The Graduate Program in Life Sciences (GPILS) offers cutting-edge research training in basic, biomedical, clinical, and population sciences. Graduate programs in biochemistry and molecular biology, epidemiology and human genetics, gerontology, molecular medicine, molecular microbiology and immunology, neuroscience, physical rehabilitation science, and toxicology award PhD and/or MS degrees and provide integrative training. Following the structural elucidation of the genome, graduates meet the demands of the era as they translate biomedical advances to patients and communities. Students are well prepared for careers in academia, industry, or government. The University of Maryland campus is located a few blocks from Baltimore’s Inner Harbor, which is an ideal location within the nexus of biomedical research on the East Coast, providing students with access to an unparalleled level of expertise.

programs and training

GPILS’s eight programs cover the entire range of biomedical research—from the basics of protein structure and molecular biology, through integrative systems physiology, virology, and vaccine development, to behavior-, cognition-, and population-based genetics, prospective studies, and the impact of the environment on human health. Each independent degree-granting program maintains its own admission criteria and standards for advancement and graduation. Programs are independent from departments and consist of faculty from basic science and clinical departments in the schools of dentistry and medicine, the Institute for Genome Sciences, the Institute of Human Virology, and other University of Maryland research centers, institutes, and campuses. This structure provides greater coordination among the graduate programs in order to better serve the training and education needs of graduate students. GPILS strives to provide student researchers with the tools needed to solve many of the problems facing humankind today and to anticipate and hopefully prevent those emerging in the future. Program graduates who do not pursue careers in research go on to successful careers in governmental agencies, private biotech and pharmaceutical companies, venture capital firms, academic policy and administration, patent law, scientific writing and editing, consulting, and more.
The University of Maryland (UM) campus is located on the Westside of downtown Baltimore, just a few blocks from the Inner Harbor. UM consists of seven professional schools, including the Graduate School and the schools of dentistry, law, medicine, nursing, pharmacy, and social work. Physicians, scientists, medical students, postdoctoral scholars, and graduate students work side by side in state-of-the-art facilities including the University of Maryland BioPark. The School of Medicine operates in partnership with the University of Maryland Medical Center, the R Adams Cowley Shock Trauma Center, and the Baltimore Veterans Affairs Medical Center, where faculty members treat patients and conduct studies. This affords students many clinical opportunities.

To honor the achievements and contributions of graduate students, postdoctoral scholars, and faculty members, the academic community gathers annually at the GPILS Awards Ceremony. A committee comprised of faculty, staff, graduate students, and postdoctoral fellows reviews a large and highly competitive pool of nominees for the various award categories. Each student and postdoc award winner has his or her name engraved on a plaque that is housed in the GPILS office and receives a cash prize in addition to the award trophy. Awards are given in the categories of PhD Scholar, Postdoctoral Scholar, PhD Thesis Project, Teacher of the Year, and The Otani Award, which is awarded to the graduate who excels both academically and for service to the community. This event is attended by students, postdocs, faculty mentors, and senior University leadership. Following the award presentations there is always a lively reception enjoyed by all.

The GPILS Annual Distinguished Lectureship is one of the premiere lecture events on campus and is widely attended by the University community and by other academics in the greater Baltimore area. The goal of this lectureship is to provide an opportunity for students, postdoctoral scholars, and faculty to hear an internationally renowned scientist, who is not a member of the University of Maryland faculty, discuss his or her research and “career story.” The opportunity to invite and secure the speaker for this event is rotated between the eight PhD-granting graduate programs. The day of the lecture, students attend a luncheon with the speaker. Following the seminar there is a reception and dinner.
The epidemiology track has a strong quantitative focus, providing students with the tools needed to conduct world-class research on epidemiologic questions and to participate in multidisciplinary research in a wide range of specialties. Training concentrates on understanding the biological, behavioral, social, environmental, and organizational determinants of disease and health outcomes.

Recent student dissertation projects have examined the persistence of malaria in certain hot spots in Thailand, the emergence of staphylococcus infections, gender differences in bladder cancer risk, autoimmune disease and breast cancer, and the effects of sun exposure and vitamin D on multiple sclerosis risk and progression.

