



## Department of Psychology

### Psychology 621.01 (L01) – Seminar in Visual Perception

Fall 2006

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|----------------------|---------------------|---------------------------|------------|
| <b>Instructor:</b>   | <b>Chip Scialfa</b> | <b>Lecture Location:</b>  | <b>TBA</b> |
| <b>Phone:</b>        | 220-4951            | <b>Lecture Days/Time:</b> | TBA        |
| <b>Email:</b>        | scialfa@ucalgary.ca |                           |            |
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| <b>Office Hours:</b> | TBA                 |                           |            |

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#### Course Description and Goals

Do you want to find out more about vision as it relates to your research and daily life? Are you interested in things like visual development in infants, visual attention, or visual changes throughout the lifespan? Rather than being developed for those with primary research interest in vision, PSYC 621.01 will be broadly relevant to many graduate students in the department including those doing work in cognitive, clinical issues, human factors and neuroscience. The readings are a mix of the classic and contemporary that I hope will give you a good sense of the development within the discipline.

The “mission” of this course is defined by five primary learning objectives. They are to:

1. Provide students with a comprehensive and up-to-date understanding of vision science that can serve as a foundation for advanced course work, research and/or application in vision.
2. Increase student appreciation of visual and technical issues that need to be considered in research and applications that use visual presentation of information (e.g., cognitive and psychomotor research, ergonomics).
3. Show how the visual system is not a static system, but one in constant change from conception to death.
4. Provide students with the foundation needed to teach undergraduate courses in the area of visual science.
5. Allow you practice in writing essay exams and in reviewing the literature on a relevant topic that is, ideally, related to your research interests.

#### Required Text

See Readings List below.

## **Evaluation**

### Exams (25% each)

There will be a mid-term and final exam, at times to be determined by the class. Both exams will be short-answer and essay in format.

### Term Paper (25%)

A topical review, in APA format, on a subject mutually agreed on with the instructor (Length not to exceed 20 printed double-spaced pages).

Due Date: Monday, December 4<sup>th</sup>, 2006

### Class Presentations (15%)

Everyone will be expected to make several presentations based on the readings listed below. I'd like them to be in Powerpoint for ease of sharing, but if you can make a good argument for another format, talk to me.

### Participation (10 %)

The more the better. I get tired of hearing myself talk.

### **Grading Scale**

|    |         |    |        |    |        |    |        |
|----|---------|----|--------|----|--------|----|--------|
| A+ | 96-100% | B+ | 80-84% | C+ | 67-71% | D+ | 54-58% |
| A  | 90-95%  | B  | 76-79% | C  | 63-66% | D  | 50-53% |
| A- | 85-89%  | B- | 72-75% | C- | 59-62% | F  | 0-49%  |

## **Lecture Schedule**

To be determined in early discussion with the class.

### **Reappraisal of Grades**

A student who feels that a piece of graded term work (term paper, essay, test, etc.) has been unfairly graded, may have the work re-graded as follows. The student shall discuss the work with the instructor within fifteen days of being notified about the mark or of the item's return to the class. If not satisfied, the student shall immediately take the matter to the Head of the department offering the course, who will arrange for a reassessment of the work within the next fifteen days. The reappraisal of term work may cause the grade to be raised, lowered, or to remain the same.

If the student is not satisfied with the decision and wishes to appeal, the student shall address a letter of appeal to the Dean of the faculty offering the course within fifteen days of the unfavourable decision. In the letter, the student must clearly and fully state the decision being appealed, the grounds for appeal, and the remedies being sought, along with any special circumstances that warrant an appeal of the reappraisal. The student should include as much written documentation as possible.

## **Plagiarism and Other Academic Misconduct**

Intellectual honesty is the cornerstone of the development and acquisition of knowledge and requires that the contribution of others be acknowledged. Consequently, plagiarism or cheating on any assignment is regarded as an extremely serious academic offense. Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Students should examine sections of the University Calendar that present a Statement of Intellectual honesty and definitions and penalties associated with Plagiarism/Cheating/Other Academic Misconduct.

