be developed independently and be scientifically rigorous, balanced and objective in the presentation/discussion of its content, theories, and practices.

All presenters participating in an accredited CME activity are expected to disclose to the participants' relevant financial relationships with commercial entities occurring within the past 12 months (such as grants or research support, employee, consultant, stock holder, member of speakers bureau, etc.). The University of Virginia School of Medicine will employ appropriate mechanisms to resolve potential conflicts of interest to maintain the standards of fair and balanced education to the participant. Questions about specific strategies can be directed to the Office of Continuing Medical Education, University of Virginia School of Medicine, Charlottesville, Virginia.

The presenters listed below do not have any personal or professional financial relationships with a commercial entity producing healthcare goods and/or services:

**Emaad Abdel-Rahman, Roger Abounader, Laura Barnes, Stefan Bekiranov, Donald E. Brown, John Campbell, James Casanova, Carrie Cowardin, Mark DeBoer, Bimal Desai, Ukpong Eyo, Karen Fairchild, Shrirang Gadrey, Francine Garrett-Bakelman, Daniel Gioeli, Jasmin Herz, Jeffrey Holmes, Brant Isakson, Jaideep Kapur, David Kashatus, Chia-Yi Kuan, Bijoy Kundu, Virginia LeBaron, Norbert Leitinger, Benjamin Lobo, John Lukens, Coleen McNamara, Sean Moore, Kiel Neumann, Shayn Peirce-Cottler, Kevin Pelphrey, Lisa Peterson, Richard J. Price, Daniel Quinn, Melanie Rutkowski, Jung-Bum Shin, Jogender Tushir-Singh, Mark Sochor, Nina Solenski, Swapnil Sonkusare, Kenneth Walsh, Ronald Williams, Zhen Yan, Jamie Zoellner**

The presenters listed below have disclosed the following personal or professional financial relationships with a commercial entity producing healthcare goods and/or services.

Last name	First name	Commercial Interest	Clinical/Research Area	Participation
<b>Borish</b>	<b>Larry</b>	Regeneron / Sanofi	RV infections in asthma exacerbations	Consultant
		GSK	PMN IL-5R expression in COPD	Industry funded research/investigator (all funds go to UVA)
		Regeneron	Dupilumab for EoE	Industry funded research/investigator (all funds go to UVA)

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<b>Bushweller</b>	<b>John</b>	Systems Oncology	Drug development	Patent Holder Systems Oncology has licensed our CFBF-SMMHC inhibitor for commercial development.
<b>Ingersoll</b>	<b>Karen</b>	Warm Health Technology, Inc.	mHealth in HIV care	Consultant Advisory Committee/Board
<b>Kester</b>	<b>Mark</b>	Keystone Nano, Inc.	Nanoscale drug delivery	Stock/Ownership, Patent holder
		OraceuTX	Enteral nanotechnology	Stock/Ownership, Patent holder
		Ariz Biotech	siRNA therapies	Advisory Committee/Board
		Ellington Health Care Partners	Nanomedicine	Advisory Committee/Board
		Agrospheres	Agricultural nanoscale products	Advisory Committee/Board, Stock/Ownership, Patent Holder
<b>Kovatchev</b>	<b>Boris</b>	Sanofi-Aventis	Diabetes Technology	Advisory Committee/Board Speakers Bureau, Faculty, Peer Reviewer
		Tandem Diabetes Care	Diabetes Technology	Consultant Material support for study
		Dexcom, Inc.	Diabetes Technology	Industry funded research/investigator Advisory Committee/Board Speakers Bureau, Faculty, Peer Reviewer Material support for study
		Novo Nordisk	Pharmaceutical/Diabetes Technology	Industry funded research/investigator Advisory Committee/Board Speakers Bureau, Faculty, Peer Reviewer
<b>Lee</b>	<b>D. Trey</b>	Juno Therapeutics/Celgene/BMS	Chimeric antigen receptor T cell toxicity management	Advisory Committee/Board
		Harpoon Therapeutics	Immunotherapy toxicity management and study design	Consultant
		Kite Pharma/Gilead	Chimeric Antigen Receptor T cell clinical trial (ZUMA4) support	Industry funded research/investigator
<b>Loughran</b>	<b>Thomas</b>	Bioniz Therapeutics	Cancer and autoimmune disease	Advisory Committee/Board
		Keystone Nano	Cancer	Advisory Committee/Board
<b>Mathers</b>	<b>Amy</b>	SeLux Diagnostics	Rapid susceptibility testing for bacteria	Consultant
		Accelerate Diagnostics	Rapid antimicrobial susceptibility diagnostic	Consultant
		Antimicrobial Resistance (AMR) Services	Provide tools to understand transmission of hospital pathogens including the hospital environment	Consultant Advisory Committee/Board

