

Genetics & Society (SOCI 138)

Summer 2022

Two three-hour classes per week. Time and location TBD.

Professor Daniel Navon (dnavon@ucsd.edu)

Office hours: TBD

For well over a century now, genetics has powerfully shaped how we think about human difference. This class will explore the many ways in which studying our genomes and inheritance patterns has informed public understanding and policy on topics like race and ethnicity, disability, reproduction, rare disease, intelligence, sociality, delinquency, and personal identity in the United States. We will also see how social forces shape genetics research itself and discuss controversies surrounding gene patenting, forensic science, newborn screening, cloning, and genetic testing for disease, risk and ancestry. Throughout, we will adopt a comparative perspective by examining the way ideas about genetics and heritability have moved back and forth between the UK and US—from phrenology and Darwin in the 19th Century, through the eugenics movement of the early 20th Century, on the rise of modern medical genetics in the post-World War II period, and through to “post-genomic” present. In addition, we will also trace several notable stories where Edinburgh played an especially pivotal role: as the world leader for phrenological research and the intellectual cauldron that set Darwin on his world-changing path; as a leading center for the early study of chromosome abnormalities, and the point of origin for the XYY abnormality that would go on to become the infamous “criminal chromosome” that captivated criminologists, popular media, science fiction writers, and children’s rights advocates in the US; and as the site where the first cloned mammal, Dolly the sheep, was born, lived out her endlessly discussed life, and eventually found her way into a glass display at the National Museum of Scotland just a stone’s throw for the University of Edinburgh. Readings will be drawn from the genetics literature, popular culture and the social sciences. There will also be fieldtrips and guest lectures to help us take full advantage of the Edinburgh and its rich history. By the end of the class, students will possess the critical knowledge base to critically assess the promises and potential pitfalls of contemporary genetics.

Assessment

Assessment for the class will consist of reading response memos, a midterm take-home exam, and a final home exam *or* paper. The breakdown of final grades will be as follows:

Weekly mini essays: 40% of your grade. You will be required to submit four short essays (400–600 words each) in the ‘Weekly Essays’ assignment entries in Canvas. You will have a few prompts to choose from each week, all based on key readings, and your responses will be graded on a 0-10 point scale. You must submit one memo in each of weeks 1-4 by 5pm *the night before* our second class of the week.

Take-home final: 50% of your grade. I will circulate a take-home final exam consisting of short answer and essay questions at the beginning of Week 5. Alternatively, you may produce a final research paper, website, or podcast on a topic related to genetics and society. (Topics must be your own, and they must be approved by the end of Week 3.) All finals will be due towards the end of Week 5 (exact time TBD).

Class attendance and participation: 10% of your grade. This is a small class, so regular attendance and participation is required. Please keep in mind that you do *not* have to talk more than your peers to receive full participation points—regular engagements based on readings and lecture materials will suffice.

Readings

All texts are available on Canvas. I recommend setting up a VPN to access online readings off campus. See instructions here: <https://library.ucsd.edu/computing-and-technology/connect-from-off-campus/> Please let me know if you have trouble accessing the readings.

Some readings will contain technical genetics terms. I strongly recommend that you consult publicly available resources like the NIH's Genetics Home Reference or the NHGRI glossary (<https://ghr.nlm.nih.gov/>, <https://www.genome.gov/Glossary/>).

Course policies

Cheating and plagiarism:

Students are expected to do their own work and to cite sources according to established norms as outlined in the UCSD Policy on Academic Integrity. The policy can be found here: <http://senate.ucsd.edu/Operating-Procedures/Senate-Manual/Appendices/2> A FAQs page on what counts as cheating can be found here: <http://academicintegrity.ucsd.edu/faq/index.html> Cheaters will receive a failing grade on the assignment or exam and/or the entire course. They may also be referred for additional disciplinary action elsewhere at UCSD. If you are unsure about what is considered either plagiarism or cheating, please ask.

Missing/late exams and assignments:

Failure to turn in your essays on time without a valid excuse will result the deduction of one half-letter grade for every day (or part thereof) after the deadline. Excuses communicated after the deadline will only be accepted in exceptional circumstances.

