Annual Report
2019

Office of Research and Graduate Studies

bmvs.vetmed.vt.edu/
vetmed.vt.edu/research/

205 Duck Pone Drive
Blacksburg, VA, 24061
# TABLE OF CONTENTS

**Message from the Associate Dean for Research and Graduate Studies**  
4

Research Portfolio and Metrics ........................................................................ 5

   Strategic Highlights .................................................................................. 7
   Key Research Support ................................................................................ 7

Internal Research Support Grants .................................................................. 8

   Veterinary Memorial Fund (VMF) .............................................................. 8
   Internal Research Competition (IRC) ......................................................... 8
   Equine Research Competition (ERC) ......................................................... 9
   One Health Research Seed Grants .............................................................. 9
   FY19 UMD/VT Seed Grants ...................................................................... 10
   229 Animal Health and Disease Research Projects .................................. 10
   Other VT Internal Awards ........................................................................ 11
   ICTAS Junior Faculty Award ................................................................... 11

Newly Acquired Major Research Equipment .............................................. 12

   Other Major Equipment .......................................................................... 12
   Other SCHEV Acquired Equipment ($10,000 and above) ......................... 12

New Grant Announcements ........................................................................ 13

   Summer Veterinary Scholars Research Program (SVSRP) ...................... 18
   NIH National Veterinary Scholars Symposium and Dual Degree Colloquium .......... 18
   BMVS Fall Orientation ............................................................................ 19
   30th Annual Research Symposium ............................................................ 20

Seminars ........................................................................................................ 21

   BMVS Seminar Series ............................................................................ 21
   Invited Speakers ...................................................................................... 21
   Recent Graduate Defenses ...................................................................... 22
   Spring 2019 .............................................................................................. 22
   Summer 2019 .......................................................................................... 25
   Fall 2019 .................................................................................................. 26

BMVS Accomplishments ............................................................................. 28
Message from the Associate Dean for Research and Graduate Studies

Dear Colleagues,

On behalf of the Office of Research and Graduate Studies, I am delighted to present the Virginia-Maryland College of Veterinary Medicine (VMCVM) Research report to highlight, recognize, and celebrate research achievements of our faculty members, graduate students and research staff. We hope that this report will aid in enhancing research visibility and will showcase the research strengths. The research conducted in the college has, and will continue to have, a notable impact on both animal and human health. One of the research strengths of our college is diverse and complementary faculty expertise in basic/applied sciences, boarded veterinary specialists, and public health. We also have unique specialized research support facilities (such as BSL-3 unit, gnotobiotic pig and mice facility, and five service centers). The college’s research program is now focused on the following six major research areas of emphasis. These include (1) Pathogenic Microbiology, (2) Immune-mediated/Inflammatory Diseases; (3) Population Health Sciences; (4) Neuropathobiology; (5) Integrative Oncology; and (6) Translational/Comparative Medicine including Veterinary Clinical Research.

Our research programs are in alignment with University Destination Areas such as Global System Sciences, Adaptive Brain and Behavior, and Data and Decision. In accordance with the university’s expectation, one of our goals has been to enhance research programs and productivity. Towards this goal, I am pleased to announce that our trajectory on research productivity measured in terms of extramural funding, publications, and presentations, and invited memberships have been strong and in a positive direction. I want to congratulate our college’s research personnel who have made this possible. Our total annual research awards are continuing to increase with an average of 5% growth each year, amounting to 40.5% growth compared to FY 2015. Our faculty have published in prominent mainstream journals and top-tier specialized journals. Our faculty’s research standing has been recognized by many national agencies, as evidenced by invitation to serve on grant review panels (such as NIH study sections), scientific and policy forums, and to speak at prominent venues.

Looking Ahead

To robustly grow our research program, building new partnerships with compatible and complementary researchers is essential. In a rapidly changing world, new and emerging infectious and non-infectious diseases pose unique challenges that require multiple strategies and varied expertise to counter these threats. Susceptibility to these maladies is more complicated than initially thought - Involving the intersection of human, animal, and environmental health. A transdisciplinary approach is essential to understand and manage these disorders. Looking ahead, we hope to build on our research momentum by leveraging our unique resources (both specialized skills and distinctive infrastructure) to initiate and sustain strategic collaborations between the college and others at both Virginia Tech and other institutions. Our strengths continue to be focused on a better understanding of diseases by using relevant animal models, providing early and accurate cutting-edge diagnosis, developing new and improved vaccines, and instituting preventive public health strategies. This comprehensive approach would enable us to tackle current and anticipated medical problems spanning from a bench to translation to policy or therapeutic implementation at a public health level.

Our college has a vigorous agenda for enhancing research portfolio by recruiting research-oriented faculty and renovating more efficient research laboratories for both basic and clinical sciences. We recognize that critical to our faculty research success is the acquisition of cutting-edge equipment. In this regard, we purchased (and planning to buy) essential pieces of equipment. It is essential to diversify funding sources, considering the current tight funding situation. In this regard, our research funding diversity portfolio continues to grow with new awards from not only traditional federal funding agencies but also from many industries and foundations. Advancing veterinary clinical and comparative research will be one of the main goals. We are making significant efforts to improve the clinical research labs, provide key equipment and other resources. It is particularly gratifying to note that the number of grant proposals and awards from clinical faculty has significantly increased over the past two years. About 25% of the new grant announcements in 2019 were from clinical faculty.

I recognize that not all research achievements can be highlighted in this newsletter. We will endeavor to include research updates in future communications.

S. Ansar Ahmed
Associate Dean of Research and Graduate Studies
RESEARCH PORTFOLIO AND METRICS

Six research areas have been identified that encompass the strengths, expertise, and resources of the College’s research enterprise.

