FOCUS ON FELLOWS

APHL–CDC LABORATORY FELLOWSHIP PROGRAMS 2020-2021

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About the APHL-CDC Laboratory Fellowship Programs

The Association of Public Health Laboratories (APHL) and the US Centers for Disease Control and Prevention (CDC) partner to offer a variety of laboratory fellowship programs to train and prepare scientists for careers in public health laboratories and support public health initiatives.

There are currently seven APHL-CDC fellowship programs:

- Antimicrobial Resistance Laboratory Fellowship Program
- COVID-19 Response Fellowship Program
- Environmental Public Health Laboratory Fellowship Program
  (which did not place any fellows in 2020, and so is not included in this compilation)
- Infectious Diseases Laboratory Fellowship Program
- Infectious Disease Bioinformatics Fellowship Program
- Newborn Screening Bioinformatics and Data Analytics Fellowship Program
- Ronald H. Laessig Memorial Newborn Screening Fellowship Program

Fellowships range from one to two years, depending on the fellowship and funding availability. While each has a specific focus, these experiential programs also offer a competency-based core curriculum.

LEARN MORE ABOUT APHL’S LABORATORY FELLOWSHIP PROGRAMS:
visit aphl.org/fellowships or email fellowships@aphl.org
Core Competency Training
In addition to laboratory-specific work, all APHL fellows participate in distance-based training and learning activities to achieve proficiency in select public health laboratory core competencies.

The competencies covered in the APHL-CDC fellowship program curriculum include:

- Management and Leadership
- Communications
- General Laboratory Practice
- Research
- Surveillance
- Ethics
- Safety
- Emergency Management and Response
- Quality Management Systems

This curriculum provides a well-rounded introduction to public health laboratory science to all fellows, and provides them with the knowledge, skills and abilities to enter and advance in the public health laboratory workforce.

The Public Health Laboratory Competencies outline the knowledge, skills and abilities necessary for public health laboratory professionals to deliver core services efficiently and effectively. As part of a two-year project co-sponsored by CDC and APHL, competencies were developed for 15 domain areas by a diverse group of over 170 experts, representing state and local public health laboratories, clinical laboratories, academic institutions, laboratory professional organizations, CDC and APHL.

View the complete document, Competencies Guidelines for Public Health Laboratory Professionals, to learn more.
Antimicrobial Resistance (AR) Laboratory Fellowship Program

AR testing in public health laboratories for nationwide capacity is an emerging field and, therefore, a new class of well-equipped and dedicated scientists is required to address this growing threat. The AR Laboratory Fellowship provides training in AR laboratory activities—such as advanced molecular methodologies, surveillance and research—as well as communication and outreach.

Learn more at aphl.org/AR-fellows

Current and historical AR Lab Fellow host laboratory locations

2019–2021 FELLOWS

June Chan
PhD (Molecular Microbiology and Immunology), 2017, Johns Hopkins University

HOST LABORATORY: Wadsworth Center of the New York State Department of Health

PRIMARY MENTOR: Kimberlee Musser, PhD

FELLOWSHIP PROJECT:
• Lead multicenter pilot surveillance study assessing the prevalence of carbapenem-producing carbapenem resistant organisms (CP-CROs) in solid organ transplant recipients.
• Develop a more robust system for the molecular tracking of CP-CRO outbreaks by investigating the genetic diversity of CP-CROs within individual patients.
• Validate alternative specimen types (e.g., lower respiratory swabs) to be used for molecular CP-CRO detection.

FUTURE PLANS: I will begin a CPEP-accredited fellowship with the UCLA Medical and Public Health Laboratory Microbiology Program in July 2021. With my training as an APHL Fellow and future training as a CPEP Fellow, my career goal is to become a director of a clinical or public health laboratory. I hope to continue conducting applied research that improves patient diagnostic testing.
Mondraya Howard  
**PhD (Molecular Genetics and Microbiology), 2019, University of Pittsburgh**

**HOST LABORATORY:** Maryland Department of Health Laboratories Administration  
**PRIMARY MENTORS:** Robert Meyers, PhD  

**FELLOWSHIP PROJECT:**  
- Contribute to the Mid-Atlantic AR Lab Network core testing to detect AR threats.  
- Validate broth microdilution (BMD) panels to determine susceptibility of multi-drug resistant gram-negative bacteria against the most critical antimicrobials, including implementation of the HP D300e Digital Dispenser to create BMD panels with new-to-market antibiotics.

