

PSYC G4495
Ethics, Genetics, and the Brain
Professor Frances A. Champagne
Spring 2016

G4495. Ethics, Genetics, and the Brain (seminar).

4pts. Wednesdays 10:10-12 PM in Room 405 Schermerhorn Hall.

Prerequisites: Basic background in neurobiology (for instance PSYC 1010, 2450, 2460, or 2480) and the instructor's permission.

INSTRUCTOR PERMISSION REQUIRED PRIOR TO REGISTRATION

Advances in genetics and neuroscience have expanded our understanding of the biological basis of behavior and risk of psychiatric disorder. However, these advances have implications for decision/policy making, legal issues, and society and raise broad ethical concerns. In this seminar course, we will discuss these implications and issues and consider the future challenges that may arise from the evolving study of the genetic and neurobiological determinants of behavior.

Weekly Schedule & Readings

Jan-20-16 Introduction and Overview: What are the ethical, legal, and social implications of genetics and neuroscience research?

READINGS:

Farah MJ. (2012) Neuroethics: the ethical, legal, and societal impact of neuroscience. *Annu Rev Psychol.* 63:571-91.

Newson A. (2004) The nature and significance of behavioural genetic information. *Theor Med Bioeth.* 25(2):89-111.

Dar-Nimrod I, Heine SJ. (2011) Genetic essentialism: on the deceptive determinism of DNA. *Psychol Bull.* 137(5):800-18.

Jan-27-16 Free Will vs. Determinism; From Genes to Brains to Behavior

READINGS:

Gregory Kaebnick, "Behavioral Genetics and Moral Responsibility," in *Wrestling with Behavioral Genetics: Science, Ethics, and Public Conversation*, edited by Erik Parens, Audrey Chapman, and Nancy Press (Johns Hopkins University Press, 2005).

Brembs B. (2011) Towards a scientific concept of free will as a biological trait: spontaneous actions and decision-making in invertebrates. *Proc Biol Sci.* 278(1707):930-9.

Neuroscience vs philosophy: Taking aim at free will. (2011) *Nature* 477: 23-25

Kendler KS. (2005) "A gene for...": the nature of gene action in psychiatric disorders. *Am J Psychiatry.* 162(7):1243-52.

Plomin R, Crabbe J. (2000) DNA. *Psychol Bull.* 126(6):806-28.

Wolf C, Linden DE. (2012) Biological pathways to adaptability-- interactions between genome, epigenome, nervous system and environment for adaptive behavior. *Genes Brain Behav.* 11(1):3-28.

Bearden CE, Glahn DC, Lee AD, Chiang MC, van Erp TG, Cannon TD, Reiss AL, Toga AW, Thompson PM. (2008) Neural phenotypes of common and rare genetic variants. *Biol Psychol.* 79(1):43-57.

Feb-03-16 Consciousness, Neural Activity, & Genes

READINGS:

Posner MI. (2005) Genes and experience shape brain networks of conscious control. *Prog Brain Res.* 150:173-83.

Crick F, Koch C. (2003) A framework for consciousness. *Nat Neurosci.* 6(2):119-26.

Rees G, Kreiman G, Koch C (2002) Neural correlates of consciousness in humans. *Nat Rev Neurosci* 3: 261–270.

**Feb-10-16 Class Discussion and Presentation of Vignettes: How does genetic and neurobiological information shape our decisions?
Journal Presentations**

Feb-17-16 Reproductive Choices: Ethics of Using Genetic Information

READINGS:

Klitzman R, Thorne D, Williamson J, Chung W, Marder K. (2007) Decision-making about reproductive choices among individuals at-risk for Huntington's disease. *J Genet Couns.* 16(3):347-62.

Klitzman R, Appelbaum PS, Chung W, Sauer M. (2008) Anticipating issues related to increasing preimplantation genetic diagnosis use: a research agenda. *Reprod Biomed Online*. 17 Suppl 1:33-42.

Burke W, Tarini B, Press NA, Evans JP. (2011) Genetic screening. *Epidemiol Rev*. 33(1):148-64.

Feb-24-16 Engineering Genomes & Brains

READINGS:

Lowenstein PR, Castro MG. (2001) Genetic engineering within the adult brain: implications for molecular approaches to behavioral neuroscience. *Physiol Behav*. 73(5):833-9.

Kiuru M, Crystal RG. (2008) Progress and prospects: gene therapy for performance and appearance enhancement. *Gene Ther*. 15(5):329-37

Spink J, Geddes D. (2004) Gene therapy progress and prospects: bringing gene therapy into medical practice: the evolution of international ethics and the regulatory environment. *Gene Ther*. 11(22):1611-6.

Clausen J. (2011) Conceptual and ethical issues with brain-hardware interfaces. *Curr Opin Psychiatry*. 24(6):495-501.

