Selected Notable Faculty Accomplishments

Awards and Recognition

**Michael P. Malone National Leadership Award:** Dr. Wondwossen Gebreyes, Professor of Veterinary Preventive Medicine and Director of Global Health Programs received this recognition for his work in establishing research and training programs on molecular epidemiology of foodborne pathogens for eastern Africa, including Ethiopia, Kenya, and Tanzania. Dr. Gebreyes also shepherded “One Health Ethiopia,” an initiative aimed at connecting researchers, clinicians, and students from all corners of the globe to address major emerging health threats in the East Africa region. He also developed online coursework that has educated more than 7,000 students in 90 countries. The Malone Award, a national honor sponsored by The Association of Public and Land-grant Universities (APLU) and awarded annually, recognizes individuals who further international education at public universities.

**Society of Toxicologic Pathology (STP) Outstanding Mentor Award:** Dr. Thomas Rosol, Professor in the Department of Veterinary Biosciences and Senior Advisor for Life Sciences to the Office of Technology and Commercialization, was the recipient of the STP 2015 Outstanding Mentor Award. The Outstanding Mentor Award is given to a member in good standing who has played a significant role in the training of toxicologic pathologists. Dr. Rosol has been instrumental in the training of numerous toxicologic pathologists over the past three decades. The award recognizes individuals who have mentored pathologists as part of formal training programs, as well as individuals who have consistently provided informal coaching or instruction.

**Zoetis Research Award:** Dr. Chen Gilor, Assistant Professor in Veterinary Clinical Sciences received the Zoetis Research Award for his work investigating novel therapies related to feline and canine diabetes mellitus. Dr. Gilor’s research has been funded by ACVIM Foundation, Merck Animal Health, Morris Animal Foundation, and Ethos Advisory Group. The award is presented to a faculty member for his/her innovative research, on which the scientific advancement of the profession depends, recognizing outstanding research effort and productivity.

**Charles Capen Teaching Excellence Award for Graduate Education:** Dr. Li Wu, Professor in Veterinary Biosciences. The Capen Award serves to honor faculty members who excel in their roles as advisors and mentors for post-doctoral fellows, Master of Science, and Doctor of Philosophy candidates. To date, Dr. Wu has trained eight post-doctoral fellows and graduated five MS/PhD students that have gone on to distinguished careers in academia, government, or industry. He currently has four post-doctoral fellows and two PhD candidates in his laboratory.

**Canine Cancer, Clinical Trials featured at TEDx:** Dr. Cheryl London, Professor in the Department of Veterinary Biosciences, Director of the Clinical Trials Office (CTO) at the Veterinary Medical Center, and Director of Translational Therapeutics at the Center for Clinical and Translational Science spoke about canine cancer as part of “The Human Narrative” on February 14, 2015 at the Wexner Center for the Arts’ Mershon Auditorium for TEDxOhioStateUniversity, an independent TED event. Dr. London, one of 12 invited speakers, explained how the efforts of researchers in the study of cancer in dogs has led to translational applications in human cancer. She gave examples from the CTO where novel drug therapies are being developed for the treatment of specific tumors. Everyone wins when dogs are part of clinical cancer trials, Dr. London told the
audience. “Our pets get access to state-of-the art cutting-edge therapy for little to no cost and humans get access to critical information that can impact their outcome.”

Commercialization

Translation of CVM discoveries, expertise, intellectual property, and other assets occurs through license and permission agreements to commercial companies. At the end of FY15, CVM had 12 active licenses in fields of diagnostics, articles, educational images and videos, therapeutics, and vaccines. The current CVM licenses are split equally between VBS (6) and VCS (6). Commercialization revenue flows from the license agreements to OSU. In the past 20 years, CVM revenues surpassed $900K seven times, and surpassed $1M three times. FY15 marked the second highest revenue to CVM spanning all years surpassing $1M. CVM continues as the leading revenue-producing college at OSU. Per OSU policy, roughly 20% of the revenue received is distributed to the college; an additional 20% flows to the department(s) of the inventor/creators. Only the VBS agreements have surpassed the OSU revenue threshold required for college and department distribution ($75K); thus, all of the FY15 revenue distributed to our college and department currently stems from VBS license agreements.

The College began tracking participation of our faculty in 2010. Participation includes the full range of activities that link to all stages of industry collaborations (initial discussions, CDAs, MTAs, or research agreements with commercial concerns) and commercialization (initial discussion of insights/discoveries through commercial translation events: licenses, contracts, etc.). Targets for faculty participation were established in 2010. As shown below, in FY15 we exceeded the 5-year 2015 faculty participation targets set in 2010 for the overall college and for all departments.

Research within our college drives the development of new insights and discoveries. Output from research and clinical understanding drives our invention reports/disclosures. As seen in the following chart, we increased reports from 2011 - 2014. Our goal at this time is to sustain submissions at double-digit levels.

The commercialization section in the CVM 2015 Annual Report is reported as fiscal year (FY) information. All commercialization databases and information for OSU are based on the OSU fiscal year (July 1 – June 30). To ensure alignment with other OSU reports the FY format for this commercialization section is presented.
The Comparative and Veterinary Medicine Graduate Program
The numbers of PhD and MS students in the College’s graduate program has remained steady for the past 3 years. In 2015, 15 PhD, and 24 MS students successfully completed their degree requirements.

Graduate Student Demographics (as of January 2016)

<table>
<thead>
<tr>
<th>Department of Advisor</th>
<th>PhD Students</th>
<th>MS Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biosciences</td>
<td>18</td>
<td>2</td>
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<tr>
<td>Clinical Sciences</td>
<td>2</td>
<td>37</td>
</tr>
<tr>
<td>Preventive Medicine</td>
<td>17</td>
<td>1</td>
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<tr>
<td>College of Medicine</td>
<td>5</td>
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<tr>
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<tr>
<td></td>
<td>43</td>
<td>49</td>
</tr>
</tbody>
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Selected Notable Student Accomplishments

2015 Graduates

Spring Semester Doctorates:
Fernanda Abreu - Co-Advisors: Marco Coutinho da Silva and Michael Day
Valeria Artuso Ponte - Advisor: Wondwossen Gebreyes
Basavaraj Binjawadagi - Advisor: Renukaradhya Gourapura
Erin Dicaprio - Advisor: Jianrong Li
Joelle Fenger – Co-Advisors: Cheryl London and William Kisseberth
Jagadish Hiremath - Advisor: Renukaradhya Gourapura
Joany Van Balen Rubio – Co-Advisors: Armando Hoet and Thomas Wittum