**FUTURE PLANS:** I am pursuing further training in clinical microbiology through a medical and public health laboratory microbiology fellowship at the University of Rochester School of Medicine and Dentistry, with the ultimate goal of directing a diagnostic microbiology laboratory.

Kimberly McCullor  
**PhD (Pharmaceutical Sciences), 2019, University of Oklahoma Health Sciences Center**

**HOST LABORATORY:** Michigan Department of Health and Human Services, Bureau of Laboratories  
**PRIMARY MENTOR:** Marty Soehnlen, PhD  

**FELLOWSHIP PROJECT:**  
- Validate WGS for predicting drug susceptibility patterns of *Mycobacterium tuberculosis*.  
- Assess the use of Fourier-Transform-Infrared Spectroscopy (IR Biotyper) technology for epidemiological studies of nontuberculous mycobacteria.  
- Expand testing capacities for the SARS-CoV-2 virus in Michigan.

**FUTURE PLANS:** My career goal is to become a public health laboratory director. I am most interested in collaborating with others to improve best practices within the laboratory. I also aspire to be involved with the research and development of cost-effective diagnostics that can provide timely, actionable data to help treat and prevent the spread of communicable diseases.
Sarah Namugenyi  
PhD (Microbiology), 2019, University of Minnesota – Minneapolis  

HOST LABORATORY: Minnesota Department of Health Public Health Laboratory  

PRIMARY MENTOR: Paula Snipes Vagone, MT(ASCP)  

FELLOWSHIP PROJECT: Assist with implementation of Min-ION, a real-time DNA sequencing device, for the analysis of carbapenemase resistance genes in gram-negative bacteria. Long-read sequences generated by the Min-ION sequencer will enable de novo assembly of plasmids that may potentially harbor the antibiotic resistance genes. This data can be used for plasmid tracking to identify transmission routes during outbreaks and to identify horizontal transfer of plasmids between and across bacterial species.  

FUTURE PLANS: I am interested in investigating and being involved in controlling emerging infectious diseases. Therefore, I would like to continue to work in public health microbiology and obtain further training that would prepare me to direct a public health microbiology laboratory.

Lindsay Alexandra Parnell  
PhD, (Biology and Biomedical Sciences, Molecular Genetics and Genomics Program), 2019, Washington University in St. Louis  

HOST LABORATORY: CDC Antimicrobial Resistance Coordination and Strategy Unit  

PRIMARY MENTOR: Dawn Sievert, PhD  

FELLOWSHIP PROJECT:  
• Contribute to the drafting and finalization of national guidance for WGS of healthcare-associated infection and AR pathogens.  
• Conduct WGS analysis of Candida auris isolates collected through the AR Lab Network to support epidemiological investigations.  
• Collaborate with laboratory scientists, bioinformaticians and epidemiologists to optimize processes for communicating C. auris WGS data with local and state public health laboratories.  
• Drive a C. auris WGS pilot project with a subset of AR Lab Network regional laboratories. The purpose of the pilot is to develop processes for and test C. auris WGS and analysis pipelines in state public health laboratories, and discuss how this testing can be implemented more widely.  

FUTURE PLANS: This fellowship has solidified my interest in a long-term public health career. It has allowed me to leverage my laboratory background, while gaining experience in new areas including applying WGS data for public health action and helping to implement new activities in public health laboratories. In the future, I hope to continue contributing to the detection and response to infectious disease threats.
2020-2021 FELLOWS

Anumita Bajpai

MPH (Epidemiology of Microbial Diseases), 2020, Yale School of Public Health

HOST LABORATORY: North Carolina State Laboratory of Public Health

PRIMARY MENTOR: William Glover II, PhD

FELLOWSHIP PROJECT:

• Validate and implement E-test antibiotic susceptibility testing for *Neisseria gonorrhoeae* isolates.

• Validate whole genome sequencing (WGS) for select *N. gonorrhoeae* isolates and residual NAAT specimens for antimicrobial resistance characterization.