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		VenatoRx	Provide advice about novel pharmaceutical agent trials and applications	Consultant Advisory Committee/Board
<b>Meyer</b>	<b>Craig</b>	Siemens Medical Solutions USA	Magnetic Resonance Imaging	Industry funded research/investigator
<b>Mugler</b>	<b>John</b>	Siemens	Medical Imaging	Industry funded research/investigator Consultant
<b>Petri</b>	<b>William A. (Bill)</b>	TechLab	Infection diseases diagnostics	Consultant
<b>Ritterbrand</b>	<b>Lee</b>	BeHealth Solutions	Digital therapeutics	Stock/Ownership
		Pear Therapeutics	Digital therapeutics	Consultant Advisory Committee/Board
		Mahana Therapeutics	Digital therapeutics	Consultant Advisory Committee/Board
<b>Salerno</b>	<b>Mike</b>	Siemens Healthcare	Cardiac MRI	Access to Source Code
		Heartflow	Cardiac CT	Industry funded research/investigator
<b>Zimring</b>	<b>James C.</b>	Rubius Therapeutics		Consultant

**The members of the faculty development programs planning committee (Ms. Ashley Ayers, Dr. Troy Buer, Dr. Susan Pollart, Dr. Maryellen Gusic, Ms. Kimberley Barker) and the faculty and staff of the Office of Continuing Medical Education do not have any personal or professional financial relationships with a commercial entity producing healthcare goods and/or services.**

**Disclosure of Discussion of Non-FDA Approved Uses for Pharmaceutical and/or Medical Devices:**

The University of Virginia School of Medicine, as an ACCME provider, requires that all presenters identify and disclose any "off label" uses for pharmaceutical and medical device products. The University of Virginia School of Medicine recommends that each physician fully review all the available data on new products or procedures prior to clinical use each physician fully review all the available data on new products or procedures prior to clinical use.

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**Learning objectives for sessions awarding CME credit**

**Concurrent sessions 1: 8:00 – 10:00 AM (2 CME credits)**

**Session 1A: *Novel concepts in cancer therapy***

Learning objectives: by the end of this session, participants will be able to discuss novel strategies for cancer therapy that are being developed at UVA; list a broad range of exciting new therapeutic approaches that include immune therapies, drug delivery, and small molecules; and discuss both conceptual and practical innovations at various stages of development.

Moderated by Roger Abounader, MD, PhD, Microbiology, Immunology, and Cancer Biology

- *CAR T Cells for Solid Tumors – Will It Ever Work?* Presented by D. Trey Lee, MD, Pediatrics.
- *Engineering an Efficient Cancer Killer: It Takes Two to Tangle.* Presented by Jogender Singh, PhD, Biochemistry and Molecular Genetics.
- *Small Molecule Inhibitor of CBFB-SMMHC Driver in AML – From Concept to Licensing.* Presented by John Bushweller, PhD, Molecular Physiology and Biological Physics.
- *Ceramide nanoLiposomes: the Road to the Clinic.* Presented by Mark Kester, PhD, Pharmacology, Biomedical Engineering, Molecular Physiology and Biophysics.

