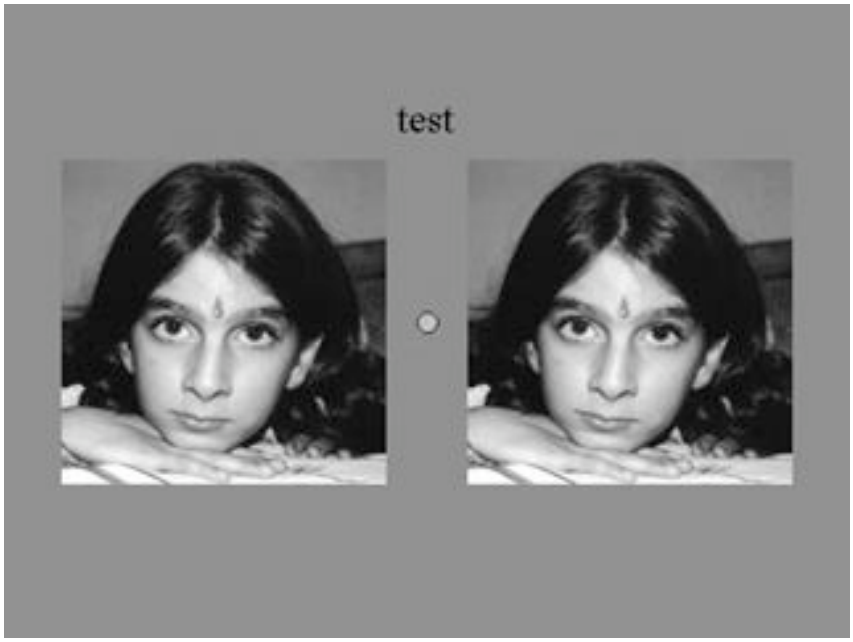
Computational Vision:Psy 5036

Assignment #3: Illusions

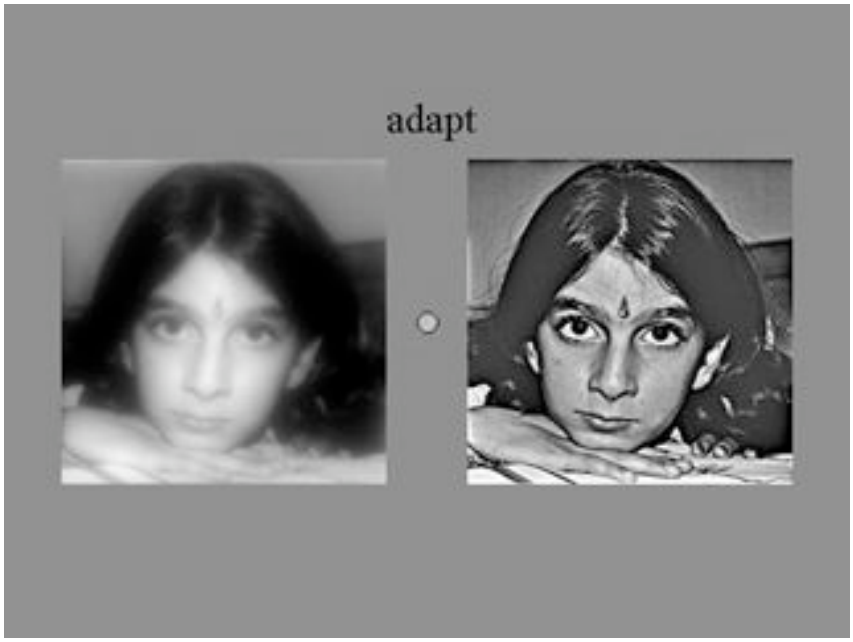
■ **Problem 1a: Write a *Mathematica* program to make a movie demonstration that illustrates adaptation to image blur. (See "bluradaptiondemo" on class web page.)**

Here is an example taken from Webster et al. (2002), but instead of using the girl's face that they used, you should use a different source image of your own choice.

Make a test image that has the identical source image on the left and right side of a fixation, similar to that shown below.



Now make the "adapt" image, where the left side is a low-pass filtered version of the original source image, and the right-side is the complementary high-pass filtered version. (Hint: the complementary high-pass version is the original image minus the blurred one). The "adapt" image should be similar to the one shown below.



