

Course Syllabus

Lecture: Tuesdays and Thursdays 11:00am-11:50am
Location: McCosh Hall 66

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Course Description

“Genes are rarely about inevitability, especially when it comes to humans, the brain, or behavior. They’re about vulnerability, propensities, tendencies.”

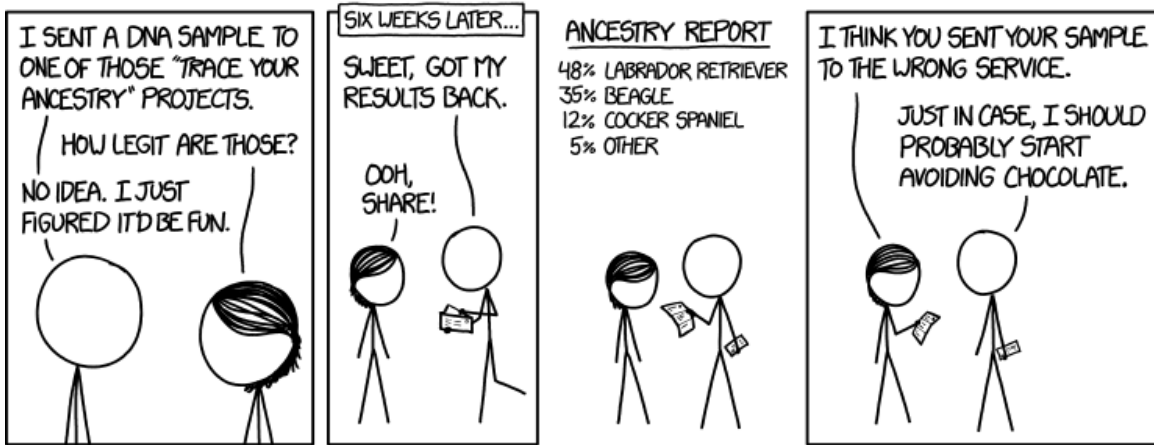
The world is in the midst of a growing revolution. Scientific advances in collecting and analyzing DNA, spurred by the completion of the Human Genome Project in 2003, are beginning to redefine how we understand ourselves and others. During the past decade, tens of millions of people in the United States alone have explored their own genome using direct-to-consumer services like 23andMe. Over that same period, researchers have made great strides connecting genes to a range of valued social, economic, and health outcomes, from education to obesity to depression.

An interdisciplinary group of social scientists—comprised of sociologists, economists, psychologists, and epidemiologists, among others—is working to integrate this genetic data into existing models of social behavior. Which DNA differences affect obesity? Through what mechanisms do genes influence a person’s chances of developing depression? Can genetic risk for antisocial behavior be modified by environmental conditions? As genetic data becomes more prevalent in our world, old controversies involving DNA begin to resurface.

Researchers wrestling with these questions must also begin to consider how people will respond to the influx of information on genetic risk and ancestry. Ever-improving genomic technologies make it possible for us to begin interpreting, interacting with, and

even manipulating our DNA. How can we prevent the use of genetic discoveries for validating—or worse yet, biologically reifying—social inequality?

In this course, we explore the new field of social genomics—what the genome tells us about our collective past, society today, and various potential futures. We begin by discussing the ugly history of discourses surrounding the heritability of social and behavioral outcomes. We then move into an overview of the key concepts of human molecular genomics, including genetic inheritance, ancestry, population stratification, polygenicity, and genetic prediction. Finally, we review recent discoveries at the intersection of genomics and the social sciences and discuss their implications for society.



Assignments & Grading

Your final grade will weight the assessments as follows:

Attendance & Participation	25%
Midterm Exam	25%
Precept Presentations	25%
Final Paper	25%

Attendance & Participation: Students are expected to attend class and actively participate in precept sections. Even students get one free miss, beyond that unexcused absense. There are three subcategories: 10% Lecture Attendance, 10% Precept Attendance, and 5% Peer Paper Feedback.

Midterm Exam: A midterm exam is scheduled for October 14th.

