PSY801  Sensation and Perception  
Fall 2019

Instructor: Taosheng Liu PhD  
Meetings: Tuesday 1:50-4:50, Room 287 Psychology Bldg  
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 2-4 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)</th>
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<tbody>
<tr>
<td>1</td>
<td>Sept 3</td>
<td>Introduction</td>
<td>VS Ch 1; linear system intro</td>
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<tr>
<td>2</td>
<td>Sept 10</td>
<td>Theoretical frameworks</td>
<td>VS Ch 2; (1-3, 4^)</td>
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<td>3</td>
<td>Sept 17</td>
<td>Signal detection</td>
<td>VS appendix A; (5-6, 7^)</td>
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<td>4</td>
<td>Sept 24</td>
<td>Color and Motion</td>
<td>VS Ch 3, Ch 10; (8)</td>
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<td>5</td>
<td>Oct 1</td>
<td>Image structure</td>
<td>VS Ch 4; (9-10)</td>
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<td>6</td>
<td>Oct 8</td>
<td>Depth</td>
<td>VS Ch 5; (11, 12)</td>
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<td>7</td>
<td>Oct 15</td>
<td>Dorsal vs. ventral streams</td>
<td>(13-16)</td>
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<tr>
<td>8</td>
<td>Oct 22</td>
<td>No class (SfN)</td>
<td>mid-term exam due</td>
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<tr>
<td>9</td>
<td>Oct 29</td>
<td>Perceptual organization</td>
<td>VS Ch 6; (17-18)</td>
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<td>10</td>
<td>Nov 5</td>
<td>Object properties and shape</td>
<td>VS Ch 7, Ch 8; (19-20, 21^)</td>
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<td>11</td>
<td>Nov 12</td>
<td>Function and category</td>
<td>VS Ch 9; (22-23, 24^)</td>
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<td>12</td>
<td>Nov 19</td>
<td>Attention &amp; Awareness</td>
<td>VS Ch 11, Ch13; (25, 26^)</td>
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<tr>
<td>13</td>
<td>Nov 26</td>
<td>Crowding</td>
<td>(27-29) [or another topic]</td>
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<td>14</td>
<td>Dec 3</td>
<td>Memory &amp; Imagery</td>
<td>VS Ch 12; (30-32)</td>
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<tr>
<td>15</td>
<td>Dec 10</td>
<td>Final exam due</td>
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Reading List  (^: optional supplementary papers)