University of Virginia
School of Medicine
Faculty Research Retreat

The Boar’s Head Inn
Charlottesville, VA
February 7 – 8, 2020

Boar’s Head Resort
200 Ednam Drive
Charlottesville, Virginia 22903

Toll Free: 1-855-452-2295
Fax: (434) 972-6024
Mailing Address:
P.O. Box 5307
Charlottesville, Virginia 22905
Table of contents

Schedule of events 3
Concurrent sessions 5
Lunch roundtable discussion sessions 15

Room and facilities maps
Boar’s Head Inn (including location of parking lots) 17
Pavilion layout 18

Reminders 19

Administrative information

Parking
You may park in any of the gray lots marked on the map of the Boar’s Head near the back of this document. There is a handicapped parking space at and several others across the street from the entrance to the Pavilion.

Registration table, contacting event administrative staff
Registration will open on Friday at 1:30 PM in the Pavilion lobby. The registration table will be staffed throughout the day on Saturday. In an emergency call David Driscoll’s office phone (434-297-5731) and leave a message, which is relayed to his mobile.

Wireless Internet Access
Meeting participants have access to high-speed internet services through the Boar’s Head Inn WIFI Network: BHEvents; Password: BHEvents!

Acknowledgments
We thank Joyce Fortune and Charlotte Odom for their administrative support for this event, and Ashley Ayers for arranging CME credit for physicians in attendance.
# University of Virginia School of Medicine
## 2020 Faculty Research Retreat
### Schedule of events