**Session 1B: *Real-time monitoring, big data, and use of technology in medical disease management***

Learning objectives: describe how CGM patterns could be used for interactive, personalized treatment of diabetes; discuss how bedside monitor vital sign data can be used to predict short-, medium- and long-term clinical outcomes in infants in the Neonatal Intensive Care Unit; list the challenges and opportunities using in-home sensors with a palliative care populations to monitor cancer pain; and be able to describe steps required for using remote data for assessing medication compliance.

Moderated by Mark DeBoer, MD, Msc, MCR, Pediatrics

- *The Power of Prediction: Using Smart Health Technology to Manage Cancer Pain at Home.* Presented by Virginia LeBaron, PhD, Acute and Specialty Care, School of Nursing.
- *Diabetes Data Science: Analytics, Artificial Pancreas, and CGM Artificial Intelligence.* Presented by Boris Kovatchev, PhD, Psychiatry and Neurobehavioral Sciences, Center for Diabetes Technology.
- *Analysis of continuously monitored NICU vital signs (HR, SpO<sub>2</sub>, BP) to predict adverse outcomes in preterm infants.* Presented by Karen Fairchild, MD, Pediatrics.
- *Leveraging Mobile Sensing to Understand and Improve Medication Adherence Patterns in Breast Cancer Survivors.* Presented by Laura Barnes, PhD, Engineering Systems and Environment, School of Engineering and Applied Science.

## **Session 1C: *Acquired Genomic/Epigenomic Abnormalities in Hematopoietic Cells and Their Association with Human Disease***

Learning objectives: The audience will be able to discuss genomic and epigenomic contributions to disease establishment and progression in high risk Acute Myeloid Leukemia patients; describe the importance of STAT3 activation and mutation in LGL leukemia; define and summarize the clinical condition of clonal hematopoiesis; assess the potential implications of clonal hematopoiesis in age-related inflammatory disorders; differentiate clonal hematopoiesis from traditional cardiovascular risk factors; describe long standing problems in our understanding of red blood cell redox biology and the barriers to therapy they represent; list recent advances in unraveling the red blood cell metabolome and how it changes our paradigmatic view of red blood cell biology; and discuss how the combination of animal models and human studies are leading to advances in our understanding of the genetic control of RBC redox biology and personalized/precision medicine.

Moderated by Stefan Bekiranov, PhD, Biochemistry and Molecular Genetics

- *Genomic and epigenomic events in high risk Acute Myeloid Leukemia.* Presented by Francine Garrett-Bakelman, MD, Biochemistry and Molecular Genetics.
- *Genomic Architecture of LGL Leukemia.* Presented by Thomas Loughran, MD, Medicine.
- *Killer Clones: Clonal Hematopoiesis as a new causal risk factor for cardiovascular disease.* Presented by Ken Walsh, PhD, Medicine.
- *Genetic Regulation of Red Blood Cell Oxidant Stress Biology - Paradoxical Oxidation by Reductases.* Presented by James C. Zimring, PhD, of Pathology.

## **Concurrent sessions 2: 10:15 AM – 12:15 PM (2 CME credits)**

### **Session 2A: *Friend or Foe – microbiome and metabolomics***

Learning objectives: By the end of this session, participants will be able to describe the vision and mission of the Trans-University Microbiome Initiative (TUMI). Find details related to TUMI Pilot and Feasibility Grant Funding Applications; discuss the impact and importance of the host microbiota on growth, neurodevelopment, and immune responses; identify the value and challenges of using gnotobiotic animal models to study human gut microbes, including the use of intact complex communities or defined, cultured isolates; define how inflammation during pregnancy can negatively impact neurodevelopment and lead to behavioral abnormalities; describe how changes in microbiota can alter gestational immune responses; describe how differences in the maternal microbiota can alter longitudinal growth and development of the immune system in early life; and discuss how commensal-associated microbial-derived products can impact anti-tumor immunity and response to immune checkpoint blockade

Moderated by William A. Petri, Jr, MD, PhD, Medicine and Sean Moore, MD, Pediatrics

- *Early life microbiota determines healthy growth.* Presented by Carrie Cowardin, PhD, Pediatrics.
- *Immune cross talk in neurodevelopmental disorders.* Presented by John Lukens, PhD, Neuroscience.
- *Interaction between a normal (wilding) microbiome and tissue resident immune cells.* Presented by Jasmin Herz, PhD, Neuroscience.
- *TLR5 signaling and failure of immune checkpoint therapy for cancer.* Presented by Melanie Rutkowski, PhD, Microbiology, Immunology, and Cancer Biology.

