In this thesis, you will be challenged to carry out field work in the Scheldt estuary. You will have a unique opportunity to work on a novel, promising and internationally recognized method to measure primary production in aquatic systems. At the end of the thesis, the student will be prepared for both experimental and theoretical future research.

Primary production in oceans, estuaries, coasts and fjords is of great importance to life on earth. It is essential for providing the planet's atmosphere with oxygen. Ocean phytoplankton, while representing only one percent of the total photosynthetic biomass on Earth, is responsible for approximately half of the net primary production worldwide. Further, by assimilating carbon in its biomass, phytoplankton removes carbon dioxide from the atmosphere and consequently plays important role in the global carbon cycle. Measuring and monitoring primary production in tidal systems (estuaries, fjords and coasts) is not an easy task. Indeed, those environments are highly dynamic: tidal currents move the water masses up and down the ecosystem, which also lead to highly variable turbidity of the water column due to settling and resuspension of sediments. As a result the amount of light that can intrude in the water column is very variable.

Over the last years, a new technique has been developed at the Ecosystem Management Research Group. The so-called Fourier Method derives primary production from high resolution time series of oxygen. The method has been demonstrated to work in well mixed system, and provides a good estimate of primary production on a time scale of ~15 days. More recent theoretical insights show potential improvements by combining multiple sensors over depth (when the water column is not always perfectly mixed) and along longitudinal gradients.

**Practical Info:** In this thesis project you will perform at least 2 measurements campaigns in the Scheldt estuary. One campaign will involve the deployment of multiple oxygen sensors over depth, in another campaign you will deploy multiple sensors along the longitudinal. You will test the refined method by comparing with other data that is available from standard monitoring. Data analysis will be performed in R.