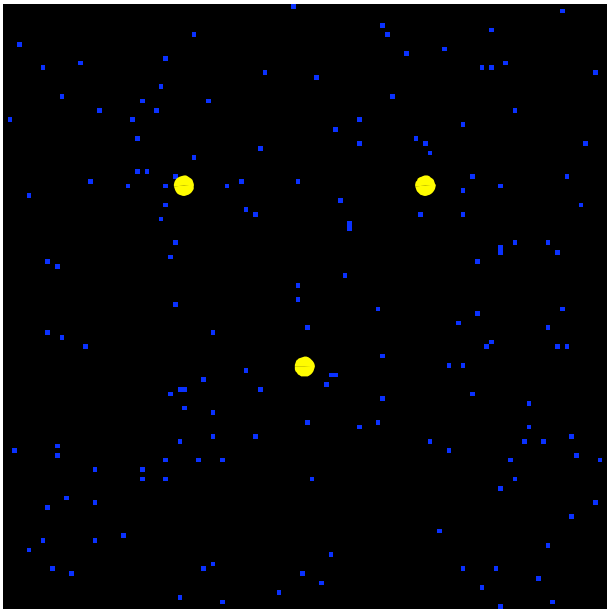
Now make a movie in which you: a) show the test image for about 1 second, b) followed by the adapt image for 7 seconds, c) followed by the test image again but now for at least three seconds. (You can do this all in one *Mathematica* program.)

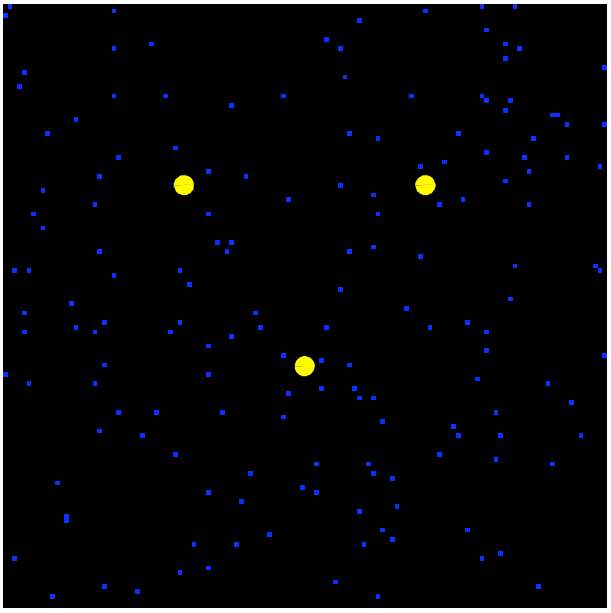
■ Problem 1b: Pose a scientific question about blur adaptation, and describe an experiment you could do to answer it.

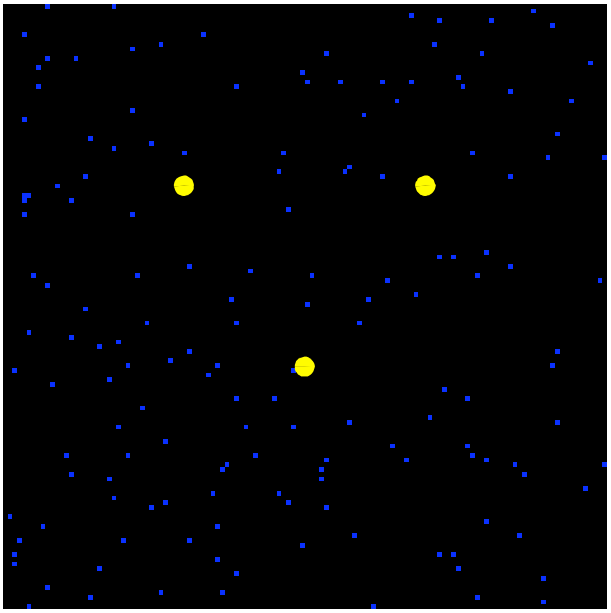
Take a look at the paper by Webster et al. (2002) to get ideas about unanswered questions on the topic. Check to see if any of the authors have web pages with related work.

