Art and the Brain, ITP, Spring 2008
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Course Description
What can art tell us about how the brain works? And, likewise, what can the brain
tell us about how we perceive and create art? This class will examine brain
functioning in relation to several topics grounded in visual art and performance:
the mechanics of emotions; the physiology of facial expressions and esthetic
movement; the science of vision; and the neural foundations of narrative,
memory and imitation.

Class discussions will be oriented around the complex and controversial
emerging field of neuroesthetics. The practical objective of the class will be to
develop an understanding of how the brain works as a resource for creating art
across traditional and new media, from film, theatre, dance, and music to
interface design, installations, and AI.

Course Goals
• Become familiar with the literature that synthesizes studies in
  neuroscience, visual cognition, and aesthetics
• Understand the promise and limits of the neuroesthetic approach
• Gain a working understanding of neural networks and the physiology of
  facial expressions
• Become inspired by new models of communication (derived from studies
  of the emotional brain) which can be used to create computer-driven,
  emotionally affective artifacts, devices, and environments

Assignments
Students are required to complete one of the course assignments described in
weeks 2-12 and a final project or paper. Final projects should be accompanied by
a 3-4 page written report describing the intention and argument driving the
project. The final paper (15-20 pages) should explore one or more of the themes
of the class, supporting a point of view with research extending beyond required
course readings. Ideas for final projects and papers must be submitted at the
March 21 class meeting. Final projects/papers are due April 25th.

Grading: Course assignment 30%, class participation 20%, final project/paper
50%.
Course Syllabus

PART 1: Neurology and Art: An Emerging Approach

1. January 17 — Introduction to Class, from aesthetics to neuroesthetics

   **Topics**
   - Goals of class
   - How does neuroesthetics fit into the tradition of the philosophy of art?
   - What does neuroscience offer to the attempt to define art?

   **Assignment**
   Bring an image of a work of art to next class.

2. January 24 — Is Art Lawful?

   “The solution to the problem of aesthetics, I believe, lies in a more thorough understanding of the connections between the thirty visual centers in the brain and the emotional limbic structures (and of the internal logic and evolutionary rationale that drives them).” — V. S. Ramachandran

   **Topics**
   - Are there artistic universals?
   - What does science have to say about art?
   - Laying down the laws
   - What about Beauty?
   - What about the role of the artist’s personal history?

   **Readings**
   V. S. Ramachandran: Chapter 3 “The Artful Brain” in *A Brief Tour of Human Consciousness* (photocopy)
   [http://www.imprint.co.uk/pdf/rama_interview.pdf](http://www.imprint.co.uk/pdf/rama_interview.pdf)

   **Assignment**
   Deliver a presentation on the phenomenon of synesthesia. Discuss “cross-modal” brain functioning and its implications for art.
   **Supporting readings:** V. S. Ramachandran: Chapter 4 “Purple Numbers and Sharp Cheese” in *A Brief Tour of Human Consciousness*; Rita Carter: *Mapping the Mind*, pp. 106-11.

Topics
• How does the brain perceive visual art?
• What do eye scanning studies say about how we perceive art works?

Readings
Robert Solso: Chapter 3 in The Psychology of Art and the Evolution of the Conscious Brain (course text)

Assignment
1. Present Margaret Livingstone’s findings on artists’ use of luminance in painting.
   http://neuro.med.harvard.edu/site/faculty/livingstone.html

2. Present a “guided tour” of artwork to discuss Solso’s ideas about cognitive science and art, and supplement with comments from artists and critics. In particular, discuss the art in relation to the idea of “context,” explained in Chapter 5 of Solso’s Cognition and the Visual Arts.

4. February 7 — Neuroesthetics in Practice

“All visual art is expressed through the brain and must therefore obey the laws of the brain, whether in conception, execution or appreciation and no theory of esthetics that is not substantially based on the activity of the brain is ever likely to be complete, let alone profound.” —Semir Zeki

Topics
• Bringing the brain into the discussion
• Zeki’s theory: Art as a quest for essentials

Readings
Semir Zeki: Chapters 1-3, 7, 9 and Epilogue in Inner Vision: An Exploration of Art and the Brain (course text)

Assignment
1. Discuss the state of face recognition technology in relation to the visual brain’s functional specialization. Present Zeki’s findings on the neurological disorder “prosopagnosia,” or face imperception. Readings: Zeki Inner Vision, chapter 17.

5. February 14 — Art and Emotional Expression
“Art is a human activity consisting in this, that one man consciously, by means of certain external signs, hands on to others feelings he has lived through, and that other people are infected by these feelings and also experience them.” —Leo Tolstoy

Topics
- The Expression Theory of Aesthetics
- Neurophysiology of emotion: a first attempt

Readings
Noel Carroll: “Art as Expression” in Philosophy of Art (photocopy)
Leo Tolstoy: Section V in What Is Art? (photocopy)

Assignment
In reference to the readings in expression theory and W. James, discuss the dynamic of emotional stimulus and response as an aesthetic narrative of emotion, with examples drawn from art, performance, literature, music, etc.


