



**ILC 9 - THE ETHICAL, LEGAL AND SOCIAL IMPLICATIONS
OF THE GENOME**

BI208-ILC Genes to Genomics

Cross listed as

SO291-ILC The ELSI of Genomes

Spring Semester 2008

Monday and Wednesday 2:40-4:10 in Spiro 1

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Course description

This ILC is quite unique in that it is a truly team taught learning community where you get two professors who are experts in their own fields – Sociology and Genetics- for the price of one. This is sort of two for the price of one sale and as a bonus (absolutely free with no string attached) you get to take the course to fulfill either your humanity or science requirements. During the course of the semester Dr. Esser and Dr. Moorthy will be discussing the ethical, legal and social implications of the Human Genome project

The scientific revolution that is going on in the field of genetics will be discussed in the initial lectures to give you all a bird's eye view of the fundamentals that govern Human Genetics. The influences and changes brought about by this Biomedical revolution will have the most profound and long lasting effects on how we live and function in society, our family structure, life expectancy and quality of our lives, health and medical expectations, the nature of privacy, the way food is grown, the way we think of God and religion and the legal, moral, social and ethical aspects of our lives are all under scrutiny due to this biotechnology revolution. It is very essential that we citizens understand the scientific concepts and the basic research that underlie this process and become informed customers.

The 3.2 billion pairs of nucleotides that carry the genetic information (several sets of Encyclopedia Britannica worth of information) that makes a human have been sequenced and read. We know the letters that make up this massive amount of information, yet we know very little-to-nothing about what we are, and who we are. Scientists are coming up with new inventions and discoveries that get flashed as front page news, yet we do not comprehend the impact of many of these inventions and discoveries in the daily working and survival of the species. The “Pandora’s Box” has been opened and we have unleashed a mighty giant – Biotechnology. There is no turning back. We need to sort out the long-term implications of these activities made more incomprehensible by the accompanying jargon. For example geneticists speak of cloning, stem-cell research, genetic enhancement, gene therapy, GM food forensics, DNA revolution in the legal system, eugenics just to name a few. We need to have a clear understanding of the concepts underlying the jargon; we need to understand the implementation options underlying the jargon and their impact on human society and human values. This is the only way we can distinguish between “what we can do” and what “we ought to do” and implement those that will benefit the humanity

Course Goals

- Understand the basic concepts and principles that govern Human Genetics.
- Explore the ways in which Biotechnology affects and changes what we think about life and how we live it.

- Explore the ethical, legal and social issues that arise from the application of Biotechnology.
- Understand the impact of genetic engineering in agriculture, on raising livestock, and in the production of new drugs.
- Understand and distinguish between genetic enhancements and gene therapy.
- Know when to have genetic screenings, pre-natal diagnosis of diseases, and the associated legal and ethical implications.
- Think about whether legislation and court decisions need to change and how they should be changed to deal with forensics and DNA evidence.
- Debate whether “The eugenics movement is still with us”.
- Explore the impact of human genome research on society.

Student Learning Objectives

- Demonstrate the learning and thinking skills to be able to critically analyze the subject matter.
- Exhibit a willingness to explore ideas that might contradict one’s own views.
- Be respectful of other people’s points of view and argue rationally (i.e. present opposing ideas in a factual and professional manner), not emotionally, without offending any one.
- Seek to conduct research in a scholarly manner and be a true team player.
- Present oral and written material in a clear, logical and organized fashion.
- Participate effectively in all class-room discussions.
- Be well prepared for all the classes.
- Maintain a high standard of integrity.

Policies

This is a college course. The primary work in a college course is the reading and the writing you do outside the classroom. The short time we spend in the classroom is merely a supplement to this activity. The purpose of the classroom is for us to work together to synthesize the main points we encounter in the various readings. This requires that you regularly do the readings before class, regularly attend class, and complete the written exercises during the period they are assigned.

In order to help the few students who have trouble maintaining the discipline required for a college class, we have instituted a set of policies regarding attendance, written work, etc. Unfortunately, for these policies to work we must impose them on the entire class.