Spring Semester Masters:
Nola Bliss - Advisor: Andrew Bowman
*Megan Brown - Advisor: Cheryl London
*Francisco Clemente Vicario – Co-Advisors: Gwendolen Lorch and William Kisseberth
*Kristen Datte - Advisor: Edward Cooper
**Sarah Depenbrock - Advisor: Katharine Simpson
**Bronwyn Fullagar - Advisor: Chen Gilor
***Alison Gardiner - Advisor: James Belknap
**Melanie Hnot - Advisor: Lynette Cole
Matthew Hogan - Advisor: Valerie Bergdall
Alissa Hunter - Advisor: Gustavo Schuenemann
*Rachel Liepman - Advisor: Ramiro Toribio
Kelvin Lim - Advisor: Wondwossen Gebreyes
*Kimberly Mulligan - Advisor: William Drost
*Lisa Rose - Advisor: William Drost
*Adam Rudinsky - Advisor: Chen Gilor
*Rachel Song - Advisor: Sarah Moore
*Audrey Wanstrath - Advisor: Alicia Bertone
*Meagan Williams - Advisor: Eric Green

Summer Semester Doctorates: None

Summer Semester Masters:
Adrian Barragan - Advisor: Gustavo Schuenemann
Santosh Dhakal - Advisor: Renukaradhya Gourapura
Kathryn Mccullough - Advisor: Paivi Rajala-Schultz
Duan-liang Shyu - Advisor: Renukaradhya Gourapura
James White – Advisor: Thomas Wittum

Autumn Semester Doctorates:
Elbashir Araud - Advisor: Jianrong Li
Paige Gott - Advisor: Gustavo Schuenemann
Hayam Ahmed Galal Hamzah Hussein - Advisor: Alicia Bertone
Anand Kumar - Advisor: Gireesh Rajashekara
Zhongyan Lu - Advisor: Linda Saif
Maria Menendez - Advisor: Michael Knopp
Lulu Shao - Advisor: Linda Saif
Feifei Wang - Advisor: Li Wu

*Judith Bertran – Advisor: Alan Litsky
Advances in Veterinary Medicine Day showcases the research and scholarship accomplishments of veterinary students, residents, graduate students, and faculty in the college and brings the college community together to learn about exciting research being carried out by colleagues. The annual event was held April 12, 2015. Dr. Jeff Lakritz served as the Chair for the 2015 Research Day and Ms. Michele Morscher organized and ran the event. Dr. Patricia Conrad, Professor and Associate Dean for Global Affairs, UC Davis School of Veterinary Medicine and Co-Director of the One Health Center of Expertise: Water, Animals, Food and Society in the UC Global Health Institute, presented the keynote address “Otters, Toxoplasma Oocysts, Oceans and One Health: What’s the Connection?” In addition, platform presentations of their research were given by Dr. Kasia Dembek (Graduate Student), Dr. Laura Pomeroy (Post-doc), and Dr. Mingqun Lin (Research Scientist). There were 87 posters presented in the areas of Structure-Function, Infectious Diseases-Immunology, Clinical Research, Epidemiology and Applied Research, Education, and Molecular and Cellular Biology. Travel awards were given to the top poster in each area.

Research Day Travel Award Winners

Platform Presentations:
Graduate Student Presentation: Kasia Dembek – Advisor: Ramiro Toribio
Post Doc Presentation: Laura Pomeroy – Advisor: Rebecca Garabed
Research Scientist Presentation: Mingqun Lin – Advisor: Yasuko Rikihisa

Graduate Student Posters:
Clinical Research: Sarah Depenbrock – Advisor: Katie Simpson
Immunology & Infectious Diseases: Tara Martin – Advisor: Prosper Boyaka
Molecular & Cellular Biology: Lauren Himmel – Advisor: Ching-Shih Chen
Structure/Function: Katheryn Dern – Advisor: Jim Belknap
Epidemiology & Applied Research: Kelvin Lim – Advisor: Wondwossen Gebreyes

Veterinary Student Posters:
Basic Research: Elizabeth Helffrich, VME 2 – Advisor: Matthew Allen
Clinical Research: Lindsey Johnson, VME 2 – Advisor: Ramiro Toribio
Epidemiology & Applied Research: Kasey Godden – Advisor: Greg Habing

2015 Summer Veterinary Student Research Program

The College continues its tradition of a strong Summer Research Program, which provides 3-month research training experiences for first- and second-year veterinary students. In 2015, 27 of the 37 applications submitted for the 2015 Veterinary Scholars Summer Research Program were funded. Funds for stipends were provided through an NIH T35 Training grant, Morris Animal Foundation, Merial, AVMA/AVMF, Faculty, Alumni, and College endowment funds. Students were kept busy not only working on their projects in the lab, but also attending a 1-day workshop entitled, “Ethics in Biomedical Research”, and biweekly brown bag seminars with topics ranging from “alternative career paths” and “the life of a graduate student”, to scientific presentations and scientific writing. A field trip was taken to The Wilds – a private, non-profit conservation center located on nearly 10,000 acres of reclaimed mine land in rural southeastern Ohio. Sixteen students, along with Drs. Oglesbee, Green, and Fenger, and Michele Morscher attended the Merial NIH National Veterinary Scholars Symposium hosted by UC Davis. The summer ended with each of the students giving a power point presentation of their research project and experience, to sponsors and members of the College community.
### 2015 SRP Participants and their Advisors

<table>
<thead>
<tr>
<th>Josie Arbogast – Ronaldo da Costa (VCS)</th>
<th>Katherine Bachman – Yasuko Rikihisa (VBS)</th>
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<tbody>
<tr>
<td>Katherine Backus – Barb Wolfe (VPM)</td>
<td>Kristen Bartholomew – Sarah Moore</td>
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<td>Paulynne Bellen – Tom Wittum (VPM)</td>
<td>Dylan Burroughs – Wendy Lorch (VCS)</td>
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<tr>
<td>Rachael Camiener – Tom Rosol (VBS)</td>
<td>Lauren Diangelo – Katy Proudfoot and William Saville (VPM)</td>
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<tr>
<td>Katherine Backus – Barb Wolfe (VPM)</td>
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<td>Lauren Diangelo – Katy Proudfoot and William Saville (VPM)</td>
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<tr>
<td>Alexander Diedrich – Gustavo Leone (MVIMG)</td>
<td>Michelle Forman – Susan Barrett (VCS)</td>
</tr>
<tr>
<td>Christina Hammons – Andy Bowman (VPM)</td>
<td>Keirsten Harris – Greg Habing (VPM)</td>
</tr>
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<td>Olivia Hegedus – Jim Belknap (VCS)</td>
<td>Elizabeth Helfrich – Ronaldo da Costa (VCS)</td>
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<td>Daniela Korec – Tom Wittum (VPM)</td>
<td>Mary Rose Lawrence – Meghan Herron (VCS)</td>
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<td>Yullee Lin – Tom Cherpes (MII/OG)</td>
<td>Sarah Linn – Stefan Niewiesk (VBS)</td>
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<td>Marisa Maglaty – Gustavo Leone (MVIMG)</td>
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<td>Kanyon McLean – Rebecca Garabel (VPM)</td>
<td>Jillian Minuto – Ramiro Toribio (VCS)</td>
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<td>Andrew Muir – Sarah Moore (VCS)</td>
<td>Leon Schermerhorn – Ian Davis (VBS)</td>
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<td>Devinn Sinnott – Rebecca Garabel and Antoinette Marsh (VPM)</td>
<td>Sarah Waibel – Wondwossen Gebreyes (VPM)</td>
</tr>
<tr>
<td>Sarah Young – Ian Davis (VBS)</td>
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</tr>
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</table>

### 2015 Gertrude Hoeger Biomedical Research Awards for Veterinary Students

The award is given in recognition of veterinary medicine students who have demonstrated enthusiasm and excellence in research.

