**Post Specification**

| | |
|---|---|
| **Post Title:** | PhD Position 3: Development of Predictive Models for On-Site Wastewater Treatment Systems |
| **Post Status:** | Full-time. |
| **Research Group / Department / School:** | Civil, Structural and Environmental Engineering, School of Engineering, Trinity College Dublin, the University of Dublin |
| **Location:** | School of Engineering, Trinity College Dublin, the University of Dublin, College Green, Dublin 2, Ireland |
| **Reports to:** | Professor Muhammad Ali |
| **Terms & Conditions:** | annual stipend of €25,000 and a further €5,750 will be contributed to the annual fees for up to four years |
| **Hours of Work:** | 9 – 5pm, Mon - Fri |
| **Closing Date:** | 12 Noon (GMT), Monday, January 13, 2025 |

**NOTE: Applicants must have been resident in an EU member state for 3 out of the last 5 years to be eligible for EU fees**

**Post Summary**

The Department of Civil, Structural, and Environmental Engineering at Trinity College Dublin is seeking applications for three PhD studentships starting in March 2025. Each studentship will be dedicated to a specific work package within a cutting-edge project on sustainable wastewater treatment. Selected candidates will join an active, multidisciplinary research group led by Prof. Muhammad Ali, with expertise spanning environmental modeling, wastewater treatment, microbial ecology, and applied bioinformatics. This PhD position will focus on developing predictive models to forecast potential failures in on-site domestic wastewater treatment systems and provide early warnings. The successful candidate will employ advanced machine learning techniques integrated with microbial growth kinetics to improve predictive accuracy. By utilizing influent and effluent water quality data (e.g., BOD, COD, nutrient concentrations), the candidate will develop and validate models to identify potential system

failure issues. This role offers opportunities for high-impact publications in predictive modeling and environmental data science. The position will be supervised by Prof. Muhammad Ali, with co-supervision by Professors Kirk M. Soodhalter and Patrick Morrissey.

**Standard Duties and Responsibilities of the Post**

- Focus on creating predictive models for on-site domestic wastewater treatment system failures and early warning systems.
- Apply advanced machine learning algorithms combined with microbial growth kinetics modeling to enhance predictive accuracy.
- Develop and validate models using influent and effluent data (e.g., BOD, COD, nutrient concentrations).
- Document the modeling workflow, perform scenario analyses, and contribute to publications on predictive modeling for wastewater treatment systems.

**Funding Information**

This project is financially sponsored by Irish Environmental Protection Agency (EPA) and each PhD will get an annual stipend of €25,000 and a further €5,750 will be contributed to the annual fees for up to four years.

**Qualifications**

- MSc in Applied Mathematics, Theoretical Physics, Numerical Modeling, Computational Science, Environmental Modeling, Data Science, Machine Learning, or a related field.
- Strong skills in data analysis, predictive modeling, and programming (e.g., Python, R).
- Experience with machine learning applications in environmental contexts is preferred.
- Ability to work effectively within a multidisciplinary team.

**Skills & Competencies**

- Strong analytical and communication skills (written and oral English).
- Ability to work both independently and as part of a team.
- Capacity to supervise graduate students, prepare high-impact manuscripts, and present findings at national and international conferences.

**Application Procedure**

Interested candidates are invited to complete the application form available at this link https://forms.office.com/e/dD2nv35Gac. Additional documents or information may be requested as needed. The deadline for submission is **Monday, January 13, 2025**. Only shortlisted candidates will be contacted for an interview.

If you have any questions regarding these positions, please contact Professor Muhammad Ali at **Muhammad.Ali@tcd.ie** and include the relevant PhD position title in the subject line.

**Further Information for Applicants**

| | |
|---|---|
| URL Link to Advertisement | www.tcd.ie/engineering |
| URL Link to Human Resources | https://www.tcd.ie/hr/ |