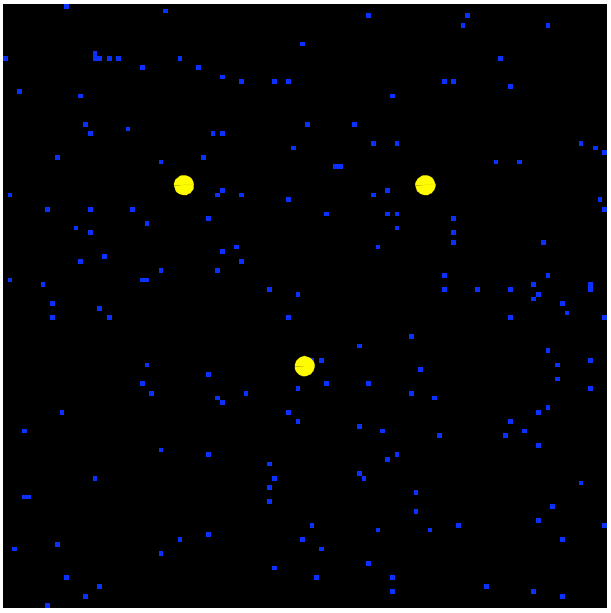
Webster, M. A., Georgeson, M. A., & Webster, S. M. (2002). Neural adjustments to image blur. *Nat Neurosci, 5*(9), 839-840.

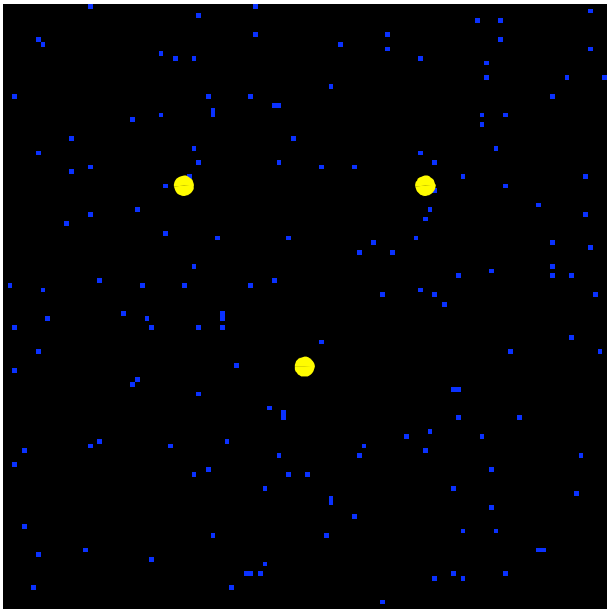
■ **Problem 2: Write a *Mathematica* program that generates a movie to illustrates motion-induced blindness. (See "motion-induced-blindness demo".)**

