PSY801 Sensation and Perception (tentative)
Fall 2021

Instructor: Taosheng Liu PhD
Meetings: Tuesday 9:00-noon
Office hours: By appointment
Readings:
2. Additional original research articles (see reading list, pdfs will be posted).

Course description and objectives
This course focuses on visual perception. Vision is arguably the most important sense for humans and it has been studied since the very beginning of psychology and physiology. Today, vision science is an interdisciplinary effort of investigation that spans several fields: psychology, neuroscience, and computer science. Scientists from these various disciplines address the same question from different perspectives: how do we see? As you will discover, the answer to this seemingly innocent and simple question is far from simple. Underneath the apparent ease of seeing is an amazingly complex and intricate machinery and associated computations. Although far from complete, our knowledge of vision is probably by far the most comprehensive among all cognitive functions, and vision remains the “best shot” for scientists to gain a true understanding of how (a piece of) the mind works. This course will survey our current understanding of visual processes from the psychological, physiological, and computational perspectives. The goal is to provide an appreciation of our increasingly integrated, coherent understanding of visual perception from multiple levels of analysis.

Prerequisite: It is indeed somewhat difficult to have all the relevant preparation for a diverse topic such as vision science. Some knowledge about the following will be useful: psychophysics, perception (undergraduate level), cognitive psychology, neuroanatomy and neurophysiology, math (calculus, linear algebra, probability and statistics).

Course requirement and assessment
Class participation 15%
Weekly write-ups 20%
Presentations 15%
Mid-term exam 25%
Final exam 25%

Participation and write-ups: I expect everyone will attend every class session, and actively participate in the discussion. To facilitate our discussion, you are to write a short reaction paper every week (except the first week). Feel free to write (some of) your thoughts about that week’s reading. Some examples of what to write about: what are the most
important/interesting things you learned from the reading? Is the reading clear, or something needs to be explained in more detail? How does the information fit with your previous knowledge? What are the outstanding questions that remain to be addressed? At the end of your paper, you should write down 1-2 questions for group discussion, things that you think are interesting and you would like to hear other’s opinion. Aim for somewhere around 500 words. Submit your paper on D2L at least **by 12 noon on Mondays**. This allows time for me to read these reaction papers and give feedback.

**Presentations:** Students are expected to present the original research articles in the reading list and lead the discussion of those readings.

**Exams:** There will be two take-home exams, with essay type of questions.

### Class schedule

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Topic</th>
<th>Reading (VS: Palmer text)</th>
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<tbody>
<tr>
<td>1</td>
<td>Sept 7</td>
<td>Introduction</td>
<td>VS Ch 1</td>
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<tr>
<td>2</td>
<td>Sept 14</td>
<td>Theoretical frameworks</td>
<td>VS Ch 2; (1-3, 4^)</td>
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<td>3</td>
<td>Sept 21</td>
<td>Signal detection</td>
<td>VS appendix A; (6, 5^, 7^)</td>
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<td>4</td>
<td>Sept 28</td>
<td>Color and Motion</td>
<td>VS Ch 3, Ch 10; (8)</td>
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<td>5</td>
<td>Oct 5</td>
<td>Image structure</td>
<td>VS Ch 4; (9, 10^)</td>
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<tr>
<td>6</td>
<td>Oct 12</td>
<td>Depth</td>
<td>VS Ch 5 (skip 5.5.7); (11, 12^)</td>
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<tr>
<td>7</td>
<td>Oct 19</td>
<td>Dorsal vs. ventral streams</td>
<td>(13-16)</td>
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<tr>
<td>8</td>
<td>Oct 26</td>
<td><strong>Fall break days</strong></td>
<td><strong>mid-term exam due</strong></td>
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<tr>
<td>9</td>
<td>Nov 2</td>
<td>Perceptual organization</td>
<td>VS Ch 6; (17^, 18)</td>
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<td>10</td>
<td>Nov 9</td>
<td>Object properties and shape</td>
<td>VS Ch 7, Ch 8 (8.1 &amp; 8.2); (20, 19^, 21^)</td>
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<td>11</td>
<td>Nov 16</td>
<td>Function and category</td>
<td>VS Ch 9; (22-23, 24^)</td>
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<td>12</td>
<td>Nov 23</td>
<td>Attention &amp; Awareness</td>
<td>VS Ch 11, Ch13; (25^, 26)</td>
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<td>13</td>
<td>Nov 30</td>
<td>Oscillations</td>
<td>(27-29) [or another topic]</td>
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<tr>
<td>14</td>
<td>Dec 7</td>
<td>Memory &amp; Imagery</td>
<td>VS Ch 12; (30^, 31^, 32)</td>
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<tr>
<td>15</td>
<td>Dec 14</td>
<td><strong>Final exam due</strong></td>
<td></td>
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Reading List  (^: optional supplementary papers, gsc: Google scholar citation)
1. Helmholtz H (1896/1925) Concerning the perceptions in general. [gsc=1126]
perception: II. Conceptual and theoretical foundations. Psychological Bulletin, 138(6), 1218-1252. [long paper] [gsc=381]


28. Fiebelkorn, I. C., Saalmann, Y. B., & Kastner, S. (2013). Rhythmic sampling within and between objects despite sustained attention at a cued location. Current Biology, 23(24), 2553–2558. [gsc=279]


Total: 32, optional: 12, → 20 discussed