**Basic Biomedical Research:** Katherine Bachman – Advisor: Dr. Yasuko Rikihisa

**Clinical Biomedical Research:** Derek Howell – Advisor: Dr. Marco da Silva

### Clinical Trials Office

The Clinical Trials Office (CTO) is a developing Shared Resource (Veterinary Clinical Research Shared Resource) of the OSU Comprehensive Cancer Center and part of the Comparative Animal Core (CAC), which is a Shared Resource supported by the Center for Clinical and Translational Studies. The office provides guidance with respect to clinical trial design including formulation of a testable hypothesis, determination of patient entry criteria, selection of appropriate toxicity assessments, review of appropriate statistical endpoints, and development of accurate budgets. The office also confirms compliance with applicable hospital, IRB, and/or IACUC requirements. Case recruitment is enhanced by an established network of regional specialists, veterinarians, and breed clubs to assist with patient enrollment. The CTO provides education in GCP, GLP, and the requirements of individual organizations sponsoring trials, and oversees and verifies correct and complete data entry and compliance with established study guidelines. The CTO supervises an average of 40-50 clinical trials each year, of which 25% are typically multi-center in nature. These studies enroll over 600-800 client-owned animals into a variety of protocols that involved pharmacokinetic sampling, tissue collection for pharmacodynamic endpoints, and adverse event assessments.

Thirty-eight clinical trials were active at the start of 2015 and another 15 were initiated throughout the year. Importantly, the number of non-cancer based studies has increased with >50% now being undertaken in non-oncologic disease entities. Examples include “A Randomized, Placebo Controlled, Proof of Concept Study of the Efficacy of LY3150053 and LY3300514 in the Treatment of Canine Osteoarthritis Pain,” “Diagnosing and Managing Neuropathic Pain in Dogs with Spinal Cord Injury.” The osteoarthritis study is particularly relevant as it is part of a multi-center clinical trial sponsored by Eli Lilly to evaluate two novel therapeutic agents in the setting of spontaneous disease in dogs. The results of this study will have direct impact on future human clinical trials with these compounds. The CAC has instituted REDCap for clinical trials management and has initiated the first studies using this system.

Outreach regarding the role of veterinary clinical trials in translational research was enhanced significantly in 2015. Dr. London spoke at the “One Health: Integrating the Veterinarian Scientist into the Biomedical Research Enterprise” workshop held at the NIH that included over 150 participants from industry, academia, and
government entities, including the FDA. The goal of this workshop was to enhance translational efforts in the setting of spontaneous disease and to promote training and incorporation of veterinary clinician scientists into the workforce. Dr. London also spoke at the IOM National Cancer Policy Forum Workshop “The Role of Clinical Studies for Pets with Naturally Occurring Tumors in Translational Cancer Research”. Importantly, a manuscript has been published as a Focus piece in *Science Translational Medicine* highlighting gap analysis generated by this IOM meeting. To enhance recruitment of animals for translational studies, the CCTS sponsored the production of a short video to explain the process associated with translational clinical trials in client owned animals and highlight the value of these data ([https://vet.osu.edu/vmc/cto](https://vet.osu.edu/vmc/cto)).

The Biospecimen Repository (BR), housed in the Veterinary Medical Center (VMC), is responsible for collecting normal tissues/samples and affected tissues/samples from client owned animals presented to the VMC. The specimens provide researchers within the OSU and Nationwide Children’s Hospital (NCH) a source material for the interrogation of disease processes and the development of new therapies that will impact both animals and humans. Samples collected by the BR include fresh, frozen, and formalin-fixed normal tissues (skin, muscle, etc.), fresh, frozen, and formalin-fixed diseased tissue (tumors, etc.), serum, plasma, PBMCs, and urine. Investigators can arrange for the Repository to collect specific samples prospectively on an “as needed” basis, or to fulfill the requirements of a specific research project. The BR is also part of the developing Shared Resource (Veterinary Clinical Research Shared Resource) of the OSU Comprehensive Cancer Center as well as the CAC supported by the Center for Clinical and Translational Studies. The BR has become more actively engaged in providing tissues for collaborative studies across OSU and NCH, as well as industry partners including Eli Lilly. Samples have been dispensed to 22 investigators, compared to nine investigators in the previous year.

**Grant Support Office**

Grant Support Office (Dr. Kate Hayes-Ozello) facilitated submission of 73 grants and contracts (budgets, editing, scientific review, proposal digests, organized Cayuse or other submission); processed 133 PA005s, submitted seven national reports (federal agencies and professional organizations), and six award nomination packages. The office provided editorial services for seven manuscripts. The GSO managed 95 active projects with $9M in expenditures, performed budget projections; directed HR action to initiate and terminate personnel appointments to project; followed up on invoicing, eCerts, ProjEnd, and overrun reports, and resolved issues. Monthly publication of Funding News includes funding opportunities of interest as well as agency updates and grant-related resources. Dr. Hayes-Ozello organized the new annual RCR workshop held May 20, 2015. In addition, she served on and/or provided support to the Veterinary Admissions Committee, VCS Research Committee, VBS Research Priority 3 Taskforce, Signature Program Committee, Institutional Data Committee, Phi Zeta manuscript review committee, Global One Health Task Force, Gut Microbiome group, Medicine and the Arts Roundtable, and Research Day.

