

## Vision, Brain and Art

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**Website:** <http://cogscilab.kaist.ac.kr> (to access, id and password required)  
**Classes:** Mon Wed: 13:00 – 16:00; Tue Thu Fri: 13:00 – 15:00;  
Office hours: Mon Wed 14:00 – 15:30 N41327

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### Course Description:

The relationship between vision, brain science and art would be remote and vague at a first glance. However, when we give a thought about a definition of the function of both the brain and art, "to represent the constant and essential features of objects, and thus allow us to acquire knowledge about the world (Zeki, 1999)," it manifests the surprising connection of them. Our brain does not accept the external world as given. As the world is ever-changing, seeing objects from different angles, distances, and in different light conditions always result in different percepts. Without a constant mechanism, however, we would have been so susceptible to this vulnerable vision and lost our survival value a long time ago. Visual brain thus discounts all natural variations and has interests in the constant, enduring, and invariable properties of objects in the world. This active processing eventually guarantees acquiring the knowledge about the essential characteristics of the world.

Just as the visual brain does, art has a similar purpose, seeking out a way to represent the natural world as reliable as possible through various media. Throughout history, artists have struggled to transfer the 3-D reality into the 2-D picture plane, convey the movement into the static form of sculpture, and register the organic form of life into inorganic material substances. In summary, brain and art share a common task: to extract information about the constant and essential aspects of the visual world.

This lecture will offer an interdisciplinary approach to the principles of brain functioning and its process of visual information as manifested in art works of various cultures. A comparative study of artistic representation in different principles will illustrate the human processing of visual events and the nature of sensory systems. This lecture will provide an integrated understanding of cognitive process of perception and the comprehension of art beyond intuitive and often uninformed appreciation of its aesthetic values.

### Textbook:

Margaret Livingstone, *Vision and Art: The Biology of Seeing* (New York: Harry N. Abrams, 2014).

### Readings:

Semir Zeki, *Inner Vision: An Exploration of Art and the Brain* (Oxford: Oxford University Press, 1999).

Robert L. Solso, *The Psychology of Art and the Evolution of the Conscious Brain* (Cambridge: The MIT Press, 2003).

H. W. Janson and Anthony F. Janson, *History of Art: The Western Tradition*, 7<sup>th</sup> rev. ed. (Upper Saddle River, NJ: Prentice Hall, 2007).

### Course Evaluation:

The course grade is based upon:

- Attendance (5%): Missing more than 3 days will automatically lead to an F.
- Two exams (70%): Exams will cover material from lectures and the book. Exams will consist of short essays and one or two longer essays.

- Group-based project report (25%): Project topic will be announced.

**Schedule:**

<b>Period</b>	<b>Topics</b>	<b>Contents</b>
Week 1	Function of the Brain and Art Form in Vision and Art	<ul style="list-style-type: none"> <li>• Introduction to Vision Science</li> <li>• Physiological Basis of Vision: Art of Receptive Field, Visual Pathways</li> <li>• Central/Peripheral Vision</li> <li>• Spatial Frequency Theory</li> <li>• Evolution of Impressionism: A Case of Claude Monet</li> <li>• Faces</li> </ul>
Week 2	Color Processing Gallery Walk	<ul style="list-style-type: none"> <li>• Opponent Processing of Color</li> <li>• Retinex Theory</li> <li>• Color Mixing and Resolution</li> <li>• Georges Seurat and Neo-Impressionism</li> <li>• Gallery Walk</li> </ul>
Week 3	From 3-D to 2-D	<ul style="list-style-type: none"> <li>• Pictorial cues (perspective &amp; shading)</li> <li>• Stereopsis</li> <li>• Creating the Illusion of Depth: Linear Perspective and the Renaissance Masters</li> <li>• Breakdown of Linear Perspective: Cubism and Conceptualized vision</li> </ul>
Week 4	Kinetic Art Constancy and Illusion Visual Aesthetics	<ul style="list-style-type: none"> <li>• Types of Visual Motion</li> <li>• Illusion of Motion</li> <li>• Capturing the Movement: From Futurism to Op Art</li> <li>• Visual Aesthetics</li> <li>• Application of Human Information Processing</li> </ul>