Pathogenic Microbiology/Infectious Diseases
Research themes include: Infectious Diseases, Immunity to infections, Development of vaccines, Host-Pathogen-environment interactions
Select recent publications:


Immune-mediated/Inflammatory Diseases
Research themes include: Understanding the genetics, epigenetics, and environmental triggers of the immune-mediated diseases, Identification of biomarkers, and new therapeutic targets. Chronic inflammation leading to cancer or autoimmune diseases
Select recent publications:


Neuropathobiology
Research themes include: neurodevelopment and traumatic injury, neurovascularization, neuroinflammation, and neurooncology
Select recent publications:


**Integrative Oncology**

Research themes include: cancer biology, genomics, and therapeutics

Select recent publications:


**Population Health Sciences**

Research themes are infectious diseases epidemiology; and public health education

Select recent publications:


**Translational and Comparative Medicine**

Research themes include: Clinical Veterinary medicine research and translational medicine; Stem cell biology and its clinical application; Clinical trials management and human-animal bond/interactions

Selected recent publications:


Strategic Highlights
- Increased extramural awards from diverse sponsors
- Increased internal funding ($600,000+) with a goal of securing large extramural grants and/or build a line of research inquiry to initiate and enhance research programs
- Over $1.5 million in active clinical research sponsored programs.
- Acquired major pieces of equipment (Equipment List)
- Invited many external speakers

Key Research Support
- Research support for new faculty hires that include equipment, graduate students, and start up needs
- Improvements of lab space that includes cutting-edge laboratories at Center for One Health Research (COHR), and a shared lab for clinical faculty to conduct collaborative clinical research, new lab space at Comparative Oncology Research Center (CORC).
- Opportunities to participate in training grants and assist in participation in other large-grant proposal initiatives across campus.
- Provide assistance in grant proposal submission and budget preparation, and pre/post-award management.
- Support of faculty in participation in VT Proposal Development Institute, VT-FAST etc.

FY19 AWARDS $8.8 MILLION

Source: VT Award Database

28.58 Research FTE
Over 50% appt 15.23 FTE
Under 50% appt 13.35 FTE

Source: VT Data Commons
INTERNAL RESEARCH SUPPORT GRANTS

Internal funding mechanisms have been expanded and now over $600,000 is annual available to support VM CVM faculty. Below are the projects funded during the most recent award cycle.

**Veterinary Memorial Fund (VMF)**

VMF funds are to be used to support research in veterinary clinical sciences with the goal of improving health care for animals. Projects with direct clinical relevance were prioritized for funding.

**Total Awards: $64,988.50**

- Michele Borgarelli (SACS)
  “Three dimensional echocardiographic determinants of the age of onset of myxomatous mitral valve disease in Cavalier King Charles Spaniels” ($33,120.00 two year funding)

- Jennifer Davis (DBSP)
  “Pharmacokinetics and Pharmacodynamics of Acetaminophen in Adult Horses with Naturally Occurring Osteoarthritis” ($19,191.00)

- Otto Lanz (SACS)
  “Minimally invasive, integrated endoscopic hemilaminectomy for Hansen Type I intervertebral disc herniation in chondrodystrophic dogs” ($9,990)

- Nathaniel White (EMC/LACS)
  “The effect of change in hoof conformation on horses’ gait: a pilot study” ($2,687.50)

**Internal Research Competition (IRC)**

The Internal Research Competition provides small seed grants for basic, interdisciplinary and translational research with the goal of collecting enough data to help procure external funding. The underlying goal of this seed funding mechanism is to enhance our research priority areas that include (but not limited to) infectious diseases and immunity, inflammatory diseases, regenerative medicine, comparative oncology, and Destination Area aligned research.

**Total Awards: $123,699.20**

- Coy Allen (DBSP)
  “Elucidating the microbiome contribution to hypereosinophilic syndromes in the absence of noncanonical NF-kB signaling” ($16,000)

- Clay Caswell (DBSP)
  “Assessing Brucella infection via the oral route” ($12,000)

- Jia-Qiang He (DBSP)
“Intestinal Trimethylamine-Producing Bacteria Exacerbate Ischemic Myocardial Infarction” ($16,000)
John Rossmeisl (SACS)
“Characterization of the immunologic response to HFIRE treatment in the brain” ($15,699.20)
James Weger (DBSP)
“Defining the role of nutrition in dengue virus pathology and pro-inflammatory immune response” ($16,000)
Hehuang Xie (DBSP)
“Brain epitranscriptome regulation mediated by FMR1 and TET1 interaction” ($20,000)
Lijuan Yuan (DBSP)
“Identifying the role of SAMD9 in restriction of rotavirus replication in gene knockout gnotobiotic pigs” ($20,000)
Sharon Witonsky (LACS)
“Enhancing equine immune research using equine-ized mice” ($8,000)

**Equine Research Competition (ERC)**

*The Equine Research Competition provides small seed grants for basic, interdisciplinary, and translational clinical research in equines with the goal of collecting enough data to help procure external funding. The underlying goal of this seed funding mechanism is to enhance our equine research priority areas that include (but not limited to) infectious diseases and immunity, inflammatory diseases, regenerative medicine, and musculoskeletal. Total Awards: $39,913.13*

Jennifer Davis (DBSP)
“Pharmacodynamics of Acetaminophen in Adult Horses with Experimentally Induced Pyrexia” ($19,943.13)

Sharon Witonsky (LACS)
“Discovery of a genetic predisposition for Equine Protozoal Myeloencephalitis (EPM) susceptibility and associated gene dysregulation in clinically affected horses” ($19,970)

**One Health Research Seed Grants**

*One Health program was created to foster collaboration between faculty from VMCVM and VCOM. Each project must have a principal investigator from VT and VCOM. Total Awards: $199,994*

Hehuang Xie (VT) and Terry Hrubec (VCOM)
“Epitranscriptome Dynamics upon Neuronal Activation: Novel Clues for Autism Pathology and Treatment” ($50,000)

Kevin Lahmers (VT) and Pawel Michalak (VCOM)
“Genomic characterization of the invasive Longhorned tick and its microbiota including the known pathogen, *Theileria orientalis*” ($50,000)
Bradley Klein (VT) and Blaise Costa (VCOM)
“Mechanisms and Neuroprotective Effects of Triheteromeric NMDA Receptor Modulators”
($49,994)

Coy Allen (VT) and Stephan Brown (VCOM)
“Elucidating Mechanisms Modulated by NIK and Non-Canonical NF-kB Signaling in Colorectal Cancer” ($50,000)

**FY19 UMD/VT Seed Grants**

*This seed grant program was created to foster collaboration between faculty at the Virginia and Maryland campuses. Each project must have a principal investigator from VT and UMD.*

*Total Awards: $40,000 (VT) and $40,000 (UMD)*

Jia He (VT) Shi (UMD)
“The liver-heart axis during dissemination of fungal pathogen *Candida albicans*”
$20,000 ($10,000 for Dr. Jia He VT; and $10,000 for Dr. Meiqing Shi).