**Research Funding (January 2015 – December 2015)**

**Select Major Grant Awards:**

- College faculty in collaborative research project with Nationwide Children’s Hospital received a 5-year, $6.75M Program Project Grant to develop RSV vaccine. Drs. Stefan Niewiesk, Jianrong Li, and Krista La Perle, faculty members in the Department of Veterinary Biosciences are working with researchers from the Center for Vaccines and Immunity at Nationwide Children's Hospital (Drs. Mark Peeples, Octavio Ramilo, and Asuncion Mejias), to develop a vaccine for respiratory syncytial virus (RSV). RSV is one of the most common causes of lower respiratory tract infections in human infants, with an annual 3.4 million cases leading to hospitalization in children under 5-yrs old, according to a study published in the *National Library of Medicine*. The team's end goal is to create an effective RSV vaccine that can be given as nose drops to infants. This will be achieved by weakening the virus while increasing its ability to stimulate a protective immune response. Contributions from the College of Veterinary Medicine highlight the multidisciplinary nature of the research team, with expertise in fundamental virology, model systems to evaluate antiviral immune responses, and comparative pathology being essential to success. A successful outcome means the vaccine will save the lives of infants and children worldwide, preventing over 57,000 hospitalizations and over 2 million medical visits
for infants and children each year. Tackling the challenge of human RSV may also directly benefit the veterinary and agricultural community, given the role of bovine RSV in respiratory disease of cattle.

• **National Institutes of Health grant awarded to Dr. Li Wu and Colleagues to study the mechanisms of HIV-1 latency.** Dr. Wu, Professor in the Department of Veterinary Biosciences and member of the Center for Retrovirus Research has received a 3-year $600,000 grant from the National Institutes of Health. HIV and TB infections are the world's most fatal infectious diseases, according to the World Health Organization. Around the globe, nearly 37 million people currently are living with HIV; in 2014, 1.2 million people died from AIDS-related illnesses. About 5,500 people contract HIV infection each day, but HIV basic research holds promise in eradicating this devastating disease. The NIH grant will allow Dr. Wu and his team, which includes collaborators in China, to gather new information on the cellular and viral processes that underlie HIV's complex routes of transmission and replication. They will specifically focus on identifying currently unknown mechanisms that control HIV latency, which researchers have deemed “the most challenging question in HIV research.” This study will facilitate the development of more effective strategies to combat HIV.

• **National Institute of Diabetes and Digestive and Kidney Diseases grant awarded to Dr. Prosper Boyaka to study the regulation of mucosal IgA and allergic inflammation by intestinal epithelial cells.** Dr. Boyaka, Professor in the Department of Veterinary Biosciences has received a 5-year $1.74M grant from the National Institutes of Health. Epithelial cells lining mucosal surfaces represent the first barrier of the host against exogenous products and pathogens. Intestinal epithelial cells (IEC) have been extensively studied for their role in the digestion and selective absorption of ingested food molecules. IEC produce cytokines that influence the differentiation of classical antigen presenting and other innate cells and subsequently, shape adaptive immune responses. These cells also express the receptor for polymeric immunoglobulins, which allows the transport of polymeric IgA across the epithelium and their secretion as secretory IgA antibodies in the lumen. However, the role of IEC in allergic responses remains poorly understood and it is unclear how specific signaling pathways in IEC affect allergic sensitization in the GI tract and influence allergic responses at distant mucosal sites such as the airways. Dr. Boyaka and colleagues will address the overall hypothesis that selected innate signaling pathway in IEC shape allergen-specific antibody isotype responses and promote IgA antibodies, which can prevent the development, or reduce the magnitude of allergic inflammation at distant sites. They propose to use genetically modified mice and pharmaceutical inhibitors of the selected innate signaling pathway to address how canonical and non-canonical NFκB signaling in intestinal epithelial cells regulate adaptive immune response during allergic sensitization and to establish mechanisms of protection against allergic inflammation by IgA and IgA-B cells.

• **National Institute of Allergy and Infectious Diseases grant awarded to Dr. Yasuko Rikihisa to study infectious entry mechanisms of and of an obligatory intracellular pathogen.** Dr. Rikihisa, Professor in the Department of Veterinary Biosciences has received a 5-year $1.93M grant from the National Institutes of Health to study infectious entry mechanisms of *Ehrlichia chaffeensis* (*Ech*). Human monocytic ehrlichiosis is an emerging tick-borne zoonosis caused by *Ech*, an obligatory intracellular bacterium. The essential virulence factor of *Ech* is its entry into human monocytes through the route permissive for its replication. To advance the basic understanding and permit development of new therapies, the long-term goal of the Rikihisa lab is to elucidate the mechanisms that mediate *Ech* infectious entry. Studies reveal that *Ech* uses EtpE (Entry triggering protein of *Ehrlichia*), a unique surface-exposed outer membrane protein to engage the human cell surface glycosylphosphatidylinositol-anchored protein DNase X, which induces its entry into host cells to establish prolific infection. How EtpE binding to DNase X triggers infectious *Ech* entry is unknown. Dr. Rikihisa has novel preliminary data indicating that CD147, hnRNP-K, and N-WASP interact with the EtpE-DNase X complex. They hypothesize that EtpE-DNase X binding anchors and activates N-WASP via CD147 and hnRNP-K to elicit spatio-temporal actin polymerization that drives *Ech* entry. This proposal aims to understand how EtpE binding to DNase X drives infectious *Ech* entry. If their exciting hypothesis is proven, EtpE would be the first bacterial molecule described to activate N-WASP through a unique protein complex for infectious entry. The identified pathways will provide a platform for developing new prophylactic and therapeutic strategies against *Ech*. 
• National Institute of Health Research Scientist Development Grant (K01) awarded to Dr. Joelle Fenger to dissect the role of microRNA-9 in normal and malignant mast cell biology. Dr. Fenger, Assistant Professor in the Department of Veterinary Clinical Sciences has received a 5-year $654,000 Career Development Award (Mentor: Dr. Cheryl London). Mast cells are key effector cells in a wide variety of physiological and pathological processes, including innate immune responses and allergic disorders, chronic inflammatory diseases such as cardiovascular disease and arthritis, and tumor progression. Activated mast cells secrete a diverse array of factors that mediate their roles in inflammation, immunity, and tissue remodeling. MicroRNAs (miRNAs) are small non-coding RNAs that regulate gene expression and their dysregulation is implicated in numerous pathologic conditions. Dr. Fenger has found that miR-9 over-expression was associated with aggressive, metastatic canine mast cell tumors, a well-established model of spontaneous malignant mast cell disease and forced high expression of miR-9 in normal and malignant mouse mast cells promoted invasion and enhanced the expression of CMA1, a mast cell-specific protease involved in tissue remodeling. Studies funded by this grant will ultimately result in a more complete understanding of the molecular mechanisms through which miR-9 regulates mast cell behavior both in vitro and in vivo, particularly as it relates to induction of the metastatic phenotype.

