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"Physical Concepts in Cell Biology," an upper level interdisciplinary course in cell biophysics/mathematical biology DIMITRIOS VAVYLONIS, Department of Physics. Lehigh University — I will describe my experience in developing an interdisciplinary biophysics course addressed to students at the upper undergraduate and graduate level, in collaboration with colleagues in physics and biology. The students had a background in physics, biology and engineering, and for many the course was their first exposure to interdisciplinary topics. The course did not depend on a formal knowledge of equilibrium statistical mechanics. Instead, the approach was based on dynamics. I used diffusion as a universal "long time" law to illustrate scaling concepts. The importance of statistics and proper counting of states/paths was introduced by calculating the maximum accuracy with which bacteria can measure the concentration of diffuse chemicals. The use of quantitative concepts and methods was introduced through specific biological examples, focusing on model organisms and extremes at the cell level. Examples included microtubule dynamic instability, the search and capture model, molecular motor cooperativity in muscle cells, mitotic spindle oscillations in *C. elegans*, polymerization forces and propulsion of pathogenic bacteria, Brownian ratchets, bacterial cell division and MinD oscillations.

Dimitrios Vavylonis
Department of Physics, Lehigh University

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