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Activity</th>
<th>Session/participants</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Friday the 7th</strong></td>
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<tr>
<td>2:30-2:45 PM</td>
<td>Discussion</td>
<td>Welcome</td>
<td>Dean David Wilkes and EVPH Craig Kent</td>
<td>Pavilion</td>
</tr>
<tr>
<td>2:45-3:45 PM</td>
<td>Discussion</td>
<td>New Models for Science Collaborations</td>
<td>Jeff Holmes, Wendy Cohn, Don Brown, and Karen Johnston</td>
<td>Pavilion</td>
</tr>
<tr>
<td>4:00-6:00 PM</td>
<td>Session</td>
<td>Pinn Scholars Symposium</td>
<td>Gordon Laurie, Scott K. Heysell, Benjamin W. Purow, Jeff Saucerman, Owen Pornillos, and Charles Farber</td>
<td>Pavilion</td>
</tr>
<tr>
<td>6:00-7:00 PM</td>
<td>Reception</td>
<td></td>
<td>Receipt (hors d’oeuvres, beverages)</td>
<td>Pavilion</td>
</tr>
<tr>
<td>7:30-8:00 AM</td>
<td>Breakfast</td>
<td></td>
<td>Bring Continental breakfast into your first concurrent session</td>
<td>Pavilion foyer</td>
</tr>
<tr>
<td>8:00-10:00 AM</td>
<td>Concurrent</td>
<td>Novel concepts in cancer therapy</td>
<td>Roger Abounader, moderator; D. Trey Lee, Jogender Tushir-Singh, John Bushwell, Mark Kester</td>
<td>Pavilion II</td>
</tr>
<tr>
<td></td>
<td>sessions</td>
<td>Real-time monitoring, big data, and use of technology in medical disease management</td>
<td>Mark DeBoer, moderator; Virginia LeBaron, Boris Kovatchev, Karen Fairchild, Laura Barnes</td>
<td>Pavilion III</td>
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<tr>
<td></td>
<td></td>
<td>Genomic/Epigenomic Abnormalities in Hematopoietic Cells and Their Association with Human Disease</td>
<td>Stefan Bekiranov, moderator; Francine Garrett-Bakelman, Thomas Loughran, Ken Walsh, James C. Zimring</td>
<td>Pavilion III</td>
</tr>
<tr>
<td>10:00-10:15 AM</td>
<td>Break</td>
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<tr>
<td>10:15 AM-12:15 PM</td>
<td>Concurrent</td>
<td>Friend or Foe – microbiome and metabolomics</td>
<td>William A. Petri, moderator; Sean Moore, discussant; Carrie Cowardin, John Lukens, Jasmin Her, Melanie Rutkowski</td>
<td>Pavilion I</td>
</tr>
<tr>
<td></td>
<td>sessions</td>
<td>New Information and Techniques for Advanced Imaging</td>
<td>Bijoy Kundu, moderator; Jaideep Kapur, John Mugler, co-discussants; Rich Price, Kiel Neumann, Craig Meyer, Mike Salerno</td>
<td>Pavilion II</td>
</tr>
<tr>
<td></td>
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<td>Obesity and the Vasculature</td>
<td>Zhen Yan, Norbert Leitinger, co-moderators; Swapnil Sonkusare, Brant Isakson, Coleen McNamara, Shyan Peirce-Cottler</td>
<td>Pavilion III</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engineering-in-Medicine Collaborative Projects</td>
<td>Jeff Holmes, Mark Sochor, co-moderators; Larry Borish and Dan Quinn, Emaad Abdel-Rahman and Don Brown and Ben Lobo, Amy Mathers and Lisa Colosi Peterson, Shrirang Gadrey and Ronald Williams</td>
<td>Executive Boardroom</td>
</tr>
<tr>
<td>12:15-1:45 PM</td>
<td>Lunch roundtab</td>
<td>Six sessions on potential research collaborations/initiatives. Grab a box</td>
<td></td>
<td>Various locations</td>
</tr>
<tr>
<td></td>
<td>discussions</td>
<td>lunch in the Pavilion foyer and bring it to your session of choice. Box lunches will include special diet options.</td>
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</tr>
<tr>
<td>1:45-3:45 PM</td>
<td>Concurrent</td>
<td>Cell Signaling in Disease</td>
<td>Daniel Gioeli, moderator; David Kashatus, James E. Casanova, Bimal Desai, Zhen Yan</td>
<td>Pavilion I</td>
</tr>
<tr>
<td></td>
<td>sessions</td>
<td>Making it Real: using digital health for community research</td>
<td>Lee Ritterband, moderator; Lee Ritterband, Karen Ingersoll, Nina Solenski, Jamie Zoellner</td>
<td>Pavilion II</td>
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<tr>
<td></td>
<td></td>
<td>The Inter-Connected Brain</td>
<td>Jung-Bum Shin, moderator; Kevin Pelphrey, Alex Kuan, John Campbell, Ukpong Eyo</td>
<td>Pavilion III</td>
</tr>
<tr>
<td>3:45-4:00 PM</td>
<td>Break</td>
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<tr>
<td>4:00-6:00 PM</td>
<td>Reception</td>
<td></td>
<td>Closing reception (hors d’oeuvres, beverages)</td>
<td>Pavilion</td>
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</table>
Welcome

New Models for Science Collaborations: 2:45 – 3:45 PM (Pavilion)

Jeff Holmes
“Engineering in Medicine: Building an Ecosystem to Foster Cross-School Collaboration”

Wendy Cohn
“The road to becoming a National Cancer Institute-designated Comprehensive Cancer Center: Opportunities for collaboration”

Don Brown and Karen Johnston
“Finding the Common Thread for Collaboration (introducing the iTHRIV Commons)”

Pinn Scholars Symposium: 4:00 – 6:00 (Pavilion)

Class of 2017:

Gordon Laurie, PhD
Department of Cell Biology
“Genome-wide CRISPR screens for the lacritin homeostasis receptor(s) and signaling mediators”

Class of 2018:

Scott K. Heysell MD, MPH
Department of Medicine
“Personalized and integrative approaches to improve tuberculosis outcomes”

Benjamin W. Purow, MD
Department of Neurology
“Treating glioblastoma with intratumoral delivery of immune danger signals plus systemic checkpoint inhibition”

Class of 2019:

Jeff Saucerman, PhD
Department of Biomedical Engineering
“Systems biology of cardiac regeneration”

Owen Pornillos, PhD
Department of Molecular Physiology and Biological Physics
“Molecular mechanisms of HIV-1 replication”

Charles Farber, PhD
Department of Public Health Sciences
“Developing a Predictive Gene Regulatory Network for Osteoporosis”
Concurrent sessions 1: 8:00 – 10:00 AM (Pavilions I, II, and III)

Session 1a (Pavilion 1):
Novel concepts in cancer therapy

This session will present novel strategies for cancer therapy that are being developed at UVA. It will cover a broad range of exciting new therapeutic approaches that include immune therapies, drug delivery and small molecules. Both conceptual and practical innovations at various stages of development will be discussed.

