

**NBB 470S/ IDS 385**  
**Emory University, Spring 2005**  
**Wed. 2-5, 1462 Clifton Rd, Room 231**

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## **The Roots of Modern Neuroscience**

This course will trace contemporary issues in neuroscience from their origins in the 18<sup>th</sup> and 19<sup>th</sup> centuries to new frontiers. We will use a combination of literature, film, and laboratory demonstrations. Among the topics treated will be localization vs. holism, visionaries and their models, conflicts and controversies between scientists and their students, and philosophical concepts vs. instrument-based inquiry. Readings will consist mainly of primary sources supplemented by occasional contemporary essays, films, and historical laboratory demonstrations.

Class sessions will be available for inter-institutional videoconferencing participation and will be webcast courtesy of the Center for Behavioral Neuroscience, a National Science Foundation funded Science Technology Center

**Texts:** Mary Shelley, Frankenstein, Santiago Ramón y Cajal, Vacation Stories, and William Gibson, Neuromancer, are available in the bookstore. Additional readings will be made available through Reserves Direct or distributed in class or via e-mail.

**Requirements:** a historical research paper of 15 pages (typed, double spaced, references APA or Chicago style) and two short in-class presentations

**Grading:** 50% research paper, 25% presentations (12.5% each), 25% class participation

**Jan. 19      Introduction and Overview**

**Jan. 26      Turf Wars**

Fields that Have Laid or Still Lay Some Claim to Territory Now Covered by Neuroscience: Engineering, Literature, Mathematics and Computational Physics, Neurology, Philosophy, Psychiatry, Psychology, Religion, Theology

Panel Discussion: How has your field influenced modern neuroscience, and why should neuroscientists pay attention to work in your field?

Participants:

Philippa Lang (Classics)  
Elaine Walker (Psychology)  
Linton Hopkins (Neurology)  
Steve Potter (Engineering)

Student Presentations: Describe the contribution to neuroscience by someone who is not on the syllabus and was not a 20<sup>th</sup>-century scientist

**Feb. 2      Does Electricity Power Life? Does Electricity Define Life?**

Readings:

Luigi Galvani, Commentary on the Effect of Electricity on Muscular Motion (selections)

Joost Mertens, “Shocks and Sparks: The Voltaic Pile as a Demonstration Device”

Gabriel Finkelstein, “M. du Bois-Reymond Goes to Paris”

Mary Shelley, Frankenstein, ch. 1-4

Film clips from The Matrix (Wachovski) and Frankenstein (Branagh)

Guest: Prof. Gabriel Finkelstein, Dep’t of History, University of Colorado, Denver

**Feb. 9            Neurons, or a Net?**

Readings:

Edwin Clarke and C. D. O'Malley, The Human Brain and Spinal Cord, pp. 87-138, "The Neuron vs. Nerve Net Controversy" (includes writings by Joseph von Gerlach, Camillo Golgi, Wilhelm His, August Forel, and Santiago Ramón y Cajal)

Santiago Ramón y Cajal, "The Fine Structure of the Nerve Centers" (1894)

George Henry Lewes, The Physical Basis of Mind (selections)

A Short History of Microscopy

Lab Demonstration: How Instrument Resolution Can Affect Scientific Concepts

**Feb. 16            Concepts vs. Instruments**

Readings:

Emil du Bois-Reymond, Animal Electricity (abridged), trans. Henry Bence Jones, [1848, 1849] 1852 (selections)

Emil du Bois-Reymond, "On the Time Required for the Transmission of Volition and Sensation through the Nerves" (1868)

Hermann von Helmholtz, "The Recent Progress of the Theory of Vision" (1868), in Science and Culture: Popular and Philosophical Essays

Demonstration: The Virtual Laboratory <http://vlp.mpiwg-berlin.mpg.de>

**Feb. 23            Modeling vs. Animal Experimentation**

Readings:

Sigmund Freud, Project for a Scientific Psychology

David Ferrier, The Functions of the Brain (selections)

Wilkie Collins, Heart and Science (selections)

Guest Speaker: Prof. John Banja, Medical Ethics

**March 2      Modeling Neuroscience through Fiction**

Readings:

Santiago Ramon y Cajal, “For a Secret Offense, a Secret Revenge,” “The Fabricator of Honor,” and “The Corrected Pessimist”

S. Weir Mitchell, “George Dedlow”

**PARAGRAPH ON RESEARCH PAPER DUE**

**March 9      Localization vs. Holism**

Readings:

Carl Wernicke, “The Motor Speech Path and the Relation of Aphasia to Anarthria”

Henri Bergson, Matter and Memory (selections)

Kurt Goldstein, “The Holistic Approach,” from Human Nature in the Light of Psychopathology

Oliver Sacks, “The Disembodied Woman”

Guest Speaker: Prof. Stuart Zola, Director, Yerkes Primate Research Center

**March 16      Spring Break**

**March 23      Mentors and Students**

Readings:

Johannes Müller, Elements of Physiology, trans. William Baly (1839)

Charles Sherrington, TBA

**March 30      Controlling the Mind: Drug Narratives**

Readings:

Albert Hofmann, LSD: My Problem Child (selections)

Carlos Castañeda, TBA

Darren Aronofsky, Pi (a film), parts to be shown in class

**DRAFT OF RESEARCH PAPER DUE**

**April 6            Reality vs. Virtual Reality: Tricking the Brain**

Demonstration by Virtually Better, Inc.

**April 13          AI: Problem-Solving and Neurorobotics**

Readings:

E. T. A. Hoffmann, “The Sandman”

Norbert Wiener, The Human Use of Human Beings (selections)

Guest Speaker: Prof. Steve Potter, Georgia Tech

**April 20          A Conscious Internet**

Reading:

William Gibson, Neuromancer

Discussion of the Interface between the Nervous System and Technology: Is there still a soul?

Student Research Presentations, Part I

**April 27      Integration and Conclusion**

Student Research Presentations, Part II

Workshop to Design History of Science Interest Group at Emory

Reception

**FINAL DRAFT OF RESEARCH PAPER DUE**