

Bio U545/G245
Neuroethology

Mechanisms of Animal Behavior

Instructor: Joseph Ayers

<http://www.neurotechnology.neu.edu/ayers.html>

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Key Numbers: BIOU545 #00224, BIOG245 #

Neuroethology attempts to explain simple behavior in terms of the properties and connections of central neural networks. The present course will explore such mechanisms in both a field and laboratory context in representative marine invertebrates and lower vertebrates. The laboratory work will emphasize techniques of quantification of behavior by observation, stop-frame video analysis and electrophysiological techniques. A term paper will involve a review of the behavior and neural mechanisms of a marine animal model system.

Week.	Date	Topic
1	Sept 16	Types of Animal Behaviors
2	23	Anatomical Substrates of Behavior
3	30	Cell Biology of Neurons Membrane, Action and Slow Potentials
4	Oct 7	Nerve Networks Synaptic Transmission and Integration
5	14	Central Pattern Generators
6	21	Command and Coordinating Systems
7	28	Sensory Systems Sense Organs, Sensory Integration
8	Nov 4	Types of Motor Systems I Walking, Swimming and Flying Midterm Exam
9	11	Veterans Day: No Class
10	18	Types of Motor Systems II Escape, Molluscan and Crustacean Feeding
11	25	Sensory-Motor Integration Proprioceptive Reflexes, Balance
12	Dec 2	Exteroceptive Reflexes and Navigation Taxes, Kineses, Investigation
13	Dec 9	Behavioral Choice and Sequencing Pleurobranchia Hierarchies, Leech Feeding, Agonistic Behavior

Textbook: Reprint Collection to be distributed on Blackboard

Grading:			
	Midterm	Nov 4	30%
	Term Paper	Due Dec 9	30%
	Final Examination	Around Dec 10	40%

Undergrad Key 00244 Grad Key #

Bio U546/G246
Neuroethology Laboratory

Key Numbers: BIOU545 #, BIOG245 #

Neuroethology Laboratory introduces quantitative techniques for the analysis of the behavior of invertebrates and lower vertebrates. Techniques include identified organisms, neuroanatomy, ethograms, video analysis of behavior, kinematic analysis, analysis of lesion-based deficits and correlated analysis of electrophysiology and behavior.

Week.	Date	Laboratory
1	Sept 16	Social Learning in Honeybees
2	23	Ladder like Chains, Methylene Blue, HRP, Cobalt,
3	30	Lobster and Crayfish Ethograms
4	Oct 7	Video Ethograms
5	14	Electronic Neuron CPGs Motor Program Analysis
6	21	Kinematic Analysis of Behavior
7	28	Lobster Chemoreception
8	Nov 4	Lobster Limb Coordination
9	11	Veterans Day: No Class
10	18	Escape and Defensive Behavior in Crayfish and Lobsters
11	25	Crawfish Interneurons Lobster Righting Reflexes
12	Dec 2	Lobster Cam Finite State Analysis of Behavior
13	Dec 9	Fixed Action Patterns in Siamese Fighting Fish

Protocols:

Detailed protocols for all experiments and associated reprints will be provided on Blackboard

Grading:

Lab Notebook

Due Dec 9