• Evaluate, validate and implement an *Mycobacterium tuberculosis* WGS analysis pipeline for the detection of mutations associated with drug resistance.

FUTURE PLANS: I aim to continue my work in public health by staying in the field of AR surveillance. Through this fellowship I was able to see the intersection of laboratory science and epidemiology in outbreak investigations. I plan to pursue a PhD in infectious disease epidemiology with the hope of applying to the CDC EIS fellowship afterwards.

RaNashia Boone

MS (Biology), 2020, Fisk University

HOST LABORATORY: Tennessee Department of Health Division of Laboratory Services

PRIMARY MENTOR: Victoria Stone, PhD

FELLOWSHIP PROJECT:

• Validate a rapid and reproducible short tandem repeat (STR) based typing assay for *Candida auris* that identifies five different clades to potentially support regional outbreak investigations or be used to characterize phenotypic relationships associated with different clades.

• Assist with *Aspergillus fumigatus* triazole resistance surveillance study, which includes validating the screening procedure to track and identify triazole-resistant *A. fumigatus*.

FUTURE PLANS: I plan to pursue a career in microbiology/clinical research and development.
**Dylan Curry**  
MS (Microbiology and Immunology), 2019, Thomas Jefferson University  

**HOST LABORATORY:** Utah Public Health Laboratory  
**PRIMARY MENTOR:** Alessandro Rossi, PhD  

**FELLOWSHIP PROJECT:**  
- Train in multiple areas of the infectious disease laboratory, especially the AR Lab Network.  
- Examine phenotypic variability in clonal isolates of CRAB from nosocomial outbreaks over time.  
- Develop a culture-independent WGS protocol for residual urine samples positive for *Neisseria gonorrhoeae*. Antimicrobial resistance determinants will be predicted through bioinformatics, contributing to surveillance in Utah.  

**FUTURE PLANS:** I hope to continue my career in government with a focus on public health or research.

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**Hannah K. Gray**  
PhD (Environmental Health and Engineering), 2020, Johns Hopkins University  

**HOST LABORATORY:** Washington State Public Health Laboratory  
**PRIMARY MENTOR:** Philip Dykema, PhD  

**FELLOWSHIP PROJECT:**  
- Streamline *Candida auris* colonization surveillance screening efforts by validating and implementing an automated extraction platform, optimizing existing PCR assay and assessing swab performance.  
- Validate a robust bioinformatics pipeline for analyzing diverse resistant bacterial species associated with hospital-acquired infections to characterize organisms, track resistance determinants and improve epidemiological cluster identification and tracing.  

**FUTURE PLANS:** I plan to continue working in public health microbiology, focusing on tracking antibiotic and antifungal resistance with the AR Lab Network. I would like to transition into a leadership role, with the eventual goal of pursuing a directorial position or a position at a national public health institution like NIH or CDC.

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**Kelli Hager**  
MPH (Infectious Diseases and Vaccinology), 2020, University of California—Berkeley  

**HOST LABORATORY:** Wadsworth Center, New York State Department of Health  
**PRIMARY MENTORS:** Kimberlee Musser, PhD and Sudha Chaturvedi, PhD  

**FELLOWSHIP PROJECT:** Sequence FKS1 gene from *Candida auris* isolates to better understand resistance mechanisms.  

**FUTURE PLANS:** I am currently applying for PhD programs in molecular biology and microbiology to continue researching AR mechanisms and therapeutic innovation.
Andrea Lopez
BS (Microbiology and Cell Science), 2019, University of Florida

HOST LABORATORY: Florida Department of Health, Bureau of Public Health Laboratories
PRIMARY MENTOR: Marie-Claire Rowlinson, PhD, D(ABMM)

FELLOWSHIP PROJECT:
- Validate a method for extracting Mycobacterium tuberculosis (MTBC) DNA from patient-derived isolates.
- Develop and validate a method for using WGS to detect drug susceptibility in MTBC, and integrate it into the laboratory’s current drug susceptibility detection protocol.
- Analyze WGS drug susceptibility data using the Wadsworth bioinformatics pipeline.

FUTURE PLANS: I look forward to pursuing a master’s degree upon finishing the fellowship. I hope to later pursue an MD and apply a multidisciplinary approach when providing clinical care, thanks to the valuable public health and laboratory experience I have gained through the fellowship.

