



## Online Master of Science in Precision Medicine

35 Credit Hours

### Admission Requirements:

- Application and processing fee.
- Official transcripts in English of all previous colleges attended. The transcripts must indicate an earned Bachelor's degree from a regionally accredited college or university.
- An undergraduate GPA of 3.0 and no work experience OR an undergraduate GPA between 2.5-2.99 with quality full-time work experience. The program director will evaluate applications on a case-by-case basis.
- Purpose statement addressing career goals.
- Resume or CV.

### Cost:

- Per Credit - \$650
- Resource Fee - \$200 per course\*
- Total Tuition Per Course - \$2,150
- Estimated Total Tuition - \$24,750

\*Resource fee does not apply to research application courses.

# Master of Science in Precision Medicine



## Required Curriculum:

### **PCM 601 - Histopathology and Molecular Biology of Cancer**

This course introduces fundamental cancer theory and image analysis techniques in cancer histopathology. Students will explore topics in slide preparation and changes in tumor cell morphology as it relates to image interpretation. An introduction to the application of digital image processing techniques for feature extraction and disease classification is provided.

### **PCM 605 - Molecular Targets in Precision Medicine**

The identification of drug targets for disease is central to pharmaceutical research. This course provides students a historical understanding of key targets of drug development by reviewing one of the most important aspects of drug discovery – the identification of drug targets for precision medicine.

### **PCM 611 - Essential Clinical Laboratory Operations/Management Skills**

Training in genetics laboratory operations and management is an essential component in a laboratory leader's professional's toolkit. This program covers the best practices in many areas of laboratory management and reporting, including financial considerations in sustainable laboratory operations, accreditation and quality control issues, HIPAA, ethics in molecular pathology, effective communication strategies, and how to manage and report bioinformatics results.

### **PCM 622 - Applied Next Generation Sequencing (NGS) and Analysis**

Since the completion of the Human Genome Project, next generation sequencing (NGS) has become the leading technology platform driving advances in Precision Medicine. This course provides fundamental training in the most advanced NGS platforms, methods and their applications to healthcare practice and medical research.

### **PCM 626 - Applied Medical Genetics/ Pharmacogenomics**

This course presents fundamental concepts, laboratory techniques and skills employed in the rapidly growing field of applied medical genetics. With an emphasis in cancer genetics, this class explores how patient genetic data are used to better diagnose diseases, assess risk and select optimal treatment strategies based on an individual's genetic profile.

### **PCM 633 - Regulatory and Operational Compliance**

Diagnostic laboratories are subject to unique regulatory and payment guidelines. This course explores key clinical laboratory practices needed to demonstrate knowledge, intent and processes that comply with important safety and legal regulations. Also discussed will be practices to help remain current with ongoing changes in relevant laws and regulations.

### **PCM 637 - Advanced Strategies in Clinical Biomarker Development/Use**

Biomarkers are used to objectively measure and evaluate biological processes, or responses to a therapeutic intervention. This course explores how to identify, verify and validate biomarkers in molecular medicine and explores nine ways that precision medicine can benefit patients and the healthcare system.

### **PCM 641 - Introduction to Machine Learning and Artificial Intelligence**

This course provides an introductory explanation of data analysis techniques including machine learning, data mining, and statistical analysis used to generate clinically useful molecular information for clinicians to make diagnostic, prognostic and/or therapeutic decisions.

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## Required Curriculum:

### **PCM 644 - Clinical Research Designs / Statistics / Data Analytics**

This course examines key research design principles pertinent to health care, clinical laboratory operations and drug development. Students will learn classical and adaptive clinical trial study designs, common statistical methods and quality assurance techniques used to interpret clinical data and platforms used to analyze online clinical data sets.

### **PCM 652 - The Immune System and its Role in Precision Medicine**

Due to the important role immunology plays in infectious disease, autoimmune disorders, chronic disease, cancer and more, major pharmaceutical research focuses on precision medicine strategies that target the immune system. This course provides an advanced study of clinical immunology including physiology of the immune system, the immune response to infection and disease, pathophysiology of infectious disease and current diagnostic and immune targeted strategies used in drug development and disease treatment.

## Research Application:

### **PCM 671 - Research Application 1**

Students will be paired with research mentors who are working in existing data sets to identify a research problem and propose an analysis.

### **PCM 672 - Research Application 2**

Students will work with a research mentor to conduct a literature review and description of the data deployed in the specific research project.

### **PCM 673 - Research Application 3**

Students will work with a research mentor to analyse the dataset according to the research proposal.

### **PCM 674 - Research Application 4**

Student will work with a research mentor to compile and write a research report, which will be graded by the faculty of record.

### **PCM 675 - Research Application 5**

Student will work with a research mentor to create an asynchronous research presentation, which will be graded by a panel of three faculty members.