Coy Allen (VT) Zhang (UMD)
“Pattern recognition receptor driven suppression of host-antiviral immune signaling in hepatitis E virus infection”
$20,000 ($10,000 for Dr. Coy Allen VT; and $10,000 for Dr. Zhang).

Lijuan Yuan (VT) Samal/Khattar (UMD)
“Avian Paramyxovirus type-3 vectored vaccine for Norovirus infection”
$20,000 ($10,000 for Dr. Lijuan Yuan VT; and $10,000 for Dr. Samal/Khattar).

Xin Luo (VT) Nelson (UMD)
“Linking Muribaculum intestinale to systemic lupus erythematosus and investigating a species-specific alternative antimicrobial treatment”
$20,000 ($10,000 for Dr. Xin Luo, VT; and $10,000 for Dr. Nelson, UMD).

**229 Animal Health and Disease Research Projects**

*Research operational supports for projects related to the Animal Health and Disease Research program to study basic and applied studies on infectious and non-infectious agents which impair the normal state of the animal body and/or that affect the performance of vital functions. Includes laboratory studies research on metabolic diseases and other diseases, application of molecular biology to animal health problems.*

*Total Awards: $101,375*

Clay Caswell- PI “Comprehensive Characterization of Small regulatory RNAs in Brucella Abortus”: ($10,000).

Previously Meng- now Kevin Lahmers- PI) “Detection and control of Porcine Reproductive and Respiratory Syndrome Virus and Emerging Viral Diseases of Swine” ($10,000 Plus $2,000 for travel to PRRSV conference presentation)
Ansar Ahmed-PI. Participants- Allen, Allison, Caswell, Duggal, Dai, Inzana, Lahmers, LeRoith, Lindsay, Meng, Nathan, Sherri-Clark, Stewart, Yuan, Weger, Zajac. "Host-Pathogen-Environment Interactions: Animal Health and Disease in Virginia" (a total of $70,000 for the above participants of this project).

Francisco Carvallo: “Unravelling the infectious causes of bovine pneumonia in the state of Virginia” is funded. ($9,375 Plus $2,500 from DBSP)

Other VT Internal Awards

ICTAS Junior Faculty Award

*This program provides up to $40,000 in the first year, renewable for a second year with adequate progress, to a junior faculty PI who has identified an interdisciplinary partnership with another Virginia Tech faculty member. The focus is on building teams with strong potential for external funding in cutting-edge science and technology.*

James Weger (DBSP)

“Development of an in vitro midgut model for assessing vector infection rates and identifying arbovirus cellular targets” ($40,000)
NEWLY ACQUIRED MAJOR RESEARCH EQUIPMENT

Worked with the VP for OVPRI to secure funding for new research equipment amounting to $545,868.

These include the following

- **A new FACS Fusion Cell sorter (and Flow cytometer).**
  Negotiated location and operations to be placed in Steger Hall room 202 to promote single cell genomics (this gives our college a new presence in the Fralin Life Sciences Steger Hall). ($405,728-located in Steger Hall)

- **Cytation 5 Image System** ($94,915-located in ILSB for infectious agents imaging)

- **Ultramicrotome** for the E/M lab ($45,225-located in E/M lab)

**Other Major Equipment**

- **ImageXPress Pico**- An automated cell imaging system ($75,683-located at Phase II Room 203)

- **Ultramicrotome** for the GLP lab ($45,225)

**Other SCHEV Acquired Equipment ($10,000 and above)**

- **Flexmap-3D**- a multi-cytokine analyzer ($75,750-located in IDRF)

- **Two Single sided ventilated rack, includes blowers and all caging components** ($84,000-located in TRACSS facility)

- **EEG Recording Set-up for 4 units** ($23,000-located in LS1 35)

- **Freezer/mill** for cryogrinding animal tissues and other sample matrices at liquid nitrogen temperatures ($11,604-located in the Analytical Res. Lab 227, Phase II)

- **Edge I Ultrasound (includes HFL38X Transducer, Edge Stand and Triple Transducer Connect)** ($25,197-located VTH 156)

- **Shanks MRI compatible equine table and SNELL inflatable table pad** ($37,500-located in 133, 135/910 of EMC)

- **Two Portable Ultrasound machines** ($38,000-located EFS)
NEW GRANT ANNOUNCEMENTS

Employing Novel Porcine Models of Orthotopic Pancreatic Cancer to Evaluate Histotripsy Based Tumor Ablation Strategies
PI: Coy Allen, Dept. of Biomedical Sciences and Pathobiology
Co-I: Eli Vlaisavljevich; Kiho Lee; Sherrie Clark-Deener; Sheryl Coutermash-Ott; Chris Byron
Sponsor: R21 NIH NIBIB
Amount: $427,815

Development of Novel Porcine Models of Orthotopic Pancreatic Cancer for FUS and Histotripsy Tumor Ablation Applications
PI: Coy Allen, Dept. of Biomedical Sciences and Pathobiology
Co-I: Eli Vlaisavljevich; Kiho Lee; Sherrie Clark-Deener; Sheryl Coutermash-Ott; Chris Byron
Sponsor: The Focused Ultrasound Foundation
Amount: $100,000

Understanding Arbovirus Emergence and Changing the Approach to Intervention
PI: James Weger-Lucarelli, Dept. of Biomedical Sciences and Pathobiology
Sponsor: DARPA (flow-through Institut Pasteur)
Amount: $500,000