Logan Patterson
PhD (Experimental Pathology), 2020, University of Virginia—Charlottesville

HOST LABORATORY: Wisconsin State Laboratory of Hygiene
PRIMARY MENTOR: Ann Valley

FELLOWSHIP PROJECT:
- Assist with all AR testing and surveillance activities at the Wisconsin State Laboratory of Hygiene.
- Collaborate with the CDC to validate a new panel for testing antimicrobial susceptibility.
- Improve extraction methods for Candida auris detection.
- Streamline the genome sequencing process of AR isolates.

FUTURE PLANS: I plan to continue working towards receiving ABMM certification and becoming a clinical microbiology laboratory director. My goal is to improve patient care by incorporating the newest technologies to detect and respond to infections, while advocating for proper antibiotic use to reduce the spread of antimicrobial resistance.
Eliot Stanton  
PhD (Microbiology), 2020, University of Wisconsin—Madison  

HOST LABORATORY: Minnesota Department of Health Public Health Laboratory  
PRIMARY MENTOR: Paula Snippets Vagone, MT(ASCP)  

FELLOWSHIP PROJECT:  
• Design and implement a standardized workflow for quality control/assurance of WGS data from isolates determined to be carbapenemase-producing/carbapenemase-gene positive.  
• Implement and validate WGS-based detection of antibiotic resistance in Streptococcus pneumoniae isolates to facilitate faster and more complete identification of disease outbreaks.  
• Investigate accurate molecular identification of yeast isolates at the species level using sequencing data targeting the D1/D2 domain within the 26S rDNA region.  

FUTURE PLANS: This fellowship has provided me with training in the functioning of a public health laboratory as a collaborative and multi-disciplinary environment. Going forwards, I plan to leverage my experience from this fellowship and my background in research as a scientist in either a government or academic lab. I hope to focus on translating basic research into public health applications.

Sidney Thigpen  
MPH (Epidemiology), 2020, University of Arizona  

HOST LABORATORY: Indiana State Public Health Laboratory  
PRIMARY MENTOR: Sara Blosser, PhD  

FELLOWSHIP PROJECT:  
• Perform WGS and sequence analysis of clinical isolates and outbreak analysis for epidemiological investigations.  
• Validate and document the performance of a new Sensititre AST panel to better align with CDC recommendations and Indiana’s testing needs.  

FUTURE PLANS: As a long-standing career goal, I am interested in the prevention and surveillance of infectious diseases. By participating in the AR Fellowship Program, I will be able to extend my knowledge of public health and practices, have the opportunity to gain more extensive laboratory skills and inform first responders on better prevention measures to decrease the risk of furthering the spread of hospital-acquired infections.
COVID-19 Response Fellowship Program
The COVID-19 pandemic required an unprecedented response from public health laboratories across the nation, so the COVID-19 Response Fellowship was established to help fill the critical need for a high quality workforce. The program provides training and mentorship to fellows to excel in pandemic response efforts in public health laboratories. COVID-19 Response Fellows contribute invaluable support to their laboratories through projects that include performing SARS-CoV-2 sequencing, validating instrumentation and assays, and characterizing antibodies from individuals infected with SARS-CoV-2.

The COVID-19 Response Fellowship is one of several initiatives APHL launched to support pandemic response efforts in public health laboratories.

Joanna M. Kettlewell
PhD (Tropical Medicine, Medical Microbiology and Pharmacology), 2020, John A. Burns School of Medicine, University of Hawaii—Manoa

HOST LABORATORY: Hawaii State Laboratories Division
PRIMARY MENTOR: Edward Desmond, PhD, D(ABMM)

FELLOWSHIP PROJECT:
• Develop and complete a validation study comparing detection of SARS-CoV-2 antibodies in saliva versus serum using the Elecs Anti-SARS-CoV-2 Immunoassay (EUA) using the Roche cobas® e 411.
• Complete monthly SARS-CoV-2 serological testing using the Elecs Anti-SARS-CoV-2 Immunoassay using the Roche cobas® e 411 serial for a year-long serological survey among socioeconomically-challenged groups and university students in order to better understand the scope of COVID-19 illness in Hawaii.
• Define protocol and assist in implementation of a pilot study for SARS-CoV-2 wastewater.