The molecular epidemiology track is designed for students who wish to undertake research that combines molecular, genetic, and epidemiologic techniques and apply them to the understanding of human health and disease. Recent advances in genomics have added a new dimension to the understanding of risk factors for disease transmission and acquisition. Students in this track develop...
a solid knowledge base in epidemiology and biostatistics, while gaining the laboratory and informatics skills needed to incorporate genomic data into their research. The genetic structure of malaria and its effect on vaccine success in Mali, risk factors for childhood diarrhea in Bangladesh, optimal universal precautions for treating patients with hospital-acquired infections, and markers for inflammation and depression among hip fracture patients are just a few of the diverse dissertation topics examined by students in this track.

The human genetics and genomic medicine track offers training for students who want to understand human genetic variation and its relation to health and disease. Students first receive a broad overview of human genetics (molecular, biochemical, clinical, cytogenetics, and genetic epidemiology/genomics), and then specialize in their particular areas of interest. The track utilizes a multidisciplinary team approach to research training involving faculty from across the campus. Recent students have carried out research in a range of areas, including mechanisms of DNA repair, clinical genetics and screening, gene mapping in simple and complex diseases, gene discovery and function, recombination and mutation in bacteria that cause human disease, and characterization of chromosomal diversity in an Amish population.
student life

The University of Maryland (UM) campus is located in downtown Baltimore, just blocks from the Inner Harbor and a wide variety of shopping, dining, and entertainment options. The Inner Harbor is also home to the National Aquarium, Baltimore; the Maryland Science Center; Oriole Park at Camden Yards; Ravens Stadium; and Harborplace and the Gallery.

campus center

The Southern Management Corporation (SMC) Campus Center at UM provides space for students, faculty, and staff to come together. The Wellness Hub, URecFit, Student Life Services, Event Services, and Bon Appétit, are all housed within the SMC Campus Center, which is conveniently connected to the Health Sciences and Human Services Library. The SMC Campus Center provides a variety of spaces for students to use including study areas and spa-like relaxation rooms. In addition to a pool and world-class exercise facilities, URecFit provides a diverse array of group exercise options including spin classes, aerobics, and yoga. The programming provided by the Wellness Hub staff is aimed at helping the University community enjoy a healthy work-life balance through a robust set of ongoing workshops, small group activities, and weekend expeditions that take students off campus for activities such as hiking and kayaking tours of Washington, D.C.'s capital area.

financial support and housing

PhD students are guaranteed a highly competitive stipend and complete remission of tuition and health insurance for the duration of their studies. The cost of living in Baltimore is surprisingly reasonable especially when compared to other similarly sized cities on the East Coast. Residents of Baltimore City and the surrounding suburbs enjoy ample public transportation options in addition to a wide array of housing choices. Students that are interested in living on campus have several options including the Pascault Row Apartments and Fayette Square Apartments, which combine the best features of luxury apartment living with the essentials for today's sophisticated scholar, all within blocks of school.
The reason Baltimore is known as “Charm City” has a lot to do with the people who live here. Residents are uniquely unpretentious and take great pride in their city, neighborhoods, and sports teams. When they say, “Welcome to Bawlmer, Hon!” (in that wonderfully unique Baltimore accent), the endearment is not in jest. Baltimoreans are an extraordinarily welcoming bunch, which is part of the reason so many visitors return again and again.

Feeling hungry? Baltimore is best known for its seafood, particularly crab cakes and steamed blue crabs. Make sure to ask a local for restaurant recommendations—they are usually very opinionated about where to find the best crabs and crab cakes. The stalls of Baltimore’s world famous public markets offer cuisine to suit any palate. On the Eastside of the Harbor students will find historic Little Italy. Residents and visitors to the city’s eclectic neighborhoods enjoy dining options ranging from popular neighborhood pubs and bistros to well-known restaurants offering world-class cuisine and dining experiences.

Within walking distance of the campus are M&T Bank Stadium and Oriole Park at Camden Yards, home to the Baltimore Ravens and Baltimore Orioles, respectively. Baltimore is also home to a number of museums dedicated to just about everything from art and history to pop culture, sports, and dentistry. Historic sites and monuments can be found throughout the area. Students who are interested in the dramatic can find small art-house theatre, touring Broadway productions, and everything in between. Those with a passion for music won’t be disappointed—Baltimore has many noted venues for live music.
core course