Struggles with the class:

If you are having trouble with any aspect of the class, including deadlines, it is always best to contact me as soon as possible. That way we can address the problem before you have fallen too far behind or lost too many points from your final grade. We understand that these are challenging times, and that many of you are facing extraordinary external pressures.

Disability accommodations

Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD). Students are required to present their AFA letters to Faculty (please make arrangements to contact me privately) and to the OSD Liaisons in the Sociology Department in advance so that accommodations may be arranged.

Fieldtrips

All fieldtrips are mandatory and may be integrated into the course essays (described above).

Weekly themes and readings (* indicates readings suitable for response memos)

Week 1: Introductions and historical origins

Day 1: Introduction to the class, plus genetics and society meets COVID-19

Day 2: Historical origins in Edinburgh, and what do we mean by ‘gene’?

- *Shapin, Steven. 1979. “The Politics of Observation: Cerebral Anatomy and Social Interests in the Edinburgh Phrenology Disputes.” *The Sociological Review* 27(1_suppl):139–78. doi: [10.1111/j.1467-954X.1979.tb00061.x](https://doi.org/10.1111/j.1467-954X.1979.tb00061.x).
- *Poskett, James. 2019. *Materials of the Mind: Phrenology, Race, and the Global History of Science, 1815-1920*. Chicago: University of Chicago Press. Chapter 1: ‘Skulls’.
- * Keller, Evelyn Fox. 2002. *The Century of the Gene*. Harvard University Press. Introduction and Chapter 2.
 - Recommended: Scientific American. [Genes vs. DNA vs. Chromosomes](#) (video).
 - Mayr, Ernst and William B. Provine. 1981. “[The Evolutionary Synthesis](#).” *Bulletin of the American Academy of Arts and Sciences* 34(8):17–32.
 - ‘Darwin in Edinburgh’: <https://blog.nms.ac.uk/2019/06/07/darwin-in-edinburgh/>

Fieldtrip 1: Visit to the [University of Edinburgh’s Anatomical Museum](#) to view the collection of the Edinburgh Phrenological Society, arguably the most important center for phrenological research in the world. Then, we will take a walking tour orient students, taking in the site of famous Plinian Society and Charles Darwin’s Edinburgh [residence](#) along the way.

Week 2: From eugenics to modern human genetics

Day 1: Eugenics’ origins and early debates, a racist nightmare, and eventual unraveling

- * Galton, Francis. 1904. “[Eugenics: Its Definition, Scope, and Aims](#).” *American Journal of Sociology* 10(1):1–6.
- * Paul, Diane B. 1995. *Controlling Human Heredity, 1865 to the Present*. Humanities Press. Chapters 1-3.
- * Stern, Alexandra Minna. 2005. [Eugenic Nation: Faults and Frontiers of Better Breeding in Modern America](#). Berkeley: University of California Press. Chapters 3 and 4.
 - Recommended: [Buck v. Bell, 274 U.S. 200](#) (1927). US Supreme Court Ruling.
 - * Kevles, Daniel J. 1998. *In the Name of Eugenics: Genetics and the Uses of Human Heredity*. Cambridge, MA: Harvard. Chapter VII.
 - Shoichet, Catherine E. 2020. “[The US Has a Horrifying History of Forced Sterilizations. Some Fear Hysterectomies in ICE Custody Could Be a New Chapter](#).” *CNN*, September 16.

Day 2: The new human genetics, 'geneticization', and the ghost of eugenics

- * Comfort, Nathaniel. 2014. [*The Science of Human Perfection: How Genes Became the Heart of American Medicine*](#). Reprint edition. Yale University Press. Chapters 5 and 6.
- * Lindee, M. Susan. 2008. *Moments of Truth in Genetic Medicine*. The Johns Hopkins University Press. Chapter 4.
- * Hedgecoe, Adam M. 2001. "[Geneticization: Debates and Controversies](#)." in *eLS*.
 - Recommended: * McKusick, Victor A. 1993. "[Medical Genetics](#)." *JAMA: The Journal of the American Medical Association* 270(19):2351–56.
 - Bernard, Lennox. 1961. "[Chromosomes For Beginners](#)." *The Lancet* 277(7185):1046–51.

