Medical Genomics (BIOC6236)

Thursdays 4:00-6:00 PM
(Webex online schedule)

Director: Dr. Alejandro Villagra, avillagra@gwu.edu
Office: 800 22nd St NW, Suite 8880 (SHE Building). Individual meetings will be scheduled upon request during regular office hours (8am-5pm)
Lecturers: Dr. Alexandros Tzatsos, atzatsos@gwu.edu
Dr. Katherine Chiappinelli, kchiapp1@gwu.edu
Dr. Valerie Hu, valhu@gwu.edu
Dr. Anelia Horvath, horvatha@gwu.edu
Dr. Satish Noonepalle, snoonepalle@email.gwu.edu
Dr. Nima Aghdam, nima.aghdami@gmail.com

Course Description: The aim of this course is to introduce students to fundamental concepts and applications of medical genomics. This course covers structural and functional properties of genes and genomes, analysis of genome data, and practical applications of medical genomics. Topics include molecular basis of genomics, functional genomics, epigenetics, comparative genomics, transcriptomics and genetic and genomic mechanism of human diseases.

Course Objectives: Upon completion, students should be able to: 1) outline the important features of eukaryotic genomes; 2) demonstrate how to analyze the genomes of human and model organisms using genomic databases and genome browsers; 3) understand how transcriptomics is used to analyze genome expression; 4) explain how genomics (a) enhanced our understanding of human biology, (b) revolutionized translational research; 5) give examples of practical applications of genomics in medicine.

Reference books: There are no assigned textbooks. Handouts and reading articles will be provided by the course instructors.
Reference books you might find helpful:

Exams and Grading System: There will be two exams (a mid-term and a final), quizzes and homework assignments. The instructors will give you detailed information about grading components. The mid and final exams will include multiple choices, matching questions, and short answer questions.
Final course grades will follow the structure shown below:

A = 100-96 points  
A- = 95-90 points  
B+ = 89-85 points

B = 84-80 points  
B- = 79-70 points  
C+ = 69-60 points

C = 59-50 points  
F = 49 points and below

Midterm Exam: 40%  
Final Exam: 40%  
Journal Club: 20%

Optional Book Reading and Presentation: Will replace 25% of the final grade
**Make-up exam policy:** There is a make-up exam at the end of the semester, but it will be given only under special circumstances. If you must miss an exam session due to an emergency, please contact instructors, who will evaluate the reasons and determine whether you are entitled to a make-up exam. The instructors reserve the right to modify the make-up exam format.

**Cell Phones and other electronic devices:** The use of cell phones and any other electronic devices is strictly PROHIBITED. Please be considerate of your fellow students and turn off your electronic devices.

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**Course Topics**  
(2020)

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<th>L</th>
<th>Date</th>
<th>Room</th>
<th>Instructor</th>
<th>Topic</th>
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<td>1</td>
<td>9/3</td>
<td>116</td>
<td>Dr. Villagra</td>
<td>Introduction: organization and structure of genomes; the study of genomics (comparative, functional and structural genomics and epigenomics)</td>
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<td>2</td>
<td>9/10</td>
<td>116</td>
<td>Dr. Noonepalle</td>
<td>Introduction to genome browsers, repository databases and other genomic databases.</td>
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<td>3</td>
<td>9/17</td>
<td>116</td>
<td>Dr. Villagra</td>
<td>Epigenetics. HDACs, ATPD chromatin remodeling complexes and other epigenetics mechanisms. Oncogenes, tumor suppressor genes, drivers and passengers.</td>
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<td>9/24</td>
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<td>Dr. Aghdam</td>
<td>Genomic Testing for Clinical Decision Making</td>
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<td>5</td>
<td>10/1</td>
<td>116</td>
<td>Dr. Chiappinelli</td>
<td>Epigenetics. DNA methylation, CRISPR</td>
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<td>6</td>
<td>10/8</td>
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<td>Dr. Tzatsos</td>
<td>Cancer Genomics 4: epigenomics, ChIPseq processing pipeline</td>
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<td>7</td>
<td>10/15</td>
<td>116</td>
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<td>10/22</td>
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<td>Exam I</td>
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<td>9</td>
<td>10/29</td>
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<td>Genomic tools to study ERVs, TCR sequencing</td>
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<td>Dr. Millan</td>
<td>Medical Genomics and Rare Disorders</td>
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<td>11</td>
<td>11/12</td>
<td>116A</td>
<td>Dr. Horvath</td>
<td>Transcriptome analysis, Functional genomics</td>
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<td>12</td>
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<td>Dr. Hu</td>
<td>An integrative genomics approach to autism</td>
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<td>11/26</td>
<td>116</td>
<td>No class</td>
<td>Thanksgiving</td>
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<td>12/3</td>
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<td>Exam</td>
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<td>15</td>
<td>12/10</td>
<td>116</td>
<td>Dr. Villagra</td>
<td>Makeup exam, if necessary</td>
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University Policy on Religious Holidays

1. Students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance.
2. Faculty should extend to these students the courtesy of absence without penalty on such occasions, including permission to make up examinations.
3. Faculty who intend to observe a religious holiday should arrange at the beginning of the semester to reschedule missed classes or to make other provisions for their course-related activities

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 Rome Hall, Suite 102, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to: gwired.gwu.edu/dss/

Mental Health Services 202-994-5300
The University's Mental Health Services 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. counselingcenter.gwu.edu/

Academic Integrity Code [NOTE: reference to the code should be made and the url provided]
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: studentconduct.gwu.edu/code-academic-integrity