## **Academic Accommodation**

*It is the student's responsibility to request academic accommodations.* If you are a student with a documented disability who may require academic accommodation and **have not** registered with the Disability Resource Centre, please contact their office at 220-8237. Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. You are also required to discuss your needs with your instructor no later than fourteen (14) days after the start of this course.

## **Absence From A Test**

Make-up exams are NOT an option without an official University medical excuse (see the University Calendar). You must contact the instructor before the scheduled examination or you will have forfeited any right to make up the exam. At the instructor's discretion, a make-up exam may differ significantly (in form and/or content) from a regularly scheduled exam. Except in extenuating circumstances (documented by an official University medical excuse), a makeup exam is written within two (2) weeks of the missed exam.

A completed Physician/Counselor Statement will be required to confirm absence from a test for health reasons. The student will be required to pay any cost associated with the Physician Counselor Statement.

## **Important Dates**

The last day to drop this course and **still receive a fee refund** is September 22, 2006. The last day to withdraw from this course is December 8, 2006.

## Readings

### Psychophysics

#### Assigned Readings:

Gescheider, G.A. (1976). The classical psychophysical thresholds. In, Psychophysics: Method and Theory. Hillsdale, NJ: LEA, pp. 20-38.

Jones, F.N. (1974). History of psychophysics and judgment. In, E.C. Carterette & M.P. Friedman (Eds.). Handbook of Perception, Vol. II: Psychophysical Judgment and Measurement. NY: Academic, pp. 1-22.

Swets, J.A., Tanner, W.P., & Birdsall, T.G. (1961). Decision processes in perception. Psychological Review, 68, 301-340 (only to page 311).

#### Readings for Presentations:

Joffe, K.M., & Scialfa, C.T. (1995). Texture segmentation as a function of eccentricity, spatial frequency and target size. Spatial Vision, 9, 325-342.

Hecht, S., Schlaer, Simon, & Pirenne, M.H. (1942). Energy, quanta and vision. Journal of General Physiology, 25, 819-840.

Stevens, S.S. (1962). The surprising simplicity of sensory metrics. American Psychologist, 17, 29-39.

### Visual Anatomy and Physiology

#### Assigned Readings:

DeValois, R.L., & DeValois, K.K. (1988). Retinogeniculate anatomy and physiology. In, Spatial Vision. NY: Oxford, pp. 55-93.

DeValois, R.L., & DeValois, K.K. (1988). Striate cortex. In, Spatial Vision. NY: Oxford, pp. 94-146.

#### Readings for Presentations:

Hartline, H.K., Wagner, H.G., & Ratliff, F. (1956). Inhibition in the eye of Limulus. The Journal of General Physiology, 39, 651-673.

Hubel, D.H. & Weisel, T.N. (1963). Shape and arrangement of columns in cat's striate cortex. The Journal of Physiology, 165, 559-568.

Marks, W.B., Dobbie, W.H., & MacNichol, E.F. (1964). Visual pigments in single cones. Science, 143, 1181-1183.

## Spatial Vision

### Assigned Readings:

Schwartz, S.H. (1999). Spatial vision. In Visual Perception: A Clinical Orientation (2<sup>nd</sup> ed.), Stamford, CT: Appleton & Lange (pp. 175-204).

### Readings for Presentations:

Gagnon, R. & Kline, D.W. (2003). Senescent effects on binocular summation for contrast sensitivity and spatial interval acuity. Current Eye Research, *27*, 315-321.

Scialfa, C.T., Garvey, P.M., Gish, K.W., Deering, L., Leibowitz, H.W, & Goebel, C.G. (1988). Relationships among measures of static and dynamic visual sensitivity. Human Factors, *30*, 677-687.

Scialfa, C., Kline, D.W., & Wood, P.K. (2002). Structural modeling of contrast sensitivity in adulthood. Journal of the Optical Society of America, *19*, 158-165.

Tieger, T. & Ganz, L. (1979). Recognition of faces in the presence of two-dimensional sinusoidal masks. Perception and Psychophysics, *26*, 163-167.

## Visual Attention

### Assigned Readings:

Nakayama, K., & Joseph, J.S. (1998). Attention, pattern recognition and pop-out in visual search. In R. Parasuraman (Ed.), The attentive brain. Cambridge, MA: MIT Press. (pp 279-288).