Books: Students are required to buy the course texts and to bring them to class. It is your responsibility to anticipate which texts we will use on a particular day given the reading assignments for that week. If in doubt, bring them all. **THE FINANCIAL HARDSHIP EXCEPTION:** If you have a special financial handicap that requires special arrangements regarding access to class texts we will make special arrangements with you, but only if you discuss this with us during the first two weeks of classes.

Attendance: Attendance will be taken at the beginning of every class. You are "present" if you are in the room with your books when we call the roll. You are permitted three absences during the course of the semester, excused or unexcused. As with a job, you must plan your absences to cover sickness, athletic events, family emergencies, oversleeping, hangovers, etc. We are giving you three absences to cover all such cases. We reserve the right to lower your final course grade two points for each absence beyond the three permitted. For example: a course grade of 82 with 6 total absences reduces your grade to a 76, effectively turning a B- into a C. Please do not give us doctor's notes, leave us voice mail messages, talk to us after class, or call us on the phone to tell us why you missed a class. We trust you to use your absences judiciously. **THE EXTENDED EMERGENCY EXCEPTION:** If you experience an emergency that forces you to miss two or more weeks of class we will consider (at our discretion) granting you an exception to this policy, but only if you confer with us at the beginning of this emergency. **THE ATHLETICS EXCEPTION:** If you are on a sports team, we will excuse you for competition dates only if early in the semester you give us memo from your coach listing all dates and official departure times. Otherwise, you will not be excused for classes missed due to competitive events.

Entering/Exiting the Room While Class Is In Session: It is rude and unacceptable to leave the room during class on a regular basis to go to the bathroom, take a smoke, or just take a break. A required skill of working American adults is that they be able to "hold it in" during classes, meetings, work, etc. However, it is acceptable to us if on rare occasions you enter the room after class has begun or leave the room while the class is in session if you are late, if you have an appointment, or if you find yourself ill. There is no need to inform us.

Written Work: Written work is due at the beginning of class on the assigned date. You are permitted five grace days during the course of the semester (five days across all assignments, not for each assignment; note that weekend days count as well, even though it is not possible to turn in work on those days). Once you have used up your five grace days, we reserve the right to downgrade the work one-half letter grade for each day it is late (e.g. a B becomes a C+). Please do not give us doctor's notes, leave us voice mail messages, talk to us after class, or call us on the phone to tell us why your paper is late. We trust you to use your grace days judiciously. Papers handed in late may not be graded and returned until the end of the semester. **THE EARLY NOTIFICATION EXCEPTION:** We are open to making special arrangements, but only if you speak with us prior to the distribution of the assignment.

Emailing Written Work: If you email us written work, we will count it as handed in using the time and date you sent it, **BUT ONLY** if you (1) email it to us at jesser@wagner.edu or asmooth@wagner.edu, (2) email us from your name@wagner.edu address, (3) include "Genome" in the subject heading, (4) submit the work in the body of the email or as an attachment in Microsoft Word

format only (NOT Microsoft Works format), and (5) also submit a hard copy to us at the next class session.

Readings: Students are expected to have the readings done on the Monday of the week assigned. We will feel free to ask students questions regarding the reading assignments. You should note that the readings differ in difficulty and in length. Judge your time accordingly.

Grading: Normally it will take us two weekends to grade an assignment. Assignments handed in late may not be graded until the end of the semester.

Class Participation: While there is no class participation grade per se, students are expected to regularly participate in class discussions. Above-average participation can raise your final grade, and below-average participation can lower your final grade. Our evaluation of your class participation is based on the level of participation, not comprehension.

Scheduling: we will endeavor to stick to the scheduling in this syllabus. However, there will inevitably be some adjustment during the course of the semester. For example, it is likely that at some point we will fall behind the syllabus schedule. Changes in the scheduling of assignments will be announced in class. It is your responsibility to stay aware of such changes, especially if you miss a class.

Class Cancellations Due to Inclement Weather: Most students live on campus and Dr. Esser lives five minutes from campus so in most cases class will be held in the case of inclement weather. Classes are only cancelled for bad weather when the College officially cancels all classes. The College's official "snow line" (718) 390-3400 and its website www.wagner.edu convey news on the possible cancellation of all classes due to extreme weather conditions. However, if you are a commuter student, we will "excuse" your absence in the case of bad weather.

Assignments

Readings: Students are expected to have the readings done on the Monday of the week assigned.

