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Abstract for an Invited Paper
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Water in nanoconfined spaces: from superhydrophobicity to Janus interfaces to curved hydrophobes

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The talk will review our theoretical and molecular simulation works that predict and elucidate thermodynamic driving forces and kinetic factors pertinent to nanoconfined water. Retrieval of superhydrophobicity on nanostructured surfaces will be one example. We will discuss a new mechanism for water mediated (Laplace) attraction between solutes with contrasting polarities (Janus interfaces) that can play an important role by enabling adhesion between polar and nonpolar particles in both, biophysical systems and heterogeneous nanomaterials. Other examples will show how macroscopic thermodynamics remarkably works down to molecular lengthscales. We will elucidate why water-induced interaction between curved hydrocarbon surfaces can be repulsive.