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**The Faculty of Computing, Engineering and the Built Environment (CEBE) is making major investments in growing the quality and volume of research across its two constituent Schools (Schools of Engineering and the Built Environment, and Computing and Digital Technology) through investments in academic staff and researchers, doctoral students and new labs, workshops and equipment.**

The [Water, Environment and Communities Research Centre](https://www.bcu.ac.uk/computing-engineering-and-the-built-environment/research/water-environment-and-communities) is located in the Faculty of Computing, Engineering and the Built Environment (CEBE) and based at our City Centre Campus. The Centre undertakes applied research on a range of contemporary themes relating to water and the environment reflecting the diversity and interdisciplinary nature of issues concerning the development of resilient communities. The Centre undertakes a portfolio of applied interdisciplinary research, knowledge exchange, education, community engagement and advice for decision makers and policy makers at all levels. The Centre’s work embraces and integrates local, national and international perspectives on water, focusing on environmental challenges towards sustaining resilient communities.

We have a range of PhD studentships now available across the range of disciplines represented in the centre. There are a limited number of funding opportunities available with some studentships including full scholarships while others having partial or self-funding options. Funding will be determined based on the strength of the candidate and quality of the proposal. Some of these projects also include support from our collaborating organisations.

**ESTABLISHING THE CORRELATION BETWEEN MIXING SPEED AND BIOGAS PRODUCTION IN ANAEROBIC DIGESTION**

**How to apply**

**The closing date for applications is 23.59 on Sunday 1 December 2019.**

To apply, please complete the [project proposal form](http://www.bcu.ac.uk/Download/Asset/1c822112-124b-e911-818d-005056831842) , **ensuring that you quote the project reference,** and then complete the [online application](https://www.bcu.ac.uk/courses/bsbe-research-degrees-phd-2018-19)  where you will be required to upload your proposal in place of a personal statement.

You will also be required to upload two references, at least one being an academic reference, and your qualification/s of entry (Bachelor/Masters certificate/s and transcript/s)

For international applicants, a valid English language qualification, such as International English Language Test System (Academic IELTS) or equivalent with an overall score of 6.5 with no band below 6.0, must be submitted with your application.

These studentships come with full fee waivers for both UK and international candidates. There will also be the opportunity for some paid teaching work of up to 180hrs per academic year. Exceptionally strong candidates may also be offered a bursary. Final funding arrangements will be determined based on the strength of the candidate and quality of the proposal. Some of these projects also include support from our collaborating organisations.

You can find further details on studying for a PhD and details of how to apply [here](https://www.bcu.ac.uk/courses/bsbe-research-degrees-phd-2018-19)

**Project title: ESTABLISHING THE CORRELATION BETWEEN MIXING SPEED AND BIOGAS PRODUCTION IN ANAEROBIC DIGESTION**

**REF: CEBE-BIOGAS**

**Contact:**

The successful candidate will be supported by an interdisciplinary research team, consisting of Dr Dominic Flynn, Dr Roshni Paul and Prof Lynsey Melville. For further information please contact the Director of Studies, Dominic Flynn, (Dominic.Flynn@bcu.ac.uk).

**Overview:**

Anaerobic digestion (AD) is a widely used renewable energy technique to obtain biogas from biomass such as sewage sludge and other feedstock. Biogas production from AD is incredibly complex and is affected by factors such as mixing speed, impeller type, temperature and feedstock, to name a few. Mixing in AD reactors, or digesters, ensures that the microbes come into contact with the biomass and thus promote methane production through enhanced degradation mechanisms.

Mixing speed affects the rate of biogas production, although some research has shown that higher speeds have inhibited methane production. Sindall et al (2013) demonstrated a correlation between mixing speed and methane production in a lab-scale sewage sludge experiment. However, above a certain mixing speed, the methane production appeared to rapidly decrease. The hypothesis for this decrease was that small-scale turbulence was destroying the microbes and thus inhibiting methane production. This project seeks to determine the influence of small-scale turbulence on biogas production in lab-scale ADs for a range of feedstock. Data will be obtained using a combination of lab-based experiments and computational fluid dynamics simulations.

**Person specification:**

Successful applicants will have graduated (or be due to graduate) with an undergraduate first class degree and/or MSc distinction in a relevant engineering subject. Applicants must also demonstrate knowledge of AD or CFD

**References:**

Sindall, R., Bridgeman, J. and Carliell-Marquet, C., 2013. Velocity gradient as a tool to characterise the link between mixing and biogas production in anaerobic waste digesters. Water Science and Technology, 67(12), pp.2800-2806

Terashima, M., Goel, R., Komatsu, K., Yasui, H., Takahashi, H., Li, Y.Y. and Noike, T., 2009. CFD simulation of mixing in anaerobic digesters. Bioresource technology, 100(7), pp.2228-2233.