During the first semester of study the majority of students take what is considered GPILS’s “core course”—Mechanisms in Biomedical Sciences: From Genes to Disease. An eight-credit class, this course is a comprehensive overview of current knowledge in cellular, molecular, and structural biology. Providing all of the background necessary for subsequent specialized studies in biomedical research in a concentrated program, the innovative format of this course is highly interactive. Mechanisms in Biomedical Sciences: From Genes to Disease includes lectures presenting creative, cutting-edge approaches to investigating fundamental and current biomedical questions in concert with a review of the fundamental principles of molecular and cellular biology. Vertically integrated topics tie together the study of individual genes, proteins, cellular function, and associated clinical disorders and place an emphasis on the development and critical evaluation of scientific hypotheses and state-of-the-art techniques.

ethics

In research ethics, students examine data collection and ownership, issues in the use of human and animal subjects, the responsibilities of authorship, the identification and handling of conflicts of interest, scientific misconduct, the peer review system, collaborative research in academia and industry, mentor/mentee relationships, contemporary ethical issues, and the role of the scientist as a responsible member of society. Topics of discussion are “ripped from the headlines.” Engaging in interactive discussions related to recent events in the scientific world adds to the relevance of the course.
All courses make use of educational support technologies including online delivery of content, resources, and discussions via Blackboard and the Blackboard Mobile Learn app for iPads, iPhones, and BlackBerrys. Students access readings, notes, and PowerPoint files that are provided in advance of each lecture and can download MP4 and MP3 (video and audio) recordings of lectures, which are posted following each lecture for students to use as study aids and references. Recently, GPILS implemented an iPad pilot program in which all PhD students enrolled in the GPILS core course receive an iPad. Faculty are now utilizing an iPad-based, e-click solution in class, which allows students to anonymously respond to questions from their iPads. The aggregated results are then displayed in bar-chart format on both the presentation screens of the lecture hall and on their iPad screens. This interactive engagement helps to steer the direction of lectures and enhances the overall learning experience. Also, as part of the iPad pilot program, students, faculty, and support staff are testing numerous apps including iAnnotate PDF, which provides students with a powerful PDF reading and annotation solution and has allowed the GPILS core course to go nearly paperless.

This state-of-the-art facility, which opened in 1998, provides wireless access, more than 900 seats, 1,500 data connections, 40 study rooms, three microcomputer classrooms, and a distance education center. The HS/HSL staff also provide a well-developed series of monthly workshops on research and presentations skills and on emerging technologies that enhance collaborations, communications, and professional efficiencies. As the second largest health science library on the East Coast, and the intellectual heart of the campus, over 370,000 volumes and 3,500 print and digital subscriptions are housed within this architecturally striking building.
University of Maryland (UM) faculty take mentoring seriously and view the development of students as one of the most important factors in the success of their respective research goals. Plainly put: student researchers are highly valued and respected. As faculty train the next generation of scientists, they strive to provide them with the tools needed to solve many of the problems facing humankind today and to anticipate and hopefully prevent those emerging in the future.

GPILS boasts an impressive faculty with whom students can choose to do their dissertation research. Faculty members represent a large and diverse research enterprise that spans many departments, centers, institutes, and several of the schools across the campus. This allows students access to a number of different research strategies and models and provides unparalleled opportunities to engage in multidisciplinary collaborations. Students also benefit from a collegial and highly interactive atmosphere that is rare amongst top-tier researchers. To read more about UM faculty, visit the GPILS program website.

lab rotations

GPILS graduate programs seek to engage student researchers in hands-on research as soon as possible—many programs have lab rotations as part of their curriculum. If they are taking the core course, students typically begin lab rotations as soon as the core course ends. Lab rotations are essential in that, by giving several labs of interest a trial run, students are well-equipped to select a mentor with whom they will find success. Many programs also offer “professor’s rounds” where students learn about potential mentors through a series of informal “chalk-talks” where professors discuss the research they are conducting.
Many GPILS programs and research areas host their own seminars, journal clubs, and retreats. There are so many seminars on campus that students sometimes have a hard time picking which ones to attend. It is important to give students as many opportunities to learn outside of the classroom as possible. Journal clubs give students the chance to present and defend important new literature to colleagues. Retreats allow students to interact with their colleagues and mentors in a different environment and to immerse themselves in specific topic areas, and to present their research during poster sessions or short talks. Many program retreats stress the importance of taking a break almost as much as they stress scientific dialog. Those retreats include activities ranging from Frisbee and horseshoes to volleyball and rafting trips.