## **Session 2B: New Information and Techniques for Advanced Imaging**

Learning objectives: At the conclusion of this presentation, participants will be able to identify two emerging roles of machine learning in medical imaging and will be able to describe novel techniques being developed at UVA for cardiovascular MRI.

Moderated by Bijoy Kundu, PhD, Radiology and Medical Imaging; John Mugler, PhD, Radiology and Medical Imaging (Discussant); and Jaideep Kapur, PhD, Neurology (Discussant)

- *Leveraging nuclear medicine to advance focused ultrasound research at UVA.* Presented by Rich Price, PhD, Biomedical Engineering.
- *Concussion Induced Brain Inflammation.* Presented by Kiel Neumann, PhD, Radiology and Medical Imaging.
- *Artificial Intelligence for Medical Imaging.* Presented by Craig Meyer, PhD, Biomedical Imaging.
- *Technological advances in Cardiac MRI at UVA.* Presented by Mike Salerno, MD, PhD, Medicine.

## **Session 2C: Obesity and the Vasculature**

Learning objectives: discuss how new advances at the molecular level in the vasculature can determine pathological outcomes in obesity, including redox and immune responses; describe how computer modeling changes in the vasculature during obesity can lead to new insights into etiology of the vascular effects seen with obesity; and list how now pharmacological targets are being developed for treating the pathologies associated with obesity.

Moderated by Zhen Yan, PhD, Medicine and Norbert Leitinger, PhD, Pharmacology

- *Pathological signaling microdomains in obesity.* Presented by Swapnil Sonkusare, PhD, Molecular Physiology and Biological Physics.
- *Fit and fat: FTO in the endothelium.* Presented by Brant Isakson, PhD, Molecular Physiology and Biological Physics.
- *Perivascular Adipose Tissue (PVAT) and Atherosclerosis.* Presented by Coleen McNamara, MD, Medicine.
- *Modeling changes in the vasculature using a computer.* Presented by Shayn Peirce-Cottler, PhD, Biomedical Engineering.

## **Session 2D: Engineering-in-Medicine Collaborative Projects**

Learning objectives: this session will highlight exciting work by some of the teams funded over the past 2 years by seed grants from the Center for Engineering in Medicine. All projects bring together new teams of engineers and clinicians to improve prevention, diagnosis, monitoring, and/or treatment of disease. By the end of this session, participants will be able to identify the complications with using high doses of Erythropoiesis Stimulating Agents (ESAs); discuss the societal Burden of Dialysis versus renal transplant; describe the concept of hemoglobin cycling; describe common places bacteria are known to grow within the hospital; describe the burden of infections from antibiotic resistant bacteria; describe plasmids role within the global outbreaks of antibiotic resistant infections; become familiar with the term Body Sensor network; describe the percentage of asthmatic patients that experience frequent severe exacerbations; and describe the different power harvesting techniques for body sensors.

Moderated by Jeff Holmes, MD, PhD, Departments of Biomedical Engineering and Medicine and Mark Sochor, MD, MS, Departments of Emergency Medicine and Mechanical Engineering

- *Airflow-powered Implantables for Batteryless Monitoring of Respiratory Health.* Presented by Larry Borish, MD, Medicine and Dan Quinn, PhD, Mechanical and Aerospace Engineering.

