DOCTOR OF PHILOSOPHY IN THE FIELD OF GENOMICS AND BIOINFORMATICS

The PhD in genomics and bioinformatics program is designed to develop research scientists in areas where the principles and methods of cell and systems biology, biochemistry and genetics are applied to the study of human diseases.

Investigators in the program use the latest technologies in genomics, proteomics, high-resolution imaging, bioinformatics and pre-clinical (murine) trials. The training program includes research opportunities in autism spectrum disorders, muscular dystrophies, biomarkers, asthma, airway diseases, brain tumors, microRNA processing, dysregulation of mitochondrial functions and protein trafficking.

The program begins with interdisciplinary coursework in genes, cells and systems in biomedical sciences, professional development in scientific communication and science careers, and laboratory rotations offered through GW’s Integrated Biomedical Sciences program (https://ibs.smhs.gwu.edu/). After the first year of study, students work with their research advisor to complete remaining degree requirements, including the dissertation.

Program faculty are drawn largely from the GW School of Medicine and Health Sciences, including scientists from the Children’s Research Institute of Children’s National Health System.

Students have access to extensive research facilities and libraries on campus and in the greater Washington, DC area. These include the School of Medicine and Health Sciences, GW’s Gelman Library and Himmelfarb Health Sciences Library, the Children’s Research Institute, National Institutes of Health, and numerous other research institutions.

This is a STEM-designated program.

Visit the Integrated Biomedical Sciences program website (https://ibs.smhs.gwu.edu/) for additional information.

ADMISSIONS

Admission deadlines:
- Fall – December 1

Standardized test scores:
The GRE general exam is not required.

Minimum scores for the program are:
- Academic IELTS: an overall band score of 7.0 with no individual score below 6.0; or
- TOEFL: 600 on paper-based or 100 on Internet-based; or
- PTE Academic: 68;

Recommendations:
- Three (3) recommendations required:

Prior academic records:
- Transcripts are required from all colleges and universities attended, whether or not credit was earned, the program was completed, or the credit appears as transfer credit on another transcript. Unofficial transcripts from all colleges and universities attended must be uploaded to your online application. Official transcripts are required only of applicants who are offered admission. If transcripts are in a language other than English, English language translations must be provided. The English translation alone should be uploaded into your application.

Prerequisite requirements:
- A bachelor’s degree in biological sciences, chemistry, or a related field.

Statement of purpose:
In an essay of 250 – 500 words, state your purpose in undertaking graduate study in your chosen field. Include your academic objectives, research interests, and career plans. Also discuss your related qualifications, including collegiate, professional, and community activities, and any other substantial accomplishments not already mentioned on the application.

Interview:
- An interview is required.

Additional requirements:
- A Curriculum Vitae is required.

International applicants only:
- Please follow this link - https://columbian.gwu.edu/international-graduate-applicants/ - to review the International Applicant Information carefully for details on required documents and English language requirements.

Supporting documents not submitted online should be mailed to:
Columbian College of Arts and Sciences, Office of Graduate Studies
The George Washington University
801 22nd Street NW, Phillips Hall 107
Washington DC 20052

For additional information about the admissions process visit the Columbian College of Arts and Sciences Frequently Asked Questions (https://columbian.gwu.edu/graduate-admissions-faq/) page.

Contact:
askccas@gwu.edu
202-994-6210 (phone)
REQUIREMENTS

The following requirements must be fulfilled:

The general requirements stated under Columbian College of Arts and Sciences, Graduate Programs (https://bulletin.gwu.edu/arts-sciences/#degreeregulationtext).

The requirements for the Doctor of Philosophy Program (https://bulletin.gwu.edu/arts-sciences/#doctoraltext).

72 credits, including required core and elective courses. Successful completion of a grant-style qualifier examination is required for advancement to candidacy. In addition, students perform full-time research in faculty laboratories for the duration of their program.

Students are advised to complete 45 credits in the first two years of PhD study comprising required interdisciplinary core courses, required genomics core courses, electives, and advanced readings and research. Upon successful completion of a grant-style qualifier, students register for up to 27 credits of dissertation research through completion and successful oral defense of a written dissertation.

