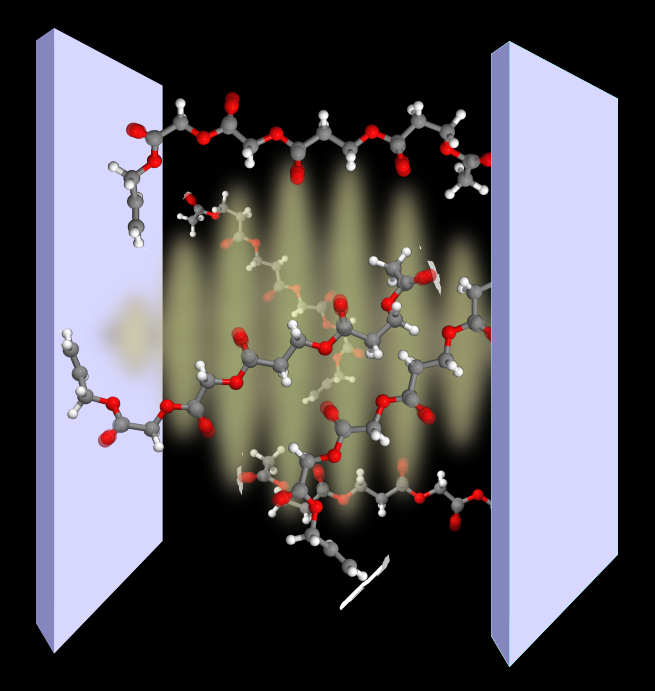
**Polariton chemistry: molecules in optical cavities**

Joel Yuen-Zhou, Associate Professor, University of California San Diego

The strong coupling of ensembles of molecular transitions with confined electromagnetic fields in optical microcavities gives rise to molecular polaritons, hybrid light-matter quasiparticles. Can strong coupling fundamentally alter the chemical properties of matter? [1] In this talk, I’ll showcase some of these opportunities that we have been theoretically (and, together with our experimental collaborators) exploring in the past few years. I will briefly summarize the relevant time and energy scales associated with molecular polaritons [1]. Next, I will proceed to discuss the theoretical challenges to understand thermally-activated chemical reactions under vibrational strong coupling [2-3] and present a possible resolution for these problems involving polariton condensates [4]. I will conclude by showing how polariton-assisted remote-energy transfer (PARET) can give rise to intriguing new concepts such as remote control of chemical reactions [5-7].



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