

## Abstract:

Anoxygenic phototrophic bacteria, such as *Rhodobacter sphaeroides*, capture energy from light without generating oxygen from water. A proton gradient is established across the membrane using only one photosystem and cyclic electron flow. Anoxygenic phototrophy, therefore, provides a unique opportunity to study carbon assimilation independently from energy metabolism. In this seminar, using propionate as an example, it will be delineated how *Rhodobacter sphaeroides* makes efficient use of its carbon source and incorporates all three carbons into cell constituents during anaerobic growth in the light. For redox balance, CO<sub>2</sub> has to be co-assimilated and photoheterotrophic growth with propionate is predicted to require an operational Calvin-Benson-Bassham cycle. Propionyl-CoA is not only an intermediate during growth with propionate but also during assimilation of acetate, 3-hydroxypropionate, and some amino acids, such as isoleucine. Because propionyl-CoA can be toxic to the cell the assimilation of this intermediate, via the methylmalonyl-CoA pathway, has to be tightly controlled.