• Michelson Foundation grant awarded to Drs. Marco A. Coutinho da Silva and John Lannutti to study electrospun delivery to enhance the effectiveness of anti-fertility strategies. Dr. Coutinho da Silva, Associate Professor Clinical in the Department of Veterinary Clinical Sciences with his colleague Dr. John Lannutti (College of Engineering & Materials Science) have received a 4-year $426,000 grant from the Found Animal Foundation. Electrospun nanofibers strongly mimic the extracellular matrix in which cells normally reside. The ability of the structure to carry a drug ‘payload’ and the ease of biochemical ‘tuning’ provide distinct advantages in avoiding the foreign body response to enable controlled drug delivery. The goal of Dr. da Silva’s work is to develop an electrospun nanofiber delivery technology enabling long-term, controlled delivery of a GnRH agonist (and potentially other synthetic or biological compounds) to the subcutaneous or intramuscular environment resulting in prolonged suppression of reproduction in companion animals (periods longer than 5 years). The results from this study are likely to significantly benefit population control of stray animals in the US and abroad.

New Grant Awards and Contracts Received by CVM Principal Investigators

January 1, 2015 – December 31, 2015

<table>
<thead>
<tr>
<th>CVM PI</th>
<th>Team</th>
<th>Sponsor</th>
<th>Title</th>
<th>Award*</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boyaka, P. (VBS)</td>
<td>Cormet-Boyaka, E. (Co-PI)</td>
<td>NIH-NIDDK</td>
<td>Regulation of mucosal IgA and allergic inflammation by intestinal epithelial cells</td>
<td>$1,741,477</td>
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<tr>
<td>Cormet-Boyaka, E. (VBS)</td>
<td>Amer, A. (Co-PI)</td>
<td>NIH-NHLBI</td>
<td>The role of microRNA-calibrated autophagy in innate immunity and inflammation</td>
<td>$1,529,758</td>
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<td>Davis, Ia. (VBS)</td>
<td>American Heart</td>
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<td>Modulation of influenza pathogenesis by alterations in anion channel function</td>
<td>$154,000</td>
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<td>Davis, I. (VBS)</td>
<td>Cystic Fibrosis Fdn.</td>
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<td>Mechanisms underlying influenza-induced CF exacerbations</td>
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<td>London, C. (VBS/VCS)</td>
<td>Animal Clinical Invest.</td>
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<td>An exploratory study evaluating the safety and efficacy of RV1001, an isoform selective PI3K inhibitor, in dogs with T or B cell lymphoma</td>
<td>$100,000</td>
<td>10/15-10/17</td>
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<td>London, C. (VBS/VCS)</td>
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<td>Ex-vivo study to evaluate activity of LSN3213128 in canine lymphoma samples</td>
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<td>05/15-05/17</td>
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<td>Niewiesk, S. (VBS)</td>
<td>NIH sub from Weill Cornell</td>
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<td>Engineering protease-resistant A/B foldamer peptides for broad-spectrum</td>
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<tr>
<td>Name</td>
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<tr>
<td>Rikihisa, Y.</td>
<td>NIH-NIAID</td>
<td>Infectious entry mechanisms of obligatory intracellular pathogen</td>
<td>$1,925,000</td>
<td>11/15-10/20</td>
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<td>Wu, L.</td>
<td>NIH-NCI</td>
<td>HIV-1 Nef interactions with Nef-associated factor 1 contribute to viral latency</td>
<td>$600,000</td>
<td>08/15-07/18</td>
<td></td>
</tr>
<tr>
<td>Belknap, J.</td>
<td>USDA-NIFA</td>
<td>Insulin-related growth factor signaling is responsible for laminar failure in equine metabolic syndrome</td>
<td>$454,989</td>
<td>05/15-05/18</td>
<td></td>
</tr>
<tr>
<td>Bertone, A.</td>
<td>Arthro Dynamic Tech.</td>
<td>Effect of polyglycan treatment on lipopolysaccharide-challenged synovial cells in vitro</td>
<td>$39,427</td>
<td>02/15-02/16</td>
<td></td>
</tr>
<tr>
<td>Coutinho da Silva, M.</td>
<td>Found Animals Fdn.</td>
<td>Electrospun delivery to enhance the effectiveness of anti-fertility strategies</td>
<td>$409,327</td>
<td>01/15-12/18</td>
<td></td>
</tr>
<tr>
<td>Da Costa, R.</td>
<td>Gray Lady Fdn.</td>
<td>Finite element modeling of the cervical spine of Doberman Pinscher and Great Dane dogs</td>
<td>$22,056</td>
<td>05/15-04/16</td>
<td></td>
</tr>
<tr>
<td>Dyce, J.</td>
<td>Am. College of Veterinary Surgeons</td>
<td>Pharmacokinetics and pharmacodynamics of oral Tapentadol for the treatment of pain in dogs with clinical osteoarthritis</td>
<td>$10,000</td>
<td>04/15-04/16</td>
<td></td>
</tr>
<tr>
<td>Dyce, J.</td>
<td>AicheraBio</td>
<td>A randomized, placebo controlled, proof of concept study of the efficacy of LY3150053 and LY3300514 in the treatment of canine osteoarthritis pain</td>
<td>$79,870</td>
<td>08/15-08/16</td>
<td></td>
</tr>
<tr>
<td>Gilor, C.</td>
<td>Kindred Biosciences</td>
<td>Colony support and lease agreement</td>
<td>$73,984</td>
<td>09/15-08/17</td>
<td></td>
</tr>
<tr>
<td>Gilor, C.</td>
<td>Intervet/Schering-Plough</td>
<td>Determination of certain biomarkers such as glucagon, GLP-1, GIP, and insulin in the plasma samples collected from healthy cats administered with different doses of a glucagon receptor antagonist, MK-3577, for six months for Merck Animal Health.</td>
<td>$19,852</td>
<td>11/15-02/16</td>
<td></td>
</tr>
</tbody>
</table>
| Gemensky-
Metzler, A. | OH Animal Health Fdn.        | Objective evaluation of the systemic effects of topicaly applied 1% atropine in the horse | $10,000  | 04/15-12/15 |
<p>| Guiot, L.      | Sub from Univ. of Cambridge - VOS | Motion capture analysis of stifle joint kinematics following total knee replacement in dogs | $60,816  | 07/15-09/16 |
| Kisseberth, W. | Morris Animal Fdn.           | Targeting the B-cell receptor signaling pathway in canine lymphoma          | $125,803 | 01/15-12/16 |
| Lorch, G.      | ALK-Abello A/S               | Evaluation of allergenic extract intradermal threshold concentration variation in non-allergic dogs | $32,062  | 10/15-12/16 |
| Moore, S.      | Da Costa, R.                 | Diagnosing and managing neuropathic                                           | $21,498  | 05/15-      |</p>
<table>
<thead>
<tr>
<th>(VCS)</th>
<th>(VCS)</th>
<th>Fdn.</th>
<th>pain in dogs with spinal cord injury</th>
<th>04/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scansen, B. (VCS)</td>
<td>Am. College of Vet. Internal Med.</td>
<td>Right ventricular systolic function in dogs with myxomatous mitral valve disease</td>
<td>$8,469</td>
<td>01/15-01/17</td>
</tr>
<tr>
<td>Toribio, R. (VCS)</td>
<td>Grayson-Jockey Club</td>
<td>Steroid / neurosteroid dynamics in critically ill newborn foals</td>
<td>$101,518</td>
<td>04/15-03/17</td>
</tr>
<tr>
<td>Toribio, R. (VCS)</td>
<td>Morris Animal Fdn.</td>
<td>High dose ACTH stimulation test to assess adrenocortical function in critically ill foals</td>
<td>$5,000</td>
<td>05/15-08/15</td>
</tr>
<tr>
<td>Bas, S. (VPM)</td>
<td>OH Dairy Producers Assn.</td>
<td>Effect of metritis on physiological and behavioral responses in lactating dairy cows</td>
<td>$5,770</td>
<td>01/15-06/16</td>
</tr>
<tr>
<td>Bowman, A. (VPM)</td>
<td>OH Dept. of Health</td>
<td>Scenario based training of youth exhibitors to mitigate influenza A virus transmission at agricultural fairs</td>
<td>$20,000</td>
<td>04/15-12/15</td>
</tr>
<tr>
<td>Da Costa, L. (VPM)</td>
<td>OH Dairy Producers Assn.</td>
<td>Assessment of maternal welfare conditions in colostrum quality, neonatal health and survival</td>
<td>$4,880</td>
<td>02/15-01/16</td>
</tr>
<tr>
<td>Gebreyes, W. (VPM)</td>
<td>NIH-FIC</td>
<td>Bridging the gap in e-capacity for global health research and training in eastern Africa</td>
<td>$323,631</td>
<td>05/15-04/18</td>
</tr>
<tr>
<td>Habing, G. (VPM)</td>
<td>APHIS</td>
<td>Distribution, diversity, and antimicrobial resistance of Salmonella subtypes recovered from hatching shipment boxes</td>
<td>$44,321</td>
<td>02/15-02/16</td>
</tr>
<tr>
<td>Habing, G. (VPM)</td>
<td>APHIS</td>
<td>Antimicrobial use and resistance in food animals: Interpreting data from national animal health monitoring system (NAHMS) studies</td>
<td>$100,000</td>
<td>09/15-09/16</td>
</tr>
<tr>
<td>Hoet, A. (VPM)</td>
<td>World Org. for Animal Health</td>
<td>OIE veterinary education twinning project</td>
<td>$246,682</td>
<td>06/15-05/18</td>
</tr>
<tr>
<td>O’Quin, J. (VPM)</td>
<td>Univ. FL</td>
<td>Impact of heat treatment on regional prevalence of <em>Dirofilaria immitis</em> antigen detection in shelter dogs</td>
<td>$5,000</td>
<td>05/15-05/16</td>
</tr>
<tr>
<td>Proudfoot, K. (VPM)</td>
<td>USDA-NIFA</td>
<td>Living up to her potential: Increasing dairy cow productivity and welfare using an improved understanding of sleep</td>
<td>$100,000</td>
<td>09/15-08/16</td>
</tr>
</tbody>
</table>

