**HCOL 185M: Controversies in Modern Genomics**
**Fall 2016 Syllabus**

Monday and Wednesday, 3:30-4:45pm
HSRF 300

**Faculty:**

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Office Hours: By appointment

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## Course Summary and Goals

Following completion of the Human Genome Project, genomics has proven a rich source of controversy. As the applications and implications of rapid, inexpensive, and reliable genome sequencing become clearer, complex ethical, moral, and practical questions emerge. Misuse and misunderstanding of the science behind genomics has clouded conversations in the public forum and polarized topics that warrant many shades of gray. This course will focus on thoughtful, engaging, and open-minded discussions of current controversies involving genomics (the study of the structure, function, and evolution of an organism's entire genome) and genetics (the study of specific gene function and inheritance). The course is arranged in four sections based on topics being discussed: Life, Health, Ethics, and Society. Students are expected to actively participate and prepare for each class through critical review of assigned scientific literature, documentaries, public policy reports and documents, news articles, and other media. This

course has no pre-requisite knowledge of genetics or genomics. Evaluation will include preparing for and actively engaging in class discussions and projects, composing thoughtful reflection papers and a midterm paper, and crafting a well-sourced final research report and presenting findings as part of an expert team to the class for discussion.

## Course Learning Objectives

Throughout this course, students will:

- Engage in thought-provoking discussions with classmates, instructor, and guest speakers.
- Increase familiarity and awareness of controversies in genomics and genetics.
- Develop skills to critically interpret scientific literature, policy documents, and mass media coverage of topics in genomics and genetics.
- Expand appreciation for the ways in which science affects society and society affects science.
- Practice working in groups to dissect a topic of interest into its scientific, ethical, and social implications.

Skills developed in this course include:

- Articulate an argument or position and respectfully listen to and understand arguments or positions of others.
- Write concise and thoughtful prose reflecting on complex topics spanning science, ethics, and society.
- Conduct literature research to form and support positions.
- Work individually and collaboratively to complete projects.
- Increase comfort and skill with oral presentations.
- Challenge previous notions and impressions held through curious learning.

## Required Text

Atkinson, P., Glasner, P., & Lock, M. (2013). *Handbook of genetics and society: Mapping the new genomic era*. London: Routledge.

## Blackboard

Assigned reading and viewing materials, excluding text chapters, will be provided on Blackboard either by PDF attachment or web link. Please use Blackboard for updated reading/viewing materials as changes may occur to the listed course schedule included in this syllabus. Assignments must be uploaded to Blackboard by the listed deadline. Please contact Debra Leonard (contact information above) prior to the deadline if you are not able to upload an assignment to Blackboard so other arrangements can be made.

## Attendance Policy

Given the importance of active discussion in attaining the goals of the class, attendance is mandatory. Students must notify Debra Leonard of any University-approved absences

prior to class when possible. Any student with three or more unexcused absences will receive a failing grade.

## Grading Criteria

100 points total shall be earned as follows:

- 20 points- Class participation
- 20 points- 4 Reflection papers
- 20 points- Midterm paper
- 5 points- Research report proposal (25% individual score, 75% team score)
- 5 points- Participation in peer review of report proposals
- 10 points- Panel presentation and discussion (50% team score, 50% individual score)
- 20 points- Final research report (75% individual score, 25% team score)

## Assignments

- **Reflection Papers**: Four, 3-4 page papers (excluding cover page and bibliography) summarizing thoughts, perceptions, and lingering questions on any topic discussed in class within its section (Life, Health, Ethics, and Society). Written in first person and must cite at least 3 relevant and legitimate references or sources.
- **Midterm Paper**: 4-6 page paper (excluding cover page and bibliography) citing reputable sources exploring the science, ethics, and social implications of a controversy in genomics /genetics. Written as a research paper and must cite at least 5 relevant and legitimate references or sources.
- **Final Project**: Students will work in teams of 4 students to research a controversial genomics/genetics topic with each student taking the lead in one aspect of the controversy. Groups must cover the science and technology related to the topic, ethical considerations, legal or policy implications, and its impact on society. Individual and team grades will be given for the proposal, the final report and the panel presentation. Individual grades will be given for providing peer review of other teams' proposals.
    - **Report Proposal:** Each team will submit a proposal for their report in outline format, identifying the key aspects that will be covered in the final report and presentation (details provided in the assignment description).
    - **Peer Review:** Proposals will be reviewed by the instructor but also will be reviewed by classmates as part of a peer review process. Each student will review and provide feedback on the other teams' proposals.
    - **Final Report**: Each student will independently contribute a 3-5 page section of the final report based on the aspect of the controversy he or she researched for the team project, citing at least 5 relevant and legitimate references or sources. The team will collaboratively write the Executive Summary, Introduction, and Conclusion sections.
    - **Panel Presentation**: Each team will be an expert panel and lead a class discussion on the scientific, ethical, and societal considerations of the selected topic. Students

will receive copies of each team's final report to read prior to the class discussion to enable an engaging, well-informed dialogue.

