

Course Description

This course is an interdisciplinary introduction to higher-level aspects of visual processing. Lectures will be given by USC faculty involved in vision research, as well as several visiting lecturers chosen for their areas of expertise.

Logistics

- Meeting time and place: Tu/Th 9:30-10:50, HNB 100
- Final Exam: Tuesday, May 9, 8-10 a.m.

Course Work

The coursework will consist of readings (3-4 hours/week) and homework assignments (1-2 hours per week) associated with each lecture. Late homeworks will not be accepted.

Exams

Three exams will be given (see course syllabus). Exams will cover material only in their respective blocks of the course. No makeup exams will be given.

Grading

Grading will be on a curve, i.e. will not be linked to absolute percentage scores. Grades will be weighted as follows:

Homeworks: 25%

Exams: 25% each

Syllabus

Jan 10	1. Cortical connectivity and dorsal/ventral pathways <i>Irving Biederman (1); Psychology</i>
Jan 12	2. The neural basis of object and face recognition <i>Irving Biederman (2); Psychology</i>
Jan 17	3. Comparative anatomy of visual cortex <i>Marty Sereno, UCSD</i>
Jan 19	4. Gain control in cortical simple/complex cells <i>Matteo Carandini, SKI</i>
Jan 24	5. Orientation maps, ocular dominance, and surround effects in V1 <i>Judith Hirsch (1)</i>
Jan 26	6. Simple and complex cells: an intracellular view <i>Judith Hirsch (2)</i>
Jan 31	7. Modeling contrast-invariant orientation tuning <i>Bartlett Mel (1), BME</i>
Feb 2	8. Simple and complex cells: alternative views <i>Dario Ringach, UCLA</i>
Feb 7	9. Simple cells as a sparse code <i>Fritz Sommer, UC Berkeley/Redwood</i>
Feb 9	10. Cue combination: gain control revisited <i>Bartlett Mel (2)</i>
Feb 14	Exam 1
Feb 16	11. Contour detection: neural data and models <i>Bartlett Mel (3)</i>
Feb 21	12. Contour extraction: computer vision approaches <i>Gérard Medioni (1), Comp Sci</i>
Feb 23	13. Image segmentation: computer vision approaches <i>Christoph von der Malsburg (1)</i>
Feb 28	14. Neural mechanisms of color in V1 <i>Elizabeth Johnson, Duke University</i>
Mar 2	15. Color constancy: data and models <i>Bartlett Mel (4)</i>
Mar 7	16. Motion measurement and interpretation <i>Gérard Medioni (2)</i>
Mar 9	17. Cortical measurement of motion <i>Norberto Grzywacz, BME</i>
Mar 13-17	Spring Break
Mar 21	18. Perception of motion: psychophysics and models <i>Zhong-Lin Lu (1), Psychology</i>
Mar 23	Exam 2
Mar 28	19. Computer vision models of face and object recognition <i>Christoph von der Malsburg (2)</i>

Mar 30	20. Face and object processing <i>Ione Fine, Opthamology</i>
April 4	21. Visual attention: recent results and open questions <i>John Reynolds, Salk Institute (Tentative)</i>
April 6	22. Attention and eye movements <i>Laurent Itti, Comp Sci</i>
April 11	23. Models of dendritic processing in visual cortical function <i>Bartlett Mel (5)</i>
April 13	24. Bayesian models of visual inference <i>Bosco Tjan (1), Psychology</i>
April 18	4th Annual USC Vision Symposium
April 20	25. Visual memory and learning <i>Zhong-Lin Lu (2)</i>
April 25	26. Reading <i>Bosco Tjan (2)</i>
April 27	27. Dyslexia <i>Zhong-Lin Lu (3)</i>
May 7	Exam 3