

The 20th Century Gene, from Eugenics to Epigenetics

History of Science 350

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Office hours: Wednesdays 12:00–2:00 pm, or by appointment

Spring 2015

Van Vleck B 223

Mondays, Wednesdays 4:00–5:15 pm

From the eugenics movement at the beginning of the century to the global initiative to sequence the human genome at its close, the gene has figured prominently into twentieth century history. How did genetics come to occupy a prominent place in both scientific and popular thinking? What are the consequences of the attention devoted to genes? In the first unit, we'll start by addressing the intertwined origins of biometrics, classical genetics, medical genetics, and eugenics; focusing in particular on the history of eugenics in North America. The second unit will examine how ideas about human destinies and free will are shaped by and expressed through genetics. We'll travel back to a time before notions of heredity existed, and study science fiction stories about the power of nature and nurture. The third unit will use a series of contemporary cases as starting points for discussions about where genetics is headed and how science and society intersect in its future directions. Students will have the opportunity to choose what topics they would like to discuss—such as three parent embryos, controversies over the heritability of intelligence, or personal genomics—in the final weeks of the course. The course is discussion-based; with occasional in-class lectures that provide additional background on topics not covered by the course readings. Assignments for this course include oral presentations and essays, with a focus on developing revision skills. This class is suitable for students in the sciences, social sciences, and humanities, and no prior knowledge of genetics is required.

Course Objectives

By the end of the course, students will be able to:

- identify key people, events, technologies, and institutions in the history of genetics;
- understand the historical circumstances that led to the emergence of heredity as a concept, and how genetic research has changed over the course of the twentieth century;
- articulate the connections between scientific research on genetics and other domains such as medicine, public policy, and popular culture;
- reflect on the insights that controversial moments in the history of genetics (such as the eugenics movement) hold for contemporary society;
- accurately summarize the key points in individual articles, synthesize themes across bodies of academic scholarship, and present these findings orally;
- develop and defend their own academic arguments in writing;
- use revision techniques to evaluate and improve the quality of their oral and written assignments.

Course materials

There are two required texts for this course:

- Dorothy Nelkin and M. Susan Lindee. 2004. *The DNA mystique: the gene as a cultural icon*. 2nd edition. Ann Arbor: University of Michigan Press
- Aldous Huxley. 2006. *Brave New World*. Reprint edition. New York; London: Harper Perennial Modern Classics

You can purchase these texts from the bookstore of your choice, or use the copies available at the reserve desk at College Library in Helen C. White Hall. Readings marked with † in the syllabus are available for download through UW Madison's electronic library collections. You can download these readings from the electronic course reserves page on the Learn@UW site for the course. All remaining readings are in a course pack available for purchase at the Social Science Copy Center (Social Science 6120). A copy of the course pack will also be available at the College Library reserve desk.

Assignments and grading

<i>Assignment</i>	<i>% of final grade</i>	<i>Due date</i>
Class participation	15%	formative assessment mid-semester
Oral presentation	20%	as assigned throughout semester
Research paper	15%	March 13, 2015, 5:00 pm
Revised research paper	25%	April 17, 2015, 5:00 pm
Final exam	25%	May 10, 2014, 5:00 pm

Class participation Your participation grade will be based on your attendance, preparation for class, and the quality of your participation in class discussions and in-class exercises. Students are expected to arrive in class having read the assigned readings for that day and ready to participate in discussion or other in class activities. A detailed rubric outlining expectations for discussion participation will be distributed in class, and you will receive feedback and an interim grade on your class participation midway through the semester.

Oral presentation You will choose one of the assigned readings and present on it at the beginning of class on the day that the reading is assigned. These presentations will develop and evaluate your skills at summarizing the most important points of a reading, connecting those arguments to the themes of the course, and stimulating discussion on the topic. Before your presentation, you must schedule a brief meeting with me (at least 48 hours before your presentation) to get feedback on your draft presentation. More detailed instructions and a grading rubric for this assignment will be distributed in class.

Research paper The grading of the paper is broken down into two parts, with 15% of the course grade allocated to the first version of the paper (note that this should be a complete and formatted paper, not simply an outline or rough draft) and 25% to the revised and resubmitted version of this paper. The grading of the paper will place particular emphasis on your ability to create and defend an original academic argument, and to use revision techniques to strengthen the argument and its written presentation.

Final exam The final exam is a take-home assignment where you will choose three of four short essay questions to write on, using course readings as your sources. The take home essay prompts and the grading rubric will be distributed and discussed on the final course meeting.