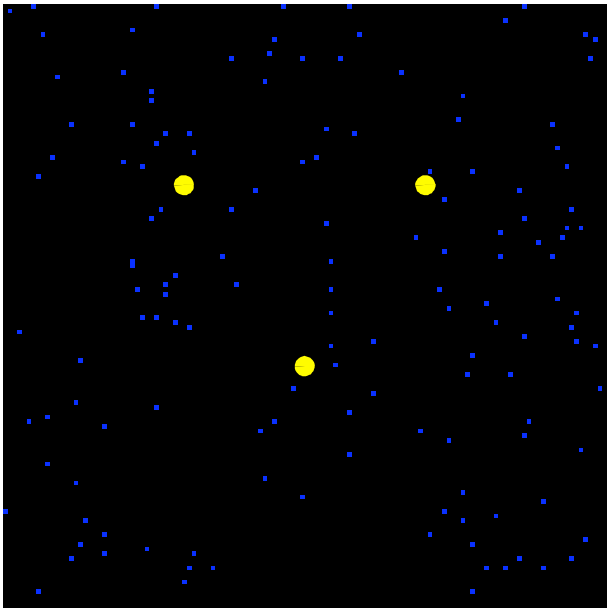


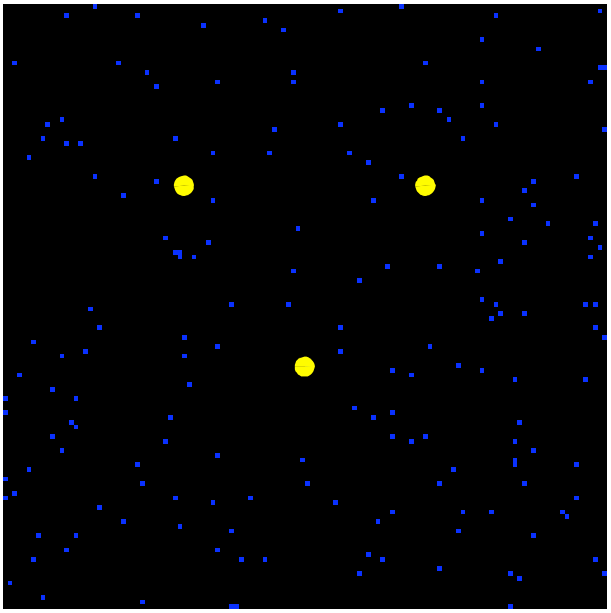


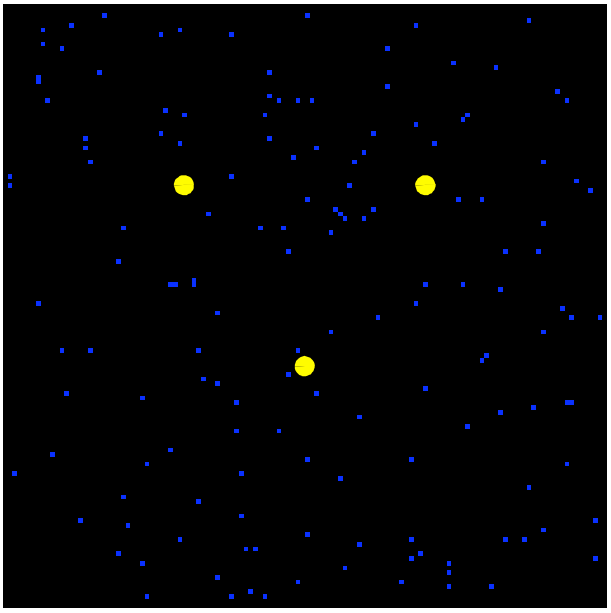


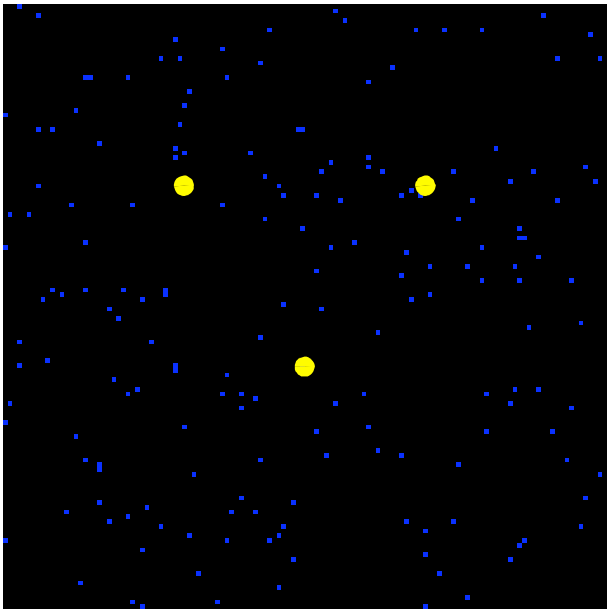


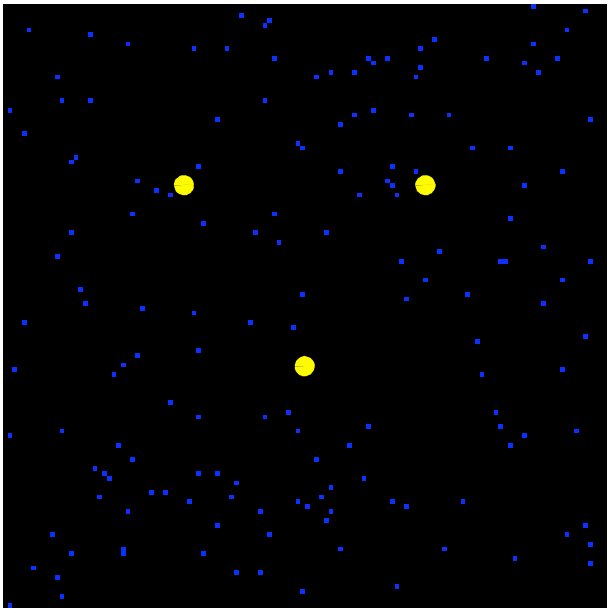












■ **Problem 2b: Pose a scientific question about motion-induced blindness, and describe an experiment you could do to answer it.**

Take a look at the paper by Bonneh et al. (2001) to get some ideas. You could also do a literature or web search to look for follow-up work, or other studies done by the same authors.

Bonneh, Y. S., Cooperman, A., & Sagi, D. (2001). Motion-induced blindness in normal observers. *Nature, 411*(6839), 798-801.