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Abstract for an Invited Paper  
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### **Dynamics and mechanism of ultrafast water-protein interactions**

DONGPING ZHONG<sup>1</sup>, Ohio State Univ - Columbus

Protein hydration is essential to protein stability, flexibility, dynamics and function. We have used a tryptophan scan with femtosecond spectroscopy to probe global surface water dynamics and characterize the coupled interactions of water and proteins. With extensive temperature-dependent studies, we found that water plays the dominant role to drive relaxation on the picosecond time scales. By measuring both water and protein relaxations, it shows that hydration water drives local protein fluctuations, a clear beta-relaxation, and such results are significant for the understanding of protein dynamics and functions.

<sup>1</sup>This is an invited speaker.