Parasuraman, R., Warm, J.S., & See, J. (1998). Brain systems of vigilance. In R. Parasuraman (Ed.), The attentive brain. Cambridge, MA: MIT Press. (pp. 221-256).

Treisman, A.M., & Sato, S. (1990). Conjunction search revisited. Journal of Experimental Psychology: Human Perception and Performance, *16*, 459-478.

### Readings for Presentations:

Egeth, H., Virzi, R., & Garbart, H. (1984). Searching for conjunctively defined targets. Journal of Experimental Psychology: Human Perception and Performance, *10*, 32-39.

Klein, R. M., & MacInnes, W. J. (1999). Inhibition of return is a foraging facilitator in visual search. Psychological Science, *10*(4), 346-352.

Remington, R.W., Johnston, J.C., & Yantis, S. (1992). Involuntary attentional capture by abrupt onsets. Perception & Psychophysics, *51*, 279-290.

Simons, D. J., & Levin, D. T. (1998). Failure to detect changes to people during a real-world interaction. Psychonomic Bulletin & Review, *5*(4), 644-649.

## Eye Movements

### Assigned Readings:

Becker, W. (1989). Metrics. In Wurtz and Goldberg (Eds.), The neurobiology of saccadic eye movements. North Holland: Elsevier. (pp. 13-67).

### Readings for Presentations:

Henderson, J.M. & Ferreira, F. (1990). Effects of foveal processing difficulty on the perceptual span in reading: Implications for attention and eye movement control. JEP:LMC, 16, 417-429.

Ottes, F.P, van Gisbergen, A.M., & Eggermont, J.J. (1985).. Latency dependence of colour-based target vs. nontarget discrimination by the saccadic system. Vision Research, 25, 849-862.

Scialfa, C.T., & Joffe, K.M. (1998). Response times and eye movements in feature and conjunction search as a function of target eccentricity. Perception & Psychophysics, 60, 1067-1082.

Volkman, F.C. (1986). Human visual suppression. Vision Research, 26, 1401-1416.

## Colour Vision

### Assigned Readings:

Schwartz, S.H. (1999). Colour vision. In, Visual Perception: A Clinical Orientation (2<sup>nd</sup> ed.), Stamford, CT: Appleton & Lange (pp. 93-138).

### Readings for Presentations:

Bowman, K.J. (1973). The Farnsworth dichotomous test – The panel D-15. The Australian Journal of Optometry, 56, 13-24.

De Valois, R. & Jacobs, G. (1968). Primate color vision. Science, 162, 533-540.

MacNichol, E.F. (1964). Three-pigment color vision. Scientific American, 1-10.

Montgomery, G. (1988). Color perception: Seeing with the brain. Discovery, December, 52-59.

Rushton, W.A.H. (1962). Visual pigments in man. Scientific American, 207, 120-132.

Steward, J.M., & Cole, B.L. (1989). What do color vision defectives say about everyday tasks? Optometry & Vision Science, 66, 288-295.

## Form Perception

### Assigned Readings:

Rock, I. (1975). The Perception of Form I: Organization. In, An Introduction to Perception. New York: MacMillan (pp. 251-294).

Rock, I. (1975). The Perception of Form II: Specific Shape. In, An Introduction to Perception. New York: MacMillan (pp. 295-331).

### Readings for Presentations:

Ramachandran, V.S. (1988). Perceiving shape from shading. Scientific American, 259, 76-83.

Todd, J. & Akerstrom, R. (1987). Perception of three-dimensional form from patterns of optical texture. JEP:HPP, 13, 242-255.

## Depth Perception

### Assigned Readings:

Bruce, V., Green, P., & Georgeson, M. (1996). Chapter 7: Depth Perception. In, Visual Perception: Physiology, Psychology and Ecology (3<sup>rd</sup> ed.) (pp. 137-169).

### Readings for Presentations:

Cohn, TE E. & Lasley, David J. (1990). Wallpaper illusion: Cause of disorientation and falls on escalators. Perception, 19, 573-580.

Peissig, J.J., Young, M.E., Wasserman, E.A., & Biederman, I. (2005). The role of edges in object recognition by pigeons. Perception, 34, 1353-1374.

