

The MD/Master of Science in Genomic Medicine Program at the University of Miami, Miller School of Medicine

The Medical Degree (MD) /Master of Science in Genomic Medicine program (MSGM) was started in 2012. The program is structured to allow the completion of both the traditional MD curriculum and the MSGM program in four years. It builds upon the continued success of the Four Year Pathway in Medical Genetics and Genomics (initiated in 2005) at the Miller School of Medicine. The Pathway program provides research experience and clinical enrichment activities for interested medical students, but no additional certification or credential. Currently there are 39 medical students in the MSGM program, and an additional 35 in the Pathway program.

The first class of four MSGM students graduated this summer, entering residencies in Ob/Gyn (2), internal medicine (cardiology) and general surgery. These residencies reflect the educational mission of the MSGM: to graduate clinicians with the ability and desire to integrate genomic knowledge into any specialty, not just traditional medical genetics. An additional goal is to have MSGM graduates help educate their fellow students during medical training and fellow residents during their residencies.

As the current medical school curriculum is relatively fixed, the MSGM concurrent program allows additional training and enrichment for those interested students without extending their clinical training. Students are introduced to the program during the medical school application and interview process, and interested students apply for admission to the MSGM program in their first semester of medical school. Students begin MSGM studies in January of their second semester, with approval of the Medical School.

To allow the completion of the MSGM program in the same four years as the MD degree, we have structured instruction in four primary components: 1) **a self-paced didactic component in each course**, involving directed readings and online video lectures that the students can review at any time, maximizing flexibility. 2) **weekly small group “active learning” sessions** to emphasize topics covered in the online videos, using hands-on exercises such as problem sets, research paper discussions, and the classical “case study” format to illustrate an application of genomic information in a disease. These are completed during the first two years of medical school classroom work. 3) **clinical experience through medical genetics and genomic medicine clerkships** in the 3rd or 4th clinical year. 4) Completion of a capstone experience, which comprises three elements: a) **attendance at journal “symposiums”** occurring five times per year during their clinical years, b) **ten case reports** from clinical rotations describing their relevance to genomic medicine, and c) **a research project**, culminating in a master’s paper and oral presentation.

The faculty for the MSGM program are drawn from the existing faculty in John P. Hussman Institute for Human Genomics (HIHG) and the Dr. John T. Macdonald Foundation Department of Human Genetics. Sufficient numbers of clinical and research faculty exist to fulfill instructional requirements, and most courses are team-taught, reducing the instructional load for any one faculty member.

All students in the MSGM program pay dual-degree tuition charges for enrolling MD students, regardless of state residency. In addition, we have received yearly grants from the John T. and Winifred Hayward Foundation. Initially, these were used to support administrative and teaching costs for the program, until these components became self-supporting through tuition. Currently the Hayward Foundation funding helps support the MSGM laboratory course, in which the students identify the genetic cause of rare, inbred disorders using Next Generation Sequencing - true hands on learning - as well as providing a small research fund for student capstone research projects and supporting travel for students to a genetics meeting.