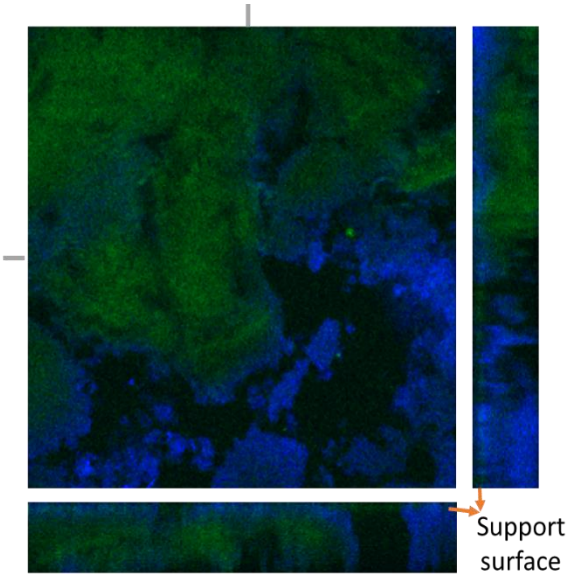
Anaerobic Extracellular Polymeric Substances (EPS) Application as new separation technology

Field: Environmental and/or engineering/biotechnology
Type of project: Thesis
Duration: 6-9 months, starting in May/June 2019
Location: Wetsus, European Centre of Excellence for Sustainable Water Technology, Leeuwarden (The Netherlands)
Allowance: 350 €/month

1. Project description

Membrane separation technologies has widely been used in waste water treatment "to improve degradation of compounds and prevent the washout of biomass. However this advantages are somewhat masked by recurrent fouling problems of the membranes. The fouling is commonly seen as drawback we see it as an opportunity. The fouling of the membrane is partially due to the deposition of EPS on the membrane surface. The EPS are a complex mixture of biological polymers like polysaccharides and proteins that are excreted by the microorganisms. Studies with aerobic membrane bioreactors have shown that gelling agents like polysaccharides with a high molecular weight can develop a "secondary" membrane that dictates the filtration performance, increasing the retention of particles and soluble compounds.
We are interested to study the formation of such secondary membrane and it`s filtration/structure properties using anaerobic EPS and dead-end filtration systems.

Orthogonal view of the stained EPS layer using confocal microscopy



2. Your tasks

- Operation of dead-end filtration systems, understanding filtration flux profiles;
- Visualization and structure characterization of the EPS layers (Confocal layer scanning microscopy and Optical coherence tomography)
- Characterize the performance of the EPS layers in terms of compounds separation

3. Your profile

- Specializing in environmental engineering, water bio/technology or related fields
- Actively enrolled in undergraduate (BSc) or graduate (MSc) studies
- Highly preferably, EU citizen or international student registered at a Dutch university
- An aptitude and interest for practical laboratory experience and analytical work
- Fluent in English language (speaking, writing and communication skills)

4. How to apply

- Interested students are invited to send a motivation letter (max. 1 page) and a CV (max. 2 pages) to Emanuel Dinis (Emanuel.dinis@wetsus.nl). In the email, please indicate when and how long you are available.