Concurrent Master's in Genomic Medicine for Medical Students
4 years to MD/MS

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Program Background

- The potential for genomic information to be incorporated into medicine is increasing rapidly
- Experience: Guilford County GM in NC in private practices about 12 years ago (now known as the Genomedical Connection)
- DOD funded, purpose was modeling more than practice
- Problem: Not the public but the physician
  - Physicians are reluctant to practice genomics
  - Physicians are the actual consumers, the gatekeepers to the patients
  - Without creating and educated "market" we could end up the GM food problem

Training Physician "Consumers"

- One of the major bottlenecks is the lack of knowledge and "comfort" by physicians:
  - Knowledge:
    - Older physicians never were taught genetics
    - Medical school curriculum's are already full
  - Lack of training increases
    - Concern of litigation
    - Time needed to "catch-up", further dissuading MDs

Program Background

- Masters
  - Avoids curriculum problem
  - Train one, they train others
  - Increases awareness in other medical students
  - Goal is create a qualified consumer and advocate
  - Increases value for residency?
- Medical School Approaches
  - Add a year for Masters
- Incorporate training over regular 4 years
  - Gives time for questions and hopefully reinforces training
  - Keeps up-to-date into residency
  - Less intense infrastructure

Program details

- 30 credit hour program over 4 years
  - Didactic coursework (self-paced online modules)
  - Small group discussions
  - Laboratory rotations
  - One clinical rotation
  - Research thesis in genomics
- Concurrent with medical curriculum
  - Last two years of MSGM focus on research and clinical experience

Hussman Institute and Department of Genetics Support faculty

- Statistical/Bioinformatics 8 faculty
- Epigenetics 2 faculty
- Molecular 8 faculty
- Clinical 6 faculty
- Ethics 2 faculty
- Clinical Laboratory 3 faculty
- Genetic Counselors 5, one faculty
- Currently 17 graduate students for PhD

MSGM Curriculum

Year 1(second semester)	Year 2	Years 3 & 4
Fundamentals of Genomic Medicine: Intro to basic concepts, terminology, and clinical skills important in genomic medicine.	**Computational Methods for Genomic Medicine**: Will provide instruction on basic biostatistical terminologies and tests as well as risk assessment and bioinformatics tools.	**Genomic Medicine Clerkship:** An elective clerkship in genomic medicine or medical genetics completed as part of the MD curriculum.
Clinical Applications of Genomic Medicine I: Provides genomic medicine case studies and systems-based learning paralleling the medical school core curriculum.	**Clinical Applications of Genomic Medicine II & III**: Topics covered include respiratory system, nephrology, gastroenterology and nutrition.	**Genomic Medicine Practicum:** Students will complete a clinical or research practicum focusing on an aspect of genomic medicine, which culminates in a written master's paper and public presentation.
Genome Ethics and Public Policy: A case-based approach to discussing ethical, legal and social issues related to genomic medicine.	**Research Ethics:** Prior to research practicum, training in the responsible conduct of research, protection of human subjects, and obtaining regulatory approval.	**Small Group Sessions** Regular small group sessions for literature and cases students have experienced
Genomic Medicine Laboratory: Rotation in the molecular genetics and biochemical genetics diagnostic laboratories.	**Pharmacogenetics**: Overview of known drug/gene interactions, interpreting test results, and integrating these results into clinical practice.	

Program structure and timeline

- First class accepted for Spring Semester 2013
  - 10 students applied in November from 150 in first year
  - 9 were approved, one not doing well enough in MD classes
  - 5 students in 1st class, 4 decided not to move ahead, 3 to $$
  - Interests? Neurosurgery, Oncology, Pediatrics, Cardiology, and Internal Medicine

Student Perspective/motivations

- Realization that genetics is in all aspects of medicine
- Benefit of being "first in the field" of medical students with degree in genomic medicine
- Personal interest in genomics/genetics
- Have already noted usefulness in understanding some MD lectures
- Often report errors in MD lectures
- Two students sought and received funding for diversity conference on genomics this week

http://medgen.med.miami.edu/education/msgm

Why We Can't Wait:
Conference to Eliminate Health Disparities in Genomic Medicine

2013 Theme:
The role of industry, foundations, non-profits and government



May 29-31, 2013
Palace Hotel
San Francisco, California

Presented by the John P. Hussman Foundation

Organized By

John P. Hussman Institute for human genomics
University of Miami Leonard M. Miller School of Medicine
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Stanford Center for Computational, Evolutionary, and Human Genomics
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Program Background

- Problems
  - Added cost of about 8K per year for in-state
  - Not all students can handle both programs
  - Have to remain flexible in scheduling
  - Added time for students
- Future
  - Funding
    - Hayward Foundation funded initial costs
    - At 35 students total should be self-supporting
    - Needs: support for program and students
  - Advertise for incoming class

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