Indian Institute of Technology Gandhinagar

Advertisement for Postdoctoral Fellow in the discipline of Electrical Engineering

IIT Gandhinagar invites applications for the position of **Postdoctoral Fellow** in a research project sponsored by the **Royal Academy of Engineering, UK**.

Project title:
Novel laser-based monitoring of key environmental parameters – addressing well-being, livelihood and a healthier environment in developing regions of India

Principal Investigator:
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Project description:
The Photonic Sensors Lab at IITGN (www.photonicsensorslab.com) focusses on mid-infrared quantum cascade laser-based spectroscopic gas sensing for industrial and biomedical applications. We currently use powerful modern techniques of tunable diode laser absorption spectroscopy (TDLAS) and photoacoustic absorption spectroscopy (PAS). We are also keen to diversify into cavity ring-down spectroscopy (CRDS) and cavity enhanced absorption spectroscopy (CEAS) techniques. A high-sensitivity gas sensing system is currently under development to detect hazardous gases in the atmosphere. This activity is part of a research project sponsored by the Royal Academy of Engineering, UK. The objective is to develop a system that can measure the mole fraction of various oxides of nitrogen (NOx), carbon dioxide and carbon monoxide for real-time ambient air quality monitoring. TDLAS is ideally suited for this purpose because the measurements are absolute in nature (no calibration required), high-sensitivity (low ppm to ppb), in situ, non-invasive concentration measurements of the four gases can be made simultaneously with very low cross-sensitivity. The project will use recently developed calibration-free first harmonic (1f) and second harmonic (2f) wavelength modulation spectroscopy (WMS) algorithms that we have developed in our lab. The selected candidate will work with other lab members specifically on the full-scale development of a robust sensor system that will then be taken to various parts of Gujarat for in situ measurements. This will involve implementing WMS techniques on the laser, setting up a robust opto-mechanical system to make the system field-deployable, executing extensive laboratory tests of the system to establish the detection limit, and finally taking the system out of the lab for field measurements.

The candidate would also be encouraged to initiate alternative strategies such as CRDS and CEAS techniques. The candidate would also be encouraged to explore the field of dual-comb spectroscopy.

The candidate will also participate in writing periodic reports to document the progress of the project. The candidate must be energetic and organized.

Required background/skills:
The successful candidate will work in an inter-disciplinary environment in the Photonic Sensors Lab at IITGN (www.photonicsensorslab.com). The work will be at the intersection of photonics and electronics. The following skill set is required –

a) Experience in optical gas sensing using tunable diode laser absorption spectroscopy (TDLAS), photoacoustic absorption spectroscopy (PAS), cavity ring-down spectroscopy (CRDS), cavity enhanced absorption spectroscopy (CEAS) would be a distinct advantage.
b) Proficiency in experimental work involving lasers, photodetectors, and various optical and photonic equipment.
c) Experience in using optical simulation tools such as COMSOL and Lumerical
d) Reasonable proficiency in programming using Python / MATLAB/ LabVIEW.
e) High levels of proficiency in oral and written communication in English is necessary.
f) The ability to work harmoniously with team members at various levels and the willingness to mentor students.

Eligibility Criteria:
The selected candidate would be expected to have obtained a PhD degree in Physics, Applied Optics, Photonics, Engineering Physics, Electronics Engineering/ Electronics and Communications Engineering/ Instrumentation / Electrical Engineering from a recognized academic institute in India. Applicants who have submitted their PhD thesis may also apply.

Compensation:
The selected candidate could expect to receive a salary of Rs 50,000 – Rs 65,000 depending on the proficiency level.

Duration of appointment:
The appointment will initially be for **10 months** with the possibility of renewal depending on the performance and the extension of the project duration.

How to apply:
Please email your application as a **single zipped file** named as **<your last name>_raeng_postdoc_iitgn.zip** to arup@iitgn.ac.in. **The subject line of the email should be "RAENG-POSTDOC-IITGN".** The application **must** contain-

(i) Curriculum vitae highlighting your expertise and experience
(ii) a one-page statement of purpose outlining why you consider yourself suitable for this position and including the skills and details of projects you have executed that are relevant to this opening.
(iii) List of referees who can comment on your skills and their contact details

Candidates shortlisted for the interview would be required to submit the hardcopies of relevant academic documents if they are selected. Incomplete application forms i.e. resumes only without the application form and applications without statement of purpose will be rejected.

Deadline: The last date for application is **25 May 2022**.

Prospective candidates may contact Prof Arup Lal Chakraborty by email (arup@iitgn.ac.in) for clarifications in this regard.