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>Required interdisciplinary core</strong> *</td>
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<tr>
<td>BMSC 8210</td>
<td>Genes to Cells</td>
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<tr>
<td>BMSC 8212</td>
<td>Systems Physiology</td>
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<tr>
<td>BMSC 8215</td>
<td>Lab Rotations (Taken three times for a total of six credits)</td>
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<tr>
<td>BMSC 8216</td>
<td>Scientific Writing, Presentation Skills, and Seminar Planning</td>
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<tr>
<td>BMSC 8217</td>
<td>Ethics and Grant Writing</td>
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<tr>
<td>BMSC 8218</td>
<td>Career Options in the Biomedical Sciences</td>
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<tr>
<td>BMSC 8230</td>
<td>Molecular Basis of Human Disease</td>
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<tr>
<td>BMSC 8235</td>
<td>Applied Biostatistics for Basic Research</td>
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<tr>
<td><strong>Required genomics core</strong> *</td>
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<tr>
<td>GENO 8231</td>
<td>Introduction to Genomics, Proteomics, and Bioinformatics</td>
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<tr>
<td>GENO 8234</td>
<td>Genomics and Precision Medicine Seminar (Taken two times for a total of two credits)</td>
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<tr>
<td><strong>Electives</strong></td>
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<tr>
<td>20 credits elective courses selected in consultation with graduate program advisor.</td>
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<tr>
<td>ANAT 6130</td>
<td>Clinically Oriented Human Embryology</td>
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ANAT 6150 | Clinically Oriented Human Microscopic Anatomy           |
ANAT 6160 | Human Clinical Neuroanatomy                             |
ANAT 6182 | Fundamentals of Translational Science                    |
ANAT 6275 | Advanced Studies in Translational Sciences               |
ANAT 6292 | Projects in Anatomical Sciences: Introduction to Neuroradiology |
BIOC 6240 | Next Generation Sequencing                              |
BIOC 6242 | Bioscience Big Data Statistics                          |
BIOC 6281 | Topics                                                  |
BIOC 8225 | Metabolism                                              |
BIOC 8232 | Molecular and Cellular Signaling                        |
BMSC 8219 | Writing the Grant-Style Qualifier                       |
BMSC 8220 | IBS Research Practicum                                  |
CANC 8221 | The Basic Science of Oncology                           |
CANC 8222 | Molecular Oncology and Cancer Epigenetics                |
CANC 8223 | Immunology and Immunotherapy of Cancer                   |
GENO 6223 | Bioinformatics                                           |
GENO 6236 | Medical Genomics                                         |
GENO 6237 | Proteomics and Biomarkers                               |
GENO 8232 | Computational Biology and Bioinformatics: Principles and Practices |
GENO 8998 | Advanced Readings and Research                          |
MICR 6292 | Tropical Infectious Diseases                            |
MICR 8210 | Infection and Immunity                                  |
MICR 8230 | Molecular and Cellular Immunology                        |
MICR 8270 | Advanced Topics in Immunology                           |
MICR 8271 | HIV Persistence, Comorbidities, and Treatment            |
NRSC 8284 | Foundations of Experimental Neuroscience I               |
NRSC 8285 | Foundations of Experimental Neuroscience II              |
<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PHAR 6116</td>
<td>Pharmacogenomics and Personalized Medicine</td>
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<tr>
<td>PHAR 6205</td>
<td>Pharmacology</td>
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<tr>
<td>PHAR 6206</td>
<td>Advanced Pharmacology</td>
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<tr>
<td>PHAR 6322</td>
<td>Advanced Professional and Communication Skills</td>
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<tr>
<td>PHAR 8211</td>
<td>Physiology</td>
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<td>PHAR 8281</td>
<td>Molecular Pharmacology and Neurobiology of Excitable Tissues</td>
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<tr>
<td>PUBH 6276</td>
<td>Public Health Microbiology</td>
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<td>PUBH 6278</td>
<td>Public Health Virology</td>
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<tr>
<td>PUBH 6861</td>
<td>Public Health Genomics</td>
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<tr>
<td><strong>Dissertation research (6-27 credits)</strong></td>
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<tr>
<td>GENO 8999</td>
<td>Dissertation Research</td>
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*Required courses may be waived at the discretion of the graduate program director based on written documentation of prior equivalent coursework. Any waiver increases the number of electives required, by the number of credits waived.*