History of Neuroscience HISC 117

Winter Quarter, 2018 Instructor: Cathy Gere Email: <u>cgere@ucsd.edu</u>

This class will explore the history of neuroscience, from the coining of the word 'neurologie' in 1664 to cutting-edge developments in the twenty-first century. The readings and lectures aim to cultivate an awareness of the cultural, political, legal, and ethical aspects of neuroscience, past and present.

Class Requirements and Grading

By the end of the course, students should be able to:

Understand how scientists have thought about the brain in other times and places

Explain the importance of historical context for the making of scientific knowledge about the brain

Recall the principle developments in the history of neuroscience since the seventeenth century

Class materials: All required readings will be available in electronic format on the TED site for the class.

Requirements: Attendance at lectures is required. Students will write weekly short (600-900 word) essays based on combination of the lectures and the readings. A final essay (1000- 1200 words) will comprise a response to some aspect of contemporary neuroscience of the student's own choosing, which can be a book or an article, or a neuroscience lecture, class, or lab tour at UCSD.

Grading breakdown:

Attendance and participation 10% Weekly writing assignments 80% Response to contemporary neuroscience 10%

Course Outline and Reading

Week 1: Introduction: 'brainhood' and sovereignty

Week 2: Animal electricity and decapitation experiments

Aldini, Giovanni. (1803) An account of the galvanic experiments performed by John Aldini on the body of a malefactor executed at Newgate, Jan. 17, 1803: with a short view of some experiments which will be described in the author's new work now in the press London : Printed for Cuthell and Martin, pp.1-23.

Anonymous. (1804) *Galvanic and Electrical Experiments on Human and Animal bodies, conducted by the Medical Society of Mainz* Frankfurt am Main: Andreäischen Bookhandlung. Excerpts, translated from the German by C. Gere.

Stanley Finger *Minds Behind the Brain: a history of the pioneers and their discoveries*, Oxford University Press, 2000, Chapter 8.

Week 3: Localization and materialism

Broca, P. 1861. 'Remarks on the Seat of the Faculty of Articulate Language' in Bonin, Gerhardt von. 1960. *Some Papers on the Cerebral Cortex. Translated from the French and German.* Springfield, Ill.

Stanley Finger *Minds Behind the Brain: a history of the pioneers and their discoveries*, Oxford University Press, 2000, Chapter 10.

Week 4: Animal-human continuity and the sensory motor system

Bartholow, R. (1874) 'Experimental Investigations into the Function of the Human Brain' *American Journal of the Medical Sciences*, 84:307-313.

Ferrier, D. (1876) 'Chapter XIII: Cerebral and Cranial Topography' in *The Functions of the Brain* New York: Putnam and Sons, pp. 296-314.

Stanley Finger *Minds Behind the Brain: a history of the pioneers and their discoveries*, Oxford University Press, 2000, Chapter 11.

Week 5: Psychoacoustics and the origins of cognitive science

Hermann von Helmholtz "Physiological Causes of Harmony in Music" in *Popular Lectures on Scientific Subjects*, Longmans, 1903

Stanley Finger and Nicholas Wade (2002), 'The Neuroscience of Helmholtz and the Theories of Johannes Müller Part 1: Nerve Cell Structure, Vitalism, and the Nerve Impulse' *Journal of the History of the Neurosciences*, 11:2 pp. 136-155

Stanley Finger and Nicholas Wade (2002), 'The Neuroscience of Helmholtz and the Theories of Johannes Müller Part 2: *Journal of the History of the Neurosciences*, 11:3 pp. 234-254

Week 6: 'All or Nothing': decoding the neuron

Edgar Adrian *The Basis of Sensation: the Action of the Sense Organs*, London: Christophers, 1928, pp. 11-47, 112-120.

Eric Kandel 'The Nerve Cell Speaks' in *In Search of Memory: the emergence of a new science of the mind,* New York: Norton, 2007, pp. 74-89.

Stanley Finger *Minds Behind the Brain: a history of the pioneers and their discoveries*, Oxford University Press, 2000, Chapter 15.

Week 7: Cybernetics: computing machines and the nervous system

Norbert Wiener, *Cybernetics, Or Control and Communication in the Animal and the Machine* (Cambridge, MA: MIT Press, 1948): Chapter 5, "Computing Machines and the Nervous System," pp. 116-132.

Week 8: Pain, pleasure, and mind control

B. F. Skinner 'A Technology of Behavior' and 'What is Man' in *Beyond Freedom and Dignity*, London: Penguin, 1971, pp. 9-30, 180-210

Heath, Robert G. and Charles E. Moan. "Septal Stimulation for the Initiation of Heterosexual Behavior in a Homosexual Male." *Journal of Behavioral Therapy and Experimental Psychiatry* 3, no. 1 (1972): 23-30

Noam Chomsky's review of Beyond Freedom and Dignity

Week 9: Imaging the brain

No Lie MRI website: http://www.noliemri.com/index.htm

Elena Rusconi and Timothy Mitchener-Nissen. "Prospects of Functional Magnetic Resonance Imaging as Lie Detector." *Frontiers in Human Neuroscience*, 7:594 (2013): 1-12.

Week 10: Split brains!

Michael Gazzaniga "Cerebral Specialization and Interhemispheric Communication: Does the Corpus Callosum enable the human condition?" *Brain* 123: 1293-1326

Michael Gazzaniga, Gifford Lecture