Genomics Headlines: Look for new discoveries or accomplishments in Human genomics and Biotechnology for the week (from the newspaper, science news, internet, etc.), get a clipping, read it and bring it to class. From time to time we will circulate to you by email or photocopy stories we have found. These are required reading for the class.

Definitions: There will be ten sets of definitions. You will hand write definitions of a list of concepts from your readings on sheets distributed by us. These must be done individually. We will eyeball these, but we will not grade them. You

either get a zero for not turning them in, a .5 for not taking them seriously, or a 1 for handing in a serious attempt.

Exams: There will be two exams, including an in-class closed-book exam on March 12th and a take-home final exam distributed on Wednesday, April 30th and due on Wednesday, May 7th.

Paper and Presentations: Each student will write an individual research paper and participate in a group presentation. Details will be distributed in class the second or third week of the semester.

ACE Lecture: The requirements for this class include mandatory attendance at an ACE lecture not held during the regular class period that will be announced well in advance.

Films: There will be approximately three films to shown outside of regular class on dates and times to be announced. Films will also be on reserve in the library. The library has two televisions with VCR's and headphones. Each TV can seat up to three persons with headphones. (Films include "GATTACA," "Harvest of Fear," and "I, Clone").

Grading

Exam I (Midterm In Class Exam)	25%
Exam 2 (Final Take-Home Exam)	25%
Definitions	10%
Paper Intro, Para, Outline, Bibliog.	5%
Class Presentation	10%
Final Paper	25%

Books (These books are available at the Wagner College Bookstore)

Scott Gilbert, Anna L. Tyler, and Emily J. Zackin. 2005. Bioethics and The New Embryology: Springboards for Debate. Sunderland, MA: Sinauer Associates.

David Lazer (Editor), DNA and The Criminal Justice System: The Technology of Justice. Cambridge, MA: The MIT Press, 2004.

Philip R. Sloan (Editor), Controlling Our Destinies: Historical, Philosophical, Ethical and Theological Perspectives on the Human Genome Project (Notre Dame, IN: University of Notre Dame Press, 2000).

The readings not included in these books are preceded by an asterix ("*") and will be placed on reserve in the Horrmann Library. There will be some additional readings, including news articles, sent to you by email and/or handed out in class.

Syllabus for the Course

Week One - January 23rd

- Topic: Human Genome and Ethical, Legal, and Social Issues
Open class discussion.
- Powerpoint: The Human Genome Project
- Movie: "Do You Want To Know?" (Excerpt)
- Readings:
1. This Syllabus
 2. *"Genomics: Its Impact on Science and Society"

Week Two - January 28th and 30th

- Topic: Some History of Biology
Pre Darwin (Moorthy)
Darwin (Moorthy)
Mendel and Pedigrees (Moorthy)
- Reading:
1. *"Early Theories of Evolution"
 2. *"Single Gene Inheritance"

Week Three – February 4th and 6th

- Topic: Some History of Social Science and Government Policy
Social Darwinism (Esser)
Eugenics (Esser)
Is There A Criminal Gene? (Esser)
- Powerpoint: Eugenics (Moorthy?)
- Movie: "The Lynchburg Story" (Excerpt)
- Readings:
1. Readings on Criminology from Joseph Jacoby (editor), Classics of Criminology, Third Edition (Prospect Heights, IL: Waveland Press, Inc., 2004).
 - a. *Gina Lombroso-Ferrero, Criminal Man (1911), based on the writings of her father Cesare Lombroso in 1876. pp. 141-56
 - b. *Richard Dugdale, The Jukes: A Study in Crime, Pauperism, and Heredity (1877), pp. 157-64.
 - c. *H. H. Goddard, Feeble-Mindedness (1914), pp. 165-71
 2. Readings on Social Darwinism
 - a. *Herbert Spencer, Social Statics (1851), pp. 117-118.
 3. Readings on Eugenics (Esser)
 - a. *David Micklos and Elof Carlson. 2000. "Engineering American Society: The Lessons of Eugenics," Nature Reviews: Genetics 1:153-58.