Redding, G. M. (2002). A test of size-scaling and relative-size hypotheses for the moon illusion. Perception & Psychophysics, 64, 1281-1289.

Roncato, S., Parlangei, O., Farfaneti, G. (1998). Effects of contextual and local factors on Ponzo illusion magnitude. Psychological Research, 61, 119-124.

## Motion

### Assigned Readings:

Bruce, V., Green, P., & Georgeson, M. (1996). Chapter 8: The Computation of Image Motion. In, Visual Perception: Physiology, Psychology and Ecology (3<sup>rd</sup> ed.) (pp. 171-204).

### Readings for Presentations:

Antal, Andrea; Varga, Edina T; Nitsche, Michael A; Chadaide, Zoltan; Paulus, Walter; Kovacs, Gyula; Vidnyanszky, Zoltan. (2004). Direct current stimulation over MT + /V5 modulates motion aftereffect in humans. Neuroreport:For Rapid Communication of Neuroscience Research, 15, 2491-2494.

Kim, Nam-Gyoon; Grocki, Michael J. (2006). Multiple sources of information and time-to-contact judgments. Vision Research, 46, 1946-1958.

Bonato, Frederick; Bubka, Andrea; Story, Meredith. (2005). Rotation direction change hastens motion sickness onset in an optokinetic drum. Aviation, Space, and Environmental Medicine, 76, 823-827.

Priebe, Nicholas J; Lisberger, Stephen G. (2004). Estimating target speed from the population response in visual area MT. Journal of Neuroscience, 24, 1907-1916.

#### Developmental (Children)

##### Assigned Readings:

Daw, N.W. (1995). Development of visual capabilities. In, Visual Development, N.Y.: Plenum (pp. 29-58).

##### Readings for Presentations:

Bertin, Evelin; Bhatt, Ramesh S. (2006). Three-month-olds' sensitivity to orientation cues in the three-dimensional depth plane. Journal of Experimental Child Psychology, 93, 45-62.

Gibson, Eleanor J; Walk, Richard D. The "visual cliff." (1960). Scientific American, 202, 64-71.

Graybiel, Ann M; Held, Richard. (1970). Prismatic adaptation under scotopic and photopic conditions. Journal of Experimental Psychology, 85, 16-22.

Teller, D. (1977). A forced-choice preferential looking procedure: A psychophysical technique for use with human infants. Infant Behavior and Development, 2, 135-153.

#### Developmental (Aging)

##### Assigned Readings:

Scialfa, C., & Kline, D. W. Aging effects on vision. In, J.E. Birren (Ed). Encyclopedia of Gerontology. Oxford, UK: Elsevier, in press.

##### Readings for Presentations:

Kramer, A. Boot, W., McCarley, J., Peterson, M. Colcombe, A., & Scialfa, C. (2006). Aging, memory and visual search. Acta Psychologica, 122, 288-304.

Scialfa, C., Kline, D., & Wood, P. (2002). Structural modeling of contrast sensitivity in adulthood. Journal of the Optical Society of America A, 19, 158-165.

Scialfa, C., Hamaluk, E., Skaloud, P., & Pratt, J. (1999). Age differences in saccadic averaging. Psychology and Aging, 14, 695-699.

Kline, D.W., Scialfa, C.T., Lyman, B.J., & Schieber, F. Age differences in the temporal continuity of gratings as a function of their spatial frequency. Experimental Aging Research, 16, 61-65.



## Human Factors

### Assigned Readings:

None.

### Readings for Presentations:

Grahame, M., Laberge, J., & Scialfa, C. (2004). Age differences in search of web pages: The effects of link size, link number and clutter. Human Factors, 46, 385-398.

Kline, D. (1994). Optimizing the visibility of displays for older operators. Experimental Aging Research, 20, 11-23.

Rock, P., & Harris, M. (2006). Tau as a Potential Control Variable for Visually Guided Braking. Journal of Experimental Psychology: Human Perception and Performance, 32, 251-267.

Wade, C., Davis, J., Marzilli, T. & Weimar, W. (2006). Information processing capacity while wearing personal protective eyewear. Ergonomics, 49, 955-967.