

# FOCUS ON FELLOWS 2013

Emerging Infectious Diseases Laboratory Fellowship



# 2013

## FOCUS ON FELLOWS

“This program allowed me to expand upon my previous research experience and gave me opportunities to learn new skills in and outside of the laboratory. My previous experience was in an academic research environment, but this program has allowed me to work on public health applied research projects.”

- Kathy Seiber, Class 16 Training Fellow, CDC Division of Foodborne, Waterborne & Environmental Disease, currently participating in CDC Public Health Prevention Services (PHPS)

“The EID Fellowship was an invaluable experience that provided me with the foundation needed for a successful career in public health. The fellowship not only expanded my knowledge of local, state and federal public health infrastructure, but also provided me with the appropriate skills needed to work in the field.”

- Brenda Saldivar, Class 8 Training Fellow, State Hygienic Laboratory at the University of Iowa

“This program exceeded my training and research objectives. I was able to learn many new skills and get a sense of the inner workings of a public health laboratory, as well as work on an individual project that was extremely interesting. I did not expect to learn as much as I did nor have the opportunity to work on an outbreak investigation. I got to present a poster at a national conference, and interact with professionals at all levels of public health.”

- Margot Stuchin, Class 17 Training Fellow, Colorado Department of Public Health and Environment

“My favorite part of the fellowship was being able to test samples that were collected from around the state, if a pathogen was isolated I was then able to perform the molecular subtyping and see if the pathogens isolated from the food samples were connected to human cases. It was very rewarding to feel as though I was making a contribution to public health and possibly preventing foodborne illnesses by connecting a food source to a group of illnesses or even an outbreak.”

- Jade Braman, Class 17 Training Fellow, New York State Department of Agriculture & Markets currently a laboratory scientist at the Ohio Department of Health

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The **Emerging Infectious Diseases (EID) Laboratory Fellowship Programs** train and prepare scientists for careers in public health laboratories and support public health initiatives related to infectious diseases. The **Centers for Disease Control and Prevention (CDC)** and the **Association of Public Health Laboratories (APHL)** are pleased to present the 2013 EID Fellows associated with the Emerging Infectious Diseases (EID) Laboratory Fellowship.

### **EID Advanced Laboratory Training Fellowship**

This is a one-year program designed for bachelor's and master's level scientists, with emphasis on the practical application of technologies, methodologies, and practices related to emerging infectious diseases. Fellows participate in an orientation session at CDC in Atlanta to gain a general understanding of the public health laboratory system and how it relates to infectious disease surveillance, prevention, research, and control. Fellows are placed in local, state, and federal (CDC) public health laboratories and receive advanced infectious disease laboratory-related training. The training is customized for each fellow based upon areas of infectious disease interest, high priority laboratory personnel needs, and host laboratory capabilities.

A specific objective-based curriculum is developed for each fellow focusing on areas such as: vaccine-preventable diseases, drug-resistant pathogens, molecular methods, vector-borne or zoonotic diseases, foodborne and waterborne illnesses, sexually transmitted diseases, imported infections, computer and systems support, applications of vector or animal control, and diagnostic testing methods and instrumentation.

### **EID Postdoctoral Laboratory Research Fellowship**

This is a two-year program designed for doctoral level (PhD, MD, or DVM) scientists with an emphasis on research of infectious diseases. Fellows participate in an orientation session at CDC in Atlanta to gain a general understanding of the public health laboratory system and how it relates to infectious disease surveillance, prevention, research, and control. Fellows are placed in local, state, and federal (CDC) public health laboratories to conduct approved research. Fellows conduct applied research in areas relevant to public health including, but not limited to, development and evaluation of diagnostic and subtyping techniques, antimicrobial sensitivity and assessment of mechanisms of resistance, principles of vector or animal control, and improved methodologies for environmental sampling, testing, and evaluation.

For more information about the EID Laboratory Fellowship Programs, see [www.aphl.org/fellowships](http://www.aphl.org/fellowships) or email [fellowships@aphl.org](mailto:fellowships@aphl.org).