Delineate the mechanisms of hepatitis E virus-associated fulminant hepatitis during pregnancy
PI: X.J. Meng, Dept. of Biomedical Sciences and Pathobiology
Co-I: Ansar Ahmed, Sherrie Clark-Deener, Tanya LeRoith
Sponsor: NIH, NIAID
Amount: $1,984,407

Neural migratory deficits in congenital heart disease
PI: Paul Morton, Dept. of Biomedical Sciences and Pathobiology
Sponsor: NIH/NINDS
Amount: $474,330

Mobile, real-time, metagenomic and targeted genotyping of viruses in swine and poultry
Subcontract PI: Kevin Lahmers, Dept. of Biomedical Sciences and Pathobiology
Co-I: Tanya LeRoith, Thomas Cecere
Sponsor: USDA-NIFA
Amount: $233,447 ($499,917 total)

Food Animal Residue Avoidance Databank: VA Component
PI: Jennifer L. Davis, DVM, PhD, DACVIM, DACVCP
Sponsor: USDA-NIFA
Amount: $150,000

Meis1 Negatively Regulates Blood Flow in Hindlimb Ischemia
Determinants of prolonged Zika virus shedding in semen

PI: Nisha Duggal, Dept. of Biomedical Sciences and Pathobiology
Sponsor: NIH
Amount: $432,037

Understanding the mechanism of neurological sequelae associated with hepatitis E virus infection

Co-PI: X.J. Meng, and Wen Li, Dept. of Biomedical Sciences and Pathobiology
Co-I: Harini Sooryanarain, Tanya LeRoith, and Sherrie Clark-Deener
Sponsor: NIAID, NIH
Amount: $424,683

Prevalence, genotyping and subtyping of hepatitis E virus in market weight pigs in the United States

PI: X.J. Meng, Dept. of Biomedical Sciences and Pathobiology
Co-I: Harini Sooryanarain
Sponsor: National Pork Board
Amount: $119,643

Latency Testing of HSV-2-odNLS in Mice

PI: Andrea Bertke, Dept. of Population Health Sciences
Sponsor: Rational Vaccines Inc
Amount: $78,318

Resin Embedding and Slide Preparation of Tibial Nerves for SN 8328209

PI: Tom Cecere, Dept. of Biomedical Sciences and Pathobiology
Sponsor: Experimental Pathology Laboratories
Amount: $55,869.00

Determine the Protective efficacy of the S60-VP8 vaccine using the gnotobiotic pig rotovirus challenge model.

PI: Lijuan Yuan, Dept. of Biomedical Sciences and Pathobiology
Sponsor: Cincinnati Childrens Hospital Medical Center
Amount: $50,000

The Development of Intranasal Dual Vaccine: Hepatitis B and Norovirus

PI: Dr. Lijuan Yuan, Dept. of Biomedical Sciences and Pathobiology
Sponsor: GRDF Global
Amount: $19,998

Boehringer Ingelheim Veterinary Scholars

PI: Ansar Ahmed, Dept. of Biomedical Sciences and Pathobiology/RGS
Sponsor: Boehringer-Ingelheim
Amount: $15,000
<table>
<thead>
<tr>
<th>Project Description</th>
<th>PI:</th>
<th>Sponsor:</th>
<th>Amount:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEM Evaluation of Kidney tissues from SN 1161.20</td>
<td>Tom Cecere, Dept. of Biomedical Sciences and Pathobiology</td>
<td>Experimental Pathology Laboratories</td>
<td>$10,895</td>
</tr>
<tr>
<td>TEM Evaluation of iPSC-Derived cells</td>
<td>Tom Cecere, Dept. of Biomedical Sciences and Pathobiology</td>
<td>Experimental Pathology Laboratories</td>
<td>$10,726</td>
</tr>
<tr>
<td>Public Health Practice Support for GMEC</td>
<td>Kathy Hosig, Dept. of Population Health Sciences</td>
<td>Graduate Medical Education Consortium of Southwest Virginia</td>
<td>$7,500</td>
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<tr>
<td>Pharmacokinetics of a highly concentrated formulation of buprenorphine (Simbadol) in dogs</td>
<td>Henao Guerrero, Piedad N</td>
<td>University of California, Davis</td>
<td>$9,943</td>
</tr>
<tr>
<td>Helping Youth PROSPER and avoid Opioid misuse in Virginia</td>
<td>Kathy Hosig, Department of Population Health Sciences</td>
<td>USDA NIFA</td>
<td>$460,000</td>
</tr>
<tr>
<td>Novel nanovaccines against opioid use disorders</td>
<td>Mike Zhang, BSE</td>
<td>NIH</td>
<td>$289,267</td>
</tr>
<tr>
<td>Comparative Contrast myelography and contrast computed tomography of the cervical spine in non-neurologic horses.</td>
<td>Krista Estell, Equine Medical Center/Dept. of Large Animal Clinical Sciences</td>
<td>Virginia Horse Industry Board</td>
<td>$16,955</td>
</tr>
<tr>
<td>Developing predictive markers of reproductive soundness in peri-pubertal and mature rams throughout the year</td>
<td>Jamie Stewart, Dept. of Large Animal Clinical Sciences</td>
<td>Virginia Horse Industry Board</td>
<td>$13,556</td>
</tr>
<tr>
<td>Hair Cortisol as a Measure of Chronic Stress in Horses</td>
<td>Virginia Buechner-Maxwell, Dept. of Large Animal Clinical Sciences</td>
<td>Virginia Horse Industry Board</td>
<td>$7,650</td>
</tr>
</tbody>
</table>
### Computed tomography contract angiography of the equine cadaver head
- **PI:** James Brown, EMC/Dept. of Large Animal Clinical Sciences
- **Sponsor:** Virginia Horse Industry Board
- **Amount:** $5,097

### Development of interactive 3-D models for study of horse head vascular anatomy
- **PI:** James Brown, EMC/Dept. of Large Animal Clinical Sciences
- **Sponsor:** Virginia Horse Industry Board
- **Amount:** $18,100

