

NEUROSCIENCE

Neuroscience unites the natural science and social science disciplines of biology, chemistry, and psychology in a quest for understanding the nervous system and answering the elusive and alluring question of how the brain works.

In the interdisciplinary area in neuroscience, students and professors from different disciplines come together to examine the functioning of the brain.

If you are interested in medicine, veterinary science, nursing, graduate study in neuroscience, or biological aspects of psychology, the study of neuroscience will assist you in exploring this vital topic in a systematic and comprehensive way.

While neuroscience is not a major, completion of the requirements for this interdisciplinary area will be noted on your Lawrence transcript.

CURRICULUM

You will complete a core sequence of courses, representing each of the three relevant disciplines: *Principles of Biology*, *General Zoology*, and *Comparative Physiology* from the biology department; *Principles of Chemistry* in the chemistry department; and the two *Brain and Behavior* courses offered by the psychology department. You will select at least one more course outside your major from a long list of related courses.

To complete the interdisciplinary area, you will enroll in the advanced-level *Topics in Neuroscience*, in which psychology professor Bruce Hetzler, biology professors Bradford Rence and Nancy Wall, and anthropology professor Mark Jenike present a synthesis of the perspectives of their disciplines on the nervous system. In addition to faculty presentations, each student in the course gives one or more lectures.

Because the subject matter of *Topics in Neuroscience* changes from year to year – covering such material as the role of nitric oxide in the brain, the emerging functions of glial cells, neural development, brain evolution, alcohol and the brain, and chemical aspects of mental illness – you may repeat the course for credit.

RESEARCH

Laboratory experimentation is a vital component of the interdisciplinary area in neuroscience. As a participant in the program, you may either join a faculty member's research project or conduct your own independent project.

Recent independent student research projects include Brenda Allwardt, '91 "Nickel Chloride Axonal Filling of Neural Tracts Projecting from the Optic Lobes of the Cricket, *Teleogryllus commodus*," Elizabeth Martin, ('03 graduate with Honors in Independent Study, Summa Cum Laude), "Ethanol and nicotine interactions in the central nervous system, as measured by flash evoked potentials recorded from the visual cortex and superior colliculus of hooded rats."

Among the faculty research in which students have participated are: Professor Bruce Hetzler's studies examining the effects of a variety of drugs on photic-evoking potentials (a type of brainwave) of rats, which have appeared in *Pharmacology*, *Biochemistry and Behavior*, *Alcohol*, and *Neurotoxicology and Teratology*. Professor Hetzler's most recent work involves the effects of mecamylamine (a selective nicotine receptor antagonist) on evoked potentials in the rat visual system.

Professor Bradford Rence has worked with students studying the role of ocelli in circadian singing rhythms of crickets, which appeared in *Physiological Entomology*.

Other faculty members with related interests include Professor Beth DeStasio's NIH-funded study of muscle development in a nematode worm and Professor Nancy Wall's work on the role of patterning genes in neural development of vertebrates.

FACILITIES

You will benefit from a wide range of laboratory facilities, including a fully computerized simulation and physiology laboratory, equipment for electro-physiological recording (single cell microelectrode and patch clamp, EEG, evoked potentials), shielded recording rooms, gas and high-performance liquid chromatographs, a microscopy facility for studying neuronal anatomy and fluorescence neurochemistry, and full cell culture facilities for monitoring neural development and full imaging facilities for their visualization.

In the 2000-2001 academic year, Lawrence opened a new \$18 million molecular science building. In addition, fall 2001 marked the completed renovation of Youngchild Hall which houses the neuroscience laboratories.

AFTER LAWRENCE

Roger Nicoll '63 is professor of pharmacology and physiology at the University of California, San Francisco. Considered one of the country's leading scientists in the field of neurobiology, he is actively researching how the brain learns, transmits, and stores knowledge. He has written nearly 150 articles on his research and serves on the editorial board of *Science* magazine. In 1994, he was elected to the National Academy of Sciences, which is one of the highest individual honors an American scientist can receive.

Brenda Allwardt '91 recently completed her Ph.D. in Neuroscience at Harvard and is currently employed by Finnegan, Henderson, Farabow, Garrett, and Dunner, L.L.P. an intellectual property rights law firm in Washington D.C.

Angela Bauer-Dantoin received a Ph.D. from Northwestern University, and is a professor at the University of Wisconsin-Green Bay.

FACULTY

Bruce Hetzler, professor of psychology
DePauw University, B.A.;
Northwestern University, M.A.,
Ph.D.

Interests: neuropharmacology,
effects of alcohol on the brain,
computer analysis of brain waves

Mark R. Jenike, associate
professor of anthropology
Harvard College, B.A.;
UCLA, M.A., Ph. D.

Interests: human and non-human
primate brain evolution

Bradford G. Rence, professor of
biology
University of Iowa, B.A.;
University of California, Berkeley,
Ph.D.

Interests: neurobiology of
invertebrates, behavioral rhythms

Nancy A. Wall, associate
professor of biology
Presbyterian College, B.S.;
University of South Carolina, M.A.;
Vanderbilt University, Ph.D.

Interests: embryonic pattern
formation, cellular differentiation,
neural development