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HEALTH SCIENCES ONLINE
NEUROETHICS RESOURCES AND REFERENCES

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Health Sciences Online



Welcome to Health Sciences Online (HSO), **Neuroethics Resources and References**. Ms. Sofia Lombera and Dr. Judy Illes at the National Core for Neuroethics (the Core), University of British Columbia (UBC) in Vancouver, Canada, led this project in conjunction with the International Neuroethics Network (INN) headquartered at the Core and an advisory board of distinguished international experts.

The Core and the INN are committed to developing and providing comprehensive educational material on neuroethics that is widely accessible. The material here is part of Health Sciences Online (HSO), a “*portal where health professionals in training and practice can access free comprehensive, high quality, current courses, references and other learning resources to improve global health*” (<http://www.hso.info>). The resources and references serve both as an introduction to current topics in neuroethics and an orientation to landmark papers in the field for health professionals. The content was designed with special attention to key emerging topics in neuroethics, to priority areas for the international community identified in the peer-reviewed literature, and to the neurologic and mental health challenges facing the developing world. The papers included in the list were selected from existing neuroethics syllabi available online and were supplemented with in-house expertise. Topics are divided into the following categories: Brain Science and the Self, Brain Science and Social Policy, Ethics and Practice of Brain Science and Brain Science and Public Discourse.

The material is updated regularly to ensure that readings are up-to-date. If you have any suggestions for content, papers or topics, please email hso.neuroethics@ubc.ca.



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INTRODUCTION TO NEUROETHICS

Research on the moral and social implications of advances in science and technology has accelerated and expanded in scope during the last few decades. Since the 1970s, scholars have reflected on how biology, physics, chemistry, computer science, among other disciplines can alter the way that people live, think and behave. Major scientific efforts, especially in the life sciences, have been designed to include teams devoted to considering the downstream effects of new knowledge. One well-known example is the Ethical, Legal and Social Implications (ELSI) research program in the United States that is associated with the Human Genome Project (HGP). Bioethics scholars associated with that program are devoted to the “*systematic study of the moral dimensions...of the life sciences and healthcare*”¹ have been instrumental in designing guidelines to ensure that medical practice and research are carried out in an ethically sound manner.

Neuroethics lies at the intersection of brain science specifically, and the implications of research on the brain for society. As Gazzaniga, 2005 has written, neuroethics is: “*[the] examination of how we want to deal with the social issues of disease, normality, morality, lifestyle, and the philosophy of living informed by our understanding of underlying brain mechanisms*”²

The range of activities that new knowledge in brain science can alter is vast. Advances in innovation have the potential to change how people think about free will, mental

¹ Reich WT. Introduction in Reich (ed.) The Encyclopedia of Bioethics. New York: Simon Schuster Macmillan, 1995 p.xxi.

² Gazzaniga M. The Ethical Brain. Chicago: University of Chicago Press, 2005, p xv.



disability, responsibility, education, addiction and morality³. Roskies asserts that “*our brains define who we are... in investigating the brain, we investigate the self*”⁴. Research from the neurosciences has increased knowledge of basic brain functioning as well as the ability of humans to manipulate this organ widely perceived to be the center of personhood and personality. Some of the most significant medical challenges will be addressed by the successful application and translation of neuroscience. However, the risk of misuse or abuse of this knowledge is important to consider and address proactively⁵.

Building on millennia of thinking about mind and brain of the past, neuroethics took its first place on the academic stage at the “Neuroethics: Mapping the Field” conference held in San Francisco, California, in May, 2002. More than 120 neuroscientists, bioethicists, doctors of psychiatry and psychology, philosophers, lawyers and policy makers participated in the proceedings which focused on defining the field and providing guiding principles for the first generation of neuroethicists. The conference participants outlined the following primary challenges for neuroethics:

- I. Brain Science and the Self
- II. Brain Science and Social Policy
- III. Ethics and Practice of Brain Science
- IV. Brain Science and Public Discourse

³ Illes J, Racine E. Imaging or imagining? A neuroethics challenge informed by genetics. *Am J Bioeth.* 2005;5(2):5-18.

⁴ Roskies A. Neuroethics for the new millennium. *Neuron.* 2002;35(1):21-3.

⁵ Illes J, De Vries R, Cho MK, Schraedley-Desmond P. ELSI priorities for brain imaging. *AM J Bioeth.* 2006;6(2):W24-31.



Brain- and biology-based explorations of these topics provide a new perspective on philosophy of mind dating back to the ancients such as Aristotle and Plato, and to the dawn of neurology in the 17th Century⁶. Phrenology, the predecessor to modern methods of localizing functional centers in the brain, became popular in the 19th century. Today, brain imaging methods such as functional Magnetic Resonance Imaging provide powerful correlative measures between brain activity and behaviour⁷, a capability that some claim might signal “*the near demise of dualist views of mind and body*”⁸. Although neuroscience is not likely to solve age-old philosophical problems such as the nature of the relationship between the mind and body, it may certainly change the way people view, think about and approach them.

The reference list that follows is intended to serve as an introduction and starting point for exploring neuroethics. It is not an exhaustive list of all literature available. Landmark papers are listed for each of the four main areas of neuroethics identified above, and many relevant sub-categories. For a more exhaustive list of peer-reviewed literature, please see the ‘Resources’ page of www.neuroethicscanada.ca. Other materials are available, for example, the ‘Neuroethics: Implications of Advances in Neuroscience’ online course developed by Dr. Ruth Fischbach (Columbia University) with the support of the Dana Foundation (<http://ccnmtl.columbia.edu/projects/neuroethics/index.html>).

⁶ Zimmer C. Beyond the ivory tower: a distant mirror for the brain. *Science*. 2004;303(5654):43-4.

⁷ Other brain imaging methods include: Computed Tomography (CT), Magnetic Resonance Imaging (MRI), and neurochemical and neuropharmacologic functional methods such as Positron Emission Tomography (PET) and Single Photon Emission Computed Tomography (SPECT).

⁸ Leshner A. It’s time to go public with neuroethics. *Am J Bioeth*. 2005;5(2):1



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