### Seroprevalence of Anaplasma phagocytophilum in the equine population of Southwest Virginia
- **PI:** Rebecca Funk, Dept. of Large Animal Clinical Sciences
- **Sponsor:** Virginia Horse Industry Board
- **Amount:** $12,050

### Identifying the role of IL-17a in EPM affected horses
- **PI:** Sharon Witonsky, Dept. of Large Animal Clinical Sciences
- **Sponsor:** Virginia Horse Industry Board
- **Amount:** $6,700

### Efficacy of deslorelin acetate on induction of ovulation in doses
- **PI:** Jamie Stewart, Dept. of Large Animal Clinical Sciences
- **Sponsor:** Theriogenology Foundation
- **Amount:** $6,593

### Evaluation of gallbladder motility assessed via ultrasonography in dogs with hyperlipidemia
- **PI:** Stefanie Demonaco, Dept. of Small Animal Clinical Sciences
- **Sponsor:** American Kennel Club Canine Health Foundation
- **Amount:** $9,148

### Viral Manipulation of neuronal microRNAs to maintain trophic support and HSV latency
- **PI:** Andrea Bertke, Dept. of Population Health Sciences
- **Sponsor:** New York University

### DVM Student Engagement in a Primary Care Clinic at Humane Rescue Alliance, Washington, DC
- **PI:** Jennie Hodgson, Office of Academic Affairs
- **Sponsor:** PetSmarts Charities Inc
- **Amount:** $50,000

### Evaluation of automated nucleotide extraction in a lower volume diagnostic setting
- **PI:** Kevin Lahmers, Dept. of Biomedical Sciences and Pathobiology
- **Sponsor:** US FDA
- **Amount:** $39,226
### Characterizing the function and regulation of a conserved virulence-associated genetic pathway of pathogenic *Alphaproteobacteria*

**PI:** Clay Caswell, Dept. of Biomedical Sciences and Pathobiology  
**Sponsor:** University of Sciences in Philadelphia  
**Amount:** $29,912

### Genetic Characterization of latent equine herpes virus-1 isolates in Virginia Horses

**PI:** Robert S Pleasant, Dept. of Large Animal Clinical Sciences  
**Sponsor:** Virginia Horse Industry Board  
**Amount:** $6,720

### Region III East Suicide Prevention Plan

**PI:** Sophie Wenzel, Dept. of Population Health Sciences  
**Sponsor:** Blue Ridge Behavioral Healthcare  
**Amount:** $5,000

### A nanoparticle-based dual vaccine against norovirus and rotavirus

**PI:** Lijuan Yuan, Dept. of Biomedical Sciences and Pathobiology  
**Sponsor:** Cincinnati Childrens Hospital Medical Center  
**Amount:** $50,000

### Food Animal Residue Avoidance and Depletion Program (VT Component)

**PI:** Jennifer Davis, Dept. of Biomedical Sciences and Pathobiology  
**Sponsor:** USDA-NIFA  
**Amount:** $150,000

### USDA-Veterinary Services Terminology Support

**PI:** Julie Green, Dept. of Biomedical Sciences and Pathobiology  
**Sponsor:** USDA-APHIS  
**Amount:** $250,000
SUMMER VETERINARY SCHOLARS RESEARCH PROGRAM (SVSRP)

Related VT News Article

Our College has an established Summer Veterinary Scholars Research Program that is funded externally by NIH-T35 grant and Boehringer-Ingelheim (previously by Merial), and the College. The intent of the program is to expose DVM students in biomedical research, and build network connections with DVM scientists in federal agencies (NIH, USDA, FDA), and in medical schools. During the summer of 2019, 12 DVM scholars took part in our Summer Veterinary Student Research program funded by NIH, Boehringer Ingelheim, and the College. In the 13 years of the program, over 175 DVM students have had the opportunity to gain valuable research experience. One of our goals is to build a “pipeline of DVM researchers” to hopefully serve in critical shortage areas in academia, industry and government. In a recent poll, over 66% of program alumni choose a career path other than private practice after graduating with their DVM.

NIH National Veterinary Scholars Symposium and Dual Degree Colloquium

Along with the 12 DVM scholars from SVSRP, three of the BMVS dual degree (DVM/Ph.D.) student presented at the Dual Degree Colloquium held during the NIH National Veterinary Scholars Symposium July 24-27, 2019. This year’s symposium was hosted by Tufts University Cumming School for Veterinary Medicine.
BMVS Fall Orientation

The B.M.V.S. program, which prepares students to be scholars and researchers who will benefit animal and human health by advancing veterinary and biomedical knowledge, welcomed 21 new students at its orientation on Aug. 24 at the veterinary college.

Of these, 12 are Ph.D. students, including two dual degree D.V.M./Ph.D. students and two resident Ph.D. students. Of the 11 new master’s degree students, six are residents. Additionally, two students who previously completed their master’s degree in the program were welcomed as Ph.D. students this semester.

VT News Article
Our 30th Annual Graduate Research Symposium was held Wednesday, November 6, 2019. This year, the research theme was Chronic Diseases and Aging. This theme was derived from the observation that "we are living longer but sicker."

Our graduate symposium is graduate student-centric, which is strongly supported by the Office of Research and Graduate Studies. Each year to celebrate and recognize our graduate (MS and Ph.D.) students' progress/achievements, we host an annual Graduate research symposium. Information about previous symposia.