## About APHL

The **Association of Public Health Laboratories (APHL)** is a national nonprofit dedicated to working with its members to strengthen governmental laboratories with a public health mandate. APHL's mission is "To promote the role of public health laboratories in shaping national and global health objectives, and to promote policies, programs and technologies that assure continuous improvement in the quality of laboratory practice and health outcomes."

APHL's core membership is comprised of public health, environmental and agricultural laboratories. Representatives from federal agencies, nonprofit organizations, corporations and interested individuals also participate in the association. APHL is a nonprofit, 501(c)(3) organization with a history of more than 50 years.

APHL works collaboratively with a diverse array of national, international, public and private partners to formulate and advocate for sound public health and environmental policies. APHL offers training and fellowship programs designed to prepare future leaders in public health laboratory practice. APHL is recognized nationally and internationally for excellence in cost-effective training and continuing education programs offered through its National Laboratory Training Network, a collaborative effort with the CDC.



## About CDC

The **Centers for Disease Control and Prevention (CDC)**, located in Atlanta, Georgia, is an agency of the US Department of Health and Human Services. It promotes health and quality of life by preventing and controlling disease, injury, and disability.

CDC's mission is "To collaborate to create the expertise, information, and tools that people and communities need to protect their health—through health promotion, prevention of disease, injury and disability, and preparedness for new health threats."



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# EID Laboratory Training Fellows



**Sarah Anderson**

**Highest Degree:** BS, Biology, University of North Carolina, Chapel Hill, NC

**Host Laboratory:** Wadsworth Center, New York State Department of Health, Albany, NY

**Primary Mentor:** Kimberlee Musser, PhD

**Fellowship Project:** I plan to carry out three 4-month rotations during my fellowship year. For my first project, I am developing a pyrosequencing assay to detect mutations associated with resistance to the drug ofloxacin in *Mycobacterium tuberculosis*. Pyrosequencing is a high-throughput sequencing method that generates short sequences in less than two hours. If successful, this assay will be used to detect drug resistance in patient samples in two days, rather than the several weeks needed for conventional testing.

**Future Plans:** *“Following completion of my fellowship year, I plan to enroll in a microbiology PhD program and pursue a career in infectious disease research. I hope to continue performing research with clinical and public health relevance.”*



**Rebecca M. Crew**

**Highest Degree:** MS, Microbiology, Colorado State University, Fort Collins, CO

**Host Laboratory:** Division of Vector-Borne Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC, Fort Collins, CO

**Primary Mentor:** Robert Gilmore, PhD

**Fellowship Project:** Previously the Gilmore lab identified several *Borrelia burgdorferi* outer surface proteins that demonstrate antigenic potential in mice. The differential expression of *B. burgdorferi* surface antigens is thought to facilitate immune evasion, allowing Lyme disease progression to more serious disease manifestations. My project aims to investigate the antigenic properties of these proteins during progressive stages of Lyme in humans. We hope to identify a reliable marker of prolonged *B. burgdorferi* infection for use in diagnostic strategies.

**Future Plans:** *“The EID Fellowship program has sparked my passion for public health. I plan to stay in the realm of infectious disease as I pursue a master’s of public health in epidemiology.”*



### Kristen Cross

**Highest Degree:** BS, Biology and Environmental Sciences, Emory University, Atlanta, GA

**Host Laboratory:** Division of Bacterial Diseases, National Center for Immunization and Respiratory Diseases, CDC, Atlanta, GA

**Primary Mentor:** Jonas Winchell, PhD

**Fellowship Project:** My research will focus on increasing our laboratory's ability to use molecular techniques to detect and characterize atypical respiratory pathogens implicated in community-acquired pneumonia. I will develop a novel molecular multiplex real-time PCR assay to detect clinically-relevant *Legionella* species. Additionally, I will begin the development of a protocol to increase the yield of microbial DNA extracted from various biological matrices.