FUTURE PLANS: The APHL COVID-19 Fellowship provides a platform to launch a career as a leader clinical microbiology and research. My long-term scientific goal is to develop a deeper understanding of the intersection of human health and infectious disease in order to contribute effective interventions for prevention and treatment both in the realm of pandemic response and everyday public health.
**Kristine Tran**  
*MS (Global Health), 2020, George Mason University*

**HOST LABORATORY:** Massachusetts Department of Public Health  
**PRIMARY MENTOR:** Glen Gallagher, PhD

**FELLOWSHIP PROJECT:**  
- Isolate and characterize antibodies from those infected with SARS-CoV-2 to determine protection against the novel coronavirus.  
- Contribute to the implementation of the BinaxNOW COVID-19 Ag card and the Influenza SARS-CoV-1 Multiplex Assay to increase testing for SARS-CoV-2.

**FUTURE PLANS:** I aim to continue working as a public health scientist with CDC, a state public health laboratory or another major global health research institution. I will likely seek further education in the form of a PhD with a focus on epidemiology and infectious diseases. I hope to leverage my skills to improve public health on a local and global scale.

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**Valerie Patritti**  
*MS (Biochemistry and Molecular Biology), 2019, Pace University*

**HOST LABORATORY:** New York City Public Health Laboratory  
**PRIMARY MENTOR:** Scott Hughes, PhD

**FELLOWSHIP PROJECT:**  
- Sequence COVID-19-positive samples submitted to the New York City Public Health Laboratory.  
- Implement new instrumentation, such as the NextSeq2000 by Illumina® and GridION by Oxford Nanopore Technologies®.  
- Draft standard operation procedures for each system and assist with their incorporation into existing workflows.  
- Assist with the analysis of COVID-19 sequencing runs using a pipeline developed in-house.

**FUTURE PLANS:** I would like to work in a clinical or public health laboratory as a research investigator with a focus on infectious disease.
Infectious Diseases Laboratory Fellowship Program

The Infectious Diseases Laboratory Fellowship Program trains and prepares post-master’s and postdoctoral scientists for careers in public health laboratories while supporting public health initiatives related to infectious diseases. Fellows receive training in critical bench-level laboratory skills and methods, and assist with high-priority infectious disease testing, surveillance and control measures. Fellows may participate and receive training in disease-specific tracks, such as foodborne illnesses, vector-borne diseases, respiratory diseases and more.

Learn more at aphl.org/ID-fellows

Emily Davis
PhD (Experimental Pathology), 2020, University of Texas Medical Branch

HOST LABORATORY: CDC Arboviral Disease Branch, Division of Vector-Borne Diseases

PRIMARY MENTOR: Aaron Brault, PhD

FELLOWSHIP PROJECT:
• Develop and validate a method of transport of clinical samples for molecular diagnostics that stabilizes viral RNA independent of a cold chain.
• Ascertain the compatibility of this methodology with next generation sequencing platforms.

FUTURE PLANS: I would like to continue to investigate solutions to problems posed by emerging infectious diseases while gaining expertise in a variety of public health fields. Using this experience, I hope to become a leader in public health, contributing to the development of policy and next generation diagnostics.
Infectious Diseases Bioinformatics Fellowship Program

Bioinformatics is revolutionizing the way the world tracks and detects infectious disease. In public health, the use of Next Generation Sequencing (NGS) technology has reshaped outbreak investigations and pathogen surveillance. Bioinformaticians are crucial for this transition to the use of NGS in public health. They develop pipelines and help interpret the data, identifying and characterizing pathogens; playing a vital role in the public health engine that keeps us all healthy. The program is a year-long, full-time working fellowship for master’s- and doctoral-level bioinformaticians; some fellowships may be extended for an additional year, as funding allows. Fellows are placed in state, local, and federal public health laboratories throughout the US.

