

# Neuroethics: Addressing – and Guiding -Neuroscience and Neurotechnology on the 21<sup>st</sup> Century World Stage

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## Overview, Scope, and Structure of the Course:

### Overview and Current Relevance

Neuroscience is forging new directions and capabilities in the ability to engineer materials and apply discoveries to the brain that enable access and control of thought, emotion and behavior at a rate and level of profundity that has been heretofore unprecedented. Spawned by iterative funding efforts, such as the United States' *Decade of the Brain* (1990-2000) and current *Brain Research through Advancing Innovative Neurotechnology* (BRAIN) initiative, and the European Union's *Human Brain Project*, the use of these technologies as tools has allowed equivalently impressive progress in medicine (e.g.- neurology, neurosurgery, psychiatry), bioengineering, the daily conduct of public life, and even national security and defense. While such progress might be construed as beneficial, the discovery and development and use(s) of new devices, information and knowledge could incur profound ethical, legal and social issues – both arising in the research itself, and stemming from misuse and/or purloined application of these technologies in ways that negatively impact public health and security.

Neuroscience and neurotechnology have become powerful socio-economic forces. Occupying a greater than \$150 billion annual market share, neurotechnology has been classified as one of the fastest growing – and most influential – fields of the 21<sup>st</sup> century. As well, international efforts in neuroscience and its technologies are becoming ever more prominent; current estimates predict a 60-70% growth in neuroscientific enterprise in Asian and Pacific Rim nations, such that by 2020, Asian presence in the neuroscience and technology market will supersede that of the United States and Europe. Thus, the neuroethical, legal and social issues spawned by the use – and potential misuse – of neuroscience and neurotechnology will be subject to cultural effects and contextualizations, and will need to be addressed and dealt with in ways that are internationally sensitive and responsive. It is in this light that this course addresses the issues, questions and problems of neuroscience and technology that are the focus, tasks and practices of the relatively new, but ever more important, necessary and growing field of *neuroethics*.

## **Scope**

This course begins with a view of how and why neuroscience has ‘evolved’ to become a dynamic force in society. Lectures will depict how key areas of neuroscience and neurotechnology have developed to become potent forces that enable assessment, access and manipulation of brain function (in individuals, groups and perhaps even communities at-large). From this, the field – and practice(s) – of neuroethics will be addressed and discussed, with relevance to the ways that progress in neuroscience compels and sustains both the issues and dilemmas that arise in and from neuroscientific and neurotechnological research and its applications, and the importance of acknowledging and addressing the ethical basis and resolutions of such issues. Next an overview of specific frontier areas of neuroscience and technology will be presented, with emphasis upon (a) the extent and scope of new knowledge and capability that such developments afford to impact the human condition, and (b) key ethical concerns that are incurred by such neuroscientific and neurotechnological progress on the 21<sup>st</sup> century world stage. Finally, paradigms for neuroethical, legal, and social probity, safety and surety, and a putative “preparatory process” for international neuroethics and neuro-policy will be discussed.

## **Structure**

The course is structured such that the *first part is mostly didactic* – lectures and readings provide a sound foundation of knowledge of the field and practices of neuroethics, as based on, derived from, and reflective upon advances in neuroscientific and neurotechnological research and use (and possible misuse) in various domains of the social sphere (inclusive of healthcare, economics, public life and safety, and politics).

The *second part of the course will be more discursive*. Once “armed” with fundamental knowledge of, and insights to neuroethics’ canon and approaches, topics will be presented with the aim of fostering discussion, debate and dialectic, as students become increasingly more versed in the foundational issues and tenets of the field and its practices, and thus are more capable of developing factually-informed discussions and arguments relating to issues of their own particular interest.

## **Required Text:**

Giordano J, Gordijn B. (eds.) *Scientific and Philosophical Perspectives in Neuroethics*. Cambridge: Cambridge University Press, 2010. (listed in readings’ assignments as *SPPN*)

## **Recommended (Optional) Text:**

Giordano J. (ed.) *Neurotechnology: Premises, Potential, and Problems*. Boca Raton: CRC Press, 2012. (listed in readings’ assignments as *NT:PPP*, \* = a supplemental reading)

### **Additional Supplemental Readings:**

Papers that provide deeper and/or more finely grained insight(s) to a particular topic will be listed as “additional supplemental” readings. These will either be provided (in class/hard copy, or posted to BlackBoard), or link(s) will be provided for open access availability.

### **Suggested Supplement(s):**

Many of our hopes and fears are expressed in fiction, and current film has certainly been a venue to communicate our expectations and anticipations about the utopian and/or dystopian potentials of neuroscience and neurotechnology, and the ethical, legal and social manifestations of such future trajectories. In light of this, certain films will be suggested as “supplements” to the academic readings to foster insight – and discussion – about colloquial conceptualizations and apprehensions fostered by the advancing tide of neuroscientific advancement.