30th Annual Research Symposium Site

Dr. Timothy M Fan
Assistant Director for Shared Resources and Professor of Veterinary Clinical Medicine at University of Illinois at Urbana-Champaign

"The Role of Veterinary Medicine in Convergent Science- From Discovery to Impact"

Dr. Steven Austad
Distinguished professor and Chair of the Department of Biology at the University of Alabama at Birmingham

"Methuselah’s Zoo: What We Can Learn from the Natural World about Extending Health Life"
BMVS Seminar Series

Invited Speakers

Dr. Waldemar Debinski
Professor
Cancer Biology
Wake Forest School of Medicine
Seminar title: "Targeted Cytotoxic Therapy for Gliomas"
February 27, 2019

Dr. Biraj Patel
Carilion Clinic
Seminar title: "Current Management of Acute Ischemic Stroke: Case-Based Approach"
March 14, 2019

Dr. Lauren Turner
Lead Scientist
Department of Molecular Genetics & Microbiology
Division of Consolidated Laboratory Service
Commonwealth of Virginia
Seminar title: "Introduction to the Division of Consolidated Laboratory Services, Public Health Laboratory for the Commonwealth of Virginia"
March 27, 2019

David Thanassi, PhD
Professor and Chair
Center for Infectious Diseases
Department of Molecular Genetics & Microbiology
Stony Brook University
Seminar title: "Metabolic Control of Outer Membrane Vesicle and Tube Formation by Francisella."
March 27, 2019

Qijing Zhang, BVsc, MS, PhD
Clarence Hartley Covault Distinguished Professor
Frank Ramsey Endowed Chair in Veterinary Medicine
Associate Dean for Research and Graduate Studies
Iowa State University College of Veterinary Medicine
Seminar title: “Emergence and pathogenesis of hypervirulent Campylobacter jejuni: Impact on One Health”
Friday, March 29, 2019

Dr. John R. Bethea, PhD
Professor and Department Head
Department of Biology, Drexel University
Seminar title: “TNF: A Tale of a Cytokine and Two Receptors in Chronic Neuropathic Pain”
Thursday, July 11, 2019

Dr. Shireen Sarraf, PhD
Postdoctoral Research Associate (PRAT Program)
National Institute of Neurological Disorders and Stroke
Seminar title: “Loss of TAX1BP1-directed autophagy results in protein aggregate accumulation in brain”
Wednesday, October 2, 2019

Dr. Brian Flesner, DVM, DACVIM-Oncology
Assistant Professor of Oncology
Veterinary Health Center, University of Missouri
Wednesday, November 13, 2019

Recent Graduate Defenses
The following graduate students have successfully completed their graduate degrees

Spring 2019
Ph.D.

Ibtesam M. Rajpar

Major Advisor: Dr. Jennifer Barrett
Dissertation Title: “Tendon regeneration: roles of growth factors and phenotypic diversity in vitro culture”
External Examiner
Defense Date: 01/25/2019
Postdoc at Thomas Jefferson University
Benjamin Okyere
Major Advisor: Dr. Michelle Theus
Dissertation Title: “Eph-Mediated Restriction of Cerebrovascular Arteriogenesis”
External Examiner:
Defense Date: 03/18/19
CNS Sr. Research Associate at Spark Therapeutics, Inc.

James “Jimmy” Andrew Budnick
Major Advisor: Dr. Clay Caswell
Dissertation Title: “Characterization of the VtlR regulons in Brucella abortus and Agrobacterium tumefaciens”
External Examiner: Cari Vanderpool, PhD, Professor, Department of Microbiology, University of Illinois
Defense Date: 03/21/2019
PostDoc Fellow in Dr. James Bina’s lab at the University of Pittsburgh School of Medicine Studying the pathogenesis of Vibrio cholerae

Kelly C. Freuenberger Catanzaro
Major Advisor: Dr. Tom Inzana (Co-advisor: Dr. Clay Caswell)
Dissertation Title: “Surface Polysaccharides of Francisella tularensis: Further Characterization, Role in Virulence, and Application to Novel Vaccine Strategies”
External Examiner: David Thanassi, PhD, Professor and Chair Center for Infectious Diseases, Department of Molecular Genetics & Microbiology Stony Brook University
Defense Date: 03/28/2019
Small animal rotating intern at MedVet Akron in Akron, Ohio

Marigold E. Ernst DVM
Major Advisor: Dr. Sriranganathan (Co-advisor-
Dissertation Title: “Characterization, toxicity, and biological activities of organometallic compounds and peptide nucleic acids for potential use as antimicrobials”
External Examiner: Dr. Qijing Zhang, BVsc, MS, PhD, Clarence Hartley Covault Distinguished Professor Frank Ramsey Endowed Chair in Veterinary Medicine, Associate Dean for Research and Graduate Studies Iowa State University College of Veterinary Medicine
Defense Date: 3/28/19
Working for IDEXX
Michael Edwards DVM

Major Advisor: Dr. S. Ansar Ahmed
Dissertation Title: "Investigations into the role of exogenous estrogenic endocrine disrupting chemicals on immune dysregulation in autoimmune disease"
External Examiner: Dr. Divaker Choubey, Professor, University of Cincinnati, School of Medicine, Professor of Environmental Health
Defense Date: 5/8/19
Postdoc at VT

MS (Combined Residency and MS)

Dr. Ashley Wilkinson

Major Advisor: Dr. David Panciera
Thesis Title: “Platelet Function in Dogs with Chronic Liver Disease”
Defense Date: 03/20/2019
Clinical Instructor at VMCVM

Dr. Andrew Enders

Major Advisor: Dr. Ian Herring
Thesis Title: “Retrobulbar neurolytic ethanol injection for the treatment of end-stage canine glaucoma”
Defense Date: 05/03/2019
Private ophthalmology specialty clinic in Dallas, TX

Dr. Cheslymar Garcia

Major Advisor: Dr. Sabrina Barry
Thesis Title: “Assessment of Bacteriuria and Surgical Site Infections in Dogs with Cranial Cruciate Ligament Disease”
Defense Date: 05/09/2019
Career in Animal Emergency Medical Center in Torrance, CA
**Summer 2019**

**Ph.D.**

**Amanda D. Házy**

Major Advisor: Dr. Michelle Theus  
Dissertation Title: “Novel Immune-Regulatory Mechanisms in a Mouse Model of Traumatic Brain Injury”  
Examiner: John R. Bethea, PhD, Professor and Department Head  
Department of Biology, Drexel University  
Defense Date: 07/11/2019

**Jingjing Ren**

Major Advisor: Dr. Chris Reilly  
Dissertation Title: “The Role of Histone Deacetylase 6 Inhibition on Systemic Lupus Erythematosus”  
Defense Date: 8/08/2019  
Postdoc at Yale

