DREXEL UNIVERSITY
Materials Science and Engineering
College of Engineering

Department of Materials Science and Engineering
Winter Seminar Series

3:00 PM, Wednesday, February 10
PISB 104

"Cellular Protein Dynamics: Signaling Pathways and Protein Aggregation"

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Abstract:
After brief comments on protein and amyloid materials from the material science perspective, we will focus on two areas of research that we have worked in biophysics. Signaling transduction pathways play important roles in regulating cell functions, such as growth, differentiation, and apoptosis. Abnormal regulations of the enzymes associated with these pathways are often related to diseases. For the systems biology point of view we have studied signaling pathways related to cancers and diabetes using time-dependent sensitivity analysis and ranked the most vulnerable nodes of these pathways. On the other hand, the protein environments inside the cells are often very crowded due to the presence of other proteins, DNA, lipids, etc. This crowdedness affects profoundly the properties of proteins. This can be understood based on the concept of entropic forces. From this point of view, we have investigated how the stabilities of the proteins and rates of reactions, such as aggregation, are affected by the presence of crowders.

Dr. Yuan:

Jian -Min Yuan is a professor in the department of Physics at Drexel University. He received a Ph.D. from the University of Chicago in 1973 and was an NWO fellow at University of Utrecht, the Netherland. He is an Honorary Professor at Hunan Normal University, Changsa, China, and a visitor at University of Science and Technology of China, Hefei, Lanzhou University, Sun Yat-Sen University, Guangzhou, Jilin University, Beijing Normal University. Dr. Yuan was elected a Fellow of American Physical Society in 1998 and is a member of American Chemical Society, Biophysical Society, and Sigma Xi. He was a co-organizer of several international conferences and workshops on chaos and quantum chaos and a co-editor of Quantum Nonintegrability, 'Directions in Chaos', Volume IV (World Scientific, Singapore, 1992) and Quantum Dynamics of Chaotic Systems (Gordon and Breach, 1993). He served on the Editorial Advisory Board of International Journal of Physics, Group Theory, and Nonlinear Dynamics. His research interests include biophysics, protein folding/unfolding, protein aggregation, cellular signaling pathways, stochastic dynamics; chemical physics, reaction dyanmics, nonlinear dynamics, interaction of radiation with matter.

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