

GENETICS, THEOLOGY AND ETHICS

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DESCRIPTION:

The dialogue between genetics, theology, and ethics must develop if we are to avoid both reductionist scientific developments and dogmatic religious reactions. Because critical reflection is a cultural product, we begin with an analysis of the history and science of the eugenics movement and key methodological and substantive developments in contemporary genetics. The second half of the course will map the genetics-theology-ethics relation in both theory and practice with a view toward advancing a new dialogical and integrative paradigm commensurate with the biotechnological challenges of the 21st century.

OBJECTIVES:

- To help students gain a basic knowledge of Genetics: Its historical and scientific principles, practical genetic engineering methods, new developments in pluripotent stem cell research, and positive implications for human freedom and well-being.
- To help students answer the question: What is Science? To gain a deeper understanding of the science-theology-ethics dialogue: Method and content, cognitive “limits” (consonance/dissonance), and implications for the human dignity and rights of persons created in the image of God.
- To offer novel and comparative international insights into the relation between culture, ethnicity, and genetics, the commodification of genetic information, human cloning, genetic screening and discrimination in insurance, employment, and forensic practices at national and international levels.
- To help students learn to think reasonably about the scientific, social, ethical, and policy issues surrounding genetics without falling prey to positivism, reductionism, or instrumentalism, on the one hand, and religious authoritarianism and dogmatism, on the other hand.

WORKLOAD:

Completion of the required readings and class participation; Pedagogical philosophy: First half of each session will be in a lecture format with the second half devoted to discussion, case method, and video.

Brief (5-7 min.), in-class presentation Nov.26; Research Paper Due: Dec. 3, 2001
(Research papers will focus on the topic: "The Ethics of Stem Cell Research")

Final Exams (Dec. 6-21, according to SPU regulations)

EVALUATION:

Research Presentation & Paper (60%)
Final Examination (40%)

REQUIRED TEXTS:

KNOPPERS, Bartha Maria, ed. *Socio-ethical Issues in Human Genetics*. Cowansville, Quebec: Y. Blais, Inc., 1998.

PETERS, Ted. *Playing God?: Genetic Determinism and Human Freedom*. Foreword by Francis S. Collins. New York: Routledge, 1997.

REISS, Michael J. and Roger STRAUGHAN. *Improving Nature? The Science and Ethics of Genetic Engineering*. Cambridge: Cambridge University Press, 1996.

SELECTED READINGS. (On Reserve: SPU Library)

COURSE OUTLINE

1. Sept.11: The Eugenics Movement: History and Science

What constitutes the diversity of goals, beliefs, and proposed policies of the Eugenics Movement between 1870-1950? In what ways did its shoddy science, and blatant race and class biases fail to deal with the tension between social good and individual liberties, human rights, and interests? What are some of the common themes of the early eugenicists? What is Science (i.e., Science described in terms of data, theory, models, and paradigms)?

BARBOUR, I. *Religion in an Age of Science*, pp.1-65.

BEATTY, J. "Origins of the U.S. Human Genome Project: Changing Relationships between Genetics and National Security." In SLOAN, ed. *Controlling Our Destinies*, pp.131-153.

CAPLAN, A.L. "What's Morally Wrong with Eugenics?" In SLOAN, ed. *Controlling Our Destinies*, pp.209-222.

KEVLES, D. *In the Name of Eugenics*.

PAUL, D. *Controlling Human Heredity, 1865 to the Present*.

2. Sept.18: The Contemporary Science of Genetics

What defines genetics and the domains of genetic science? Why is the modern science of genetics so influential in every aspect of our daily life? What is the difference between mitosis and meiosis, and how do you understand patterns of inheritance, Mendel's laws/exceptions, DNA replication, protein synthesis, transcription to RNA, translation, and mutation, and gene regulation (in Prokaryotes and Eukaryotes)? What is the Human Genome?

NOSSAL, and COPPEL. *Reshaping Life*, pp.6-21.

REISS and STRAUGHAN, *Improving Nature?*, pp.1-42.

SOBER, E. "The Meaning of Genetic Causation." In *From Chance to Choice*, BUCHANAN et al., pp.347-370.

3. Sept. 25: Genetic Engineering: Microorganisms, Plants, Non-human Animals, and Humans

What are the biochemical and genetic techniques by which DNA can be separated, rearranged, and transferred from one cell to another, and how do these techniques work (e.g., Recombinant DNA, DNA Libraries, Polymerase Chain Reaction, Gel Electrophoresis, DNA Sequencing, DNA microarray or Chip)? Should the genetic engineering of microorganism, plants, non-human animals, and humans be ethically evaluated according to the same principles and values? What are the ethically relevant scientific issues at stake?

NOSSAL, and COPPEL. *Reshaping Life*, pp.22-37.

REISS and STRAUGHAN, *Improving Nature?*, pp.93-223.