**Future Plans:** *"After my training fellowship I plan to pursue a graduate degree in molecular biology. I ultimately intend to become a leader in the development of molecular techniques with a focus in increasing our ability to improve public health."*



### Josie Delisle

**Highest Degree:** MS, Public Health Microbiology and Emerging Infectious Diseases, The George Washington University, Washington, DC

**Host Laboratory:** Vector-Borne Diseases Laboratory, Tennessee Department of Health, Nashville, TN

**Primary Mentor:** Abelardo Moncayo, PhD

**Fellowship Project:** My main project is on enhanced surveillance of Spotted Fever Group (SFG) rickettsiae in human, canine and raccoon samples in the state of Tennessee in order to better understand the epidemiology and the public health and economic burden of Rocky Mountain Spotted Fever, the most common tick-borne disease reported in the state. In addition, the potential roles different mosquito species have in the transmission and maintenance of La Crosse virus (LACV) will be investigated.

**Future Plans:** *"After completion of the fellowship I plan to pursue a career in public health laboratories, either at the state or federal level. I hope to have a career that integrates my interests in experimental research of infectious diseases and epidemiology."*



### Devy M. Emperador

**Highest Degree:** MPH, University of California, Berkeley, CA

**Host Laboratory:** Division of Viral Diseases, National Center for Immunization and Respiratory Diseases, CDC, Atlanta, GA

**Primary Mentor:** Baoming Jiang, DVM, PhD

**Fellowship Project:** Rotavirus is the leading cause of severe gastrointestinal disease in children under 5 years worldwide; the burden of disease

is highest in the developing world. While the current live oral vaccines against rotavirus are very effective in developed countries, vaccine effectiveness is lower in developing countries. To address this issue, I will conduct immunology and epidemiology projects to improve vaccine performance in developing countries and participate in ongoing R&D activities to develop a new, safe and more effective rotavirus vaccine.

**Future Plans:** *"After my fellowship I plan to continue working in public health laboratory research and policy making, specifically on global health and vaccine-related issues. I also plan on pursuing a doctorate degree to become a leader in global public health."*



### Drew C. Fayram

**Highest Degree:** MS, Microbiology, University of Iowa, Iowa City, IA

**Host Laboratory:** State Hygienic Laboratory at the University of Iowa, Iowa City, IA

**Primary Mentor:** Mary DeMartino, MT (ASCP) SM

**Fellowship Project:** Rapid, accurate identification of clinical isolates is necessary to ensure appropriate treatment is administered to patients quickly. MALDI-TOF mass spectrometry is an evolving technology with the potential to provide that. I will validate this technique for identification of *Mycobacterial* species other than tuberculosis (MOTT) and fungal specimen, and help obtain funding for implementation of this technology at SHL. Additionally, I will participate in emergency preparedness exercises and planning activities.

**Future Plans:** *“Following my fellowship year, I plan to pursue a career in public health. In the short term, this means using the skills, knowledge, and experience I acquire as a fellow to obtain a position in a public health laboratory. I hope to play a role in infectious disease identification and surveillance, bioterrorism prevention, and emergency preparedness. After increasing my experience in public health I hope to complete a doctorate to continue advancing in the public health field.”*



### Benjamin Lane

**Highest Degree:** BS, Microbiology, The University of Vermont, Burlington, VT

**Host Laboratory:** Division of High-Consequence Pathogens and Pathology, National Center for Emerging and Zoonotic Infectious Diseases, CDC, Atlanta, GA

**Primary Mentor:** Sherif R. Zaki, MD, PhD

**Fellowship Project:** The Infectious Diseases Pathology Branch (IDPB) serves as the primary CDC program involved in the pathologic diagnosis of infectious diseases. My project will focus on the development of in situ hybridization assay to enhance the pathologic detection of etiological agents. I will also participate in epidemiologic investigations and clinical evaluation of specimens related to unexplained deaths.

