Classic Papers in Neuroscience:
A selection of major discoveries and their impact
Elective Graduate Seminar

Prof. Yadin Dudai, CNS

The course will present and discuss a selection of pioneering experimental papers that became classics in neuroscience. These papers sample a spectrum of topics, methods and levels of analysis. We will discuss the roots and rationale of the work, the results and their meaning, the extent to which these results withstood the test of time, and the long-term impact on the field of neuroscience. Additional papers or reviews reflecting subsequent developments in the field will also be mentioned in each case. We will also try to determine what makes a paper a "classic".

The course is intended to promote understanding of the conceptual and methodological framework in which major chapters in current neuroscience are embedded, and the development of a selection of current research questions and experimental approaches.

Papers to be discussed (listed in alphabetical order):

1. Bliss TVP, Lomo T (1973). Long-lasting potentiation of synaptic transmission in the dentate area of the anaesthetized rabbit following stimulation of the perforant path. *J Physiol (London)* 232, 331-356.
2. Castellucci V, Pinsker H, Kupfermann I, Kandel ER (1970). Neuronal mechanisms of habituation and dishabituation of the gill-withdrawal reflex in *Aplysia*. *Science* 167, 1745-1748.
3. Georgopoulos AP, Schwartz AB, Kettner RE (1986). Neuronal population coding of movement direction. *Science* 233, 1416-1419.
4. Konopka RJ, Benzer S (1971). Clock mutants of *Drosophila melanogaster*. *Proc Natl Acad Sci USA* 68, 2112-2116.
5. Kwang KK, Bellvieau JW, Chesker DA, Goldberg IE, et al. (1992). Dynamic magnetic resonance imaging of human brain activity during primary sensory stimulation. *Proc Nat Acad Sci USA* 89, 6575-5679.
6. Lettvin JY, Maturana HR, McCulloch WS, Pitts WH (1959). What the frog's eye tells the frog's brain. *Proc. Inst. Radio Engr* 47 , 1940-1951.
7. Newsome WT, Britten KH, Movshon JA (1989). Neuronal correlates of a perceptual decision. *Nature* 341, 52-54.
8. O'Keefe J, Dostrovsky J (1971). The hippocampus as a spatial map. Preliminary evidence from unit activity in the freely-moving rat. *Brain Res* 34, 171-175.
9. Olds J, Disterhoft JF, Segal, M, Kornblith CL, Hirsh R (1972). Learning centers of rat brain mapped by measuring latencies of conditioned unit responses. 1972/3/1 Neurophysiol 35: 202-219.

10. Phillips RG, LeDoux JE (1992). Contribution of amygdala and hippocampus to cued and contextual fear conditioning. *Behav Neurosci* 106, 274-285.
11. Scoville WB, Milner B (1957). Loss of recent memory after bilateral hippocampal lesions. *J Neurol Neurosurg Psychiat* 20, 11-21.
12. Sperling G (1960). The information available in brief visual presentations. *Psychol Monog: General and Applied*, 74 (11) 1-29.

Assessment: The final project will require the student to select a paper not in the course's list, do a literature search and describe whether that paper stood the test of time and why/why not, or. alternatively, why this paper is not yet a classic but likely turn out to be so.

Time and Location: Tuesday, 10:00-12:00, Meyer 307. The seminar will start on February 13, 2018.

Prerequisites: Elements of Cellular, Molecular, Systems and Behavioral Neuroscience; basic terms and concepts will, however, be explained so that we are all on the same page.

Course enrollment cap: 10