- b. Go to and skim through the following website:
<http://www.eugenicsarchive.org/eugenics/>
- c. “Part Two: The Genome Project and Eugenics,” pp. 185-268 in Philip R. Sloan (Editor), Controlling Our Destinies

Week Four - February 11th and 13th

Topic: The New Genetics
DNA, RNA Protein Synthesis (Moorthy)
Human Genetics and Pedigrees (Moorthy)
Darwin and Mendel Explained (Moorthy)

Readings:

3. *”DNA Structure and Replication”
4. *”Gene Action: From DNA to Protein”

Week Five - February 18th and 20th

Topic: Big Science and The Human Genome Project (Esser)
Genetic Behavioralism: Is There A Criminal Gene? (Esser)
Normalcy and Essentialism (Esser)

Readings:

1. “Part One: Origins of the Genome Project,” pp. 27-184 in Philip R. Sloan (Editor), Controlling Our Destinies
2. Garland Allen, “DNA and Human-Behavior Genetics: Implications for the Criminal Justice System,” pp. 287-314 in DNA and the Criminal Justice System, Edited by David Lazer (Boston, MA: MIT Press, 2004)
3. “Chapter 13: What Is ‘Normal,’” pp. 215-226 in Bioethics and The New Embryology
4. “Chapter 14: Genetic Essentialism,” pp. 227-240 in Bioethics and The New Embryology
5. “Part Three: Is A Strong Genetic Reductionist Program Possible?,” pp. 269-340 in Philip R. Sloan (Editor), Controlling Our Destinies

Week Six – February 25th and 27th

Topic: Reproductive Technologies I: When Does Human Life Begin?

Readings:

1. *The Biology*:
 - a. “Chapter 1: An Outline of Human Development,” pp. 3-30 in Bioethics and The New Embryology
2. *The ELSI*;
 - a. “Chapter 2: Philosophical, Theological, and Scientific Arguments,” pp. 31-45 in Bioethics and The New Embryology
3. *The Law*: Readings on The Constitutional Right to Privacy

- a. *“Individual Rights” (part), pp. 338-55 in William Burnham, Introduction to the Law and Legal System of the United States (St. Paul, MN: West Group, 2000).
- b. *Griswold v. Connecticut, 381 U.S. 479 (1965)
- c. *Roe v. Wade, 410 U.S. 113 (1973)
- d. *Cass Sunstein, ”Do People Have a Legal Right to Clone Themselves?,” pp. 62-73 in M. Ethan Katsh and William Rose (Editors), Taking Sides: Clashing Views on Controversial Legal Issues, 11th edition (Guilford, CT: McGraw-Hill/Dushkin, 2004).

Week Seven -March 3rd and 5th

Topic: Reproductive Technologies II:
 In Vitro Fertilization
 Sex Determination
 Cloning
 Stem Cells

Readings:

1. Bioethics and The New Embryology, pp. 3-178
 - a. Unit 2: “Should Assisted Reproductive Technologies Be Regulated?”
 - b. Unit 3: “Should We Select the Sex of Our Children?”
 - c. Unit 4: “Should We Allow Humans to Be Cloned?”
 - d. Unit 5: “Should We Use Stem Cells To Repair The Body?”

Week Eight - March 10th and 12th

Topic: March 10th: Guest Lecture - Reprogenetics Seminar (IVF, PGD, Medical and Social Issues)
March 12th: First Exam – In Class Closed Book

Week Nine – March 17th and 19th [NO CLASS – Spring Break]

Week Ten – March 25th and 26th

(Note: No Class Monday, March 24th, but Monday classes meet on Tuesday, March 25th)

Topic: Genetic Enhancement:
 Gene Therapy
 Genetic Doping

Readings:

1. “Chapter 11: Gene Therapy,” pp. 179-198 in Bioethics and The New Embryology.

2. “Chapter 12: Should We Allow the Genetic Engineering of Humans?,” pp. 199-212 in Bioethics and The New Embryology.
3. *H. Lee Sweeney, “Gene Doping: Can It Be Long Before Gene Doping Changes The Nature of Sport?,” Scientific American, July 2004, 63.

Week Ten – March 30th and April 2nd

Topic: DNA and Forensics

DNA Data Banks,
Privacy Issues
Behavioral Genetics
Innocence Project Lecture?

