Chemical Engineering

Strano Research Group Presents:

INORGANIC CARBON FIXATION: WHAT CAN WE LEARN FROM ALGAL PHOTOSYNTHESIS?

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66-110

With rising concerns about increasing atmospheric CO2 levels and food and energy security, it is becoming urgent to understand carbon capture by photosynthetic organisms and to develop efficient, cost-effective technologies to sequester carbon. On Earth, photosynthesis transforms into biomass, 20 times more CO2 than what human activities are rejecting annually, and microalgae represent 50% of our planet's photosynthesis. The high efficiency of microalgal photosynthesis relies on (i) mechanisms actively concentrating CO2 at the vicinity of the CO2-fixing enzyme Rubisco and a (ii) spatial coordination of energy production by photosynthesis and energy usage by CO2 fixation. In this talk, we will explore the molecular mechanisms behind efficient photosynthesis in microalgae and quantify the bioenergetics of CO2 fixation. We will discuss how understanding the molecular mechanisms involved enables us to propose new photosynthesis designs capable of fixing more CO2 and increasing the productivity of different plant species.