4. Oct.1: The Breakthrough of Human Pluripotent Stem Cell Genomics

What are human pluripotent stem cells (hPSCs)? What are their positive therapeutic, pharmaceutical and scientific applications? How are stem cells scientifically derived? Is there an ethically significant difference between derivation from inner cell mass of early blastocysts and derivation from human embryonic germ (hEG cells)? What is nuclear transfer, and what are its limits and possibilities at the present time? Should scientists develop cloned transgenic animals and histocompatible (tissue-matched) hPSCs by nuclear transfer? What are the scientific limits, if any, of nuclear transfer at this time?

GERON CORPORATION. "Geron Acquires Roslin Bio-Med and Forms research Collaboration with the Roslin Institute" Q & A May 4, 1999. Handout on Stem Cell Research that discusses Science/Technical, Medical Potential, Ethical and Social Issues, and Business Issues. (Handout)

_____. "The First Derivation of Human Embryonic Stem Cells." Background, November 1998. (Handout)

SHAMBLOTT et al. "Derivation of Pluripotent Stem Cells from Cultured Human Primordial Germ Cells." *Proceedings of the National Academy of Sciences*, 95 (November 1998), pp.13726-13731.

THOMSON, James A. "Embryonic Stem Cell Lines Derived from Human Blastocysts." *Science*, Vol.282 (6 November, 1998), pp.1145-1147.

Oct. 8: No Class: Thanksgiving Holiday/Cong de l'Action de grâces

5. Oct. 15: Genetics and Culture

Is the relation between genetics and culture only of direct concern to genetic counsellors whose mandate is the communication of risk in relation to genetic disease? What is the relation between culture and genetics in connection with earlier concepts of kinship, heredity, and blood? How and why is the *meaning* attached to concepts of "disability," "normal," "abnormal," "health," and "wholeness" shaped by culture? How does the North American culture of health either accommodate or reject the promises of genetic research? What constitutes the "gene myth" in contemporary Canadian culture?

BRUNGER, F. and K. BASSETT. "Culture and Genetics." In B.M. KNOPPERS, ed. *Socio-ethical Issues in Human Genetics*, pp.1-42.

LIPPMAN, Abby. "Prenatal Genetic Testing and Screening: Constructing Needs and Reinforcing Inequities," *American Journal of Law & Medicine*, Vol. XVII/1&2 (1991), pp.15-50.

WALTERS and PALMER, *The Ethics of Human Gene Therapy*, pp.143-152.

6. Oct. 22: Mapping the Science-Theology Relation

What are some of the main contemporary views of the relationship between the methods of science and those of religion? What constitute the key methodological similarities and differences between the two fields? How do you understand the status of religious belief in an age dominated by the horizon of science and technology? How does the rise of modern science challenge the religious traditions of the three Axial Age civilizations (the West, India and China)?

BARBOUR, I. *Religion in an Age of Science*, pp.3-30; 154-185.

GREGERSEN and VAN HUYSSTEEN. *Rethinking Theology and Science*, pp.181-231.

HARDING, S. *The "Racial" Economy of Science*, pp.1-22.

JASPERS, K. "The Modern Tripartition: Science, Philosophy, Theology," in *Philosophical Faith and Revelation*, pp.50-61.

_____. *Philosophy*, Vol. I (Science-Philosophy, Science-Religion, Science-Art Relation), pp.294-335.

PEACOCKE, A. "Relating Genetics to Theology on the Map of Scientific Knowledge," in SLOAN, ed., *Controlling Our Destinies*, pp.343-365.

PETERS, T. *Science and Theology*, pp.11-39.

VATICAN COUNCIL II. *Gaudium et Spes*

7. Oct. 29: Mapping the Genetic Science-Theology-Ethics Relation

What are some of the distinctive features of a theocentric ethics for our scientific age? How do the ideas about God and God's relations to the scientific realm, especially genetic science, qualify our valuations of things? What values, principles of conduct, ideals and aspirations, and rules are grounded in, backed by, or based upon our understanding of God and God's relation to the world in a biotechnological age? What are the key challenges of the "gene myth" and genetic determinism to contemporary theological anthropology and ethical reflection?

BARBOUR, I. *Ethics in an Age of Technology*, pp.26-56; 190-200.

GUSTAFSON, J. *Ethics from a Theocentric Perspective*, Vol.2, pp1-94.

JUENGST, E.T. "Self-Critical Federal Science? The Ethics Experiment within the U.S. Genome Project," in PAUL et al., *Scientific Innovation, Philosophy, and Public Policy*, pp.63-95.

PETERS, T. *Playing God?*, pp.1-113.

WALTERS and PALMER, *The Ethics of Human Gene Therapy*, pp.17-53.

8. Nov. 5: Genethics: Theory and Practice

How would you define your ethical worldview in relation to the challenges of Genetic Science (e.g., Utilitarianism, Kantianism, Virtue Ethics/Communitarianism, Liberalism, Ethics of Care, Casuistry, Common-Morality)? What are the most basic ethical principles that should guide individual choice and public policy concerning the use of genetic interventions in a just and humane society, especially in view of the growing powers of genetic interventions after the completion of the human genome? What are the theologically and ethically significant differences, if any, between somatic and germline intervention? Are we "playing God" in either form of intervention?

BEAUCHAMP and CHILDRESS. *Principles of Bioethics*, pp.3-40.