**Groups for Final Project**

Group A: Briana Leger (bleger)
Avery Rasmussen (aerasmus)
Aubrey Pelletier (apellet3)
Elizabeth Whalen (emwhalen)

Group B: Niveditha Badrinarayanan (nbadrina)
Graham Nadel (gnadel)
Megan Williams (mwilli31)
Kate Murphy (kmurph40)

Group C: Megan Fahey (mjfahey)
Carolyn Marquis (camarqui)
Rachel Foster (rhfoster)
Henry Mitchell (hmmitche)

Group D: Helena Munson (hvmunson)
Victoria Taormina (vtaormin)
Annie Resnikoff (awresnik)
Ani Harlan (aharlan)

Group E: Gwen Matthews (gmatthe1)
Maddy Powell (mypowell)
Mari Tomanelli (mtomanel)
Rachel Slimovitch (rslimovi)

**Classroom Environment Expectations**

Each student is expected to:

- Actively and thoughtfully participate in class discussions
- Treat others in the class with respect and dignity
- Complete assigned reading materials prior to class
- Turn in assignments on time
- Seek out assistance from the instructors or from classmates when needed
- Behave with academic honesty, integrity and honor
- Show up for class on time
- Silence and put away cell phones and laptops while in class

**UVM Libraries Liaison for Honors College Students**

For assistance with library services and for support in research for Honors College courses, please contact Patricia Mardeusz, Library Associate Professor of Information & Instruction Services at 802.656.5718 or by email at patricia.mardeusz@uvm.edu.

**Additional Information/Resources for Students**

The UVM Student Rights and Responsibilities are available at http://catalogue.uvm.edu/undergraduate/academicinfo/rightsandresponsibilities/.

**Student Learning Accommodations:** In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact ACCESS, the office of Disability Services on campus. ACCESS works with students to create reasonable and appropriate accommodations via an accommodation letter to their professors as early as possible each semester.
Contact ACCESS: A170 Living/Learning Center; 802-656-7753; access@uvm.edu; www.uvm.edu/access
UVM's policy on disability certification and student support:
www.uvm.edu/~uvmppg/ppg/student/disability.pdf

**Religious Holidays**: Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time. An Interfaith Calendar is available at http://www.interfaithcalendar.org/.

**Academic Integrity:** The policy addresses plagiarism, fabrication, collusion, and cheating. www.uvm.edu/~uvmppg/ppg/student/acadintegrity.pdf

**Grade Appeals**: If you would like to contest a grade, please follow the procedures outlined in this policy: www.uvm.edu/~uvmppg/ppg/student/gradeappeals.pdf

**Code of Student Rights and Responsibilities:**
www.uvm.edu/~uvmppg/ppg/student/studentcode.pdf

**FERPA Rights Disclosure**: The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974.
http://www.uvm.edu/~uvmppg/ppg/student/ferpa.pdf

**Promoting Health & Safety:**
The University of Vermont's number one priority is to support a healthy and safe community:

***Center for Health and Wellbeing*** http://www.uvm.edu/~chwb/

***Counseling & Psychiatry Services (CAPS)*** Phone: (802) 656-3340

***C.A.R.E.*** If you are concerned about a UVM community member or are concerned about a specific event, we encourage you to contact the Dean of Students Office (802-656-3380). If you would like to remain anonymous, you can report your concerns online by visiting the Dean of Students website at http://www.uvm.edu/~dos/

## Course Schedule

- *Subject to change- please reference Blackboard for required reading materials and schedule updates.*
- *All assignments will be turned in via Blackboard unless otherwise instructed.*

### INTRODUCTION

- **Monday, August 29:** Course Introduction (Leonard/Sidiropoulos)
  *Objectives*
  - Introductions by students and professors
  - Discuss syllabus, course objectives and expectations

- **Wednesday, August 31:** The American Eugenics Movement- Historical Misuse of Genetics (Leonard/Wassel)
  *Objectives*
  - Provide context for modern controversies in genomics by exploring the history of American eugenics
  - Discuss impact and influence of the American Eugenics Movement
  - Identify errors in eugenics research design, approach, and interpretation