**MS (Combined Residency and MS)**

**Dr. Sarah Marie Khatibzadeh**

Major Advisor: Dr. Linda Dahlgren  
Thesis Title: “Porcine urinary bladder matrix in an in vitro equine model of tenogenesis”  
Defense Date: 06/11/2019  
Ph.D. at VMCM

**Dr. Lauren E. Dodd**

Major Advisor: Dr. Meghan Shepherd  
Thesis Title: “Feline Obesity: Food Toys and Owner Perceived Quality of Life During a Prescribed Weight”  
Defense Date: 06/28/2019  
Postdoc in Dr. Charlotte Baker’s lab
Dr. Richard Shinn
Major Advisor: Dr. Theresa Pancotto
Thesis Title: "Magnetization Transfer and Diffusion Tensor Imaging in Dogs with Intervertebral Disc Herniation"
Defense Date: 07/08/2019
Position at VMCVM

Dr. Lauren Trager
Major Advisor: R. Scott Pleasant,
Thesis Title: "Evaluation of extracorporeal shockwave for treatment of horses with thoracolumbar pain"
Defense Date: 8/09/2019
Sports Medicine/EFS Resident

Fall 2019
Ph.D.

Bruno Carvahlo Meneriam
Major Advisor: Linda A. Dahlgren
Dissertation Title: "Macrophage-mediated Regulation of Joint Homeostasis"
Defense Date: 9/30/19
Postdoc at the University of Kentucky

Ashwin Ramesh
Major Advisor: Lijuan Yuan
Dissertation Title: "Study of enteric virus infection and parenteral vaccines in the gnotobiotic pig model"
Defense Date: 12/05/2019
Continuing research with Dr. Lijuan Yuan
Nicholas Catanzaro
Major Advisor: XJ Meng
Dissertation Title: “Molecular Mechanisms of PRRSV Replication and Pathogenesis”
Defense Date: 12/09/2019
Post doc in Dr. Helen Lazear's lab at University of North Carolina, Chapel Hill

MS (Combined Residency and MS)

Dr. Stacy Cloither
Major Advisor: Bill Huckle
Thesis Title: “Immune Checkpoint Molecule Expression in Canine Lymphoma and Canine Reactive Lymphoid Hyperplasia”
Defense Date: 9/09/2019
BMVS ACCOMPLISHMENTS

Kathy Barron
- Outstanding Poster Presentation at 6th Annual Meeting of the Greater Washington DC Chapter of the American Physiological Society

Alison Cash
- 3rd Place Poster Presentation at National Capital Area TBI Conference (March)
- Selected 1 of 6 oral presenters at National Dual Degree Colloquium (July)

Melissa Mercer
- Became Diplomate of American College of Veterinary Internal Medicine – Large Animal

Holly Morrison
- Outstanding Graduate Student Presentation at VirginiaDrugsDiscoveryRx Symposium (2019)

Vanessa Oakes
- Invitation and induction into the Phi Kappa Phi honor society
- 2019 Travel Award, American Association of Veterinary Laboratory Diagnosticians (AAVLD)

Swagatika Paul
- Outstanding Abstract Chosen for Oral Presentation at 6th Annual Meeting of the Greater Washington DC Chapter of the American Physiological Society

Catherine Cowan
- Outstanding Abstract Chosen for Oral Presentation at 6th Annual Meeting of the Greater Washington DC Chapter of the American Physiological Society

2019 Graduate Student Assembly Research Symposium Awards

Gold Award Winners (Oral Presentations):
- Catherine Cowan (Mentor: Ahmed)
- Alissa Hendricks (TBMH student- Mentor- Allen)

Silver Award Winners (Oral Presentations):
- James Budnick (Mentor: Caswell)

Bronze Award Winners (Oral Presentations):
- Michael Edwards (Mentor: Ahmed)

Silver Award Winners (Short Presentation):
- Holly Morrison (Mentor: Allen)
Graduate Awards (2019):

**Outstanding VMCVM Mentor Award:** Dr. Xin Luo

**Outstanding VMCVM nominee for the MS Award:** Dr. Sarah Khatibzadeh (Mentor: Dr. Dahlgren)

**Outstanding VMCVM nominee for the PhD Award:** Dr. Kristin Eden (Mentor: Dr. Allen)

**Induction as a member in the Academy of Graduate Teaching Assistant Excellence:** Dr. Hannah Leventhal.

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**2019 VCOM-Virginia Campus Research Recognition Day**

Feb 22, 2019, VMCVM Award winners

**Faculty Poster Presentations:**

- 1st Place: Dr. Rujuan Dai (Xie, Ahmed)
- 2nd Place: Dr. Ramu Anandakrishnan, VCOM/COHR

**Graduate Student Presentations**

- 1st Place: Kellie King (Mentor: Caswell)
- 2nd Place: Jingling Ren (Mentor: Reilly, Luo)
- 3rd place: James Budnick (Mentor: Caswell)
Where Our Alumni are Currently Employed

BMVS GRADUATES - TOTAL

- DVM: 35%
- Academia: 45%
- Industry: 9%
- Human Medicine: 3%
- Federal: 8%

BMVS GRADUATES - PHD

- Academia: 53%
- DVM: 13%
- Industry: 16%
- Human Medicine: 5%
- Federal: 13%

BMVS GRADUATES - MS

- DVM: 67%
- Academia: 33%
Student Publications from Our 2019 Graduates

2019


2018


**2017**


**2016**


RESEARCH SUPPORT NEWS

Research Staff Retirements

Kathy Lowe
Joined the Vet school in 5/1/1987 became the manager of the “Morphology Lab” (aka Electron Microscope lab) on 1/1/97. She retired on 12/31/2018.

Kathy is a meticulous and dedicated research staff member. Her electron microscopy technical skills from sectioning to processing to imaging are extraordinary. Researchers appreciate her attention to detail. She efficiently managed the electron microscopy lab for over 30 years. Her service to the college is laudable. We wish her a happy retirement! Thanks for all you did for RGS and the college over the years.