Overview:
Roger Abounader, MD, PhD (Moderator)
Department of Microbiology, Immunology, and Cancer Biology

Research Talks
D. Trey Lee, MD
Department of Pediatrics
“CAR T Cells for Solid Tumors – Will It Ever Work?”

Jogender Tushir-Singh, PhD
Department of Biochemistry and Molecular Genetics
“Engineering an Efficient Cancer Killer: It Takes Two to Tangle”

John Bushweller, PhD
Department of Molecular Physiology and Biological Physics
“Small Molecule Inhibitor of CBFB-SMMHC Driver in AML – From Concept to Licensing”

Mark Kester, PhD
Department of Pharmacology, Biomedical Engineering, Molecular Physiology and Biophysics
“Ceramide nanoLiposomes: the Road to the Clinic”
Session 1b (Pavilion II):
Real-time monitoring, big data, and use of technology in medical disease management

There is an ongoing increase in the diversity and amount of data that are continuously generated during medical care both inpatient and outpatient. This raises issues of how these real-time data can be best analyzed and used to improve patient outcomes. This session will begin with an introduction to the concept of real-time data, including its generation, collection, interpretation and overall implications. Presenters will discuss some types of real-time data and how they are used in medical care settings.

Overview:
Mark DeBoer, MD, Msc., MCR (Moderator)
Department of Pediatrics

Research Talks
Virginia LeBaron, PhD
Department of Acute and Specialty Care, School of Nursing
“The Power of Prediction: Using Smart Health Technology to Manage Cancer Pain at Home.”

Boris Kovatchev, PhD
Department of Psychiatry and Neurobehavioral Sciences
Center for Diabetes Technology
“Diabetes Data Science: Analytics, Artificial Pancreas, and CGM Artificial Intelligence.”

Karen Fairchild, MD
Department of Pediatrics
“Analysis of continuously monitored NICU vital signs (HR, SpO2, BP) to predict adverse outcomes in preterm infants.”

Laura Barnes, PhD
Department of Engineering Systems and Environment, School of Engineering and Applied Science
“Leveraging Mobile Sensing to Understand and Improve Medication Adherence Patterns in Breast Cancer Survivors.”
Session 1c (Pavilion III): Genomic/Epigenomic Abnormalities in Blood Cells and Their Association with Human Disease

The accessibility of patient blood samples and rapid rise of high throughput technologies have enabled the genetic, epigenetic and metabolic characterization of a number of hematological diseases. This has further resulted in the development of powerful mouse models to uncover the mechanisms of these diseases and identify therapeutic targets. In this session, speakers will present their work on the genetics and epigenetics of acute myeloid leukemia, importance of STAT3 mutation and activation in large granular lymphocytic leukemia, the role of clonal hematopoiesis in age-related inflammatory disorders and cardiovascular disease and the genetic regulation and metabolic characterization of red blood cell oxidant stress.

Overview:
Stefan Bekiranov, PhD (Moderator)
Department of Biochemistry and Molecular Genetics

Research Talks
Francine Garrett-Bakelman, MD
Department of Biochemistry and Molecular Genetics
“Genomic and epigenomic events in high risk Acute Myeloid Leukemia”

Thomas Loughran, MD
Department of Medicine
“Genomic Architecture of LGL Leukemia”

Ken Walsh, PhD
Department of Medicine
“Killer Clones: Clonal Hematopoiesis as a new causal risk factor for cardiovascular disease”

James C. Zimring, PhD
Department of Pathology
“Genetic Regulation of Red Blood Cell Oxidant Stress Biology - Paradoxical Oxidation by Reductases”
Concurrent sessions 2: 10:15 AM – 12:15 PM (Pavilions I, II, III, Executive Boardroom)

Session 2a (Pavilion I):
Friend or Foe – microbiome and metabolomics

In this session participants will learn about the vision and mission of the Trans-University Microbiome Initiative (TUMI), the value and challenges of using gnotobiotic animal models to study human gut microbes, and the impact and importance of the host microbiota on growth, neurodevelopment, cancer and immune responses, and during pregnancy.