Week 3: Genetics meets race and sex, behavior and culture

Day 1: Sex and crime, intelligence and race

- * Panofsky, Aaron. 2014. *Misbehaving Science: Controversy and the Development of Behavior Genetics*. Chicago: University of Chicago Press. Chapter 3.
- * Gould, Stephen Jay. 1994. "Curveball." *The New Yorker*, November 28, 139–49.
- *de Chadarevian, Soraya. 2020. *Heredity under the Microscope*. Chicago, IL: University Of Chicago Press. Chapter 3: X and Y
- Gould, Stephen Jay. 1996. *The Mismeasure of Man*. W. W. Norton & Company. Epilogue to Chapter 4, pp. 173-5.
 - Recommended: * Richardson, Sarah S. 2013. *Sex Itself: The Search for Male and Female in the Human Genome*. University of Chicago Press. Chapter 5.
 - Brown, W. M., W. H. Price, and P. A. Jacobs. 1968. "[Further Information on the Identity of 47,XXY Males](#)." *British Medical Journal* 2(5601):325–28.
 - Kingsbury, Kathleen. 2009. "[Which Kids Join Gangs? A Genetic Explanation](#)." *Time*, June 10.

Day 2: Culture, 'biosocial' identity, and the genetics of race and ancestry

- *Nelkin, Dorothy and M. Susan Lindee. 2004. *The DNA Mystique: The Gene as a Cultural Icon*. University of Michigan Press. Introduction and Chapter 6.
- *Hacking, Ian. 2006. "[Genetics, Biosocial Groups & the Future of Identity](#)." *Daedalus* 135(4):81–95.
- *Fullwiley, Duana. 2007. "[The Molecularization of Race: Institutionalizing Human Difference in Pharmacogenetics Practice](#)." *Science as Culture* 16(1):1–30.
- Moffat, Alistair. 2017. *The Scots: A Genetic Journey*. 2nd edition. Birlinn. Excerpts TBD.
 - Recommended: Bolnick, Deborah A. et al. 2007. "[The Science and Business of Genetic Ancestry Testing](#)." *Science* 318(5849):399.
 - *Nelson, Alondra. 2008. "[Bio Science Genetic Genealogy Testing and the Pursuit of African Ancestry](#)." *Social Studies of Science* 38:759–83.
 - Anon. 2019. "Scotland's Genetic Landscape Reflects Dark Age Populations." *BBC News*, September 3.

Week 4: Genetic testing for risk, disease, and racial/eth

Day 1: Prenatal genetic testing and newborn screening

- *Timmermans, Stefan and Mara Buchbinder. 2013. *Saving Babies? The Consequences of Newborn Genetic Screening*. Chicago: University of Chicago Press. Chapters 1-2.
- *Lippman, Abby. 1991. “[Prenatal Genetic Testing and Screening: Constructing Needs and Reinforcing Inequities](#).” *American Journal of Law & Medicine* 17:15.
- *Parens, Erik and Adrienne Asch. 2003. “[Disability Rights Critique of Prenatal Genetic Testing: Reflections and Recommendations](#).” *Mental Retardation and Developmental Disabilities Research Reviews* 9(1):40–47.
 - Recommended: Knoppers, Bartha M., Karine Sénécal, Pascal Borry, and Denise Avaré. 2014. “[Whole-Genome Sequencing in Newborn Screening Programs](#).” *Science translational medicine* 6(229):229cm2–229cm2.
 - Greely, Henry T. 2011. “[Get Ready for the Flood of Fetal Gene Screening](#).” *Nature* 469(7330):289–91.
 - Anon. n.d. “Scots Parents Fear New Down’s Syndrome Testing Will Lead to More Abortions.” *Daily Record*.
 - Anon. 2019. “UK Newborn Baby Screening ‘Not Good Enough.’” *BBC News*, July 22.

