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Master Thesis on Biomethanation

The Department of Civil and Environmental Engineering at Northwestern University invites both national and international students to apply for a master thesis on biomethanation.

Biomethanation, i.e., the microbial conversion of biogas (~65% CH₄, ~35% CO₂) to synthetic natural gas with a methane content >95%, allows biogas plants to act as energy storage facilities in times of surplus renewable electricity production. The upgraded gas can be directly injected into the existing natural gas grid or be used as a carbon-neutral vehicle fuel.

To aid Northwestern's efforts to advance biomethanation technology, the successful candidate will perform work on a lab-scale biomethanation reactor. Specific tasks include:

- Commissioning of an existing setup (including a test operation with water and inert gas, fine-tuning of pump operation, commissioning of mass flow meters and sensors)
- Start-up of the biomethanation reactor (i.e., inoculation with anaerobic biomass, establishment of a suitable feeding regime, build-up of a biofilm for hydrogenotrophic biomethanation)
- Establishment of baseline operation of the biomethanation reactor
- Analysis of biomethanation reactor performance via measurement of CH₄ content (%) and production rate ($\text{m}^3\text{CH}_4/(\text{m}^3_{\text{reactor volume}} \cdot \text{d})$) of the upgraded biogas

Requirements for a successful application include knowledge and interest in wastewater engineering, laboratory experience, very good written and spoken English skills, and completed course work. The candidate should be able to work independently in an international environment.

The anticipated starting date for the master thesis is August 2023, or as soon as a suitable candidate is identified thereafter. Applications will be reviewed as received with an interest in an early appointment. The duration of the master thesis is six months. Added costs due to the international appointment can be compensated for foreign students.

To apply, please email a cover letter describing your research interests, laboratory experience, field of study, a curriculum vitae, your transcript of records, and a letter of recommendation by one of your supervisors to George Wells (george.wells@northwestern.edu). Please send applications as a single pdf file.

Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes, including veterans and individuals with disabilities. Women and underrepresented minorities are encouraged to apply.