

Visualizing Vision
CLPS 1590 - S01

T-Th 1-2:20, Metcalf Chemistry, Room 107

This course provides hands-on experience in studying vision using computer graphics combined with visual psychophysics. Students will gain a better understanding of how images are formed, how one employs properties of image formation in the experimental study of vision, and how the perception of complex images works in biological systems. Labs will rely on Matlab and several computer graphics packages (e.g., Art of Illusion). If you are proficient in another 3D graphics package (e.g., 3DS-Max) you are welcome to use it if you have access to a copy.

Instructors:

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Teaching Assistants:

Carlo Campagnoli

Graduate Student

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Office Hours: Monday 10-12 @ Metcalf Chemistry, Room 107

Course web page:

Canvas

Requirements: Implementation of three experimental projects/demonstrations and written report of each project. Final projects may (optionally) be done in groups, so these reports can be “co-authored” meaning that two or more group members may turn in one report. The written reports for the first two projects can be quite short – 1500-2500 words – see typical *Science* or *Nature* articles. The report for the final project should also be written as a research report for *Nature* or *Science* and should be about 3000-4000 words including figure captions (but not references). No final exam. Course grades will be determined by attendance, participation, lab quality, and written reports.

Required Texts:

- *Readings to be assigned..*

Course goals. By the end of this course you should have developed:

- 1) Proficiency in image synthesis
- 2) Proficiency in psychophysical methods as they apply to vision
- 3) A better understanding of how we perceive complex images

Some details

This course will use Matlab and several off-the-shelf graphics packages, including Art of Illusion and Adobe Photoshop. It is not expected that you already know how to use these specific programs, but you should feel comfortable both programming and learning to use new, reasonably complex software.

The course will consist of “modules” that emphasize different topics within visual perception. Classes themselves will be a mixture of lecture and laboratory, as well as a separate one hour technical weekly section (Monday 10am-12pm) to help you learn to use the specific software tools on which we will rely.

Jan 24	Intro
Jan 29	3D Shape Perception
Jan 31	Methods – Introduction to R (Carlo Campagnoli)
Feb 4	(M 10-12) Building Stereo Stimuli
Feb 5	Stereo
Feb 7	Project #1 – Design of Stimulus Displays
Feb 12	Methods (Carlo Campagnoli)
Feb 14	P#1 - Design of Stereo Experiments
Feb 19	No class – President’s Day Holiday
Feb 21	P#1 continued
Feb 26	P#1 discussion
Feb 28	P#1 discussion
Mar 3	(M 10-12) Building Dynamic Stimuli
Mar 5	Structure From Motion (SFM); P#1 papers due (Science/Nature style)
Mar 7	Project #2 – Design of SFM Displays
Mar 12	Project #2 - Design of SFM Experiments
Mar 14	P#2 continued
Mar 19	P#2 continued
Mar 21	P#2 discussion
Mar 26	Spring Break
Mar 28	Spring Break
Apr 2	Complex 3D Shapes P#2 papers due (Science/Nature)
Apr 4	Project #3
Apr 9	P#3 Design of Stimuli
Apr 11	P#3 Design of Experiments
Apr 16	P#3 continued
Apr 18	P#3 continued
Apr 23	P#3 discussion
Apr 25	P#3 discussion
Reading Period	
May 10	P#3 papers due (Science/Nature style)