

# Fisher FOCUS



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News from the Sherrilyn and Ken Fisher Center for Environmental Infectious Diseases

## Space Renovation Completed



Investigators and research staff within university settings often must labor within office space that is constrained or not well-designed. This renovation provides infectious diseases faculty with seven new offices and 27 spacious, work space cubicles oriented to foster a collaborative space. The teleconference center provides users with the ability to connect with colleagues locally and across the globe.

Project management was provided by Pamela Guevarra-Johnson. The Fisher Center occupants are truly grateful for the opportunity to work in a modern, well-designed facility, made possible by the extraordinary generosity of Sherrilyn and Ken Fisher.

*Photos courtesy of Cho Benn Holback + Associates.*

Approximately 6,000 square feet of former anatomy labs, classrooms and offices have given way to newly renovated research space for the Sherrilyn and Ken Fisher Center for Environmental Infectious Diseases. The Center is located on the second floor of the Pre-Clinical Teaching Building on the East Baltimore Campus of Johns Hopkins University. Personnel moved into the area

in September 2013, immediately enjoying the new office and teleconference facilities. Center personnel have expressed much satisfaction with the renovations designed by the award-winning architectural firm of Cho Benn Holback + Associates. Using bright colors of lime green and cobalt blue, the Center was designed to be an open, contemporary office environment.



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### Mission Statement

The Sherrilyn and Ken Fisher Center for Environmental Infectious Diseases is dedicated to the clinical research of environmental pathogens which improves the diagnosis and treatment of these infections.



## A word from our Director Paul Auwaerter, M.D., M.B.A.

Clinical Director, Division of Infectious Diseases

A brief media splash arose this past August when the Centers for Disease Control (CDC) issued a press release suggesting that more than 300,000 cases of Lyme disease occur annually in the United States. Although these are at best indirect numbers ascertained from insurance billing data, it does point to the fact that the number of reported cases (20,000-30,000 annually) is perhaps only 10% of actual. Most public health officials are not surprised at this discrepancy since underreporting is well known to occur with all notifiable infectious diseases. Though this study has not yet been published, other evidence also suggests that over the last two decades, *Borrelia burgdorferi* has widened its geographic range beyond the traditional boundaries of New England, the Mid-Atlantic and upper Midwest United States. These numbers give a different luster to what is already the most common vector-borne infection in North America.

What these figures do not purport is that these are untreated cases of Lyme disease in the numbers discussed, which has been a common misinterpretation of the CDC information by some journalists. Yet, even though Lyme

disease remains a mostly regional infection as contrasted to a respiratory infection such as influenza, it does speak to a clearly credible need to improve efforts at prevention.

Given the complex life cycle of the bacteria *Borrelia burgdorferi* that includes not only ticks but mice, deer, birds among other animals with humans as an inadvertent host--there are many potential scenarios that could be explored. Efforts to decrease infection acquired in the outdoors have been examined including a home yard application with a pesticide (also known as an acaricide in this case, commercially available granular deltamethrin) compared to sham, but this innovative study failed to show impact at decreasing human infection. Clever deer feeding stations that force the animals to rub past acaricide-impregnated rollers do decrease tick numbers, but no one knows how this translates to impact upon Lyme disease. Even such universal, common-sense recommendations regarding personal tick inspections, use of DEET or other tick repellants clearly are insufficient to solely staunch the numbers of infection.

Protection through immunization is

the most logical choice, and an FDA-approved vaccine (LYMERix) was available from 1998-2002. This agent did protect by about two-thirds, but the manufacturer withdrew the vaccine due to poor sales following allegations of safety concerns. There are a number of new, candidate vaccine approaches that industry or academic investigators are researching, though it's unclear if the hurdles including efficacy, regulatory and economic will be overcome.

With vaccination a distant goal, accurate identification and treatment remains a cornerstone. Some approaches currently under investigation with the support of the Fisher Center including Dr. Megan Reller's development of a multiplex PCR to examine a number of tick-borne infections as well as collaboration with Dr. Ying Zhang and colleagues in the Bloomberg School of Public Health to investigate whether diagnostics based on T-cell assays may be more sensitive in detecting early Lyme disease than current antibody testing. Improved approaches to Lyme disease have been relatively slow in coming but this is not unique with bacterial infections generally despite modern innovations.

