

## SFI funded PhD Postgraduate Researcher position

University College Cork, Ireland  
Department of Physics, School of Chemistry & Environmental Research Institute  
College of Science, Engineering and Food Science

### **Topic: A compact cavity-enhanced nitrogen oxide detector for mobile platforms**

Supervisors/Principal Investigator: Prof. Andy Ruth

#### **PhD Overview**

It is a general scientific challenge to measure and characterize the *spatial distribution* of low concentration atmospheric trace radicals in order to develop boundary layer schemes and distribution mechanisms for state-of-the-art chemical transport and chemistry–climate models. The reason for the limited field information is the lack of portable, highly sensitive detection technology. In the PhD project currently available in the Physics Department /Environmental Research Institute of UCC we are seeking to address this gap through the innovative development of a compact (high TRL) detection instrument for nitrogen oxides, based on cavity-enhanced absorption spectroscopy, that enables its employment on mobile platforms. Among different possible experimental implementations the key challenges will be to minimize the size, weight, and power consumption of the instrument, while optimizing its sensitivity, reliability, robustness and control. This includes the establishment of robust calibration, validation and zeroing procedures and generating an adaptability for different utilization platforms. The instrument is to be utilized in field campaigns in collaboration with our partners at the *Chemical Science Division of the Earth System Research Laboratory* (NOAA), Boulder (CO), USA.

The PhD fellowship is funded through Science Foundation Ireland for a maximum of 4 years.

#### **Expected Skill Set**

We are seeking a strongly motivated, enthusiastic person with a high level of initiative, capable of working independently and within a team. The candidate should have fluent English and excellent communication, organization, planning and interpersonal skills with a strong innovative spirit.

The successful applicant should have a strong interest in and talent for experimental engineering of instruments for atmospheric applications. Ideally, the candidate should have outstanding experimental, engineering and IT skills (e.g. CAD), as well as experience in optics. Know-how in interfacing, electrics and electronics, as well as in experimental data retrieval is very desirable.

#### **Key Duties and Responsibilities**

- The PhD candidate will conduct a specified programme of research under the supervision of Prof. Andy Ruth.
- Contribute to the design, construction and operation of a new compact spectroscopy set-ups for mobile platforms including UAVs.
- Conduct experiments and tests as required by the research programme.
- Analyse, visualise and report data in model-useable formats.
- Use results to improve knowledge on the spatial distribution and transport of nitrogen oxide in the lower troposphere.
- Work with other researchers in the Physics Department, project collaborators, and research visitors.

#### **Qualifications and Experience**

- Minimum 2:1 undergraduate degree (or equivalent) in physics, engineering, chemistry or a similar discipline.
- Appropriate technical competence and accomplishment, including the use of programming, interfacing and analytical tools for data analysis and data visualisation.
- Basic understanding of spectroscopy, gases and aerosols.
- Some knowledge of atmospheric processes (pollutants, main sources, basic meteorological processes).
- Enthusiasm and an awareness of atmospheric science and air quality issues in society.
- A commitment to gaining practical experience working on a research project.
- Applicants whose first language is not English must show evidence of English proficiency, please check the minimum requirements at: <https://www.ucc.ie/en/study/comparison/english/>

#### **Diversity**

To help address gender under-representation in science, applications from female applicants are strongly encouraged, as are those from international students and other under-represented groups. This reflects UCC's commitment to providing a diverse and open environment for students and staff.

For informal enquiries on the position candidates should contact: Prof Andy Ruth, [a.ruth@ucc.ie](mailto:a.ruth@ucc.ie) , +353-21-4902057

**Funding details:** €18,000 stipend per annum. EU tuition fees will be covered (for non-EU applicants additional fees may be incurred).

**Duration:** 48 Months

**Start Date:** 1 Oct 2022

**To Apply**

Please send:

1. Short cover letter describing your motivation for applying for the position and how your experience and expertise match the research topic.
2. CV, including lists of relevant courses taken, research/industry projects performed, relevant experience and any publications.
3. Contact details of two academic references.

to Prof A. Ruth, [a.ruth@ucc.ie](mailto:a.ruth@ucc.ie), quoting “**CEAS PhD**” in the subject line of your email..

Supplementary Information on the Department/Research Centre is available at the following URL:

<http://www.physics.ucc.ie/> <https://www.ucc.ie/en/chemistry/> <https://www.ucc.ie/en/crac/>