“The behaviors and evolution of cells are encoded in the physical chemistry of its proteome”

Wednesday
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3:00 pm
Wu and Chen Auditorium-Levine Hall

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Abstract
Some behaviors of biological cells are less a consequence of specific biology — some particular gene or protein or pathway — and more a consequence of the physical properties of the whole proteome. For example, we find that the growth rate of bacteria as a function of temperature is a matter of the denaturation of its proteins, and the growth rate vs. salt is a matter of the diffusion speeds of proteins inside the cell. The cell has built a complex and energy-expensive machinery to keep its proteins folded and disaggregated. Simple physical models can give insights into these mechanisms and their evolution.

Bio
Kenneth Dill is the Louis and Beatrice Laufer Professor of Physics and Chemistry at Stony Brook University and the Director of the Laufer Center for Physical and Quantitative Biology. Previously, he was on the faculty of the University of California, San Francisco. Dill received SB and SM degrees from MIT in Mechanical Engineering, a PhD in Biology at the University of California, San Diego, and did postdoctoral research in Chemistry at Stanford University. He received the Hans Neurath Award in 1998 from the Protein Society, for his research on structures, properties and folding of proteins. He has been president of the Biophysical Society, and is a member of the National Academy of Sciences and the American Academy of Arts and Sciences. With Sarina Bromberg, he co-authored Molecular Driving Forces, a textbook in physical chemistry and statistical mechanics. His research interests are at the intersection of statistical physics and cell biophysics and structural biology.

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