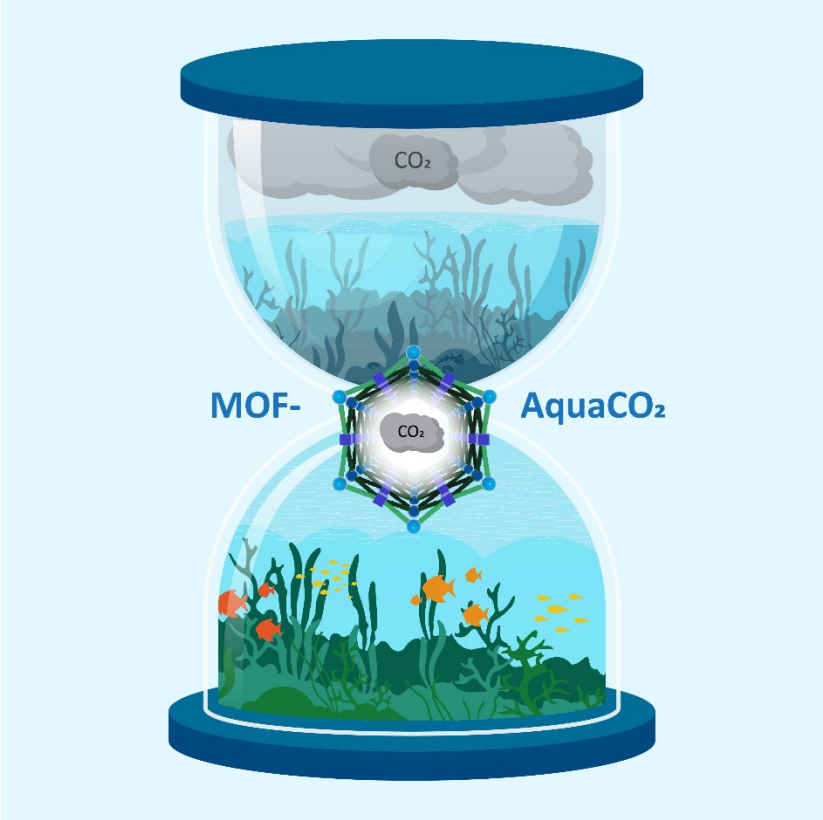
Abstract for General Public

The disruption of natural rhythms in aquatic ecosystems, can have profound consequences for environment. Ocean acidification, driven by increasing industrial carbon dioxide **(CO_2) emissions** has recently become a significant threat to the rhythmic balance of global aquatic ecosystems. As atmospheric CO_2 dissolves in seawater, it lowers the pH by altering hydrogen ion concentrations, thus, disrupting marine life cycles.



The proposed **MOF-AquaCO_2** project aims to address ocean acidification through the development of innovative sorbents for selective and efficient removal of dissolved CO_2 from water. We aim to fundamentally study the targeted synthesis of unique sorbents – metal-organic frameworks (MOFs) and their ability for CO_2 capture from water. These porous materials are composed of metal nodes and organic linkers and are very tunable. Here, we will synthesize different types of MOFs by precisely tuning their chemical composition. We will dive into unknown interactions of MOF with water and different carbonic species, and will study the possibility to selectively adsorb CO_2 from both model and real-world aqueous systems. We will print 3D composites based on our MOF sorbents to make them even more efficient and robust. The project will give a foundational understanding of design, synthesis, modification and characterization of MOF materials specifically for capture of dissolved CO_2 from water. All in all, a library of water-stable MOFs and their composites that are efficient sorbents of dissolved CO_2 will be established. It will provide a toolbox of MOF sorbents and composites to address the global issue of ocean acidification