Overview:
William A. Petri, Jr, MD, PhD (Moderator)
Department of Medicine

Sean Moore, MD
Department of Pediatrics (Introduction to the Trans-University Microbiome Initiative)

Research Talks
Carrie Cowardin, PhD
Department of Pediatrics
“Early life microbiota determines healthy growth”

John Lukens, PhD
Department of Neuroscience
“Immune cross talk in neurodevelopmental disorders”

Jasmin Herz, PhD
Department of Neuroscience
"Effects of a wild microbiome (wildling mice) on the immune landscape of the spleen and central nervous system”

Melanie Rutkowski, PhD
Department of Microbiology, Immunology, and Cancer Biology
“TLR5 signaling and failure of immune checkpoint therapy for cancer”
Session 2b (Pavilion II):
New Information and Techniques for Advanced Imaging

In this session, the speakers will describe advanced and novel imaging techniques being developed at UVA for cardiac and neuro ultrasound, positron emission tomography and magnetic resonance imaging. The role of nuclear medicine in neuroinflammation and its intersection with focused ultrasound for brain imaging in human subjects and rodents will be discussed. The emerging role of artificial intelligence including neural networks and machine learning methods in medical imaging will be identified.

Overview:
Bijoy Kundu, PhD (Moderator)
Department of Radiology and Medical Imaging

Jaideep Kapur, PhD (Co-discussant)
Department of Neurology

John Mugler, PhD (Co-discussant)
Department of Radiology and Medical Imaging

Research Talks
Rich Price, PhD
Department of Biomedical Engineering
“Leveraging nuclear medicine to advance focused ultrasound research at UVA”

Kiel Neumann, PhD
Department of Radiology and Medical Imaging
“Concussion-induced Brain Inflammation”

Craig Meyer, PhD
Department of Biomedical Imaging
“Artificial Intelligence for Medical Imaging”

Mike Salerno, MD, PhD
Department of Medicine
“Technological advances in Cardiac MRI at UVA”
**Session 2c (Pavilion III):**  
**Obesity and the Vasculature**

Describe new advances at the molecular level in the vasculature that 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 discuss how new pharmacological targets are being developed for treating the pathologies associated with obesity.

**Overview:**  
Zhen Yan, PhD (Co-moderator)  
Department of Medicine

Norbert Leitinger, PhD (Co-moderator)  
Department of Pharmacology

**Research Talks**  
Swapnil Sonkusare, PhD  
Department of Molecular Physiology and Biological Physics  
“Pathological signaling microdomains in obesity”

Brant Isakson, PhD  
Department of Molecular Physiology and Biological Physics  
“Fit and fat: FTO in the endothelium”

Coleen McNamara, MD  
Department of Medicine  
“Perivascular Adipose Tissue (PVAT) and Atherosclerosis”

Shayn Peirce-Cottler, PhD  
Department of Biomedical Engineering  
“Modeling changes in the vasculature using a computer”
Session 2d (Executive Boardroom):
Engineering-in-Medicine Collaborative Projects

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.