Course policies

Absences You are allowed one “freebie” absence during the semester, which you can take for any reason and at any time. For additional absences due to illness, family emergencies, scheduled conflicts, or other legitimate reasons, you can make up the missed participation grades by handing in a 250 word informal reading response instead of attending class. You must contact me in advance of the missed

class (except in exceptional circumstances) to clear your absence with me and agree on a due date for your reading response.

Grading and late assignments All assignments will receive a numeric score (e.g. 29/30), which will also be displayed as a percentage score on the Learn@UW website. Your final percentage grade will be converted into a final letter grade using the conversion table below. Late assignments will be penalized by 3% of the total assignment points per day, unless you have made prior arrangements with me.

A	AB	B	BC	C	D	F
93.0–100%	88.0–92.9%	83.0–87.9%	78.0–82.9%	70.0–77.9%	60.0–69.9%	0–59.9%

Students with disabilities I am available to discuss academic accommodations for students with disabilities. Please present your McBurney visa to me within the first three weeks of the semester (except in unusual circumstances) so that there is enough time for appropriate arrangements to be made.

Academic integrity All students are expected to adhere to the University of Wisconsin–Madison’s core values regarding academic integrity. Plagiarism or other academic misconduct may result in a zero on the assignment or exam, a lower grade in the course, or failure in the course. See the Dean of Students Office website for more information about the academic misconduct process (<http://students.wisc.edu/doso/acadintegrity.html>).

Week 1: Course introduction

January 21

No required readings

Unit 1: What is genetics and where did it come from?

Week 2: The double helix and Mendel’s peas

January 26

- James D. Watson. 1980. *The double helix: a personal account of the discovery of the structure of DNA*. New York: Atheneum, “The double helix,” pp. 95–108
- Angela N. H. Creager and Gregory J. Morgan. 2008. “After the Double Helix.” *Isis* 99 (2): 239–272. doi:10.1086/588626[†]

January 28

- Matt Ridley. 1999. *Genome: The Autobiography of a Species in 23 Chapters*. New York: Harper Perennial, “History,” pp. 38–53

- Robert C. Olby. 2000. "Horticulture: the font for the baptism of genetics." *Nature Reviews Genetics* 1 (1): 65–70. doi:10.1038/35049583[†]

Week 3: Breeding better plants and humans

February 2

- Barbara A. Kimmelman. 1983. "The American Breeders' Association: Genetics and Eugenics in an Agricultural Context, 1903-13." *Social Studies of Science* 13 (2): 163–204. doi:10.1177/030631283013002001[†]

February 4

- Daniel Kevles. 1985. *In the name of eugenics: genetics and the uses of human heredity*. New York: Knopf, "Francis Galton," pp. 3–19

Week 4: The eugenics movement in North America

February 9

- Diane B. Paul. 1995. *Controlling human heredity: 1865 to the present*. Atlantic Highlands, N.J.: Humanities Press International, "From soft to hard heredity," pp. 40–49
- Dorothy Nelkin and M. Susan Lindee. 2004. *The DNA mystique: the gene as a cultural icon*. 2nd edition. Ann Arbor: University of Michigan Press, "The eugenic gene," pp. 19–37

February 11 – Guest lecture by Dr. Eunjung Kim, Department of Gender and Women's Studies

- Robert Proctor. 1988. *Racial hygiene: medicine under the Nazis*. Cambridge, MA: Harvard University Press, "The control of women," pp. 118–130
- Martin S. Pernick. 1999. *The Black Stork: Eugenics and the Death of "Defective" Babies in American Medicine and Motion Pictures since 1915*. New York: Oxford University Press, "The birth of a controversy," pp. 1–18

Week 5: Classical genetics and medical genetics

Research paper assignment distributed in class

February 16

- Robert E. Kohler. 1994. *Lords of the fly: Drosophila genetics and the experimental life*. Chicago: University of Chicago Press, "Constructing drosophila," pp. 53–90

February 18

- M. Susan Lindee. 2005. *Moments of Truth in Genetic Medicine*. Baltimore: Johns Hopkins University Press, "Provenance and the pedigree," pp. 58–89

Week 6: Molecular biology

February 23

- Soraya de Chadarevian. 2011. *Designs for Life: Molecular Biology after World War II*. Cambridge: Cambridge University Press, "Reconstructing life," pp. 50–97
- Hans-Jörg Rheinberger. 2008. "What Happened to Molecular Biology?" *BioSocieties* 3 (3): 303–310. doi:10.1017/S1745855208006212[†]