Research expenditures as a metric are used to track actual research activity; monies expended result in the distribution of the associated Facilities and Administrative (F&A) monies to the College. Below is a table showing CY2015 research expenditures from extramurally awarded grants and contracts, and F&A recovery. Five-year trends are shown in subsequent graphs and tables. The current federally negotiated F&A rate is 54%; lower F&A rates result from awards from agencies that provide little to no F&A (common with Foundations and NIH training grants) and clinical trials (uses a 26% F&A rate).

<table>
<thead>
<tr>
<th>Department</th>
<th>Total Expenditures (MTDC)</th>
<th>F&amp;A Recovery*($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veterinary Medicine Administration</td>
<td>$ 94,946 ($ 56,808)</td>
<td>66.5% ($ 37,754)</td>
</tr>
<tr>
<td>Veterinary Biosciences</td>
<td>$5,457,935 ($3,262,504)</td>
<td>46.6% ($1,520,407)</td>
</tr>
<tr>
<td>Veterinary Clinical Sciences</td>
<td>$1,359,261 ($1,125,295)</td>
<td>18.7% ($210,348)</td>
</tr>
<tr>
<td>Veterinary Preventive Medicine</td>
<td>$2,097,210 ($1,508,975)</td>
<td>34.5% ($520,402)</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$9,009,352 ($5,953,582)</strong></td>
<td><strong>38.4% ($2,288,911)</strong></td>
</tr>
</tbody>
</table>

*Modified Total Direct base used for calculation of F&A recovery (e.g., excludes equipment and tuition); our current federal rate is 54%.

Summary of CVM Research: By the Numbers

Below are data showing various aspects of the CVM research enterprise as 3-to-5-year trends to be informative. Data were compiled from the eActivity (http://osp.osu.edu/resources/etools/) databases.

In a snapshot:

<table>
<thead>
<tr>
<th>College of Veterinary Medicine</th>
<th># of Proposals Submitted</th>
<th># of Funded Projects (Active Projects)</th>
<th>Total Awards (New and Continuing)</th>
<th>Total Expenditures</th>
<th>F&amp;A Recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>166</td>
<td>77</td>
<td>$8,093,672</td>
<td>$8,177,966</td>
<td>$1,884,805</td>
</tr>
<tr>
<td>2012</td>
<td>140</td>
<td>83</td>
<td>$8,397,300</td>
<td>$7,974,811</td>
<td>$1,815,256</td>
</tr>
<tr>
<td>2013</td>
<td>149</td>
<td>96</td>
<td>$9,167,215</td>
<td>$8,797,024</td>
<td>$2,203,997</td>
</tr>
<tr>
<td>2014</td>
<td>178</td>
<td>114</td>
<td>$8,343,499</td>
<td>$8,814,948</td>
<td>$2,322,552</td>
</tr>
<tr>
<td>2015</td>
<td>143</td>
<td>95</td>
<td>$8,734,527</td>
<td>$9,009,352</td>
<td>$2,288,911</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>College of Veterinary Medicine VPM - FAHRP</th>
<th># of Proposals Submitted</th>
<th># of Funded Projects (Active Projects)</th>
<th>Total Awards (New and Continuing)</th>
<th>Total Expenditures</th>
<th>F&amp;A Recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>40</td>
<td>38</td>
<td>$1,809,245</td>
<td>$1,962,535</td>
<td>$447,748</td>
</tr>
<tr>
<td>2012</td>
<td>13</td>
<td>42</td>
<td>$3,905,800</td>
<td>$2,185,535</td>
<td>$491,399</td>
</tr>
<tr>
<td>2013</td>
<td>32</td>
<td>34</td>
<td>$4,386,334</td>
<td>$2,847,589</td>
<td>$566,858</td>
</tr>
<tr>
<td>2014</td>
<td>41</td>
<td>40</td>
<td>$2,838,084</td>
<td>$2,953,507</td>
<td>$696,475</td>
</tr>
<tr>
<td>2015</td>
<td>28</td>
<td>36</td>
<td>$2,876,566</td>
<td>$3,000,001</td>
<td>$686,389</td>
</tr>
</tbody>
</table>


Positive trends: Numbers of active projects in the College no longer include projects funded by Residual Funds (administration of Residual Funds was turned over to internal College financial administration in May 2015); therefore, the number of active projects is likely greater than presented here. Total expenditures were the highest in this 5-year period and the F&A recovery was very close to last year’s value (2nd highest), mainly due to the awarding of several 5-year NIH grants.
**Trends to monitor:** There were 20% fewer grant proposals submitted from the College in 2015; size and duration of awards are smaller. Investigators have had more success with the R21 NIH grants and there has been a distinct shift (as noted in data presented below) away from federal funds to funding from foundations and industry (which are generally smaller, shorter-term awards).