Catherine Caldwell
Catherine Caldwell recently retired from Virginia Tech on 12/31/19. She worked in the Teaching and Research Animal Care and Support Service (TRACSS)/RGS as an administrative assistant working to provide support with per diem billing, ordering, inventory management, and a variety of program management tasks necessary to support continued compliance with AAALAC, USDA, IACUC, etc. She began her career at Virginia Tech as a wage employee in 1989 in the Athletic Department, and worked for a variety of other departments including Humanities, Recreational Sports, Center for Excellence in Undergraduate Teaching, Academic Assessment, University Writing Program, Virginia Tech Electric Service, and the Mechanical Utilities Department before coming to her last position in Veterinary Medicine in 2010.

Her knowledge and experience in computer databases, finance, and customer service will be missed, but we wish her well in her much-deserved retirement!

Registration
Coming Soon!

2019 Research and Graduate Studies Outstanding Co-worker Award
Catherine Caldwell was the recipient of 2019 Research and Graduate Studies Outstanding Co-worker Award. This award is given to a Research staff member, and selected by a staff committee. She was selected for her professional and conscientious attitude concerning work, for her initiative in work-related tasks, and being an excellent team worker. Congratulations Catherine!

Save the Date
April 1, 2020

17th Annual VT Laboratory Exposition
Inn at Virginia Tech

Sponsored by LabConnect
Requests
RGS seeks your input for instrumentation requests. We have several opportunities through the year such as SCHEV to request university support for purchasing equipment. RGS maintains a request list in order to be responsive to these calls.

Resources and Shared Equipment

VMCVM Equipment List

Animal Resources

- **AAALAC Accredited Animal Facilities** - Our college animal facility at this point in time is the only one in the university that is AAALAC-accredited. It is the plan of the university to build on this accreditation to acquire AAALAC accreditation for the entire university.

- **Germ free pig** - Our College is one of the few in the nation to have a germ-free pig facility. This has enabled us to conduct unique federally-funded and contract research, and also establish collaborations with the College of Agricultural Sciences faculty in generating CRISPR-9 gene-altered pigs for infectious and non-infectious work.
  - Ellen P. Neff “Keeping Large Animals Contained”

- **Germ free mouse** - To complement the germ free pig facility, we also have a germ-free mouse facility that has enabled us to conduct research on microbiome regulation of immune and neurological conditions.

- Our college is the only one in the university to have an **ABSL3 facility**.

**GLP Program – Contact Sandy Hancock**

**ViTALS**

The [Virginia Tech Animal Laboratory Services](#) (ViTALS) is American Association of Veterinary Laboratory Diagnosticians (AAVLD) accredited.
Analytical Chemistry Research Laboratory (Pharmacology and Toxicology)

The formerly “Toxicology Lab” name was recently changed to “Analytical Chemistry Research Laboratory”. This name change now accurately reflects the service offered by this unit. The lab provides a variety of enzyme assays, qualitative and quantitative determination of the concentration of drugs, heavy metals, toxins, pesticides, as well as metabolism and pharmacokinetic studies.

Contact: Dr. Jennifer Davis, Analytical Lab Supervisor, 540-231-2192 or jdavis4@vt.edu
McAlister Council-Troche, Analytical Lab Manager, 540-231-4835 or rmct@vt.edu

LC-MS Click on the picture for more information

HPLC Click on the picture for more information

GC-MS Click on the picture for more information

ICP-MS Click on the picture for more information
Electron Microscope Lab

The “Ultrastructure lab” name has now been changed to “The Electron Microscope Lab”, which is consistent with the primary function of this lab. The lab is equipped with instrumentation for ultrastructural analysis of biological and non-biological materials to provide investigators with data concerning specimen morphology.

Contact: Dr. Tom Cecere, Clinical Associate Professor, tcecere@vt.edu.

Search process to replace Ms. Kathy Lowe supervisor of the E/M lab is in progress.

Flow Cytometry
Phase 2 Room 221

Contact: Melissa Makris

- Flow sorter and analyzers
- Image stream- This is a unique piece of equipment that is a combination of flow cytometry and high definition microscopy.
Sterilization and Laboratory Support Services
The “Glassware Lab” name has now been changed to “Sterilization and Laboratory Support Services” to accurately reflect the current and expanded services provided to the college’s research community. This service is provided at three different locations of the college: the main building (Phase II), Center for One Health Research (COHR), and Integrated Life Science Building (ILSB). The research staff members of this unit provide a constant supply of washed and sterilized glassware, plastics, media, distilled water, laboratory animal cages, bottles, and cage lids that are essential for research activities. They also provide training for operations of autoclaves to faculty, staff, and students.

Contacts: Andrea Renshaw (phase II), Debby Coley (COHR) and Doris Tickle (ILSB)

Study Design and Statistics
The lab assists with design, planning, and implementation of research projects, data management and analysis, evaluation, and presentation of data and information.

Contact: Dr. Stephen Werre, Study Design & Statistical Analysis Lab Supervisor, 540-231-3522 or swerre@vt.edu

The Teaching and Research Animal Care Support Services (TRACSS)
TRACSS is an AAALAC-accredited unit that provides care and maintenance of animals used in research and teaching. TRACSS also provides policies, guidelines, and support to assist investigators with animal research projects while ensuring compliance with Federal law and regulatory agency policies.

Contact: Karen Hall, TRACSS Supervisor, at kgetzewi@vt.edu or 540-231-4318.

OTHER SUPPORT:

Clinical Research Support
The Veterinary Clinical Research Office offers assistance to investigators through proposal preparation and review; forging connections with internal and external collaborators; serving as an initial point of contact for sponsors, owners, and other internal and external stakeholders.
Learn more about the Clinical Research Office's investigator support.

If you have content you would like to see in the next issue, please contact the RGS Office.

Acknowledgements:
I want to thank the follow individuals. These include: Dr. Jessica Crawford, Andrea Green, Holly Morrison, and Xavier Cabana Puig. Dr. Jessica Crawford has been instrumental in the production of this report.