**Future Plans:** *“After my fellowship I would like to pursue an MPH and continue on to medical illustration school. Visually striking art can be a great way of promoting public awareness on complex health related issues. Ideally, I would like to use multi-media art for public health initiatives to make a positive impact on communities.”*



### De'Ashia E. Lee

**Highest Degree:** BS, Biology, Howard University, Washington, DC

**Host Laboratory:** Florida Department of Health Bureau of Public Health Laboratories, Tampa, FL

**Primary Mentor:** Lea Heberlein-Larson, MPH, SM(ASCP)

**Fellowship Project:** My fellowship will consist of rotations through various departments of the laboratory including: biological defense, arbovirology, molecular virology, serology,

tissue culture, bacteriology, parasitology and epidemiology. I will also rotate through the county health department where I will participate in breast/cervical cancer screenings, the tuberculosis center and the environmental health department. At the conclusion of my rotations, I will choose one or more areas to conduct a research project.

**Future Plans:** *“Following the completion of my fellowship I plan to pursue a PhD in microbiology. We live in a global community, and our actions and decisions have widespread consequences for our own and other's health. It is my hope that the knowledge and experience I gain from this fellowship will allow me to have a positive impact on the health of my community.”*



### Circe McDonald

**Highest Degree:** BS, Biology, Dominican University of California, San Rafael, CA

**Host Laboratory:** Division of Parasitic Diseases, Center for Global Health, CDC, Atlanta, GA

**Primary Mentor:** Vitaliano Cama, DVM, PhD

**Fellowship Project:** Onchocerciasis, a disease caused by the filarial parasite *Onchocerca volvulus*, is the fourth leading cause of blindness with an estimated 37 million people infected and 90 million people at risk of infection. My project will focus on detecting and characterizing serological responses to several antigens of *O. volvulus* in animal models of onchocerciasis. This work will help to develop new methods for evaluating on-going elimination efforts.

**Future Plans:** *“Following the EID Fellowship I plan to attend veterinary school with a special interest in zoonotic diseases while maintaining an emphasis on public health applications.”*



### Rachelle Reneau

**Highest Degree:** BS, Microbiology, Colorado State University, Fort Collins, CO

**Host Laboratory:** Public Health Laboratory, Minnesota Department of Health, St. Paul, MN

**Primary Mentor:** Sara Vetter, PhD

**Fellowship Project:** I will be completing a project within the Unexplained Death Program (UNEX) to: 1) further characterize previous picornavirus-positive specimens, looking for rhinoviruses, enteroviruses, and parechoviruses via real-time PCR; 2) evaluate the data generated and compare it to other surveillance programs looking for trends or oddities; and, 3) create and implement a database to improve upon the current system and allow for more efficiency when choosing test panels.

**Future Plans:** *“Upon completion of the EID Fellowship I will obtain my PhD in microbiology with a focus on infectious disease research. I hope to continue my career in public health and eventually work for the Centers of Disease Control and Prevention.”*



### Rohini G. Sandesara

**Highest Degree:** BS, Biology, Duquesne University, Pittsburgh, PA

**Host Laboratory:** Division of Vector-Borne Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC, San Juan, PR

**Primary Mentor:** Jorge L. Muñoz-Jordán, PhD

**Fellowship Project:** There are four serotypes of Dengue virus (DENV-1, 2, 3, 4). After more than a decade of high transmission rates, DENV-2 dropped sharply coinciding with the rise of DENV-3 throughout Puerto Rico except in an Eastern refuge region. Use virus neutralization assays to see if this rise of DENV-3 caused a selective pressure

by providing cross-neutralizing antibodies making a less conducive environment for other strains to flourish. Also, see if the genetic and neutralization profiles of these other strains changed after they re-emerged years later as possible escape mutants.