Learn more at aphl.org/bioinformatics-fellows
Marko Bajic
PhD (Genetics and Molecular Biology), 2019, Emory University

HOST LABORATORY: CDC Division of Parasitic Diseases and Malaria, Deputy Director for Public Health Service Center for Global Health

PRIMARY MENTOR: Eldin Talundzic, PhD

FELLOWSHIP PROJECT:
• Develop a targeted sequencing protocol and bioinformatics pipeline for genotyping and determining the regional genetic diversity of Plasmodium falciparum.
• Identify single-nucleotide polymorphism haplotypes for inferring anti-malarial drug resistant phenotypes which can distinguish between recrudescence and reinfection.

FUTURE PLANS: I would like to have a career at CDC where I can work to standardize the different aspects of NGS data analysis, sharing and storage at CDC and public health labs around the globe. Whatever roles I play at my future prospects, I want them to help reduce confusion and help others reach their data reporting goals with as little confusion and frustration as possible.

Dieunel Derilus
PhD (Environmental Sciences), 2020, University of Puerto Rico—Rio Piedras

HOST LABORATORY: CDC Division of Parasitic Diseases and Malaria, Entomology Branch, Insecticide Resistance and Vector Control Team

PRIMARY MENTOR: Audrey Lenhart, PhD

FELLOWSHIP PROJECT:
• Implement a bioinformatics pipeline for comparative transcriptomic analysis to identify the main candidate genes, SNPs and metabolic pathways associated with metabolic resistance to key insecticides used for malaria vector control.
• Perform comparative RNA-Seq analysis to identify potential candidate genes responsible for insecticide resistance in Anopheles arabiensis and Aedes aegypti.
• Assist with the assembly and analysis of the Anopheles albimanus genome data generated using PacBio and Illumina sequencing technology.
• Provide bioinformatics training to external collaborators in the analysis of high-throughput sequencing data.

FUTURE PLANS: I am thoroughly enjoying the public health research. I hope to continue working as a public health bioinformatician either at CDC or at a state public health laboratory.
Tara Gallagher  
*PhD (Molecular Biology and Biochemistry), 2020, University of California—Irvine*  
**HOST LABORATORY:** Utah Public Health Laboratory  
**PRIMARY MENTOR:** Kelly Oakeson, PhD  
**FELLOWSHIP PROJECT:**  
- Validate the Illumina COVIDSeq protocol and bioinformatics pipeline for SARS-CoV-2 detection and genomics analysis.  
- Develop a bioinformatics pipeline to predict antibiotic resistance in Gonorrhea and enteric pathogens, and track foodborne disease outbreaks from shotgun sequencing of samples from culture-independent based tests.  

**FUTURE PLANS:** It’s such an exciting time to be a bioinformatician in public health! I hope to continue working alongside other scientists to advance NGS approaches and routinely apply bioinformatics to track outbreaks and monitor antibiotic resistance.

Jillann Hagey  
*PhD (Animal Biology), 2020, University of California, Davis*  
**HOST LABORATORY:** CDC Waterborne Disease Prevention Branch, Molecular Epidemiology Laboratory, Clinical Detection and Surveillance Team  
**PRIMARY MENTOR:** Dawn Roellig, PhD  
**FELLOWSHIP PROJECT:** Develop a pipeline for a comparative genomics study of Cryptosporidium parvum subtype Ila15G2R1 genomes. Specific aims are to estimate within and among host genome-wide variability for these isolates and predict zoonotic source attribution based machine learning algorithms.  

**FUTURE PLANS:** Post-fellowship I hope to continue working in public health with a focus on zoonotic diseases with international importance.

Alexandra Lorentz  
*PhD (Environmental Health and Engineering), 2020, Johns Hopkins Bloomberg School of Medicine*  
**HOST LABORATORY:** Minnesota public Health laboratory  
**PRIMARY MENTOR:** Sean Wang, DVM, PhD  
**FELLOWSHIP PROJECT:**  
- SARS-CoV2 whole genome sequencing and analysis.  
- Epidemiology and genomics of SARS-CoV-2 introductions.  
- CLIA Assay development.
Michelle Su  
PhD (Microbiology and Molecular Genetics), 2020, Emory University  
HOST LABORATORY: CDC Laboratory Reference and Research Branch, Division of STD Prevention, GC/CT/Metagenomics Team  
PRIMARY MENTOR: Matthew Schmerer, PhD  
FELLOWSHIP PROJECT:  
• Containerize an antimicrobial resistance (AR) profiling and typing tool for whole-genome sequenced gonorrhea isolates to increase the accessibility, ease of use and adoption.  
• Develop a plasmid typing module for the AR profiling and typing tool to query plasmid diversity and prevalence and potentially detect horizontal gene transfer events.  
FUTURE PLANS: I hope to join a local public health laboratory and continue to advance the adoption of whole genome sequencing technologies in outbreak detection and investigation as well as clinical use (e.g. antimicrobial resistance prediction).