### LIFE

- **Wednesday, September 7:** Genetic Modification Technology (Wassel)
  *Objectives*
  - Review briefly the basic science of genetic modifications
  - Discuss the pros and cons of human genetic modification
  - Consider ethical and moral issues
  - Discern fact from fiction in popular perceptions of genetic modification

  *Assignment Due*
  - **Practice Reflection Paper (Eugenics) due September 7 by 3pm (Optional and ungraded) Students wishing for ungraded feedback on writing may submit a Reflection Paper on Eugenics**

- **Monday, September 12:** In Vitro Fertilization and Human Embryos (Guest: Stephen Brown, M.D., Associate Professor, Department of Obstetrics, Gynecology and Reproductive Sciences, UVM College of Medicine and UVM Medical Center)
  *Objectives*
  - Review basics of assisted reproduction, preimplantation genetic diagnosis and prenatal testing
  - Discuss ethical issues of the reproductive choices available today
  - Discuss impact of reproductive choices on families and society

- **Wednesday, September 14:** Genetically Modified Organisms (GMO) (Leonard)
  *Objectives*
  - Review basics of the technologies and applications of genetic modification of plants and organisms

- Describe scientifically-based pros and cons to GMOs based on available research
- Discuss both popular and personal perceptions of GMOs
- Compare state and federal legislation related to GMOs

- **Monday, September 19:** Genetically Modified Organisms (GMO) II (Guest Speaker Representative Kesha Ram) (Leonard)
  *Objectives*
  - Engage with speaker on the pros and cons of labeling GM foods in Vermont
  - Understand the broader implications of Vermont's labeling law nationwide, and proposed federal GMO laws
  - Learn about the process of political and social advocacy

## HEALTH

- **Wednesday, September 21:** Genomics and Healthcare (Sidiropoulos)
  *Objectives*
  - Review the role of genomics in disease diagnosis and treatment
  - Discuss the potential and limitations of personalized medicine
  - Discuss cultural and social stigma of genetic disease
  - Five students present 5-minute Executive Summary of Reflection Paper #1

  *Assignment Due*
  - **Reflection Paper #1 (Life) due September 21 by 3pm**

- **Monday, September 26:** Personal Genomics (Guest: Mr. Greg Merhar) (Sidiropoulos)
  *Objectives*
  - Engage in discussion with Mr. Merhar, who had his genome sequenced
  - Come to class prepared with one question for Mr. Merhar

- **Wednesday, September 28:** Genetic Testing and Genomic Medicine (Sidiropoulos)
  *Objectives*
  - Understand the differences between genetic disease and genetic susceptibility
  - Discuss the impact and implications of increasing genetic testing on disease diagnosis, treatment, and prevention
  - Discuss issues related to genetic testing interpretation and cost

  *Assignment Due*
  - **One page brief outline for Midterm Paper due September 28 by 3pm (ungraded but required)**

- **Monday, October 3:** Genomics and the Healthcare Industry (Guest: Dr. Tamara Williams, Equitas, Inc.) (Sidiropoulos)
  *Objectives*
  - Engage with guest on genetics and the pharmaceutical industry
  - Discuss drug development and pricing for the niche of genetic diseases

- **Wednesday, October 5:** Final Report Proposal Workshop (Leonard)
  *Objectives*
  - Five students present 5-minute Executive Summary of Reflection Paper #2
  - Work in Final Report teams to develop proposals

  *Assignment Due*
  - **Reflection Paper #2 (Health) due October 5 by 3pm**

## ETHICS

- **Monday, October 10:** Ethical Framework and Legal Protections (Wassel)
  *Objectives*
  - Introduce a basic ethical framework for assessment of complex genetic issues
  - Discuss the impact of GINA on society

- **Wednesday, October 12:** Genetic Counseling (Guest: Ms. Leanne Haskins-Leahy, Genetic Counselor, UVM Medical Center) (Leonard)
  *Objectives*
  - Introduce the career of genetic counseling and the role of the genetic counselor in the health care team
  - Interact with the guest speaker to better understand the real-world ethical conflicts of genetics in the health care setting
  - Reflect on social and ethical implications

- **Monday, October 17:** Genetic Stigmatization (Wassel)
  *Objectives*
  - Compare and contrast research approaches taken to assess genetic testing clinical validity and its impact on society
  - Discuss the ethics behind current and potential uses of genetic information
  - Understand the importance of genetic information privacy, issues of confidentiality, stigmatization, and the psychological impact of learning about your own genetic makeup

  *Assignment Due*
  - **Midterm Paper due October 17 by 3pm**

- **Wednesday, October 19:** Criminal Justice (Wassel)
  *Objectives*
  - Discuss the ethics behind current and potential uses of genetic information
  - Discuss the implications of genetic information in criminal justice