**Future Plans:** *“My intentions are to stay in the infectious disease field of public health research, preferably studying viruses because that’s where my interests truly lie. An MPH or an MS in public health focusing on research methods and laboratory techniques are strong contenders following this fellowship since I would like to stay at the bench doing experiments for the public at large and alongside epidemiologists to have a hand in monitoring disease, studying molecular characteristics of pathogens to find therapeutics and developing cutting edge diagnostic tools to make the detection of disease easier and more widely available.”*

# EID Laboratory Research Fellows



## Melissa Hargreaves

**Highest Degree:** PhD, Integrative Microbiology and Biochemistry, University of Montana, Missoula, MT

**Host Laboratory:** Public Health Laboratory, Minnesota Department of Health, St. Paul, MN

**Primary Mentor:** Paula Vagnone, MT (ASCP)

**Fellowship Project:** I plan to clarify the molecular epidemiology of emerging carbapenem-resistant *Enterobacteriaceae* (CRE) in Minnesota. This will include implementation of a rapid test to detect CRE from patient samples and elucidation of molecular mechanisms of carbapenem resistance arising within the CRE population over time. I will also develop molecular methods to examine the genetic diversity and invasive serotype prevalence of the Lyme disease bacterium *Borrelia burgdorferi* in reservoir tick and mouse populations throughout Minnesota.

**Future Plans:** *“Following completion of my fellowship I will continue to pursue my passion for molecular epidemiology and disease surveillance and seek to become a leader in the field. To accomplish this I plan to obtain a master’s degree in epidemiology in order to strengthen my expertise in this vital area of public health. Ultimately, I would like to direct a group of public health scientists in applied molecular epidemiology research to further our understanding of disease transmission and inform prevention measures for emerging and challenging infectious agents.”*



## Enitra N. Jones

**Highest Degree:** PhD, Microbial Pathogenesis, Immunology and Inflammation, University of Tennessee Health Science Center, Memphis, TN

**Host Laboratory:** Immunology and Pathogenesis Branch, Influenza Division, National Center of Immunization and Respiratory Diseases, CDC, Atlanta, GA

**Primary Mentor:** Shivaprakash Gangappa, DVM, PhD

**Fellowship Project:** Influenza seasonal epidemics and intermittent pandemics pose a significant threat to public health worldwide. Current antiviral treatments give rise to drug resistant mutants and, most importantly, fail to protect against immune-mediated lung injury. My fellowship research focuses on the development and optimization of adjunct therapies that may be effective against influenza-induced inflammation and the subsequent morbidity associated with pathogenic strains of influenza viruses. These studies may serve as the evidence needed to reduce influenza-induced morbidity and mortality globally.

**Future Plans:** *“After the fellowship my goal is to play a leading role in health initiatives that combine applied research and community outreach to safeguard the overall health of the nation. I am particularly interested in the development of policies and initiatives that target subpopulations disproportionately affected by disease.”*



## Alyssa L. MacMillan

**Highest Degree:** PhD, Cell and Molecular Biology, University of Pennsylvania, Philadelphia, PA

**Host Laboratory:** Public Health, Environmental and Agricultural Laboratory, New Jersey Department of Health, Ewing NJ

**Primary Mentor:** Nelson Delgado, PhD

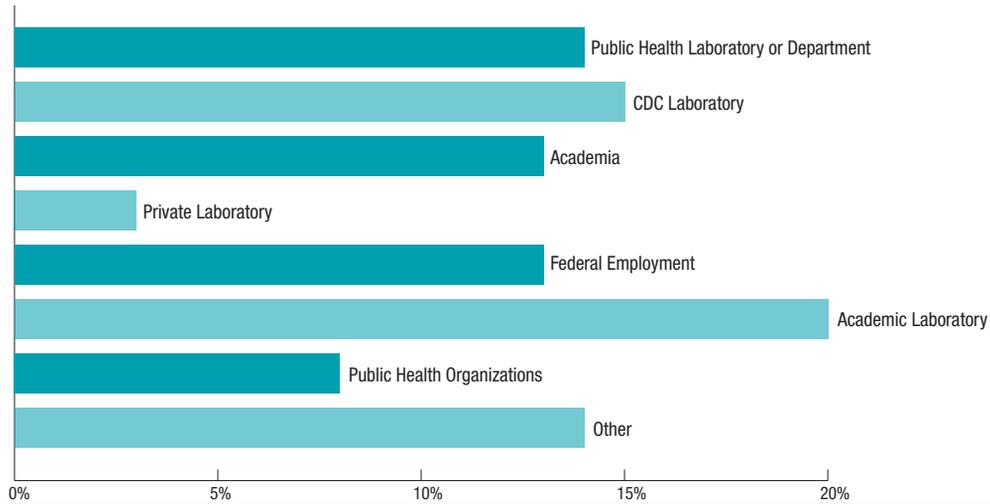
**Fellowship Project:** In collaboration with the CDC I will be assessing influenza isolates for specific drug-resistance mutations using pyrosequencing. Utilization of this technology will allow for high-throughput analysis, and general surveillance will help healthcare networks better understand patterns of antiviral drug resistance within the population and improve therapeutic outcomes for patients.

