

Humanities 175: The Neurobiology of Classical Chinese Poetics—A Case Study

Michael A. Fuller

SYLLABUS

Course Materials

Bernard Baars and Nicole M. Gage, *Fundamentals of Cognitive Neuroscience: A Beginner's Guide* 2nd edition (Academic Press, 2012)

Antonio Damasio, *Self Comes to Mind: Constructing the Conscious Brain* (New York: Vintage, 2012)

Selected Journal articles

Eric L. Hutton, trans., *Xunzi: The Complete Text* (Princeton: Princeton University Press, 2014)

“The Record of Music” in the *Record of the Rites*

“The Great Preface” to the *Canon of Poetry*

Stephen Owen, *Readings in Chinese Literary Thought* (Cambridge: Harvard University Press, 1992)

Grading

Class Participation	20%
Essay 1	15% (2 page report)
Essay 2	20% (2 page report)
Essay 3	20% (2 page report)
Essay 4	25% (3-4 page essay)

WEEK 1: INTRODUCTION TO THE BRAIN: BASIC STRUCTURES AND PATHWAYS

Baars and Gage, *Fundamentals of Cognitive Neuroscience*

Chapter 3: The Nerve Cell

Chapter 4: The Brain

Fuller, “Neuronal Post-Structuralism: A Humanist’s Perspective on the Mathematics of the Construction of Memory”

Fuller, “‘Weary Night:’ A Reflection on Embodied Poetics in the Classical Chinese Tradition”

April 2	Overview of the Course
April 4	Introduction to Neurons
April 6	Introduction to Brain Structure

WEEK 2: THE VISUAL SYSTEM AS MODEL FOR SENSORY PROCESSING

Baars and Gage, *Fundamentals of Cognitive Neuroscience*
 Chapter 6: The Art of Seeing

April 9 The Retina
 April 11 The LGN and the Primary Visual Cortex
 April 13 Higher Order Processing

WEEK 3: THE EMOTIONAL SYSTEMS OF THE BRAIN

Damasio, *Self Comes to Mind*
 Chapter 3: Making Maps and Making Images
 Chapter 4: The Body in Mind
 Chapter 5: Emotions and Feelings
 Deborah Talmi, "Enhanced Emotional Memory: Cognitive and Neural Mechanisms"
Current Directions in Psychological Science (2013) 22.6:430–436

April 16 The Mid-Brain Affective systems
Essay 1 Due
 April 18 The Primary Cortical Affective systems
 April 20 Higher Order Affective processing

WEEK 4: INTRODUCTION TO THE MATHEMATICS OF NEURAL NETWORKS

Patricia S. Churchland and Terrence J. Sejnowski, "Blending Computational and
 Experimental Neuroscience," *Nature Reviews: Neuroscience* (November 2016) 17, 667-68
 Rafael Yuste, "From the Neuron Doctrine to Neural Networks," *Nature Reviews: Neuroscience*
 (Aug. 2015) 16, 487-97.
 Andy Clark, "Whatever Next? Predictive Brain, Situated Agents, and the Future of
 Cognitive Science" *Behavioral and Brain Sciences* (2013) 36, 181–253.

April 23 The Mathematics of Neural Networks
 April 25 [Cancelled: to be made up finals week]
 April 27 [Cancelled: to be made up finals week]

WEEK 5: BIOLOGICAL NEURAL NETWORK MODELING

Michael A. Fuller, "Neurons and Neural Networks," Chapter 1 in *Patterns of Identity* (Draft)

Recommended

Andrea Avena-Koenigsberger, Bratislav Misic and Olaf Sporns, "Communication
 dynamics in complex brain networks," *Nature Reviews: Neuroscience* V. 19 (January
 2018): 17-33.

Laurence T. Hunt and Benjamin Y. Hayden, "A distributed, hierarchical and recurrent framework for reward-based choice," *Nature Reviews: Neuroscience* V. 16 (March 2017): 172-182.

Pieter R. Roelfsema and Anthony Holtmaat, "Control of synaptic plasticity in deep cortical networks," *Nature Reviews: Neuroscience* V. 19 (March 2018): 166-180.