Precept Presentations: Once during the semester, each student will be expected to the lead and facilitate the precept discussion. In addition, during the final weeks of precept, students will give a 10-minute presentation on their final paper topic. This presentation must include their main question, a preliminary argument, and the type of evidence they intend to bring to bear. There are two subcategories: 12.5% Precept Discussion Leader and 12.5% Final Paper Presentation.

Final Paper: Each student will prepare a term paper that explores a social, ethical, or policy issue related to human genomics, broadly defined. The paper may not strictly be a literature review and instead must synthesize sources to advance a novel argument. To select a topic, each student should consider which facets of genomics and society are most compelling to them. Each paper must be 8 to 10 pages (double-spaced, 1" margins, Time New Roman font) and are due via e-mail on December 16th (Dean's Date) at 5pm.

Lecture Calender

TUESDAY		THURSDAY	
Sep 6th Introduction	1	8th Eugenics & Heritability	2
13th Twin & Adoption Studies	3	15th Human Molecular Genetics	4
20th What is a Genetic Effect?	5	22nd From Candidate Genes to GWAS	6
27th Polygenic Scores	7	29th Population Stratification	8
Oct 4th Social Genetic Effects	9	6th Problems with Polygenic Scores	10
11th Midterm Review	11	13th Midterm Exam	12
18th <i>-Fall Recess-</i>		20th <i>-Fall Recess-</i>	
25th Race & Ancestry I	13	27th Race & Ancestry II	14
Nov 1st Race & Ancestry III	15	3rd Gene-Environment Interactions	16
8th Social Mediation of Genetic Effects	17	10th Genes & Identity I	18
15th Genes & Identity II	19	17th Genes & Social Inequality I	20
22nd <i>-No Class- (Friday Schedule)</i>		24th <i>-Thanksgiving Recess-</i>	
29th Genes & Social Inequality II	21	Dec 1st Genes & Social Policy	22
6th Epigenetics	23	8th Conclusion	24

Course Reading

Required Texts

The Social Life of DNA: Race, Reparations, and Reconciliation After the Genome. Alondra Nelson (Beacon Press, 2016).

The Genome Factor: What the Social Genomics Revolution Reveals about Ourselves, Our History, and the Future by Dalton Conley & Jason Fletcher (Princeton University Press, 2017).

The Genetic Lottery: Why DNA Matters for Social Equality by Kathryn Paige Harden (Princeton University Press, 2021).

1. Introduction (9/6)

- *The Genome Factor* Chapter 1
- *The Social Life of DNA* Chapter 1

2. Eugenics & Heritability (9/8)

- Reilly 2015. *Eugenics and Involuntary Sterilization: 1907–2015.* Annual Review of Genomics and Human Genetics
- Roberts 2019. *Eugenics is Still a Dangerous Idea.* The Philadelphia Inquirer.
- Mills & Tropf 2020. *Sociology, Genetics, and the Coming of Age of Sociogenomics.* Annual Review of Sociology.

3. Twin & Adoption Studies (9/13)

- *The Genome Factor* Chapter 2
- Polderman et al. 2015. *Meta-Analysis of the Heritability of Human Traits Based on Fifty Years of Twin Studies* Nature Genetics.

4. Human Molecular Genetics (9/15)

- *The Genome Factor* Appendix 1 & Appendix 2

5. What is a “Genetic Effect”? (9/20)

- Trejo & Martschenko Book Draft Chapter #1
- Young et al. 2019. *Deconstructing the Sources of Genotype-Phenotype Associations in Humans.* Science.

6. From Candidate Genes to GWAS (9/22)

- Chabris et al. 2015. *The Fourth Law of Behavior Genetics*. Current Directions in Psychological Science.

7. Polygenic Scores (9/27)

- *The Genetic Lottery* Chapter 3
- Ward 2018. *The 'Geno-Economists' Say DNA Can Predict Our Chances of Success*. The New York Times Magazine.

8. Population Stratification (9/29)

- Hamer 2000. *Beware the Chopsticks Gene*. Molecular Psychiatry.
- Novembre et al. 2008. *Genes Mirror Geography Within Europe*. Nature.

