COURSE DESCRIPTION:
This course provides a broad overview of the goals, methods, and applications for genomics and proteomics in the life sciences.

LEARNING OBJECTIVES:
By the end of this course, each student should:
1. be familiar with the terminology, underlying principles and strategies, and the technical methodology involved in genomics and proteomics.
2. be able to compare and contrast the strengths and limitations of this methodology.
3. be able to emphasize the use of these methods for problem-solving and hypothesis testing/hypothesis generation.
4. be able to distinguish trait-based genetics from gene-based genomics.

CREDIT HOURS: 2

COURSE DIRECTOR: Dr. Tim McCaffrey, Professor of Medicine and Director of the Division of Genomic Medicine.

PREREQUISITE: permission of instructor.

LECTURE CONTACT TIME/HOURS: one two hour-long lecture on Tuesdays from 4-6 pm in Ross Hall 402. There are a total of 14 lectures.

METHOD OF ASSESSMENT: The final grade will be calculated from the Midterm (50%) and Final examinations (50%).

EXAMINATIONS: One Midterm exam, multiple choice, one Final exam, multiple choice.

REQUIRED TEXTS:


CLASS POLICIES: Attendance policy: Attendance required. Each absence, after the first, reduces the final grade by 3%. Late work: accepted with permission, penalty may be incurred if unduly late as determined by instructor. Religious Holidays: will be accommodated if requested [NOTE: for university policies on teaching, see [http://www.gwu.edu/~academic/Teaching/main.htm](http://www.gwu.edu/~academic/Teaching/main.htm)]

Required readings are listed in the detailed weekly folders on BLACKBOARD:
OPTIONAL READING: NOT REQUIRED
Genes VII. Editor: Ben Lewin, Oxford Press.

BLACKBOARD: MICR6236 materials are also available through the Blackboard portal. Lecture notes and slides for each week’s material will be posted as soon as possible. To log onto Blackboard, you must have registered for the course and have a GWU email address. In addition, when possible, we will record lectures for review online.

ACADEMIC INTEGRITY: I strongly support the GW Code of Academic Integrity. It states: “Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information.” For the remainder of the code, see: http://www.gwu.edu/~ntegrity/code.html.

SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM: DISABILITY SUPPORT SERVICES (DSS) Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to: http://gwired.gwu.edu/dss/

UNIVERSITY COUNSELING CENTER (UCC) 202-994-5300
The University Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include:
- crisis and emergency mental health consultations
- confidential assessment, counseling services (individual and small group), and referrals
http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices

SECURITY: In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.

LECTURE TOPICS AND SCHEDULE

Schedule: Topic Reading-Chapter

Section 1: “Big” Genomics: Acquiring and understanding whole genomes
Sept  1 Introduction to Pre-Genomic Thinking and Methods McCaffrey 1
Sept  8 Genomic Medicine, Principles and Practice McCaffrey 2
Sept 15 Bioinformatic Tools for Understanding Genomes McCaffrey 3
Sept 22 Public Health Implications of Genomic Technology McCaffrey 4

Section 2: “Classical” Genomics: Genotypes and Phenotypes
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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>Sept 29</td>
<td>Large-scale Genomic Sequencing</td>
<td>Nierman 5</td>
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<tr>
<td>Oct 6</td>
<td>Connecting Traits to Genes, and Genes to Functions</td>
<td>Lee 6</td>
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<td>Oct 13</td>
<td>Pharmacogenomics/Toxicogenomics</td>
<td>O’Brien 7</td>
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<td>Oct 20</td>
<td>------------------------MIDTERM------------------------</td>
<td>McCaffrey 8</td>
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<td>Oct 27</td>
<td>Introduction to Massively Parallel Methods</td>
<td>McCaffrey 9</td>
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<td>Nov 3</td>
<td>Deep Sequencing of DNA and RNA</td>
<td>Toma 10,11</td>
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<td>Nov 10</td>
<td>Next generation sequencing applications</td>
<td>Horvath 12,13</td>
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<td>Nov 17</td>
<td>Analyzing and Mining Massive Data-Finding Causation</td>
<td>Fu 13,14</td>
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<td>Nov 24</td>
<td>Beyond Genomics—Epigenetics, Translation, and Modification</td>
<td>McCaffrey 15,16</td>
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**Section 3:** “Micro” Genomics: Massively Parallel Methods

**Section 4:** “ELSI”: Ethical, Legal, and Social Implications of Genomics

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<th>Topic</th>
<th>Instructor</th>
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<tr>
<td>Dec 1</td>
<td>Ethical Implications of the Genome</td>
<td>McCaffrey 17,18</td>
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<td>Dec 15</td>
<td>FINAL EXAM</td>
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