- *Delivering Improved Anemia Outcomes in End Stage Renal Disease by Leveraging EMR Data.* Presented by Emaad Abdel-Rahman, MD, Medicine, Don Brown, PhD, Engineering Systems and Environment, and Ben Lobo, PhD, Engineering Systems and Environment.
- *Mitigating the Spread of Antibiotic Resistance in the Hospital and Beyond.* Presented by Amy Mathers, MD, Medicine and Lisa Colosi Peterson, PhD, Engineering Systems and Environment
- *QuARK (Quantitative Analysis of Respiratory Kinematics) to Detect Potential Respiratory Failure.* Presented by Shrirang Gadrey, MD, Medicine and Ronald Williams, PhD, Electrical and Computer Engineering

### **Concurrent sessions 3: 1:45 – 3:45 PM (2 CME credits)**

#### **Session 3A: Cell Signaling in Disease**

Learning objectives: The overarching goal of this session is to expose SOM faculty to the breadth and depth of research on cell signaling in disease at the UVA SOM. Specifically, attendees will discuss how regulated alterations in the structure and function of metabolic organelles promote the metabolic changes that support tumorigenic growth; describe how calcium signaling regulates focal adhesion disassembly through lipid exchange between the ER and plasma membrane and activation of small GTPases; list how macrophages use Ca<sup>2+</sup>-signaling to switch on the metabolic programs necessary to kill pathogenic fungi; and describe how contractile and metabolic adaptations in skeletal muscle are regulated by mitoAMPK dependent mitochondrial remodeling.

Moderated by Dr. Daniel Gioeli, PhD, Microbiology, Immunology, and Cancer Biology

- *The regulation of mitochondrial dynamics by oncogenic signaling pathways.* Presented by David Kashatus, PhD, Microbiology, Immunology, and Cancer Biology.
- *ER/plasma membrane contacts and the control of cell migration.* Presented by James E. Casanova, PhD, Cell Biology.
- *Ion channels and Ca<sup>2+</sup>-signaling in cell autonomous immunity.* Presented by Bimal Desai, PhD, Pharmacology.
- *mitoAMPK in control of mitophagy.* Presented by Zhen Yan, PhD, Medicine.

#### **Session 3B: Making it Real: using digital health for community research**

Learning objectives: by the end of this session, participants will be able to define “digital health” and identify the various types of programs; discuss the potential impact of different types of digital health; and develop ideas about how digital health could assist varied patient and public health populations.

Moderated by Lee Ritterband, PhD, Psychiatry and Neurobehavioral Sciences

- *Overview of digital health: What is it, really?* Presented by Lee Ritterband, PhD, Psychiatry and Neurobehavioral Sciences
- *Making an impact with digital health tools for HIV.* Presented by Karen Ingersoll, PhD, Psychiatry and Neurobehavioral Sciences
- *Use of Telestroke to improve acute treatment in rural systems of care.* Presented by Nina Solenski, MD, Neurology
- *Addressing obesogenic behaviors and bridging the digital divide within rural communities.* Presented by Jamie Zoellner, RD, PhD, Public Health Sciences

### **Session 3C: *The Inter-Connected Brain***

Learning objectives: Inter-connectivity is the essence of the brain. This session will focus on how different regions and cell types in the brain interact with each other and other organ systems, the diseases that are associated with the dysfunction of such circuitry, and ultimately, how a deeper understanding of such connections is leveraged to develop therapies. The session will feature several representative research programs, focusing on new additions to the University of Virginia that not only highlight the interconnected brain, but also the interconnectivity of brain research at the University of Virginia. By the end of this session, participants will be able to describe how brain imaging may inform the clinical management of children with autism spectrum disorders; discuss the application of brain-monitoring in neonatal hypoxia-ischemia; describe the application of thrombolytic therapy of stroke; discuss the significance of single-cell genomics for the characterization of molecularly distinct subtypes of neurons; and list the critical role of non-neuronal glial cells of the brain in seizures.

Moderated by Jung-Bum Shin, PhD, Neuroscience

- *Building Precision Care for Autism(s)*. Presented by Kevin Pelphrey, PhD, Neuroscience
- *What the Brain Has Taught Me About Doing Research*. Presented by Alex Kuan, MD, PhD, Neuroscience
- *Disambiguating control of the heart by the nucleus ambiguus*. Presented by John Campbell, PhD, Biology.
- *Dampening seizures through microglia*. Presented by Ukpong Eyo, PhD, Neuroscience.