Traveling to relevant scientific conferences and eventually presenting at these conferences is a key part of a student researcher’s development. These meetings provide students with the opportunity to network with researchers from other institutions and develop the types of professional relationships that foster collaborations and often lead to employment opportunities following graduation.
GPILS recognizes the ever-evolving professional environment that graduates have before them. The degree and expertise they acquire during their course of study provides them with a wide array of career opportunities, and to that end, the program is committed to providing student researchers with a well-rounded training program and the support they need to excel in the career of their choice. Students enjoy a wide range of career development activities, seminars, and workshops that are vital to success in today’s market. Career development opportunities include a “Careers Away From the Bench” seminar series (followed by Q&A luncheons with speakers); workshops on grant writing and publication submission; effective research presentations; developing a CV; networking, interviewing, and negotiation skills; and a workshop on differentiating oneself in the employment marketplace. Also, students have access to an expansive series of workshops on lab leadership and project management. GPILS student researchers are prepared for today’s and tomorrow’s career opportunities.

GPILS students are regularly recognized for outstanding contributions to their fields at national and international conferences, as well as by GPILS and the University of Maryland for their contributions to the University’s research enterprise. Students typically publish first-author papers in top-tier scientific journals and have a high rate of obtaining successfully funded individual research grants. Being able to list these types of accomplishments on their CVs helps graduates differentiate themselves from the pack.
Alex Drohat, PhD  
Biochemistry and Molecular Biology; 1997  
MENTOR: David Weber, PhD  
THESIS TITLE: “The Three-Dimensional Structure and Subunit Association of S100B in the Apo and Ca(II)-Bound States, and Its Ca(II)-Dependent Interaction With Target Proteins”  
CURRENTLY: Assistant Professor, Department of Biochemistry and Molecular Biology, University of Maryland, School of Medicine

Richard Lovering, PhD, PT  
Physical Therapy and Rehabilitation Science; 2003  
MENTOR: Patrick De Deyne, PhD  
THESIS TITLE: “Eccentric Contraction-Induced Skeletal Muscle Injury and Its Consequences for the Sarcolemma and the Associated Cytoskeleton”  
CURRENTLY: Assistant Professor, Department of Orthopedics, University of Maryland, School of Medicine

David Schwwope, PhD  
Toxicology; 2011  
MENTOR: Marilyn Huestis, PhD  
THESIS TITLE: “Free and Glucuronidated Cannabinoids, Subjective, Physiological, and Psychomotor Effects and in vitro Cannabinoid Stability Following Controlled Smoked Cannabis Administration”  
CURRENTLY: Research Scientist, Aegis Sciences Corporation

John Teijaro, PhD  
Molecular Microbiology and Immunology; 2009  
MENTOR: Donna Farber, PhD  
THESIS TITLE: “Memory CD4 T Cell Heterogeneity and Protection Against Influenza Virus Infection”  
CURRENTLY: Senior Research Associate, Viral Immunobiology Laboratory, The Scripps Research Institute

Nicole Hoppman-Chaney, PhD  
Epidemiology and Human Genetics; 2007  
MENTOR: Braxton Mitchell, PhD, MPH  
CURRENTLY: Co-Director of the Clinical Cytogenetics Laboratory, Mayo Clinic

Jaclyn Schwarz, PhD  
Neuroscience; 2008  
MENTOR: Margaret McCarthy, PhD  
THESIS TITLE: “A Critical Role for Glutamate in the Organizational Effects of Estrodiol on the Developing Hypothalamus”  
CURRENTLY: Postdoctoral Fellow, Duke University, School of Medicine

Quincy Miles Samus, PhD, MS  
Gerontology; 2007  
MENTOR: Ann Gruber-Baldini, PhD  
THESIS TITLE: “Differentiated Patterns and Determinants of Functional Dependency in Assisted Living Residents With and Without Dementia”  
CURRENTLY: Assistant Professor, Department of Psychiatry and Behavioral Sciences, Johns Hopkins University, School of Medicine

Patrick Hagner, PhD  
Molecular Medicine; 2010  
MENTOR: Ronald Gartenhaus, MD  
THESIS TITLE: “Targeting the Translational Machinery as a Novel Treatment Strategy for Non-Hodgkin Lymphoma”  
CURRENTLY: Research Fellow in Biological Chemistry and Molecular Pharmacology, Harvard Medical School