9. Social Genetic Effects (10/4)

- Kong et al. 2018. *The Nature of Nurture: Effects of Parental Genotypes*. Science.
- Zimmer 2018. *You Are Shaped by the Genes You Inherit. And Maybe by Those You Don't*. The New York Times.

10. Problems with Polygenic Scores (10/6)

- Martin et al . 2017. *Human Demographic History Impacts Genetic Risk Prediction Across Diverse Populations*. American Journal of Human Genetics.
- Burt 2022. *Challenging the Utility of Polygenic Scores for Social Science: Environmental Confounding, Downward Causation, and Unknown Biology*. Behavioral & Brain Sciences.
- Trejo & Martschenko 2022. *Beware the Phony Horserace between Genes and Environments*. Behavioral & Brain Sciences.

11. Midterm Review (10/11)

- Watch: Three Identical Strangers (2018)

12. Midterm Exam (10/13)

13. Race & Ancestry I (10/25)

- *The Genome Factor* Chapter 5
- *The Genetic Lottery* Chapter 4

14. Race & Ancestry II (10/27)

- Fujimura et al. 2014. *Clines Without Classes: How to Make Sense of Human Variation*. Sociological Theory
- Reich 2018. *How Genetics is Changing our Understanding of 'Race'*. The New York Times.

- Holmes 2018. *What Happens When Geneticists Talk Sloppily About Race*. The Atlantic.
15. **Race & Ancestry III (11/1)**
 - *The Social Life of DNA* Chapter 2
 - Roberts & Rollins 2020. *Why Sociology Matters to Race and Biosocial Science*. Annual Review of Sociology.
 16. **Gene-Environment Interactions (11/3)**
 - *The Genome Factor* Chapter 7
 - Herd et al. 2019. *Genes, Gender Inequality, and Educational Attainment*. American Sociological Review.
 17. **Social Mediation of Genetic Effects (11/8)**
 - Jencks 1980. *Heredity, Environment, and Public Policy Reconsidered*. American Sociological Review.
 - Trejo & Conley 2022. *Social Genes Op-Ed*. Scientific American.
 18. **Genes & Identity I (11/10)**
The Social Life of DNA Chapter 4
 19. **Genes & Identity II (11/15)**
The Social Life of DNA Chapter 5
 20. **Genes & Social Inequality I (11/17)**
 - Harden 2021. *The Genetic Lottery* Chapter 11
 21. **Genes & Social Inequality II (11/29)**
 - *Trejo & Martschenko Book Draft* Chapter #2
 - Conley 2021. *A New Age of Genetic Screening is Coming—and We Don't Have Any Rules for It*. Washington Post.
 22. **Genes & Social Policy (12/6)**
 - Harden 2021. *The Genetic Lottery* Chapter 12
 - Wedow, Martschenko, & Trejo. *Scientists Must Consider the Risk of Racist Misappropriation of Research..* Scientific American.
 23. **Epigenetics (12/8)**
 - van Otterdijk & Michels 2016. *Transgenerational Epigenetic Inheritance in Mammals: How Good is the Evidence?*. The FASEB Journal.
 - Aristizabala et al. 2019. *Biological Embedding of Experience: A Primer on Epigenetics*. Proceedings of the National Academy of Sciences.
 24. **Conclusion (12/7)**
 - *The Genome Factor* Epilogue

Precept Calender

PRECEPT	
Sep 5th <i>-No Precept-</i>	
12th Instructor Lead	1
19th Discussion Leader #1	2
26th Discussion Leader #2	3
Oct 3rd Discussion Leader #3	4
10th Discussion Leader #4	5
17th <i>-Fall Recess-</i>	
24th Discussion Leader #5	6
31st Discussion Leader #6	7
Nov 7th Discussion Leader #7	8
14th Final Presentations	9
21st <i>-Thanksgiving Recess-</i>	
28th Final Presentations	10
Dec 5th Peer Paper Feedback	11