BUCHANAN et al., *From Chance to Choice: Genetics and Justice*, pp.1-26.

MCCORMICK, R.A. "Moral Theology and the Genome Project," in SLOAN, ed., *Controlling Our Destinies*, pp.417-427.

PETERS, T. "Genes, Theology, and Social Ethics: Are We Playing God?" In *Genetics*, ed. Peters, pp.1-45.

_____. *Playing God?*, pp.143-178.

WALTERS and PALMER, *The Ethics of Human Gene Therapy*, pp.60-92.

Case Study: "When Baby's Mother Is also Grandma and Sister" (Handout)

9. Nov. 12: Genetic Screening and Discrimination: Insurance, Employment, Forensics

Why is there more genetic variation *within* the most common socially used categories of race than *between* these categories? How does the scientific ability to screen populations (cf. Iceland study) for genetic factors in common multifactorial conditions (e.g., presymptomatic, susceptibility for disease) challenge classical and more stringent requirements of population screening programs? What are the empirical data and ethical issues related to genetic discrimination in persons' access to insurance and employment? How might the "preferential option for the poor" apply in the case of genetic discrimination?

DUSTER, T. "The Sociology of Science and the Revolution in Molecular Biology." *The Blackwell Companion to Sociology*. (Handout)

GOSTIN, L. "Genetic Discrimination: The Use of Genetically Based Diagnostic and Prognostic Tests by Employers and Insurers," *American Journal of Law & Medicine*, Vol. XVII/1&2 (1991), pp.109-144.

LEMMENS and BAHAMIN. "Genetics in Life, Disability and Additional Health Insurance in Canada," In KNOPPERS, ed. *Socio-ethical Issues in Human Genetics*, pp.135-186.

STRANC and EVANS. "Issues Relating to the Implementation of Genetic Screening Programs." In KNOPPERS, ed. *Socio-ethical Issues in Human Genetics*, pp.43-94.

10. Nov. 19: The Commercialization of Human Genetics

How do new genetic technologies challenge traditional Christian beliefs about parenthood? Will the decrease in government sponsored human genetic research funding

and its concomitant devolution to the private sector negatively impact academic freedom? Does the legitimate need to patent frustrate traditional academic collaboration and communication? What will be the impact of commercialization on traditional fiduciary duties or on possible liability? At what point will our diagnostic genetic tools become a wide part of clinical practice and medically necessary for universal health insurance coverage?

CAULFIELD and FEASBY. "The Commercialization of Human Genetics in Canada: An Overview of Policy and Legal Issues." In KNOPPERS, ed. *Socio-ethical Issues in Human Genetics*, pp.337-339.

LEBACQZ, K. *Genetics, Ethics and Parenthood*, pp.3-49.

PETERS, T. *Playing God?*, pp.115-141.

Nov. 26: Human Cloning?

What is the current state of *scientific knowledge* about the possibilities and practicalities of human cloning? What are the scientific techniques that are used and the goals pursued in cloning? Why is it the case that the person is more than the sum total of his or her genes? Is it ethical to permit some types of research on embryos while opposing human cloning? If so, why; If not, why not?

LE BRIS and HIRTLE. "Ethical and Legal Aspects of Human Cloning: Comparative Approaches." In KNOPPERS, ed. *Socio-ethical Issues in Human Genetics*, pp.277-328.

MEYER, J.R. "Cloning Human Embryos: Why Artificial Human Procreation is Immoral." *Linacre Quarterly* 62:2 (1995), pp.22-28.

RAMSEY, P. "Shall We Clone a Man?" in K. Vaux, ed., *Who Shall Live? Medicine, Technology, Ethics* (Philadelphia: Fortress Press, 1970), pp.78-113.

ROBERTS, M.A. "Human Cloning: A Case of No Harm Done?" *The Journal of Medicine and Philosophy*, Vol.21 (1996).

Dec. 3: Genetic Science, Theology, and Ethics: Toward a Limited Dialogue and Integration Paradigm for the 21st Century

Whither goes the relation? The final lecture synthesizes the relevant course material along the lines of a limited dialogue and integration paradigm for genetic science, theology, and ethics. I will argue that we must be proactive and think creatively about the new methods of genetic science, and offer some normative ethical parameters for the ongoing humanization of persons created in the image of God.

Dec. 6-21: Examens/Exams

SELECTED BIBLIOGRAPHY

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BROTHWELL, Don, ed. *Biosocial Man: Studies Related to the Inter-action of Biological and Cultural Factors in Human Populations*. London: Published for the Eugenics Society by the Institute of Biology, 1977. GN 365.9 B56B76 1977

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BUCHANAN, Allen et al. *From Chance to Choice: Genetics and Justice*. Cambridge: Cambridge University Press, 2000.

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[Http://www.hugo.gbd.org](http://www.hugo.gbd.org) or www.ornl.gov/hgms.

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held at the European Conference Center of the Wenner-Gren Foundations for Anthropological research, Burg-Wartenstein, Austria, Aug. 21-30, 1976.E 61 F57L38 1979.

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