**Intramural Research Grants and Funds Dispersed in 2015**

Barber Funds dispensed = $118,810  
Canine Funds = $141,479  
College Match to various Grants and Projects = $28,000

**Personnel Support from Extramural Grants and Contracts 2015**

The table below shows the amount of salary, off-duty pay, and stipend support that comes directly from grants and contracts to contribute to off-duty salary for 9-month faculty, employ research personnel, and provide stipends for graduate students in the College. **$2,393,178**

<table>
<thead>
<tr>
<th>Dept.</th>
<th>Faculty</th>
<th>Staff</th>
<th>GRAs and Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCS</td>
<td>$ 56,954</td>
<td>$ 154,842</td>
<td>$ 12,331</td>
</tr>
<tr>
<td>VBS</td>
<td>$ 270,654</td>
<td>$ 985,129</td>
<td>$ 332,565</td>
</tr>
<tr>
<td>VPM</td>
<td>$ 88,717</td>
<td>$ 354,935</td>
<td>$ 237,051</td>
</tr>
<tr>
<td>Total</td>
<td>$ 416,325</td>
<td>$1,494,906</td>
<td>$ 481,947</td>
</tr>
</tbody>
</table>

Faculty: Off-duty and direct pay; Staff: salary support; Students and Grad Associates: stipend/salary and benefits support

**2015 Top Research Programs Based on Extramural Grant Expenditures and Indirect Cost Recovery**

Data are according to expenditures because they represent actual activity on a grant. eActivity captures and apportions expenditures based on the stated F&A allocation to CVM.

<table>
<thead>
<tr>
<th></th>
<th>As PI</th>
<th>As Co-I*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>direct</td>
<td>indirect</td>
</tr>
<tr>
<td>Bowman, Andrew</td>
<td>$664,829</td>
<td>$316,635</td>
</tr>
<tr>
<td>Li, Jianrong</td>
<td>$577,849</td>
<td>$192,681</td>
</tr>
<tr>
<td>Green, Patrick</td>
<td>$580,079</td>
<td>$231,036</td>
</tr>
<tr>
<td>Wu, Li</td>
<td>$403,333</td>
<td>$212,413</td>
</tr>
<tr>
<td>Niewiesk, Stefan</td>
<td>$381,153</td>
<td>$193,933</td>
</tr>
<tr>
<td>London, Cheryl</td>
<td>$405,184</td>
<td>$89,217</td>
</tr>
<tr>
<td>Rikihisa, Yasuko</td>
<td>$320,038</td>
<td>$166,506</td>
</tr>
<tr>
<td>Rosol, Thomas</td>
<td>$213,250</td>
<td>$57,789</td>
</tr>
<tr>
<td>Davis, Ian</td>
<td>$214,845</td>
<td>$97,367</td>
</tr>
<tr>
<td>Garabed, Rebecca</td>
<td>$222,109</td>
<td>$30,400</td>
</tr>
</tbody>
</table>

PI portal search: query-expenditures-investigator-CVM  
Calendar year (1/1/15-12/31/15)  
Current as of 1/29/2016  
*CVM allocated $s expended by faculty as Co-I (PIs outside CVM)
Faculty Salary & Benefits Recovery (Release time) from Extramural Sources in 2015

Faculty salary and benefits recovery (historically referred to as release time) comes back to the College and by policy in 2015 has been split with 60% going to the investigator for reserve and reinvestment funds and 35% and 5% going to Department and College, respectively, for reinvestment.

<table>
<thead>
<tr>
<th>By Department</th>
<th>Total $s Recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBS</td>
<td>$415,087</td>
</tr>
<tr>
<td>VPM</td>
<td>$179,698</td>
</tr>
<tr>
<td>VCS</td>
<td>$137,906</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>By Investigator</th>
<th>Total $s Recovered</th>
<th>Total $s Recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green, Patrick</td>
<td>$102,337</td>
<td>Davis, Ian</td>
</tr>
<tr>
<td>Bowman, Andrew</td>
<td>$93,585</td>
<td>El Gazzar, Mo</td>
</tr>
<tr>
<td>Fenger, Joelle</td>
<td>$73,280</td>
<td>Lorch, Gwendolen</td>
</tr>
<tr>
<td>London, Cheryl</td>
<td>$52,970</td>
<td>Gilor, Gilor</td>
</tr>
<tr>
<td>Niewiesk, Stefan</td>
<td>$52,720</td>
<td>Toribio, Ramiro</td>
</tr>
<tr>
<td>Wu, Li</td>
<td>$43,423</td>
<td>Gebreyes, Wondwosse</td>
</tr>
<tr>
<td>Bolon, Brad</td>
<td>$39,611</td>
<td>Daniels, Josh</td>
</tr>
<tr>
<td>Wittum, Thomas</td>
<td>$37,015</td>
<td>Rosol, Thomas</td>
</tr>
<tr>
<td>Rikihisa, Yasuko</td>
<td>$27,635</td>
<td>Dyce, Jon</td>
</tr>
<tr>
<td>La Perle, Krista</td>
<td>$25,524</td>
<td>Brokken, Matthew</td>
</tr>
<tr>
<td>Li, Jianrong</td>
<td>$20,261</td>
<td>Bergdall, Valerie</td>
</tr>
<tr>
<td>da Silva, Marco</td>
<td>$19,524</td>
<td>Stull, Jason</td>
</tr>
<tr>
<td>Cormet-Boyaka, Estelle</td>
<td>$17,605</td>
<td>Drost, Tod</td>
</tr>
<tr>
<td>Boyaka, Prosper</td>
<td>$15,272</td>
<td>Byron, Julie</td>
</tr>
<tr>
<td>Wolfe, Barbara</td>
<td>$15,209</td>
<td>Oglesbee, Michael</td>
</tr>
<tr>
<td>Schuenemann, Gustavo</td>
<td>$14,655</td>
<td>Lakritz, Jeff</td>
</tr>
<tr>
<td>Belknap, James</td>
<td>$12,879</td>
<td>Proudfoot, Kathryn</td>
</tr>
</tbody>
</table>
Expenditures – 5-Yr Trends

Summary: While overall grant expenditures for 2015 was the highest of the past 5 years, the breakdown by department revealed small declines in expenditures by VBS and VCS that were balanced by an increase in VPM. Over this 5-year period, average CVM expenditures were $8,554,820 with a variation between 5.3% and 6.7% from this mean in any year. This finding suggests that the current trends will continue unless more substantive changes in strategy are realized (increased collaborative activity, better infrastructure to support large grant proposals, hiring additional research-intensive faculty, etc.).
The following graphs break out extramural awards and expenditures according to Sponsor.