### **Course Requirements**

1. **Class Contribution** including regular participation in classroom discussion. **(20%)**
2. **One Short Paper** (1800-2000 words, fully referenced) upon a topic of students’ choice that addresses and elucidates an ethico-legal and/or social issue, question, or problem (or posing/discussion of an issue/problem’s solution) arising in/from some aspect of neuroscience and technology in current and/or future culture(s), or the influence of social variables upon that brain science and/or neurotechnology. **The paper topic should be vetted and approved by the professor no later than the second week of class.** The first paper provides the basis from which the second, final paper should be developed and written, as an iterative undertaking. **(20%).**
3. **Final Paper;** (3500-5000 words fully referenced) Expands upon the short paper to explore the topic in greater detail. The paper should be written in an accepted scholarly style (eg.- MLS, Vancouver or Chicago style), and should seek to synthesize and assimilate information gained throughout the course (lectures and readings) together with the students’ unique individual interests and readings into a working knowledge, analysis, critique and/or review. **(60%)**

## Tentative Class Schedule

### WEEK

### TOPIC

#### Part I: Introducing neuroscience – and neuroethics.

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| 1 | <p>The historicity- and canon - of neuroscience<br/>Neuroscience as science, and the need for neuroethics<br/><u>Rdgs:</u> Preface (Levy); Ch. 2, 4 (<i>SPPN</i>)</p>  |
| 2 | <p>The discipline and practice(s) of neuroethics: Two<br/>“traditions” in reciprocity. What makes “neuro” important?<br/><u>Rdgs:</u> Introduction: “<i>Neuroethics- Coming of age...</i>”<br/>(<i>SPPN</i>)<br/>Ch. 16 (<i>SPPN</i>)<br/>Ch 18 (<i>NT:PPP</i>)<br/><u>Additional supplemental:</u><br/>Giordano. <i>AJOB-Neurosci</i> 2011<br/>Giordano. <i>Hum Prospect</i> 2011; 2014.<br/>Brindley, Giordano <i>Stanford J Law Sci Pol</i> (2014)<br/>Giordano Benedikter. <i>J. Evol Technol.</i> 2012.</p> |
| 3 | <p>The uses and utility of neurotechnology: Potential and<br/>problematic<br/>Assessment neurotechnologies: Neuroimaging,<br/>neurogenetics –<br/><u>Rdgs:</u><br/>Ch. 1, 3, 10, 11, 12 (<i>SPPN</i>)<br/>Ch. 1, 2, 4, 19 (<i>NT:PPP</i>)*<br/><u>Additional supplemental:</u><br/>Giordano, <i>AJOB-Neurosci</i> (2012)<br/>Giordano, Kulkarni, Farwell, <i>Theoret Med Bioethics</i><br/>(2013)<br/><u>Film:</u> <i>Minority Report</i></p>  |
| 4 | <p>Interventional techniques and technologies:<br/><u>Rdgs:</u> Ch. 5,6, 9, 11, 13, 14, 15 (<i>SPPN</i>)<br/>Ch. 10, 11, 12 (<i>NT:PPP</i>)*<br/><u>Additional supplemental:</u><br/>Giordano J. <i>AMA J Ethics</i> 2015</p>  |

Benedikter, Giordano, FitzGerald. *J. Futures*, 2010  
Films: *Eternal Sunshine of the Spotless Mind*; *Gattica*  
 and/or *Terminal Man*

### MIDTERM SHORT PAPER DUE

#### **Part II: Dealing with the possibilities and problems: Neuroethics - practice and policy.**

- 5 Neuroscience and technology in national security, defense and international relations: Neuroweapons and the brain as the 21<sup>st</sup> century battlescape.  
Rdgs: Wurzman, Giordano. *Synesis*, 2011 2: S44-65.  
 Available at: [www.synesisjournal.com](http://www.synesisjournal.com)
- 6 Neuroscientific and neurotechnologically defining constructs of personhood, the self: Implications for ethico-legal regard, bio-power and bio-politics  
Rdgs: Ch. 8 (*SPPN*)  
 Ch. 8, 13 (*NT:PPP*)\*  
Additional supplemental:  
 Loveless, Giordano. *Camb Q Healthcare Ethics* (2013)  
Film: *Blade Runner* and/or *I Robot* and/or *Transcendence*
- 7 Manipulating the neural basis of free will and morality: Whose “good”, what rationality?  
Rdgs: Ch 6, 7. (*SPPN*)
- 8 Strivings to flourish: Treatment, enablement, enhancement and neurocentric constructs of ‘normality’ on a pluralist world stage.  
Rdgs: Ch. 17. (*SPPN*)  
 Ch. 3, 5, 16 (*NT:PPP*)\*  
Films: *Limitless* or *Charly*

- 9 Neuroethics as practice: A “new” ethics of/for neuroethics?  
Considering diversity, cosmopolitanism and communitarianism.  
Rdgs: Ch. 15 (*NT:PPP*)  
Additional supplemental:  
Shook and Giordano, *Phil Ethics Hum Med* (2014)  
Lanzilao, Shook, Benedikter, Giordano, *Ethics Biol Engineer Med* (2013)
- 10 Toward a stance of preparedness and ethic of responsible action, and the process and role of “Neuro-Policy”: Are rules sufficient?  
Rdgs: Ch. 18, Afterword (*SPPP*)  
Ch. 17 (*NT:PPP*)
- 11 Discussion and closure  
**FINAL PAPER DUE**

**HONOR CODE**

MALS and DLS students are responsible for upholding the Georgetown University Honor System and adhering to the academic standards included in the Honor Code Pledge stated below:

*In pursuit of the high ideals and rigorous standards of academic life, I commit myself to respect and uphold the Georgetown University Honor system: To be honest in any academic endeavor: and to conduct myself honorably, as a responsible member of the Georgetown community, as we live and work together.*

**DISABILITIES STATEMENT:**

If you believe you have a disability, then you should contact the Academic Resource Center ([arc@georgetown.edu](mailto:arc@georgetown.edu)) for further information. The Center is located in the Leavey Center, Suite 335. The Academic Resource Center is the campus office responsible for reviewing documentation provided by students with disabilities and for determining reasonable accommodations in accordance with the American with Disabilities Act (ADA) and University policies.