- **Monday, October 24:** Genetic "Enhancement" (Leonard)
  *Objectives*
  - Review the basic science behind inheritable genetic modification
  - Discuss the potential impact of genetic modification on society
  - Discuss the ethical concerns related to genetic "enhancement"

  *Assignment Due*
  - **Final Report Proposal due October 24 by 3pm**

- **Wednesday, October 26:** Peer Review of Research Panel Proposals from Groups 1 & 2 (Leonard)
  *Objective*
  - Engage in groups to review research panel proposals

  *Required Reading/ Viewing (completed prior to class)*
  - Read assigned set #1 team research proposals posted on Blackboard

  *Assignment Due*
  - **Come to class with at least 2 questions or comments for each proposal in set #1**

- **Monday, October 31:** Peer Review of Research Panel Proposals from Groups 3, 4 & 5 (Leonard)
  *Objective*
  - Engage in groups to review research panel proposals

  *Required Reading/ Viewing (completed prior to class)*
  - Read assigned set #2 team research proposals posted on Blackboard

  *Assignment Due*
  - **Come to class with at least 2 questions or comments for each proposal in set #2**

## SOCIETY

- **Wednesday, November 2:** Genetic Influence of Human Behavior (Guest: Harris Strokoff, M.D., Child, Adolescent and Adult Psychiatrist; Medical Director of Psychiatry and Behavioral Health, Community Health Centers of Burlington; Adjunct Faculty, Geisel School of Medicine at Dartmouth, Child Psychiatry Residency) (Sidiropoulos)
  *Objectives*
  - Review research and evidence of genetic influence of behavior
  - Discuss the implications of genetic influence on mental illness, addiction, and personality

- Five students present 5-minute Executive Summary of Reflection Paper #3

*Assignment Due*

- **Reflection Paper #3 (Ethics) due November 2 by 3pm**

- **Monday, November 7:** US Precision Medicine Initiative (Wassel)

*Objectives*

- Understand the definition, scope and goals of precision medicine in the US
- Review current NIH precision medicine initiatives
- Discuss the expected impact of the precision medicine initiative, and how results will be used to impact patient care
- Discuss potential ethics implications of the precision medicine initiative, return of results to patients

- **Wednesday, November 9:** Genetics and Ancestry (Wassel)

*Objectives*

- Review the role of genetic ancestry or ancestral background in finding genetic variants for complex human traits
- Discuss the implications of genetic ancestry on potential medical treatments and drug development
- Understand and discuss the ethical considerations behind genetic ancestry, and the positive and negative aspects

- **Monday, November 14:** Genetic Influence of Human Behavior II (Sidiropoulos)

*Objectives*

- Review evidence of genetic influence of behavior
- Discuss the implications of genetic influence on sexual orientation, risk-taking, musical ability, and political beliefs

- **Wednesday, November 16:** Workshop on Final Reports (Leonard)

*Objectives*

- Work in teams to create final report
- Check in with instructor for guidance on any questions related to the final report
- Five students present 5-minute Executive Summary of Reflection Paper #4

*Assignment Due*

- **Reflection Paper #4 (Society) due November 16 by 3pm**

- **November 21-25: THANKSGIVING BREAK (No Classes)**

## CONCLUSIONS

- **Monday, November 28:** Course review and final presentation practice (Leonard)

*Objectives*
- Review course
- Meet in final project groups to finalize and practice presentations

*Assignment Due*
- **Final Report due November 28 by 3pm (one submission for each group)**

- **Wednesday, November 30:** Panel Presentations (Groups 1 & 2) (Leonard)

*Objectives*
- Groups 1 & 2 present final report findings
- Engage with students in expert panels to deepen discussion

*Required Reading*
- Final reports from Groups 1 & 2

*Assignment Due*
- **Create at least one question to ask each of the expert panels presenting**

- **Monday, December 5:** Panel Presentations (Groups 3 & 4) (Leonard)

*Objectives*
- Groups 3 & 4 present final report findings
- Engage with students in expert panels to deepen discussion

*Required Reading*
- Final reports from Groups 3 & 4

*Assignment Due*
- **Create at least one question to ask each of the expert panels presenting**

- **Wednesday, December 7:** Panel Presentations (Group 5) (Leonard)

*Objectives*
- Group 5 presents final report findings
- Engage with students in the expert panel to deepen discussion
- Class conclusion

*Required Reading*
- Final report from Groups 5

*Assignment Due*
- **Create at least one question to ask the expert panel presenting**