



fellowship

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Penn Medicine

MOLECULAR GENETIC PATHOLOGY FELLOWSHIP

DIVISION OF PRECISION AND COMPUTATIONAL DIAGNOSTICS

The Penn Molecular Genetic Pathology (MGP) program is based in the Division of Precision and Computational Diagnostics (PCD) in the Department of Pathology and Laboratory Medicine at the Hospital of the University of Pennsylvania (HUP), a part of Penn Medicine. The Division of PCD consists of the Molecular Pathology Laboratory, the Center for Personalized Diagnostics (CPD), and the Cytogenetics Laboratory. The Molecular Pathology Laboratory at the Hospital of the University of Pennsylvania was founded in 1985, one of the first such laboratories at a university hospital in the United States. Since that time, Molecular Pathology has become an essential diagnostic and prognostic instrument in the routine practice of medicine. As the field has grown, so too have the training opportunities at Penn. In the early 1990s, Penn was among the first Molecular Pathology training programs in the country, and after MGP was formally recognized as a subspecialty, one of the first two programs to obtain ACGME accreditation in 2002. The Molecular Pathology Laboratory offers services in oncology, infectious diseases, identity testing and inherited disorders, as well as other diagnostic services, employing a range of techniques and assays. The CPD provides clinical next generation sequencing services for both solid and liquid oncology samples. The Cytogenetics Laboratory performs traditional karyotyping on constitutional and oncology specimens as well as a wide range of fluorescent in-situ hybridization (FISH) assays. Numerous diagnostic, prognostic, and predictive applications make molecular pathology one of the cornerstones of personalized medicine spanning the fields of both anatomic and clinical pathology. The Molecular Pathology Laboratory together with the Cytogenetics Laboratory and the CPD are at the forefront of molecular diagnostic testing and development.

PROGRAM OVERVIEW

The goal of the Penn MGP program is to train fellows in the practice of molecular pathology and genomics, the application and interpretation of molecular laboratory techniques, and diagnostic laboratory administration. Over the course of the one-year ACGME accredited fellowship the fellow gains experience in the application of molecular pathology through service work, didactic lectures, resident teaching, involvement in laboratory administration, and hands-on test development and/or research projects through rotations at HUP and the Children's Hospital of Philadelphia (CHOP). Fellows are exposed to clinical genetics through rotations in pediatric and adult clinical genetics and biochemical genetics. At the completion of the fellowship, the trainee will be eligible to take the Molecular Genetic Pathology Board examination.

Cytogenetics: The fellow will learn specimen processing methods, cell culture technique, FISH, microscopy techniques, karyotype analysis, reporting related to oncology and constitutional cytogenetics.

CHOP Division of Genomic Diagnostics (DGD): The fellow will have the opportunity to shadow and participate in the various laboratory tests offered by the DGD including constitutional genetic and genomic testing, cancer genomic testing and immunogenetic testing.

ELEMENTS OF PROGRAM

Molecular Pathology Service: The fellows assume significant and increasing clinical and laboratory responsibility in a state-of-the-art molecular pathology laboratory at HUP that performs a broad range of molecular testing in the areas of inherited disorders, hematologic and solid tumor molecular oncology, infectious diseases, and identity testing. Service entails the involvement of the fellow and one or two pathology residents in all aspects of molecular testing in order to provide optimal patient care. Fellows assist in the training at the beginning of each rotation, with the residents gradually taking on greater responsibility for the service work. Requests for molecular testing are assessed on a daily basis to ensure the appropriateness of the requested test in the context of the clinical scenario. Test results are reviewed in preparation for reporting by the faculty and communication of critical results to health care providers. Daily case review sessions are an excellent opportunity for teaching and learning about the application of molecular technologies and the role of molecular diagnosis in clinical decision-making. Over the course of the fellowship, trainees will be exposed directly to hundreds of cases in a wide variety of diseases and clinical situations.

Center for Personalized Diagnostics: While rotating through the CPD, fellows will learn next-generation sequencing methods and participate in test development/validation, from sample selection, through extraction and sequencing, to bioinformatics and interpretation. In addition, the fellow will participate in case triage, review, and sign-out with the genetic counselors and attending faculty. In order to further appreciate the utility of genomic data in providing a personalized treatment plan for patients with malignancies, fellows will also attend and participate in Solid and Hematologic Tumor Boards, as well as a variety of other specialized clinical conferences where genomic data are discussed in the broader context of the patients' clinical and pathological history.

Clinical Genetics: The fellow participates in the diagnosis, management, and treatment of patients with genetic disorders, and in the counseling of the patient and family by attending clinics in the HUP Division of Medical Genetics. A rotation at CHOP provides the opportunity to observe and participate in the counseling and care of pediatric genetics patients in areas including general genetics, dysmorphology, metabolic, and biochemical genetics.

Microbiology/Virology: The Virology Laboratory at CHOP and the Microbiology Laboratory at HUP provide dedicated, hands-on training in various aspects of the development, testing, and utilization of molecular techniques for the diagnosis and treatment of infectious diseases. In addition, the fellow will be exposed to virology testing in the HUP Molecular Pathology Laboratory.

Laboratory Administration: The fellow will have ample opportunity to be involved in the administration of the laboratory as a member of the management team. Activities may include quality improvement initiatives, troubleshooting of assays, resolution of laboratory problems, proficiency testing, CAP inspection preparation, and new test development.

Test Development: The fellow will engage in a test development curriculum across multiple laboratories, throughout the year. This experience provides training in all aspects of assay validation, from its inception through technical validation, cost analysis, preparation of report templates, and training of technologists. Interested fellows may opt to focus their development training experience on a single assay from inception to clinical implementation. Faculty guidance and monitoring of progress is provided, but the fellows are given primary responsibility for completion of development projects.

Teaching and Conferences: A comprehensive didactic series is given by the faculty and staff for the fellows and residents. The fellows will have ample opportunities to enhance presentation skills through participation in several interdepartmental case conferences.

KEY PROGRAM FACULTY

DIVISION OF PCD

Kojo Elenitoba-Johnson, MD
Jason Rosenbaum, MD (Program Director)
Vivianna Van Deerlin, MD, PhD
Christopher Watt, MD, PhD
Salvatore Priore, MD, PhD
Warren Pear, MD, PhD
Malay Haldar, MD, PhD
Jennifer Morrisette, PhD
Jacquelyn Roth, PhD

MICROBIOLOGY

Laurel Glaser, MD, PhD

CHOP

Lea Surrey, MD
Minjie Luo, PhD

APPLICATION INFORMATION

Eligibility: Two MGP fellowship positions are available each year. Under some circumstances, a third fellow may be added at the discretion of the program. Candidates must be Board-eligible in either AP and/or CP or Medical Genetics and have passed the USMLE Part 3 exam prior to the start of the program. They must also be licensed or eligible for licensure in Pennsylvania. Prior experience in genetics and/or molecular biology is recommended.

Applications: Each academic year begins on the first of July. Application forms can be obtained by calling (215) 662-6644 or may be downloaded from the laboratory website:

<http://pathology.med.upenn.edu/education/fellowships/programs/molecular-genetic-pathology>.

Applications will be accepted beginning July 1, with an end date of December 31st, 18 months prior to the start of the program. Offers of a position are given on a rolling basis after the start of interviews; therefore, we encourage applicants to submit their applications early, as there is no guarantee that a position will be available. Candidates considered for the program will be asked to interview.