**Future Plans:** *“I hope to continue employment within the infectious disease division of a state public health laboratory, and work towards becoming a research director.”*



## STATUS OF FELLOWSHIP PROGRAM PARTICIPANTS

Past fellows who completed a 2012 survey identified their current positions as:



- 14% accepted temporary or permanent positions at a local or state public health laboratory or department
- 15% accepted temporary or permanent positions at a CDC laboratory
- 13% accepted positions in academia
- 3% accepted positions in private laboratories
- 13% accepted other federal employment positions
- 20% accepted positions in academic laboratories
- 8% accepted positions in public health organizations, including non-profits and health-related private industry
- 14% other

## EDUCATION LEVEL

Of the 493 fellows, 388 (79%) were predoctoral fellows, and 105 (21%) were postdoctoral fellows.

### Predoctoral Fellows

Of the 388 predoctoral fellows:

Education: 264 (68%) had bachelor's degrees  
124 (32%) had master's degrees

Assignment: 209 (54%) were assigned to CDC laboratories  
179 (46%) were assigned to local or state laboratories

### Postdoctoral Fellows

Of the 105 postdoctoral fellows:

Education: 96 (91%) had PhD degrees  
3 (3%) had MD degrees  
5 (5%) had DVM degrees  
1 (1%) had both DVM and PhD degrees

Assignment: 61 (58%) were assigned to CDC laboratories  
44 (42%) were assigned to local or state laboratories

## FELLOWS IN ACTION

In addition to their activities in their host laboratories, the fellows have been involved with APHL's activities, as participants at the APHL annual meeting, writing blog posts about their experiences and more. The association's quarterly magazine also features highlights of the current class of fellow's activities. Following is a snapshot of the fellows in action.

### Lab Matters

APHL Initiates New Class of EID Fellows  
Recruiting for the 2013 Class of EID Fellows  
Fellows Showcase Research at National Meetings

### Blog Posts

Are Girls Being Nipped in the STEM?  
Into the Wild: Lab Edition  
Difference between County and State Health Departments  
Former EID Training Fellow Shares: Why Public Health  
The track to becoming a public health laboratory director

### Former Fellow Class Bios

EID Fellows Class 18  
EID Fellows Class 17



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“I was able to play a lead role in a clinical research investigation that yielded high-quality and novel results that have sparked some interest in the clinical virology community. I have also had many learning opportunities that have allowed me to become familiar with various techniques and technologies that are relevant in public health laboratories.”

– Elizabeth Libby, Class 18 Training Fellow, New York State Department of Health (Wadsworth Center)

“I significantly improved my knowledge in the areas of virology and immunology since joining the program.”

– Juan De La Cruz, Class 16 Training Fellow, CDC Influenza Division

“The EID training fellowship program has far exceeded my original objectives. In the brief span of a year I have accomplished more in the field of research than I thought possible”

– Katy Hamlin, Class 16 Training Fellow, CDC Division of Parasitic Diseases and Malaria

“In addition to allowing me to participate in public health related research, working in the HIV drug resistance unit has taught the importance of quality control, which is an essential part of being a public health laboratory scientist.”

– Erin Rottinghaus, Class 15 Research Fellow, CDC Division of Global HIV/AIDS

“I wanted to see what a public health lab was all about.”

– John Feltner, Class 16 Training Fellow, Hawaii State Department of Health