**CVM Awards by Sponsor 2013 – 2015 (3-Yr trend)**

- **2013**
  - NIH 63.0%
  - USDA 12.2%
  - NSF 2.7%
  - DOD 0.0%
  - Private 10.3%
  - Industry 11.8%

- **2014**
  - NIH 53.0%
  - USDA 2.2%
  - NSF 2.6%
  - DOD 1.5%
  - Private 28.1%
  - Industry 12.4%

- **2015**
  - NIH 65.6%
  - USDA 9.8%
  - NSF 0.2%
  - DOD 0.2%
  - Private 11.2%
  - Industry 10.7%

The National Institutes of Health is still the largest funder of CVM research programs (65.6%): This past year, several investigators were awarded NIH R01 grants (5-yrs, $1M+).

**CVM Expenditures by Sponsor 2013 – 2015 (3-Yr trend)**

- **2013**
  - NIH 69.2%
  - USDA 8.0%
  - NSF 3.0%
  - DOD 0.4%
  - Private 7.9%
  - Industry 9.7%
  - Other 1.8%

- **2014**
  - NIH 52.1%
  - USDA 10.6%
  - NSF 2.3%
  - DOD 0.2%
  - Private 19.1%
  - Industry 14.9%
  - Other 0.8%

- **2015**
  - NIH 58.9%
  - USDA 16.2%
  - NSF 2.5%
  - DOD 0.6%
  - Private 7.4%
  - Industry 9.6%
  - Other 4.8%

As a whole, the diversity in awards and expenditures reflect the breadth of research areas clustered within departments. Expenditures from Federal Sponsors are between \( \frac{3}{4} \) and \( \frac{1}{2} \) of total college expenditures.
Breakdown of expenditures according to Sponsor by Department 2013 - 2015

**VBS:** Primary funding for this department is from NIH; several investigators were awarded R01 grants as opposed to R21 grants in 2015. Support from industry contracts has remained stable.

**VPM:** The funding portfolio in VPM is much broader than for VBS or VCS. In 2015, NIH, USDA, and Other (US Fish and Wildlife, OH Sea Grant, State Cooperative Epidemiologists, State of Ohio, etc.) provided the main sources of funds to VPM investigators. VPM investigators are the least likely in the College to seek Industry funding.
VCS: Industry contracts are the main source of funding for VCS investigators; in 2015, sponsorship by Industry was just eclipsed by funding from private sponsors (Foundations). This trend also influences F&A recovery because Foundations typically do not allow F&A recovery.
2015 CVM Peer-Reviewed Publications and Book Chapters
(Information compiled and provided by Department Chairs from Annual Review Documents)

Aarnes, Turi


Balakrishnan, Anusha


Bas, Santiago


Bednarski, Richard


Belknap, James


**Bergdall, Valerie**

Lewis SD, Hickman-Davis JM, **Bergdall VK**. Institutional Animal Care and Use Committee Considerations Regarding the Use of Virus-Induced Carcinogenesis and Oncolytic Viral Models. ILAR J. 2016;57(1):86-94.


**Bertone, Alicia**


Juan E. Santiago-Torres, Rebecca Lovasz, **Alicia L. Bertone**. Fetal vs Adult mesenchymal stem cells achieve greater gene expression, but less osteoinduction. World J Stem Cells, 2015 January 26;7(1):223-234. Published online 2015 January


**Bonagura, John**


Hitchcock LS, **Bonagura JD**: "Atrioventricular Valvular Stenosis" in Tilley LP & Smith FS (eds): The 5 Minute Veterinary Consult (6th ed), Baltimore, Williams & Wilkins; 2015, p158.


**Bond, Randall**


**Bowman, Andrew**


**Boyaka, Prosper**


Brokken, Matthew


Brown, Megan


Burns, Teresa


Byron, Julie


Cianciolo, Rachael


Coble, Dondrae


Cole, Lynette

Cole,Lynette,K; Samii,Valerie,F; Wagner,Susan,O; Rajala-Schultz,Paeivi,J, "Diagnosis of primary secretory otitis media in the cavalier King Charles spaniel". Veterinary Dermatology. Vol. 26, no. 6: 459-?. 2015.


Hnot,Melanie,L; Cole,Lynette,K; Lorch,Gwendolen; Papich,Mark,G; Rajala-Schultz,Paivi,J; Daniels,Joshua,B, "Evaluation of canine-specific minocycline and doxycycline susceptibility breakpoints for meticillin-resistant Staphylococcus pseudintermedius isolates from dogs". Veterinary Dermatology. Vol. 26, no. 5: 334. 2015.

Cook, Laurie


Cooper, Edward


Cormet-Boyaka, Estelle


da Costa, Luciana


da Costa, Ronaldo


Davis, Ian


Dennis, Pam


Schook, Mandi, W; Wildt, David, E; Raghanti, Mary, Ann; Wolfe, Barbara, A; Dennis, Patricia, M, "Increased inflammation and decreased insulin sensitivity indicate metabolic disturbances in zoo-managed compared to free-ranging black rhinoceros (Diceros bicornis)." General and Comparative Endocrinology. Vol. 217-218, 10-19. 2015.


Diaz Vergara, Sandra


Drost, Tod


Drost, WT, "I have an ultrasound machine-how do I aspirate stuff?". Veterinary Medicine. Vol. 110, no. 6: 152. 2015.

Dyce, Jon


Fenger, Joelle


Freed, Carrie


Garabed, Rebecca


Gardner, Alison

**Gebreyes, Wondwossen**


**Gilor, Chen**


Gordon, Eric


Green, Patrick


Guillaumin, Julien


Habing, Greg


Hickman-Davis, Judy

Lewis, Stephanie D., Hickman-Davis, Judy M. and Bergdall, Valerie K. 2015. IACUC Considerations Regarding the Use of Viral-Induced Carcinogenesis and Oncolytic Viral Models. Accepted December 2015. *Institute for Laboratory Animal Research Journal.*

Ham, Kathleen


Hill, Lawrence


Hoet, Armondo


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Jackwood, Daral


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