Teaching Biological Physics

Wednesday, Jan 28, 2004 10:00 - 11:30 AM

a) An Interdisciplinary Graduate Laboratory for Biological Physics

Raymond E. Goldstein, Univ. of Arizona

This course is taken by students majoring in biology, physics, mathematics and Applied Mathematics. It is run as a graduate level laboratory course. Topics include biological fluid dynamics, brownian motion, electrophysiology, non-linear dynamics and pattern formation, microscopy and micromanipulation, and general analysis techniques such as Fourier analysis, filtering, data acquisition and imaging.

b) An Intermediate Level Course in Biological Physics

Philip Nelson, Univ. of Pennsylvania

The profound changes in biology imply that life sciences students need a stronger background in physics, chemistry and mathematics. Freshman physics is a prerequisite for this course. The relationship between observation and mathematical description and modelling is emphasized. In order to make room for such a course in an already overcrowded roster is to identify the most boring course you offer, and eliminate it.

Topics include energy, order, and life; what cells do; heat and heat transfer; random walks; low Reynolds number flows; entropy, order, and free energy; entropic forces; chemical forces; macromolecules as physical objects; chemical and mechano-chemical machines; nerve impulses; emergence.

c) Mechanics of the Cell

David Boal, Simon Fraser Univ

This is a fourth-year or graduate course. The same rigour is applied as that expected of physics majors. Topics include soft materials of the cell, the mathematics of strings and sheets, cell mechanics, and the evolution of the cell.