Mar-2-16 Journal Presentations

Mar-9-16 Discrimination on the Basis of Genetic Information

READINGS:

Klitzman R. (2010) Views of discrimination among individuals confronting genetic disease. *J Genet Couns*. 19(1):68-83.

Raithatha N, Smith RD. (2004) Disclosure of genetic tests for health insurance: Is it ethical not to? *Lancet*. 363:395-6.

Hudson KL. (2007) Prohibiting genetic discrimination. *N Engl J Med*. 356(20):2021-3.

Bombard Y, Palin J, Friedman JM, Veenstra G, Creighton S, Paulsen JS, Botorff JL, Hayden MR; Canadian Respond-HD Collaborative Research

Group (2011) Factors associated with experiences of genetic discrimination among individuals at risk for Huntington disease. *Am J Med Genet B Neuropsychiatr Genet.* 156B(1):19-27.

Mar-16-16 SPRING BREAK – NO CLASS

Mar-23-16 Neuromarketing: Can and/or should we use brain imaging data to determine consumer preferences?

READINGS:

Fisher CE, Chin L, Klitzman R. (2010) Defining neuromarketing: practices and professional challenges. *Harv Rev Psychiatry.* 18(4):230-7.

Murphy ER, Illes J, Reiner PB. (2008) Neuroethics of neuromarketing. *J Consumer Behav.* 7: 293–302.

Zak PJ. (2004) Neuroeconomics. *Trans Phil Roy Soc B Biol Sci.* 359: 1737–1748.

Mar-30-16 **Journal Presentations**

April-06-16 Legal Responsibility: Genetic and neurobiological variation and criminality

READINGS:

Tatarelli R, Del Casale A, Tatarelli C, Serata D, Rapinesi C, Sani G, Kotzalidis GD, Girardi P (2014) Behavioral genetics and criminal responsibility at the courtroom. *Forensic Sci Int.* 237:40-5.

Appelbaum PS. (2009) Through a glass darkly: functional neuroimaging evidence enters the courtroom. *Psychiatr Serv.* 60(1):21-3.

Greene J, Cohen J. (2004) For the law, neuroscience changes nothing and everything. *Phil Trans Royal Soc B Biol Sci.* 359: 1775-1785.

Nordstrom BR, Gao Y, Glenn AL, Peskin M, Rudo-Hutt AS, Schug RA, Yang Y, Raine A. (2011) Neurocriminology. *Adv Genet.* 75:255-83.

Steinberg L (2013) The influence of neuroscience on US Supreme Court decisions about adolescents' criminal culpability. *Nat Rev Neurosci.* 14(7):513-8.

April-13-16 Owning the Genome: Patenting DNA

READINGS:

Carbone J, Gold ER, Sampat B, Chandrasekharan S, Knowles L, Angrist M, Cook-Deegan R. (2010) DNA patents and diagnostics: not a pretty picture. *Nat Biotechnol.* 28(8):784-91.

Heller MA, Eisenberg RS. (1998) Can patents deter innovation? The anticommons in biomedical research. *Science.* 280: 698-701.

Kluge EH. (2003) Patenting human genes: when economic interests trump logic and ethics. *Health Care Anal.* 11(2):119-30.

Kesselheim AS, Cook-Deegan RM, Winickoff DE, Mello MM (2013) Gene patenting-the Supreme Court finally speaks. *N Engl J Med.* 369(9):869-75.

April-20-16 Journal presentations

April-27-16 Journal presentations; Cultural Issues, Policy Implications & Future Directions

Brief E, Illes J. (2010) Tangles of neurogenetics, neuroethics, and culture. *Neuron.* 68(2):174-7.

Illes J, Bird SJ. (2006) Neuroethics: a modern context for ethics in neuroscience. *Trends Neurosci.* 29(9):511-7.

Course requirements and grading

Oral Presentations and Essay:

Students will be expected to give presentations and write a paper on a single subject chosen from a list of topics covered in the class. Five separate sessions will be devoted to the student presentations (4-5 presentations/session), in which each student will be given 20 minutes to present followed by 5-10 min for questions and discussion. Presentations should focus on one to two recently published research articles in student's area of interest, and should include: introduction to the research area, discussion of methods, results and conclusions of each paper, as well as future directions. Students not presenting will be expected to read the papers before coming to the class and to participate in discussions following presentations. Throughout the course, students will also be expected to participate in class discussions that will follow the overview lectures given by the instructor. The 8-page term paper will be due at the end of the course (April 27, 2016), and should be written in the style of a review article that summarizes the current state of knowledge and research in the student's area of interest. Students will be expected to write a 2-page article summary due prior to the midterm (March 9, 2016) to get feedback on their writing ability.

Course grades will be based on: class attendance and participation (30%), oral presentation (30%), and the term paper (40%).