Day 2: Clinical genomics, rare diseases, and direct-to-consumer testing

A special hourlong guest lecture on clinical genomics from Professor Steve Sturdy

- Harmon, Amy. 2007. “After DNA Diagnosis: ‘Hello, 16p11.2. Are You Just Like Me?’” *The New York Times*, December 28.
- *Mnookin, Seth. 2014. “[One of a Kind](#).” *The New Yorker*, July 21.
- *Caulfield, Timothy and Amy McGuire. 2012. “[Direct-to-Consumer Genetic Testing: Perceptions, Problems, and Policy Responses](#).” *Annual Review of Medicine* 63(1):23–33.
- Green, Robert C., Denise Lautenbach, and Amy L. McGuire. 2015. “[GINA, Genetic Discrimination, and Genomic Medicine](#).” *New England Journal of Medicine* 372(5):397–9.
 - Recommended: *Skomorowsky, Anne. 2016. “[The X-Factor in Infertility and Neurological Health](#).” *Scientific American*, March 1.
 - *Lindee, M. Susan. 2008. *Moments of Truth in Genetic Medicine*. 1st ed. The Johns Hopkins University Press. Chapter 6.
 - Hayden, Erika Check. 2008. “[Biological Tools Revamp Disease Classification](#).” *Nature* 453(7196):709.
 - Rochman, Bonnie. 2012. “[Why Cheaper Genetic Testing Could Cost Us a Fortune](#).” *Time*, October 26. Retrieved December 21, 2012.

Fieldtrip 2: A visit to [The MRC Institute of Genetics and Molecular Medicine](#) (IGMM) at The University of Edinburgh—the point-of-origin of the XY story from Week 3 and the leading center for clinical genomics in Scotland.

Week 5: Our 'postgenomic' era and its many dilemmas

Day 1: The human genome project, postgenomics and thorny issues of ownership
A special hourlong guest lecture on epigenetics from Professor Martyn Pickersgill

- *Rose, Hilary and Steven Rose. 2013. *Genes, Cells and Brains: The Promethean Promises of the New Biology*. Verso Books. Chapter 1.
- Watters, Ethan. 2006. “[DNA Is Not Destiny: The New Science of Epigenetics | DiscoverMagazine.com](#).” *Discover Magazine*, November 22.
- *Skloot, Rebecca. 2011. *The Immortal Life of Henrietta Lacks*. New York: Broadway Books. [Excerpt](#).
- Liptak, Adam. 2013. “[Justices, 9-0, Bar Patenting Human Genes](#).” *The New York Times*, June 13.
 - Recommended: “[Henrietta’s Tumor](#).” *Radiolab* 2009.
 - Andrews, Lori B. 2002. “[Genes and Patent Policy: Rethinking Intellectual Property Rights](#).” *Nature Reviews Genetics* 3(10):803–8.
 - Collins, Francis S. 1999. “[Medical and Societal Consequences of the Human Genome Project](#).” *New England Journal of Medicine* 341(1):28–37.
 - Callaway, Ewen. 2013. “[Deal Done over HeLa Cell Line](#).” *Nature* 500(7461):132–33.

Day 2: New breakthroughs, new eugenics? Cloning, gene-editing, etc.

- Franklin, Sarah. 2007. *Dolly Mixtures: The Remaking of Genealogy*. Durham: Duke University Press Books. Intro, and chapters 1 and 3.
- *Duster, Troy. 2003. *Backdoor to Eugenics*. Routledge. Chapter 7 and Afterword.
- Pollack, Robert. 2015. “[Eugenics Lurk in the Shadow of CRISPR](#).” *Science* 348(6237):871–871.
 - Recommended: Baltimore, David et al. 2015. “[A Prudent Path Forward for Genomic Engineering and Germline Gene Modification](#).” *Science* 348(6230):36–38.
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Fieldtrip 3: We will visit the National Museum of Scotland, and especially its [Science and Technology galleries](#), where we will pay our respects to the stuffed remains of Polly the cloned sheep. We will likely also visit the [Roslin Institute](#)—the pathbreaking center for animal genetics research that created Dolly.