Title:

“What we know and don't know about water in and around microtubules and why it is important to understand the dynamics of the aqueous cellular environment of microtubules"

Abstract:

Microtubules are cylindrical protein polymers composed of tubulin heterodimers. They play very important roles in all eukaryotic cells, in particular in material transport, structural integrity and stability of the cell as well as cell division. Due to their unusual electrostatic properties, they have been studied recently regarding their frequency-dependent electrical conductive and capacitative properties, which include strong dependence on ionic concentration and pH of the solution. Most astonishing is their hysteretic behaviour, which indicates involvement of memristive type of conduction. Finally, delayed luminescence experiments with microtubules and laser light present a major puzzle that may lead to quantum phenomena playing a role in these important biological structures. I will discuss the significance of these results and why water may be strongly involved in the biophysics of microtubules.