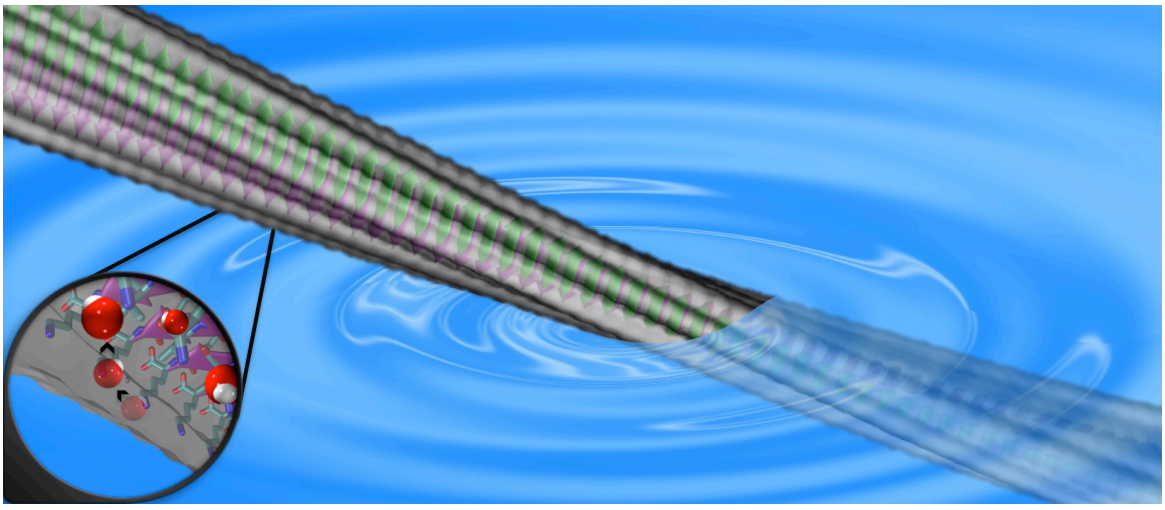
PhD project in Biophysics (Grenoble, France)

Dynamics of protein aggregates and fibers

Alongside their native, functional structure, proteins tend to adopt alternative misfolded configurations, including aggregates and amyloid fibers. Whereas the structure and dynamics of native, correctly-folded proteins are well studied and understood, the molecular properties of protein aggregates and fibers are largely unknown. This project aims at obtaining dynamical insights into protein aggregates and fibers by using neutron spectroscopy in combination with MD simulations, SAXS, X-ray diffraction, electron microscopy, FTIR, and CD spectroscopy. The proteins studied will include *tau* (involved in Alzheimer disease) and *γ-crystallin* (involved in human cataract). We have recently shown that the formation of amyloid fibers by the intrinsically disordered protein tau alters the mobility of water molecules on the protein surface [1, 2]. The increased water mobility might serve as a basis for diagnosis of Alzheimer disease. This PhD project is in collaboration with Prof. D. Tobias (UC Irvine, USA).

[1] Fichou, Y, Schiro, G, Gallat, FX, Laguri, C, Moulin, M, Combet, J, Zamponi, M, Härtlein, M, Picart, C, Mossou E., Lortat-Jacob, H, Colletier, JP, Tobias, DJ & Weik, M. (2015) Hydration water mobility is enhanced around tau amyloid fibers. ***PNAS*** in the press.

[2] Schiro, G, Fichou, Y, Gallat, FX, Wood, K, Gabel, F, Moulin, M, Härtlein, M, Heyden, M, Colletier, JP, Orecchini, A, Paciaroni, A, Wuttke, J, Tobias, D & Weik, M. (2015) Translational diffusion of hydration water correlates with functional motions in both folded and intrinsically disordered proteins. ***Nat Commun*** 6: 6490.



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