

# Physical Chemistry Seminar

Tuesday,  
February 9, 2016

11:00 am

Room 1315  
Chemistry Building

## ***Internal friction and charge expansion in intrinsically disordered proteins of the Calcitonin family***



Professor Sara Vaiana  
*Department of Physics*  
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Host: Silvia Cavagnero

Intrinsically disordered proteins (IDPs) are a recently discovered class of proteins which lack a unique three dimensional structure in solution, yet carry out important biological functions. The rate at which IDPs undergo large conformational changes in solution is expected to substantially affect their function. The roughness in the energy landscape of IDPs can significantly slow down this diffusional dynamics, giving rise to internal friction. Both experiments and simulations of unfolded states of proteins show that compact states exhibit greater internal friction than denaturant-expanded states. Yet it is unclear to what extent, and in which way, changes in a protein sequence may affect the internal friction. Using a nanosecond laser-pump spectroscopy technique we quantify the rate at which two ends of a polypeptide chain come into contact, while also quantifying the relative end-to-end distance (or compactness) of the chain. I will discuss our recent findings comparing IDPs of the Calcitonin peptide (Ct) family. These IDPs carry out important hormone functions (regulating glucose levels in the blood, calcium resorption in the bone, vasodilation and the transmission of pain signals) and include amylin, the amyloid protein involved in type 2 diabetes. Our experiments reveal that electrostatic interactions can have dramatic effects not only on the structure but also on the diffusional dynamics of IDPs, regardless of compaction.

Refreshments will be available prior to the seminar at 10:45 a.m. outside room 1315

Graduate Students can meet with the speaker in Room 8305F at 1:00 pm