“…emotions and feelings may not be intruders in the bastion of reason at all: they may be enmeshed in its networks, for worse and for better.” —A. Damasio

Topics
- What is Descartes’ error?
- Thinking with feeling
- Body and emotion in the making of consciousness

Reading
Antonio Damasio: Chapter 7 “Emotions and Feelings” and “Postscriptum” in Descartes’ Error (course text)

Assignment
Explore Damasio’s idea of the face and body as a “theatre of emotion,” with examples drawn from film, photography, theatre, literature, music, etc.

7. February 28 — The Emotional Brain

Topics
- The neural mechanics of emotional stimulus and response
- The Basic Emotions
- The Primacy of Affect or Consciousness?
Readings
Joseph LeDoux: Chapter 3 “Blood Sweat and Tears” and Chapter 6 “A Few Degrees of Separation” in The Emotional Brain

Assignment
1) Create an interactive work that demonstrates the mechanics of fear stimulus/response (the “high road” and the “low road”) according to LeDoux.
http://www.cns.nyu.edu/home/ledoux/Ledouxlab.html

PART 2 Performance and the Emotional Brain

8. March 7 — Empathy, Art and the Brain

“…there is preliminary evidence that the same neural structures that are active during sensations and emotions are active also when the same sensations and emotions are to be detected in others. It appears therefore that a whole range of different ‘mirror matching mechanisms’ may be present in our brain.” —Vittorio Gallese

“… the body-sensing areas constitute a sort of theatre where not only the ‘actual’ body states can be ‘performed,’ but varied assortments of ‘false’ body states can be enacted as well….” — A. Damasio

Topics
- Mirror Neurons
- As-if body loops

Readings
A. Damasio: Chapter 3 “Feelings” in Looking for Spinoza (photocopy)

Assignment
Discuss the functioning and implications of mirror neurons and empathy in art, supported with documentation from film, photography, live performance, or literature. Discuss how artists intentionally exploit the human capacity to imitate to engage spectators.

March 14: Spring break, no class

9. March 21 — Facial Expressions (1)
*Ideas for final projects and papers due.

**Topics**
- Early studies on the mechanics of facial expressions

**Readings**
- Darwin: Introduction and Chapter 1 in *The Expression of the Emotions in Man and Animals* (photocopy)

**Assignment**
1) Read Paul Ekman's essay “Afterword: Are there universals in human facial expression?” in Darwin *Expression of the Emotions* and present the case for the existence of universal facial expressions.

2) Read Chapter 5 “The Way We Were” pp. 104-116 in LeDoux’s *The Emotional Brain* and create an interactive piece that illustrates the issues surrounding the question whether humans possess a set of basic emotions

10. March 28 — Facial Expressions (2)

**Topics**
- Contemporary studies on facial expressions
- Reading faces: truth or lies; microexpressions
- Beauty on the brain; symmetry and the average face

**Readings**
- Paul Ekman: Selected chapters in *Emotions Revealed* (photocopy)
- Nancy Etcoff: Chapter 4 “Cover Me” and Chapter 5 “Feature Presentation,” in *Survival of the Prettiest* (photocopy)
- Semir Zeki: Chapter 17 “Face Imperception or a Portrait of Prosopagnosia,” in *Inner Vision* (course text)


**Assignment**
2. Participate in face preference study on: [http://perception.st-and.ac.uk/](http://perception.st-and.ac.uk/)
3. Present the applications of facial expression studies in art works/entertainments
11. April 4 — Making a Modern Body

Topics
- Russian Montage Theory: Kuleshov, Pudovkin, Eisenstein Rationalism and Human Expression
- Biomechanics: The scientific organization of the body
- The “Kuleshov Effect” and the Close-Up

Readings
Selected passages in Lev Kuleshov Selected Works: 50 Years in Cinema (photocopy)
Vladimir Pudovkin: Selected passages in Film Technique and Film Acting (photocopy)
S.M. Eisenstein and S. Tretyakov: “Expressive Movement” (photocopy)

Assignment
Discuss the use of facial close-ups in film (silent and sound) to create emotional narrative, supported with reference to Russian film directors

12. April 11 — Memory, Narrative, Consciousness

“To study how we perceive and recall complex experiences, we will need to determine how neural networks are organized and how attention and conscious awareness regulate and reconfigure the actions of the neurons in those networks.” Eric Kandel

Topics
- Narrative forms and the self’s experience in subjective space and time. (Episodic memory and storylines)
- The brain as confabulator
- The mind of the artmaker

Readings
Selected chapters in Neurology of the Arts: Painting, Music, Literature (photocopy)
Jeff Hawkins with Sandra Blakeslee: Chapter 4 “Memory” and chapter 8 “The Future of Intelligence” in On Intelligence: How a New Understanding of the Brain Will Lead to the Creation of Truly Intelligent Machines (photocopy)
Excerpts from In Search of Memory: The Emergence of a New Science of the Mind, Eric Kandel

Assignment
Report on and imagine uses for the application of neuroaesthetics in creating music, smart machines, new media, etc.
Report on a case study involving defects in memory and art making.

13. April 18 — Presentation of final projects/papers
14. April 25 — Presentation of final projects/papers

Course Texts

Required


Recommended and Supplementary

Ackerman, Diane *An Alchemy of Mind* (New York: Scribner, 2004).
Scientific American Book of the Brain (Guilford, CT: The Lyons Press, 1999).