April 30 Introduction to Neural Networks and Hebbian Learning

May 2 Recurrent Networks

May 4 The Neural Networks of the Brain

WEEK 6: DEVELOPMENTAL NEUROSCIENCE

Baars and Gage, *Fundamentals of Cognitive Neuroscience*

Chapter 14: Growing Up

Eveline A. Crone and K. Richard Ridderinkhof, "The Developing Brain: From Theory to Neuroimaging and Back," *Developmental Cognitive Neuroscience* 1 (2011) 101-09.

John H. Gilmore, Rebecca C. Knickmeyer and Wei Gao, "Imaging structural and functional brain development in early childhood," *Nature Reviews: Neuroscience* V. 19 (March 2018): 123-137.

Nim Tottenham, "The Importance of Early Experiences for Neuro-Affective Development," *Current Topics in Behavioral Neuroscience* (2014), 16, 109-29.

May 7 Overview of Developmental Neuroscience

May 9 Maturation of the Brain

May 11 The Development of the Self

WEEK 7: MEMORY AND MEANINGS

Baars and Gage, *Fundamentals of Cognitive Neuroscience*

Chapter 9: Learning and Memory

Damasio, *Self Comes to Mind*

Chapter 6: An Architecture for Memory

Matthew A. Lambon et al., "The neural and computational bases of semantic cognition," *Nature Reviews: Neuroscience* 18 (January 2017) 42-55.

Recommended

Christoph Anacker and René Hen, "Adult hippocampal neurogenesis and cognitive flexibility — linking memory and mood," *Nature Reviews: Neuroscience* V. 18 (June 2017): 335-346.

Howard Eichenbaum, "Prefrontal–hippocampal interactions in episodic memory," *Nature Reviews: Neuroscience* V. 18 (September 2017): 547-558

Pieter R. Roelfsema and Anthony Holtmaat, "Control of synaptic plasticity in deep cortical networks," *Nature Reviews: Neuroscience* V. 19 (March 2018): 166-180.

Carlo Sestieri, Gordon L. Shulman and Maurizio Corbetta, "The contribution of the human posterior parietal cortex to episodic memory," *Nature Reviews: Neuroscience* V. 18 (March 2017): 183-192.

- May 14 Memory Systems in the Brain
 May 16 The Processes for Creating Memories
 May 18 From Episodic to Semantic Memory

WEEK 8: THE NEUROSCIENCE OF LANGUAGE

Baars and Gage, *Fundamentals of Cognitive Neuroscience*

Chapter 11: Language

Stanislas Dehaene and Ghislaine Dehaene-Lambertz, "Is the Brain Prewired for Letters?" *Nature Neuroscience* (September 2016) 9, 1192-93.

Olaf Hauk, "What Does It Mean? A Review of the Neuroscientific Evidence for Embodied Lexical Semantics," Chapter 62 in Gregory Hickok and Steven Small, eds., *The Neurobiology of Language* (Academic Press, 2015), pp. 777-88.

Gary Lupyan & Molly Lewis, "From words-as-mappings to words-as-cues: the role of language in semantic knowledge," *Language, Cognition and Neuroscience*, (2017)

Michael A. Skeide and Angela D. Friederici, "The Ontology of the Cortical Language Network," *Nature Reviews: Neuroscience* (May 2017) 17, 323-32.

- May 21 The Language System in the Brain
Essay 2 Due
 May 23 The Processing of Words
 May 25 Language is more than language

WEEK 9: CLASSICAL CHINESE THEORY OF LANGUAGE AND POETICS

Hutton, trans., *Xunzi: The Complete Text*

Chapter 17: Discourse on Heaven

Chapter 19: Discourse on Ritual

Chapter 20: Discourse on Music

Chapter 22: Correct Naming

Stephen Owen, *Readings in Chinese Literary Thought*

"The Record of Music" in the *Record of the Rites*

"The Great Preface" to the *Canon of Poetry*

- May 28 [Memorial Day]
Essay 3 Due
 May 30 Xun Zi's philosophy of the human structuring of meaning
 June 1 The "Record of Music" and the "Great Preface"

WEEK 10: CLASSICAL CHINESE POETRY

Selected poems from Michael A. Fuller, *An Introduction to Chinese Poetry*

- June 4 Later Chinese Poetics and Overview of the Poetic Tradition
- June 6 Discussion of Poems
- June 8 Discussion of Poems

FINALS WEEK

- June 13 Student Draft Paper Presentations
- June 15 *Essay 4 Due*