Yuanyuan Wang  
PhD (Bioinformatics and Computational Biology), 2020, University of Minnesota  
HOST LABORATORY: CDC Core Facility Branch, Division of Scientific Resources  
PRIMARY MENTOR: Jan Pohl, PhD  
FELLOWSHIP PROJECT:  
• Develop an integrated analytical approach to compare the effectiveness of different influenza vaccines in the context of both innate and adaptive immunity from single-cell multi-omics data.  
• Develop interactive visualization tools of sequencing diagnostics to allow fast and easy inspections on large datasets from the National SARS-CoV2 Strain Surveillance project.  
FUTURE PLANS: I would like to pursue interdisciplinary opportunities in precision public health, where machine learning techniques are utilized at the intersection of immunology and infectious diseases to help deliver the right intervention at the right time to the right population.
Newborn Screening Bioinformatics and Data Analytics Fellowship Program

The Newborn Screening Bioinformatics and Data Analytics Fellowship places graduates of bioinformatics or biostatistics programs in newborn screening (NBS) public health laboratories, where they conduct specialized next-generation sequencing (NGS) and data analytics projects for certain recommended uniform screening panel (RUSP) disorders.

Projects range from utilizing bioinformatics skills for mining complex genetic data for biomarkers, developing and validating pipelines and tools for NGS and Sanger analysis, to comparing NBS results from unsatisfactory specimens to their matched satisfactory repeat specimens.

Learn more at aphl.org/NBS-BIF

Samantha Marcellus

MPH (Epidemiology), 2018, University of Iowa College of Public Health

HOST LABORATORY: Texas Department of Health

PRIMARY MENTOR: Rachel Lee, PhD

FELLOWSHIP PROJECT:

• Develop, standardize and refine tools and infrastructure to efficiently and accurately analyze Severe combined immunodeficiency disorder (SCID) NGS data, including sequencing alignment, variant calling and interpretation.

• Establish and pilot the use of NGS analysis pipelines for SCID screening.

• Aid in COVID-19 DNA sequencing efforts.

FUTURE PLANS: I plan to continue working in newborn screening and COVID-19 bioinformatics at my host laboratory. I would also like to fuse bioinformatics and epidemiology to improve our newborn screening processes to better serve our babies. In the future, I’m interested in providing support to other states who would like to establish a newborn screening bioinformatics team.
2020-2022 Fellows

Bryce Asay  
PhD (Microbiology), 2020, Colorado State University  
HOST LABORATORY: Utah Public Health Laboratory  
PRIMARY MENTOR: Andy Rohrwasser, PhD  
FELLOWSHIP PROJECT: Propose, develop and test machine learning classification support algorithms for amino acid and acylcarnitine disorders. Proposal is a multi-state effort, and broad adoption of the algorithmic decision or classification support resources often requires problematic data sharing and closed or black-boxed algorithms that are proprietary and patent-protected. Proposed algorithm will utilize a radically novel approach to reduce the need to share patient information with third parties and be open source to the public.  
FUTURE PLANS: Work at Utah Public Health Laboratories as a machine learning data scientist. I also volunteer helping with infectious disease data analysis for researchers in Burkina Faso in Africa.

