

Talk Title: Photoferrotrophy and the evolution of Earth Surface Chemistry and Life

Abstract:

Photoferrotrophic bacteria harness energy from sunlight to fix inorganic carbon into biomass while oxidizing ferrous iron. They therefore populate illuminated, iron-rich (ferruginous) environments where they contribute to biogeochemical cycling of carbon, iron and many other elements. Though rare on Earth today, ferruginous conditions were the hallmark of the low oxygen oceans of the Precambrian eons. Photoferrotrophs likely populated these early ferruginous oceans contributing to primary production and supporting the Precambrian biosphere. Emerging insight from modern photoferrotrophic bacteria suggests that Precambrian photoferrotrophs could have played a critical role in the evolution of atmospheric chemistry and life over billions of years of Earth's early history. This seminar will highlight these recent advances and present a new model for the maintenance of low oxygen in Earth's atmosphere throughout much of the Precambrian eons.