# Operation of lab-scale Biological Oxygen Dosing Activated Carbon (BODAC) filters

**Field:** Environmental Technology

**Location:** Wetsus, European centre of excellence for sustainable water technology, Leeuwarden, The Netherlands

**Type of project:** Master Thesis or Internship

**Duration:** 5-9 months (preferably 9) starting in April 2022

**Allowance:** 175 €/month if no grant is obtained e.g. Erasmus/regional scholarships.

**Project description:** Biological oxygen dosing activated carbon (BODAC) filtration is an emerging technology for biofouling prevention, were activated carbon (AC) is used as immobilization medium for biofilm growth (Figure 1) and high quantities of pure oxygen are dosed. BODAC technology can combine two removal processes: adsorption of pollutants onto the pores of activated carbon and biological degradation[1]. However, the exact role of the operational parameters applied ($O_2$ dosing, backwash schedule, empty bed contact times, flows) in effective biofouling prevention are still unknown. In this project, we intent to assess how these operational parameters contribute to the effective biofouling prevention, by operate a lab-scale BODAC system (Figure 2). To do so, continuous operation of the lab-scale system will be carried out, varying oxygen concentration, pollutant concentration, flows, backwash schedule and empty bed contact time, and feed. The liquid phase (influent and effluent), gas phase and AC granules will be characterized several times during the continuous operation to evaluate the removal of fouling precursors.

Figure 1 – Full-scale BODAC filter at *Puurwater Fabriek*, Emmen, The Netherland[2].

Figure 2 – BODAC lab-scale system.

**Your Tasks:**

- Write experimental plan
- Operate the BODAC lab-scale system;
- Preform physical/chemical analyses;
- Analyze the data.

**Your Profile:**

- Background in chemical engineering, environmental technology, biotechnology, or related fields.
- Currently enrolled in a master program.
- Preferably, EU citizen or international student registered at a Dutch university or technical high school.
- Laboratorial experience is a plus.
- Good English communication skills (spoken + written).

**How to apply:** Interested students should send a motivation letter (max. 1 page) and CV (max. 2 pages) to Sara Ribeiro Pinela (sara.pinela@wetsus.nl)

[1] Gamal, M.E., Mousa, H.A., El-Nass, M.H., Zacharia, R., Judd, S., 2018. Bio-regenaration of activated carbon: A comprehensive review. *Sep. Purif. Technol.* 197:345-359

[2] Retrieved from: http://necokunststof.nl/projecten/item/18/puurwaterfabriek-emmen