Jessica C. Respress  
MS (Biology), 2019, Georgia State University  
HOST LABORATORY: Wadsworth Center of the New York State Department of Health  
PRIMARY MENTOR: Denise Kay, PhD  
FELLOWSHIP PROJECT:  
• Validate a new custom-55 gene ArcherDx VariantPlex assay for SCID on the Illumina MiSeq platform.  
• Assess VariantPlex Panel accuracy and reproducibility by comparison to data via Sanger sequencing (the gold standard).  
• Optimize and validate a new bioinformatics pipeline specific to ArcherDx technology.  
FUTURE PLANS: I hope to work in the field of genetics as a bioinformatician and focus my skills on next generation sequencing technology.
Ronald H. Laessig Newborn Screening Fellowship Program

The Ronald H. Laessig Memorial Newborn Screening (NBS) Fellowship Program prepares laboratory scientists for leadership careers in newborn screening research while also strengthening “local, state and federal public health infrastructures to support surveillance and implement prevention and control programs,” as stated in the CDC prevention strategy goal. The fellowship honors Ronald H. Laessig, the former director of the Wisconsin State Laboratory of Hygiene and a national leader in NBS. Its mission is to provide a high-quality training and leadership experience for the fellow while providing workforce capacity to the public health laboratory community.

Learn more at aphl.org/NBS-Fellows

This year, two NBS fellows were chosen to improve and implement laboratory algorithms for NBS conditions such as mucopolysaccharidosis–1 (MPS-1) and the severe combined immunodeficiency/spinal muscular atrophy (SCID/SMA) assay.
**2020–2021 FELLOW**

Lauren Nufer  
MS (Human Genetics), 2020, Virginia Commonwealth University  

**HOST LABORATORY:** Virginia Division of Consolidated Laboratory Services  
**PRIMARY MENTOR:** Leigh-Emma Lion, MS  

**FELLOWSHIP PROJECT:**  
- Determine the next best step(s) of assay development for the VA NBS program by evaluating how potential changes to four tests will impact their effects on workflow, staffing and clinical work, and the cost of running the test.  
- Select one change to implement that will provide the biggest impact to the program.  

**FUTURE PLANS:** I value the application of molecular tools in newborn screening to identify individuals with genetic disorders. I hope to continue to use my background in molecular genetics to further research these genetic conditions in an effort to develop better diagnostics and treatments in order to benefit the public.

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**2020–2022 FELLOW**

Scott J. Riley II  
PhD (Chemistry), 2020 University of Maryland Baltimore County  

**HOST LABORATORY:** Division of Newborn & Childhood Screening at the Maryland Department of Health  
**PRIMARY MENTOR:** Fizza Gulamali-Majid, PhD  

**FELLOWSHIP PROJECT:**  
- Design and implement a first-tier screening method for X-linked Adrenoleukodystrophy.  
- Optimize the Biotinidase Assay by reducing the incubation time of samples and developing a semi-quantitative method for sample analysis.  
- Improve turnaround time for the SCID/Spinal Muscular Atrophy assay by introducing new qPCR instruments and enhanced Biomek processing.  

**FUTURE PLANS:** In the brief time I have worked as an APHL Fellow in newborn screening I have experienced a wealth of different scientific tests, processes and concepts. I plan to continue to develop my skills and build a career in public health. My goals are to focus on cultivating my leadership abilities to eventually become the head of a division or department.
About APHL
APHL works to strengthen laboratory systems serving the public’s health in the United States and globally. APHL represents state and local governmental health laboratories in the United States. Its members, known as “public health laboratories,” monitor, detect and respond to health threats.

APHL works closely with federal agencies to develop and execute national health initiatives. During public health emergencies, it operates as a coordinating center for laboratory response. APHL also works internationally to build effective national laboratory systems and expand access to quality diagnostic testing services. With over 20 years’ experience in 31 countries on five continents, APHL is recognized internationally as a leader in laboratory science and practice.

APHL’s core membership is comprised of state, local and territorial laboratories and includes environmental, agricultural science and food safety laboratories. Representatives from federal agencies, nonprofit organizations, corporations and interested individuals also participate in the association. International participation is expanding in response to the globalization of disease and APHL’s active global health program. Total APHL membership numbers over 800.

About CDC
CDC is one of the major operating components of the US Department of Health and Human Services. CDC works 24/7 to protect America from health, safety and security threats, both foreign and domestic. Whether diseases start at home or abroad, are chronic or acute, curable or preventable, human error or deliberate attack, CDC fights disease and supports communities and citizens to do the same.

CDC increases the health security of our nation. As the nation’s health protection agency, CDC saves lives and protects people from health threats. To accomplish our mission, CDC conducts critical science and provides health information that protects our nation against expensive and dangerous health threats, and responds when these arise.