Movie: “Dead Reckoning: DNA’s Debut”

Readings:

1. Readings on Privacy, the Fourth Amendment, and Unreasonable Searches (Esser)
 - a. *Jennifer Mnookin, “Science and Law,” pp. 714-718 in Kermit L. Hall, editor, The Oxford Companion to American Law
 - b. *Philippa Strum, “Privacy,” pp. 637-38 in Kermit L. Hall, editor, The Oxford Companion to American Law
 - c. * “Constitutional Criminal Procedure” (part), pp. 278-86 in William Burnham, Introduction to the Law and Legal System of the United States (St. Paul, MN: West Group, 2000).
2. *DNA and the Criminal Justice System: The Technology of Justice, Edited by David Lazer (Boston, MA: MIT Press, 2004)
 - a. Frederick R. Beiber, “Science and Technology of Forensic DNA Profiling: Current Use and Future Directions,” Chapter 2, pp. 23-62
 - b. Simon A. Cole, “Fingerprint Identification and the Criminal Justice System: Historical Lessons for the DNA Debate,” Chapter 4, pp. 63-90.
 - c. George J. Annas, “Genetic Privacy,” Chapter 7, pp. 135-46.
 - d. Amitai Etzioni, “DNA Tests and Databases in Criminal Justice: Individual Rights and the Common Good,” Chapter 10, pp. 197-224

Week Eleven – April 7th and 9th

Topic: Genetic Discrimination

Movie: GATTACA

Readings:

1. [**NOTE: These readings may change**]

- a. *Should Information From Genetic Testing Be Available To Employers And Insurers?,” pp. 208-220 in Carol Levine (Editor), Taking Sides: Clashing Views on Controversial Bioethical Issues, 10th edition (Guilford, CT: McGraw-Hill/Dushkin, 2004).
 - i. *Andrew Sullivan, from “Promotion of the Fittest”
 - ii. *Thomas H. Murray, from “Genetics and the Moral Mission of Health Insurance.”
- b. Genetics Privacy and Legislation Pack

Week Twelve – April 14th and 16th

Topic: Genography: Are Their Races?

Readings: [**NOTE: These readings may change**]

1. *Pharmacogenomics Pack
2. *National Geographic Article on Genography
3. *The Icelandic Database (DeCode)
4. *Minorities, Race, and Genetics Pack
5. John H. Relethford, “Chapter 2: Evolution and Genetic History,” pp. 10-31 in Genetics and the Search for Modern Human Origins (John Wiley & Sons, 2001)

Week Thirteen – April 23rd

Topic: Genetically Modified Foods (GMOs) (April 21st)
Student Presentations (April 23rd)

Movie: “Harvest of Fear”

Week Fourteen – April 28th and 30th

Student Group Presentations

**Final Take-home Open-book Exam Distributed on
Wednesday, April 30th and Due on Wednesday, May 7th**

Final Exam – Wednesday, May 7th 2:40-5:40 pm.

Attendance Mandatory!

Student Group Presentations

Final Exam Due

The following books will be available in the library. They are good optional reading for course content and good sources for your papers. (Spring 2008)

- (1) Genetic Engineering: The Cloning Debate (Debbie Stanley, Rosen Publishing Groups)
- (2) The Genetic Turning Points (James C. Peterson, William Eerdmans Publishing)
- (3) Understanding Human Genome Project (Michael Palladino)
- (4) Stem Cells and Cloning (David Prentice)
- (5) Recombinant DNA – Genes and Genomes – A Short Course
- (6) Introduction to Biotechnology (William Theiman and Michael Palladino)
- (7) Genes and Behavior (Michael Butler)
- (8) Genetic Engineering (Edited by Scott Barbour)
- (9) DNA and Genetic Engineering (Robert Snedden)
- (10) How the Human Genome Works (Edwin McConkey)
- (11) Welcome to the Genome (DeSalle and Yudell)
- (12) From Change to Choice – Genetics and Justice (Buchanan, Brock, Daniels & Wikler)
- (13) Wrestling with the Future – Our Genes and our Choices
- (14) Genetic Testimony (Charlotte Spencer)
- (15) Abraham Lincoln's DNA and other Adventures in Genetics (Philipo Reilly)
- (16) Biotechnology – An Introduction (Susan Barrum)