

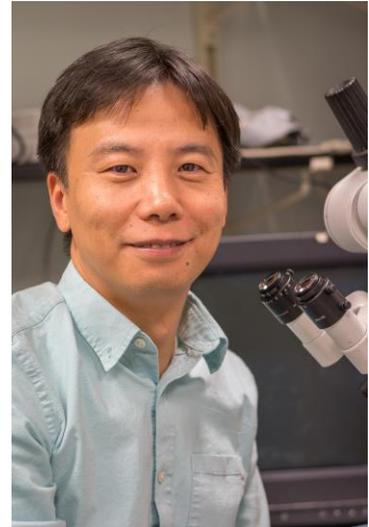
NESC-3XXX: NEUROSCIENCE THROUGH THE NOBELS

Professor Jianhua “JC” Cang, to be offered in Spring, 2019

Jefferson Scholars Professor of Neuroscience/Biology/Psychology

Prerequisite: Psych-2200 or Biol-3050; 2 lectures per week, 3 credits

This course will introduce students to many of the Nobel-winning discoveries that have profoundly shaped our understanding of the nervous system. We will explore the original experimental basis for these discoveries that are now considered textbook knowledge. We will also learn about the Nobel laureates who made the discoveries, the origins of the questions they addressed, and how their discoveries influenced later studies. This course will enable students to acquire a deeper understanding of fundamental principles in Neuroscience, to familiarize with various research techniques, and to develop a sense of history of Neuroscience research.



Tentative list of topics:

- Introduction : Neuroscience before Nobel Prizes

Basics and early days

- Golgi and Cajal (1906), structure of the nervous system
- Sherrington and Adrian (1932), function of neurons
- Dale and Loewi (1936), chemical transmission of nerve impulses

Cellular and molecular

- Eccles, Hodgkin and Huxley (1963), ionic mechanisms of the nerve cell membrane
- Katz (1970, shared with von Euler and Axelrod), neurotransmitters release
- Cohen and Levi-Montalcini (1986), discoveries of nerve growth factors
- Carlsson, Greengard and Kandel (2000), signal transduction in the nervous system
- Südhof (2014, shared with Rothman and Schekman), machinery regulating vesicle traffic

Systems and behavior

- Granit, Hartline and Wald (1967), physiological and chemical visual processes in the eye
- Sperry (1981), functional specialization of the cerebral hemispheres
Hubel and Wiesel (1981), information processing in the visual system
- Axel and Buck (2004), odorant receptors and the organization of the olfactory system
- O'Keefe, Moser and Moser (2014), place cells and grid cells
- Hall, Rosbash and Young (2017) molecular mechanisms controlling the circadian rhythm

Techniques:

- Neher and Sakmann (1991), function of single ion channels in cells
- Shimomura, Chalfie and Tsien (2008), green fluorescent protein
- Optogenetics (20??, Zeman, Miesenböck, Deisseroth, Boyden???)

Controversy!

- Egas Moniz (1949, shared with Walter Rudolf Hess), leucotomy in certain psychoses!



NESC-3XXX: Developmental Neurobiology

Xiaorong Liu, Asst. Professor of Biology & Psychology

Planned for: Fall 2018

3 credits, 2 lectures/week

Time: TBA

Instructor: Xiaorong Liu

Prerequisite: Psyc-2200 or Biol-3050.

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Course Description:

The diverse functions of the nervous system depend on precise wiring of connections between neurons. This course will cover cellular and molecular processes of how neuronal connections are established during development, especially the role of activity- and experience-dependent plasticity in postnatal development. Diseases, which result from failing to establish the circuitry in early development as well as to maintain the system with aging, will also be discussed. This course will introduce research methods and technology, and encourage students to develop skills to appreciate historical context and logical rationale of contemporary research.