



## **Extracellular polymeric substances (EPS) – versatile biological interfaces with the physical world**

Dani Or

ETH Zurich, IBP, Dept. Environmental Systems Science, Zurich, Switzerland (dani.or@env.ethz.ch)

Soil bacterial cells are often embedded in biosynthesized extracellular polymeric substances (EPS) forming aggregates or sessile colonies attached to surfaces. This aggregation and pooling of resources offer a successful adaptation to the extreme and highly dynamic hydration and nutrient availability conditions in soil. Cell proximity in such engineered environment facilitates cell-cell interactions and metabolic exchanges. The ubiquity of EPS across diverse environmental conditions and habitats reflects the many functions that EPS provide in environmental adaptation and interfacing, from colony architecture and anchoring, to nutrient entrapment, and maintenance of favorable hydration conditions. The hydro-physical properties of EPS and its primary constituent, exopolysaccharides, makes EPS a universal interface between living cells and their harsh environment. We will discuss mechanical and hydraulic properties of EPS that confer advantages to embedded bacterial cells across a wide range of conditions. The incorporation of even minute amounts of EPS may significantly alter the hydrological and mechanical properties of soil, giving rise to aggregation and other favorable structural changes.