## Fisher Center Discovery Program 2014 Awards

The second grant cycle of the **Fisher Center Discovery Program (FCDP)** yielded 16 submissions focusing on clinical or translational research related to environmental infectious diseases. The Fisher Center Discovery Program Board, composed of five senior JHU faculty members, reviewed each application resulting in six proposals receiving financial support ranging from \$30,000 to \$50,000. These funds will permit JHU faculty members to engage in pilot research or research that may lack traditional funding mechanisms.

An event to honor the 2014 FCDP awardees was held December 16, 2013 in the newly renovated Fisher Center on the main JHU School of Medicine campus in East Baltimore. The event let awardees, Board members, and Fisher Center staff to meet and mingle in an informal setting. The Fisher Center is pleased to offer these grants which may assist with career development of young JHU faculty.



L to R: Nicole Parrish, Ph.D., Pranita Tamma, M.D., Meghan Davis, D.V.M., Priya Duggal, Ph.D., Elizabeth Matsui, M.D., Mark Soloski, Ph.D., Paul Auwaerter, M.D., Christine Marie George, Ph.D.

# 2014 FCDP Award Recipients



**Elizabeth Matsui, M.D., M.H.S.**  
Associate Professor, School of Medicine,  
Division of Pediatric Allergy/Immunology

**Meghan Davis, D.V.M., M.P.H., Ph.D.**  
Fellow, Bloomberg School of Public Health,  
Department of Environmental Health Sciences  
*Home Environmental Exposure to Staphylococcal Bacteria and Asthma Exacerbation*

The bacterium *Staphylococcus aureus* can cause allergic inflammatory responses through production of staphylococcal enterotoxins, which are superantigens. It is unknown whether the presence of *S. aureus* in the environment stimulates an immune response or respiratory inflammation in people. We will study the homes and health of children and adults who have asthma to assess if superantigen-producing staphylococci are common in the homes of asthmatics and if the presence of these bacteria are associated with symptoms of asthma. This research has the potential to change clinical approaches, perhaps through targeted home environmental interventions, to improve health.



**Mark Soloski, Ph.D.**  
Professor, School of Medicine, Department of Medicine, Division of Rheumatology

*T Cell Effector Responses in Tick Borne Lyme Borreliosis*

Lyme disease is an inflammatory process initiated by infection with the tick-borne bacteria *Borrelia burgdorferi*. We do not understand why people respond differently to this infection nor do we have a good understanding of all the immune factors that are essential for complete recovery. Lyme disease is increasing in incidence and spreading geographically in the Mid-Atlantic and North East region. The CDC now estimates that there are over 300,000 new cases each year making Lyme disease the leading vector borne disease in the US. Our hypothesis is that individual differences in the immune response to the infection is an important factor in how patients recover and this is the focus of our proposed study.



**Nicole Parrish, Ph.D.**  
Assistant Professor, School of Medicine, Department of Pathology, Medical Microbiology

*Characterization of  $\beta$ -lactam Resistance in Enterobacteriaceae Isolated from the Chesapeake Bay and Upper Watershed*

Previously a pilot study of 10 carefully selected sites in the Chesapeake Bay and upper tributaries was conducted to survey bacterial populations and identify antibiotic resistance. Preliminary results suggested that significant bacterial resistance was present not only in the Bay but also in the associated watershed. The study will focus on identifying resistant bacteria and the genetic determinants of resistance. Data from these efforts will further our understanding of the dissemination of antibiotic resistance as well as identify potential impacts from agriculture and industry. Understanding the dissemination of antibiotic resistance in the Chesapeake Bay and watershed is vital for identifying potential impacts on public health and interconnected ecosystems.



**Christine Marie George, Ph.D.**  
Assistant Professor, Bloomberg School of Public Health, Department of International Health

*Identifying Environmental Transmission Routes for Shigellosis in Rural Settings using Pulsed-field Gel Electrophoresis*

Worldwide there are estimated to be 164.7 million episodes of shigellosis per year (14,000 annually in the US) with the greatest disease burden in children under 5 years of age. Alarming a recent study in rural Bangladesh found that 10% of drinking wells sampled had *Shigella* bacteria present. The primary aim of this prospective cohort study is to conduct evaluation of environmental transmission of the *Shigella* using Pulsed field gel Electrophoresis to determine if groundwater is a transmission route for *shigella* infection in humans. Through this study in rural Bangladesh interventions will be developed to reduce diarrhea morbidity and mortality in children under 5 years of age.



