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**John H. Dillon Medal Talk: Protein Fibrils, Polymer Physics: Encounter at the Nanoscale**

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Aggregation of proteins is central to many aspects of daily life, ranging from blood coagulation, to eye cataract formation disease, food processing, or neurodegenerative infections. In particular, the physical mechanisms responsible for amyloidosis, the irreversible fibril formation of various proteins implicated in protein misfolding disorders such as Alzheimer, Creutzfeldt-Jakob or Huntington's diseases, have not yet been fully elucidated. In this talk I will discuss how polymer physics and colloidal science concepts can be used to reveal very useful information on the formation, structure and properties of amyloid protein fibrils. I will discuss their physical properties at various length scales, from their collective liquid crystalline behavior in solution to their structural features at the single molecule length scale and show how polymer science notions can shed a new light on these interesting systems. 1) "Understanding amyloid aggregation by statistical analysis of atomic force microscopy images" J. Adamcik, J.-M. Jung, J. Flakowski, P. De Los Rios, G. Dietler and R. Mezzenga, Nature nanotechnology, 5, 423 (2010)