February 25 – Guest lecture by Dr. Millard Susman, Laboratory of Genetics

- M. Susman. 1995. "The Cold Spring Harbor Phage Course (1945–1970): A 50th Anniversary Remembrance." *Genetics* 139 (3): 1101–1106. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1206443/pdf/ge13931101.pdf>[†]

Unit 2: Destiny and free will in the era of the gene

Week 7: Life before and after heredity

March 2

- Staffan Müller-Wille and Hans-Jörg Rheinberger. 2012. *A cultural history of heredity*. Chicago: University of Chicago Press, "Generation, reproductions, evolution," pp. 15–39

March 4

- Dorothy Nelkin and M. Susan Lindee. 2004. *The DNA mystique: the gene as a cultural icon*. 2nd edition. Ann Arbor: University of Michigan Press, "The powers of the gene," pp. 1–18; "Sacred DNA," pp. 38–57

Week 8: Against determinism

March 9

- Dorothy Nelkin and M. Susan Lindee. 2004. *The DNA mystique: the gene as a cultural icon*. 2nd edition. Ann Arbor: University of Michigan Press, "Creating natural distinctions," pp. 102–126
- Evelyn Fox Keller. 2010. *The Mirage of a Space between Nature and Nurture*. Durham, NC: Duke University Press Books, "Changing the question," pp.31–51

March 11

- Dorothy Nelkin and M. Susan Lindee. 2004. *The DNA mystique: the gene as a cultural icon*. 2nd edition. Ann Arbor: University of Michigan Press, "Absolution," pp. 127–148
- Richard Lewontin, Steven Rose, and Leon J. Kamin. 1984. *Not in our genes: biology, ideology, and human nature*. New York: Pantheon, "The politics of biological determinism," pp. 17–36

March 13: Research paper due

Week 9: Genetic selves, families, races

March 16

- Barbara Duden. 2009. "What genes say." In *Ideas on the Nature of Science*, edited by David Cayley, 257–265. Fredericton, N.B.: Goose Lane Editions
- Daniel Navon. 2011. "Genomic Designation: How Genetics Can Delineate New, Phenotypically Diffuse Medical Categories." *Social Studies of Science* 41 (2): 203–226. doi:10.1177/0306312710391923[†]

March 18

- Dorothy Nelkin and M. Susan Lindee. 2004. *The DNA mystique: the gene as a cultural icon*. 2nd edition. Ann Arbor: University of Michigan Press, "The molecular family," pp. 58–78
- Kim TallBear. 2013. "Genomic articulations of indigeneity." *Social Studies of Science* 43 (4): 509–533. doi:10.1177/0306312713483893[†]

Week 10: Imagined destinies

March 23

- Aldous Huxley. 2006. *Brave New World*. Reprint edition. New York; London: Harper Perennial Modern Classics, selections TBA

March 25

- *no assigned readings*
- Screening of the film GATTACA

March 28–April 3: March break

Unit 3: Contemporary concerns

Week 11: The flexible gene

April 6

- Eva Jablonka and Marion J. Lamb. 2002. "The Changing Concept of Epigenetics." *Annals of the New York Academy of Sciences* 981 (1): 82–96. doi:10.1111/j.1749-6632.2002.tb04913.x[†]
- Hannah Landecker. 2011. "Food as exposure: Nutritional epigenetics and the new metabolism." *BioSocieties* 6 (2): 167–194. doi:10.1057/biosoc.2011.1[†]

April 8 – Guest lecture by Dr. Aryn Martin, York University, Canada

- Aryn Martin. 2007. “The Chimera of Liberal Individualism: How Cells Became Selves in Human Clinical Genetics.” *Osiris* 22 (1): 205–222. doi:10.1086/521749[†]

Week 12: The return of eugenics?

April 13

- Dorothy Nelkin and M. Susan Lindee. 2004. *The DNA mystique: the gene as a cultural icon*. 2nd edition. Ann Arbor: University of Michigan Press, “Genetic futurism,” pp. 169–191
- Troy Duster. 2003. *Backdoor to eugenics*. 2nd edition. New York: Routledge, “Eugenics by the back door,” pp. 114–131

April 15

- Nathaniel Comfort. 2012. “The Eugenic Impulse.” *The Chronicle of Higher Education* (November 12). <http://chronicle.com/article/The-Eugenic-Impulse/135612/>[†]
- Calum MacKellar and Christopher Bechtel. 2014. *The ethics of the new eugenics*. New York: Berghahn, “Arguments supporting the new eugenics,” pp. 120–132

April 18: Revised research paper due

Weeks 13–15: Student choice topics

April 20–May 4

- readings will be announced and posted on the Learn@UW website

May 6

No assigned readings

May 10: Take-home final exam due by 5:00 pm