**Priya Duggal, Ph.D., M.P.H.**  
Associate Professor, Bloomberg School of Public Health, Department of Epidemiology

*Host Genetic Susceptibility to Cryptosporidia Infection*

Worldwide cryptosporidiosis is a rapidly emerging infectious disease caused by parasites transmitted through contaminated food and water and leads to acute and chronic diarrhea. Cryptosporidia is highly infective and is resistant to water treatment making it difficult to prevent. In developing countries, children are often the ones most severely infected. The chronic diarrhea in young children often leads to a cycle of malnutrition and additional infections that prevent a child from properly maturing and may affect growth and cognition. This research will identify genetic factors that may make a child more susceptible or more resistant to infection. Determining why there are differences in our response to the same pathogen may help us to improve treatment and develop vaccines.



**Pranita Tamma, M.D., M.H.S.**  
Assistant Professor, School of Medicine, Department of Medicine, Pediatric Infectious Diseases

*An evidence-based screening approach to identify children at high risk for harboring multi-drug resistant Gram-negative organisms in the PICU*

Although antibiotics have saved countless lives, their use is not benign and can result in the emergence of multi-drug resistant organisms. Children who develop infections with these organisms have very poor outcomes because there are no available antibiotics to treat their infections. Once introduced into the hospital environment these organisms can spread rapidly from patient to patient. We are proposing to develop and validate an easy to use decision tree to determine which children are at risk for carrying these organisms. Once developed, we are hoping to disseminate our decision tree to institutions across the country.

## Hopkins Links

Online Referral Directory  
Find a Hopkins physician  
[www.hopkinsmedicine.org/doctors](http://www.hopkinsmedicine.org/doctors)

Johns Hopkins USA  
Residents from outside of Maryland  
1-800-695-4872  
[www.hopkinsmedicine.org/usa](http://www.hopkinsmedicine.org/usa)

Johns Hopkins Medicine International  
From outside the United States and  
for non-English speaking residents  
1-410-502-7683  
[www.hopkinsmedicine.org/international](http://www.hopkinsmedicine.org/international)

Johns Hopkins Division of Infectious Diseases  
[www.hopkinsmedicine.org/medicine/id/](http://www.hopkinsmedicine.org/medicine/id/)

Johns Hopkins Infectious Diseases Outpatient Clinics  
Green Spring Station:  
410-583-2727 general information  
410-583-2888 appointments  
Bayview Medical Center:  
410-550-0100  
HIV Moore Clinic  
410-955-1725  
Viral Hepatitis Center  
410-583-2736

## Presentations and Conferences

*Propionibacterium acnes* Prosthetic Joint Infections 2000-2012: Potential Role of Nonoperative Management was presented as a poster by **Damani Piggott, MD, PhD** at the Infectious Diseases Society of America (IDSA), ID Week, October 4, 2013 in San Francisco, CA.

West Nile Virus and Other Arbovirus Infections presented by **Paul Auwaerter, MD, MBA** at the 8th Infectious Diseases Update for Primary Care and Hospital Medicine, October 24-25, 2013. The event was hosted by Johns Hopkins in Baltimore, Maryland.

**Paul Auwaerter, MD, MBA** lectured on Lyme disease by invitation for the Tick-Borne Disease Symposium December 5, 2013 in Gainesville, Florida. The event was hosted by the University of Florida, Emerging Pathogens Institute.

The Mid-Atlantic Tick Summit was held January 23, 2014 in Laurel, Maryland. **Paul Auwaerter, MD, MBA** presented preliminary findings of a large retrospective study of Lyme disease consultations at Johns Hopkins.

On February 10, 2014 **Paul Auwaerter, MD, MBA** presented *Lyme Disease: A Permeable Border into the SE US?* at the CDC-sponsored meeting Vectorborne Infections in the Southeastern US, 2013 at the North Carolina Biotechnology Center in Durham, NC.

## Recent Publications

*A Systematic Review of Borrelia burgdorferi Morphologic Variants Does Not Support a Role in Chronic Lyme Disease*, authored by Drs. Paul Lantos, **Paul Auwaerter**, and Gary Wormser. Published January 2, 2014 in *Clinical Infectious Diseases*.

*Antibiotics in Animals: Now Harder to Get*, published December 26, 2013 on the web at <http://www.medscape.com/viewarticle/818173>. Author **Paul G. Auwaerter, MD** says it is too early to know whether the FDA voluntary phase-out of antibiotics in animals will make a real difference.

## Fisher Focus

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