Overview:
Jeff Holmes, MD, PhD (Co-Moderator)
Departments of Biomedical Engineering and Medicine

Mark Sochor, MD, MS (Co-Moderator)
Departments of Emergency Medicine and Mechanical Engineering

Research Talks:
Larry Borish, MD, Department of Medicine
Dan Quinn, PhD, Department of Mechanical and Aerospace Engineering
“Airflow-powered Implantables for Batteryless Monitoring of Respiratory Health”

Emaad Abdel-Rahman, MD, Department of Medicine
Don Brown, PhD, Department of Engineering Systems and Environment
Ben Lobo, PhD, Department of Engineering Systems and Environment
“Delivering Improved Anemia Outcomes in End Stage Renal Disease by Leveraging EMR Data”

Amy Mathers, MD, Department of Medicine
Lisa Colosi Peterson, PhD, Department of Engineering Systems and Environment
“Mitigating the Spread of Antibiotic Resistance in the Hospital and Beyond”

Shrirang Gadrey, MD, Department of Medicine
Ronald Williams, PhD, Department of Electrical and Computer Engineering
“QuARK (Quantitative Analysis of Respiratory Kinematics) to Detect Potential Respiratory Failure”
Concurrent sessions 3: 1:45 – 3:45 PM (Pavilions I, II, and III)

Session 3a (Pavilion I):
Cell Signaling in Disease

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 learn:

- How regulated alterations in the structure and function of metabolic organelles promote the metabolic changes that support tumorigenic growth.
- How calcium signaling regulates focal adhesion disassembly thorough lipid exchange between the ER and plasma membrane and activation of small GTPases.
- How macrophages use Ca2+-signaling to switch on the metabolic programs necessary to kill pathogenic fungi.
- How contractile and metabolic adaptations in skeletal muscle are regulated by mitoAMPK dependent mitochondrial remodeling.

Overview:
Daniel Gioeli, PhD (Moderator)
Department of Microbiology, Immunology, and Cancer Biology

Research Talks
David Kashatus, PhD
Department of Microbiology, Immunology, and Cancer Biology
"The regulation of mitochondrial dynamics by oncogenic signaling pathways"

James E. Casanova, PhD
Department of Cell Biology
“ER/plasma membrane contacts and the control of cell migration”

Bimal Desai, PhD
Department of Pharmacology
"Ion channels and Ca2+-signaling in cell autonomous immunity"

Zhen Yan, PhD
Department of Medicine
"mitoAMPK in control of mitophagy"
Session 3b (Pavilion II):
Making it Real: using digital health for community research

Digital health is not only a new buzz word that hints at futuristic models of health care and care delivery, but a field of work that is backed by decades of research that is making real differences in the lives of people today. This symposium offers a glimpse at some of the digital health work currently being conducted here at UVA. Talks include research in HIV using text, web, and smartphone delivered interventions (Ingersoll), use of video conferencing for the treatment and management of stroke (Solenski), and use of mobile technology to impact diet and nutrition in rural communities (Zoellner). An overview of the field of and research in digital health will be reviewed (Ritterband).

Overview:
Lee Ritterband, PhD (Moderator)
Department of Psychiatry and Neurobehavioral Sciences

Research Talks
Lee Ritterband, PhD
Department of Psychiatry and Neurobehavioral Sciences
“Overview of digital health: What is it, really?”

Karen Ingersoll, PhD
Department of Psychiatry and Neurobehavioral Sciences
“Making an impact with digital health tools for HIV”

Nina Solenski, MD
Department of Neurology
“Use of Telestroke to improve acute treatment in rural systems of care”

Jamie Zoellner, RD, PhD
Department of Public Health Sciences
“Addressing obesogenic behaviors and bridging the digital divide within rural communities”
Session 3c (Pavilion III): 
The Inter-Connected Brain

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.

Overview:
Jung-Bum Shin, PhD (Moderator)  
Department of Neuroscience

Research Talks
Kevin Pelphrey, PhD  
Department of Neuroscience
“Building Precision Care for Autism(s)”

Alex Kuan, MD, PhD  
Department of Neuroscience
“What the Brain Has Taught Me About Doing Research”

John Campbell, PhD  
Department of Biology
“Disambiguating control of the heart by the nucleus ambiguous”

Ukpong Eyo, PhD  
Department of Neuroscience
“Dampening seizures through microglia”
Lunches and beverages will be available in the Pavilion foyer. If you ordered a restricted diet lunch, please pick it up in the foyer. The map of the Boar’s Head at the back of the program indicates the locations of these sessions.

**Biomedical Imaging**
Craig Meyer  
**Location:** Pavilion III

Biomedical imaging research at UVA spans multiple departments and includes several imaging modalities. At the luncheon roundtable, imaging directors and researchers will be available to discuss the imaging facilities and equipment available at UVa and to help connect you to potential collaborators.

**Digital Health**
Lee Ritterband, Karen Ingersoll  
**Location:** Ednam West

Digital Health (e/m/health). The purpose of this roundtable is to gather and provide a forum for discussion for those faculty who are interested in and/or conducting or utilizing various digital health programs as part of their research, including web-based, mobile, sensor, and other relevant type of applications.

**Engineering-in-Medicine**
Jeff Holmes, Mark Sochor  
**Location:** Executive Boardroom

The Center for Engineering in Medicine will host collaborative discussions for generating, developing, and translating innovative ideas at the engineering-medicine interface to improve prevention, diagnosis, monitoring, and treatment of disease.
iTHRIV
Karen Johnston, Sandra Burks
Location: Pavilion I

Meet with the leadership of our local CTSA, the integrated Translational Health Research Institute (iTHRIV) that promotes shared research resources and best practices, team science, community engagement, and innovation. The iTHRIV lunch session will include hands on demonstrations of and consultations for resources such as:

1. iTHRIV research Portal
2. TrinetX – a cohort discovery tool
3. Redcap data base
4. Community studio offering
5. iTHRIV Scholars program
6. General iTHRIV consultation

Office of Research Core Administration
Jay Fox, Core Directors
Location: Pavilion II

The School of Medicine supports 14 Shared Resources whose function is to support investigators' research programs by providing expertise, technology, instrumentation, reagents and sophisticated experimental capabilities to all faculty and their laboratories. The SoM Cores also play critical roles in the training and education of fellows and students. At the luncheon roundtable several core directors will be present to discuss their cores, your projects and provide advice on projects. They will also be glad to discuss any new ideas for core activities and instruments that are of need by SoM investigators. Also, please stop by each poster and the table to receive tickets for a door prize ($1,000 service in any core).

ORIEN Program
Joyce Miller and Lea Becker
Location: Ednam East

The UVA Cancer Center is part of the Oncology Research Information Exchange Network (ORIEN), one of the largest cancer research networks in the country. The goal of this roundtable session is to discuss the resources and clinical research services for our investigators available through the ORIEN program. The ORIEN Protocol is a biobanking and database protocol in which over 5000 patients have consented and 500 sample sets have been submitted for sequencing at UVA. The participants of the roundtable session are encouraged to come with questions for discussion.
Map of the Boar's Head Inn
(Attendees may park in any lot pictured)
Boar’s Head Inn Pavilion
University of Virginia School of Medicine
2020 Faculty Research Retreat

Friday: configured as a single room.
Saturday: divided into Pavilion I, II, and III

Ednam rooms
Meals and refreshments
To main building
Registration table
Reminders from the Office for Research (OFR) and Office of Grants and Contracts (OGC)

Feedback on the retreat. Please help us to improve future research retreats by providing your feedback at https://med.virginia.edu/office-for-research/2020-faculty-research-retreat/
We thank you in advance.

Funding opportunities – reminder of three sites that may be of interest.

- **From the Dean’s Office:** research announcements and funding opportunities posted by the SOM; can subscribe to daily or weekly summaries of postings;
- **GrantForward:** research announcements; users can create and save multiple searches and have the results e-mailed to you periodically;
- **Pivot:** provides similar functionality as GrantForward, but drawing from slightly different sources.

Help us to improve the SOM research web sites. We welcome your suggestions concerning: streamlining navigation, additional information to include, new ways of displaying the information you need, dead hyperlinks, etc.

  Contact Steve Lichtenstein (SL7ZU@hscmail.mcc.virginia.edu)
- Office for Research: https://med.virginia.edu/office-for-research/
  Contact David L. Driscoll (ddriscoll@virginia.edu)